

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: May 24, 2001 3:22:47 PM PDT
To: "John Barry Smith" <Barry@corazon.com>
Cc: "Delorme, Paulette" <Paulette.Delorme@tsb.gc.ca>
Subject: **Air India Flt. 182**

Dear Mr. Smith:

Thank you for your e-mail messages of 2 May and 8 May (sent to Ms. P. Delorme, Office of the Executive Director) concerning the crash of Air India Flight 182 that occurred on 23 June 1985.

First, I must respond that the Transportation Safety Board of Canada (TSB-C) has no mandate to re-open the aviation safety investigation of the AI Flt.182 occurrence. As you may be aware, the TSB-C was not established until 1990, and the Aviation Occurrence Report you referred to was prepared by the Canadian Aviation Safety Board, the predecessor to the TSB-C. More importantly, in accordance with ICAO Annex 13, the investigation of that accident was led by the Government of India; the CASB report was prepared as input to India's investigation.

That said, we certainly have more than a passing interest in the circumstances of the AI Flt. 182 tragedy. We are interested because of the very nature of our chosen careers. We are interested because

quite a few

TSB staff were working for the CASB at the time (myself included), and many of that group were involved in the AI Flt.182 investigation.

Above all, we are interested because of the enormity of the tragedy, the links to Canada

and the fact that there has not yet been closure on this matter - almost 16

years after the event. As you are aware, the RCMP have been conducting a criminal investigation into the circumstances of the crash ever since 1985.

In accordance with Canadian law, both the CASB and the TSB-C have provided

the RCMP with copies of material from our file - excluding, of course, any

information that is privileged under our Act. The information provided

includes material that was produced by John Garstang.

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart

Blachford of the RCMP in Vancouver. The RCMP have as strong an interest as

anyone in establishing what happened to AI Flight 182. I have also

forwarded your report to the Director of Air Investigations, the Investigator-in-Charge of our SWR Flight 111 investigation, and the Director

of Engineering for their information.

With respect to the brief message in your second e-mail (of 8

May), there is one point that I must clarify in reply. It is correct that the CASB investigators' report never said it was a bomb that caused the explosion; however, the report also never said that it wasn't a bomb. In fact, to my knowledge, there was nobody on the CASB team who didn't consider a bomb to be the most likely explanation. However, the aviation safety investigation conclusion on that point was, appropriately, left to the Kirpal Commission in India.

Thank you again for your messages.

W.T. (Bill) Tucker
Director General,
Investigation Operations

-----Original Message-----

From: John Barry Smith Eudora
[SMTP:Barry@corazon.com]
Sent: Wednesday, May 02, 2001 11:37 PM
To: paulette.delorme@tsb.gc.ca
Subject: Air India Flight 182 Probable Cause

Transportation Safety Board of Canada

Dear Fellow aircraft accident investigators, 2 May 01

I am an independent investigator concentrating specifically

on early
model Boeing 747s that suffer inadvertent decompressions in
flight. After
years of research and analysis, my conclusion is that four fatal
Boeing 747
accidents were caused by faulty poly-x wiring shorting on the
forward cargo
door unlatch motor leading to the rupture of one or both of the
midspan
latches leading to explosive decompression which resulted in
amidships
breakup for three of the aircraft and a large hole on the right side
just
forward of the wing on the remaining aircraft. I refer to Air India
Flight
182, Pan Am 103, United Airlines Flight 811, and Trans World
Airlines Flight
800. UAL 811 is the aircraft that did not come totally apart and
landed with
its incontrovertible evidence that matches up with the other three
in so
many significant ways as to imply they all had the same probable
cause for
the initial event.

Regarding Air India Flight 182, an accident in which
Canadian public
safety organizations are intimately involved, I have written a
report
supporting my findings and have quoted extensively from the
Canadian
Aviation Occurrence Report of 1986 of the Canadian Aviation
Safety Bureau.

Please note that the Canadian aviation accident investigators never said it was a bomb that caused the agreed upon explosion in the forward cargo compartment of AI 182. The Canadian aviation accident investigators were absolutely correct in their conclusions of 1986 and only by subsequent similar accidents is the cause of that unexplained explosion now clear.

I am sending by Word file my Smith AAR for AI 182 for your evaluation. Should you find the wiring/cargo door/explosive decompression explanation a plausible, reasonable, alternative explanation with precedent for the destruction of AI 182, then the issue of a clear and present danger to the Canadian flying public becomes apparent as the cargo door wiring in early model Boeing 747s has not been inspected for the tell tale cracking that the polyimide insulation shows before shorting.

I invite your queries to me for further details by phone or email. Regardless, a supplemental AAR for AI 182 is probably warranted since TSB has never actually given its official opinion regarding one the most celebrated of all tragic Canadian aviation accidents, equal to the

Arrow

Gander crash and Swiss Air 111.

Swiss Air 111 showed the vulnerability of widebody airliners to the faulty Kapton type wiring insulation which I conclude is the probable cause for Air India Flight 182. The 1972 DC-10 event over Windsor, Ontario, when a cargo door inadvertently opened, presaged the Paris Turkish Airlines DC-10 cargo door accident. Therefore, when I say that faulty wiring is causing cargo doors to inadvertently rupture open in wide body airliners, I believe you will say it's possible but did it happen for AI 182 and ask for the evidence. That evidence is presented in my report.

Very Respectfully,

John Barry Smith
Independent Aircraft Accident Investigator
barry@corazon.com
www.corazon. <<http://www.corazon.com/>>
com <<http://www.corazon.com/>>831 659 3552
551 Country Club Drive,
Carmel Valley, CA USA 93924

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Tuesday, May 08, 2001 2:00 PM

To: Trans Safety Board Canada
Subject: Mounties now say 'bomb' in aft of Air India Flight
182

Yes, the Mounties are saying the 'bomb' was in the Aft
compartment
of Air India Flight 182 and want to put three guys in jail for life
for
putting it there.

Ha!

Can you do something about this nonsense?

Cheers,

John Barry Smith

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To: "'John Barry Smith'" <Barry@corazon.com>
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conducting a criminal investigation into the circumstances of the crash ever since 1985.

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Cheers,

John Barry Smith

From: John Barry Smith <barry@corazon.com>

Date: May 26, 2001 11:32:55 AM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Smith AAR Appendices A, B, C, D, E

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as PDF files are appendices A, B, C, D, E to the Smith AAR on AI 182.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: May 26, 2001 11:33:35 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Smith AAR Appendix I**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as a PDF file is appendix I to the Smith AAR on AI 182.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: May 26, 2001 11:37:08 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Smith AAR Appendices F, G, H, J,**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as PDF files are appendices F, G, H, J, to the Smith
AAR on AI 182.

Sincerely,
Barry
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: May 26, 2001 11:37:31 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Official AI 182 Reports in PDF

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as PDF file is the CASB and Kirpal Inquiry reports.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: May 26, 2001 11:38:29 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **UAL 811 NTSB AAR in PDF**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as a PDF file is the NTSB AAR 92/02 for United Airlines Flight 811.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
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barry@corazon.com

From: John Barry Smith <barry@corazon.com>

Date: May 30, 2001 7:15:55 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: PDF of Smith AAR for AI 182

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 30 May 01

Attached is the Smith AAR for AI 182 dated 1 May 01 in PDF and supercedes the earlier Word file which had formatting problems. PDF allows the color photographs to be where they should and keeps the indents in proper order.

Sincerely,
Barry
John Barry Smith
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551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: May 30, 2001 7:16:58 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Sgt Blachford contacted me

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 30 May 01

Sgt Blachford wrote me a letter received today. He confirms he has received my Smith AAR from you, will 'review and digest the contents of this report', will not be available for a meeting with me until mid August, and will be in touch with me in the 'near future'.

My reply to him below.

I have created my original Word file Smith AAR into a PDF file which incorporated the Garstang report of 16 March 01 and an additional appendix which included the Bruntingthorpe event. I trust this is the one you sent to RCMP and your staff.

Anyway, I will send the PDF of my updated report via separate email and will send by snail mail a hard copy of the updated AAR and the appendices to the Head Office in Hull, Quebec, Place de Centre, 4th floor, 200 Promenade du Portage, K1A 1K8, address. If you are located elsewhere, please inform me and I'll send it there.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Dear Sergeant Blachford,
May 2001

30

Thank you for your letter of 24 May 2001, file number 85-3196, to which I reply:

I'm glad that Mr. Tucker of TSB has forwarded my Smith AAR for AI 182 to you. That means that technical aircraft questions can be answered by TSB or me. I shall send the attachments/appendices to you by snail mail to the Heather Street address as well as a hard copy of the actual AAR.

I ask that you take note of Appendix J which is about the Bruntingthorpe bombing of a Boeing 747. Note the photograph that shows a real bomb going off in a real Boeing 747 leaving real evidence. Then note the photograph in my AAR of UAL 811 and the huge hole on the starboard side of the nose which occurs when a real electrical problem causes a real large door to inadvertently open in flight on a real Boeing 747 leaving much real evidence.

Then compare AI 182 to both of those real, incontrovertible and indisputably explained events and you will clearly see that the real bombing evidence of Bruntingthorpe is absent in AI 182 and the real explosive decompression evidence from the ruptured

open cargo door of UAL 811 is present in AI 182.

There are actually thousands of pages of accident reports and public docket information on hard copy, electronic memory, and CDs that are relevant to AI 182 and are on file here with me. All four accidents are controversial and have generated much official investigation and reports. I do not refer much to media speculation and rely on official reports for support of my claims.

I appreciate your intent to fully study the Smith AAR as it is dense and full of facts and documentation. At any time please call for any clarifications via email or telephone.

Mid August is fine for a meeting or sooner at your convenience and I have to add the situation is urgent from a public safety point of view.

I look forward to our meeting in the future. If I call you Sergeant, you might call me Major as I was in the Army or I can call you Bart and you can call me Barry.

Cheers,

Barry

John Barry Smith
(831) 659-3552 phone
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From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: June 20, 2001 6:20:48 PM PDT
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Swiss Air 111 changes

Dear Mr. Smith,

This is in reply to your series of e-mails, and to clarify the TSB position in case there is a misunderstanding. I'm sorry I have not been able to reply sooner. I shall be away for the next two work days and I had a reply to you on my "must do" list before leaving tonight.

The TSB is not presently doing further investigation of the Air India 182 accident, nor is it planning to do so. We have limited resources and a backlog of investigation work-in-process; we do not believe that cargo door or wiring problems were involved in that occurrence; and we are confident that the RCMP are doing a thorough and unbiased investigation. Therefore, we do not believe we would be justified in diverting our resources to that occurrence.

That said, I am not suggesting that your concerns and your analysis are all invalid. In fact, I find that you have raised some interesting points that have potential use for us in our work. To that end, I am

personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

From one of your e-mails, I now also understand the reason for your strong interest in advancing aviation safety, and I respect you for that.

If you wish to continue sending material to me, I shall continue to process it, as outlined above, to the best of my ability. However, I cannot promise immediate processing and I cannot engage in direct and detailed dialog on all the material you send me; I simply have too much other work to do.

Right now I have over 150 e-mails in my in-box to read and action; there will be well over 200 when I return next week. I am not complaining, I simply want you to understand my position with respect to your inputs.

Sincerely,

Bill Tucker.

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Monday, June 18, 2001 11:59 AM

To: Tucker, Bill

Subject: Swiss Air 111 changes

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 18 June 01

Below shows the impact of a conscientious effort by investigators to find out what happened in an accident and the good faith efforts of an airline to prevent it from happening again. Good work by TSB and Swiss Air. Not good by reluctance of Boeing to implement the changes for all.

Note the cameras in the cargo holds; that is very good.

I look forward to the opinion of Mr. Vic Gerden to my Smith AAR for Air India Flight 182. I also have concluded wiring is causing problems that were not apparent.

Sincerely,
Barry

John Barry Smith

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Sunday newspaper, 6-17-2001

Swissair optimizes MD-11-Cockpits with modifications to their electrical system - as a direct consequence of their Flight 111 Crash cause deliberations.

FROM TIM VAN BEVEREN ZURICH

Two and a half years later, the consequences of the crash of SR Flight 111 near Halifax N.S. have continued to affect Swissair. Their remaining 19 MD-11 airliners are being radically converted in modifications to the electrical system in the cockpit area. For over one million Swiss Francs per jet: " ...primarily it's the electrical system that is to be significantly improved " according to Swissair documents made available to Sundays newspaper. There in Zurich the crash cause for the 111 and its 229 passengers is being assumed, despite the Canadian TSB Report being anticipated for public release not before the beginning of 2002. Already many family members of Flight 111 victims have been "paid

out". So now
Swissair no longer wants to wait for the outcome of the final
report of
the Canadian accident investigation before implementing the
safety fixes
that it has identified. "Safety remains our highest priority "
claims
Swissair speaker Urs Peter Naef regarding the planned changes. "
Cost-saving measures never conflict with the required
expenditures on
flight safety, which underlie our "mode plus" modification
program
initiative."

In Canada Investigators of the Transportation Safety board (TSB)
express
themselves reservedly over the planned SR procedure.
Investigation leader
Vic Gerden: "Swissair's efforts to reduce potential safety
deficiencies
are well-known to us." As a crash cause, it is so far certain only
that an
electrical fire in the wiring-bundles was crucially responsible.
Because
of the fire, important systems in the cockpit failed in quick
succession,
without which captain Urs Zimmerman and Copilot Stephan
Loew could no
longer control their machine.

In a few days the technical modifications will begin and they will
naturally concentrate on the known SR111 trouble areas: -
significant

critical wire-bundles are to be separated out and fed, via a routing with greater electrical integrity and individual isolation, into the cockpit.

In SR111 these wiring harnesses ran through a single focal point described

as a critical node. It was specifically within this area in the ceiling

(just forward and aft of the cockpit/cabin bulkhead) that the fire had

devastatingly raged. It affected not only the emergency power systems but

the "last-ditch" power feeder lines to the batteries as well. Now that

these systems are to be split and segregated for greatest integrity, important protections will again be in place - for example the one that

controls the emergency power turbine (or ADG - air driven generator). This

propeller can be unfolded from a compartment in the fuselage in an

emergency and in the airflow produces current - like a hydroelectric

direct current generator. In SR111 the Canadian investigators found that

this critical emergency power turbine had given out no energy.

Despite the

crisis, its control functions had failed to deploy it - probably because,

by that time, the associated wiring had been consumed by the fire. Video

cameras and smoke detectors are also being installed by this "unique to

Swissair" modification program. CCTV Video cameras are being installed everywhere: in the cargo-holds, in the electronics bay under the cockpit floor - as well as behind the cabin linings. allowing the pilots a never before possible view into potential fire zones. The pictures will come up on a small 14-centimeter monitor in the cockpit. In addition more smoke detectors are being strategically positioned. The objective is that crews would no longer be condemned to helpless seated inactivity in the case of fire. Fire extinguishing agents behind the cabin linings can squirt upon any detected fire.

All Swissair aircraft are to receive a new wholly integral emergency flight attitude instrument. It is to be operable from two separate power sources and will function reliably even if all other systems have broken down (as was the case with SR111 in its last few minutes of flight). Altogether the cockpit changes are to cost 20 to 23 million Swiss Francs according to calculations of a Swiss Aviation Expert. The extensive modifications are the result of ongoing Swissair internal investigations into the accident's most likely course of events.

Shortly after the crash on 3 September 1998 a Taskforce under the leadership of retired Swissair Technical Chief Willy Schurter began its work, paralleling that being done by the official Canadian TSB Team. They sought to track down all possible causes of the disaster. The SR MD-11 Electrical Rework is in addition to other earlier measures (such as changes in checklists and procedures) - but is seen as the most important outcome of these investigations. Although latterly consulting and then in close co-operation with the US manufacturing firm Boeing, Swissair engineers unilaterally sought to analyse all factors of the accident themselves - in order to identify any deficiencies in the original type-certificated design. In a further internal document Swissair explains: "We knew that it needed three prerequisites for the initiation and propagation of a fire: a potential ignition source (e.g. arcing wires), fuel (e.g. thermal/acoustic blankets) and oxygen (i.e. air-conditioning system ventilation or crew oxygen system lines)". As a consequence of its insights another risk-factors conclusion of the SR Halifax Taskforce presents a frightening new dimension to SR111: "We have clearly concluded that such contributing factors exist in each type of aircraft and that it is not simply a case of being type-specific to

the MD-11." These were conclusions also reached by the TSB and sent to the certifying authority (the US FAA). To date the only ramifications of SR111 reaching beyond the MD-11 are the new emergency rules retroactively affecting the STC's (Supplemental Type Certification) of Inflight Entertainment Systems on just about every type of airliner in service today.

Nevertheless, neither manufacturers Boeing nor the American FAA supervisory authority want to even recommend (let alone mandate) the new Swissair safety precautions for all remaining MD-11's. If this was to be done, such a program could then logically expand to include most other types of airline aircraft exhibiting the identical type-certification deficiencies. The first Swissair machine should be converted and ready for return to service at the end of June 2001. Before the SR MD-11 Fleet is permitted to carry passengers following the incorporation of these system safety adjustments, it must pass a strict test flight program in Zurich. Preliminary re-certification assessments would normally be monitored by representatives of the FAA (the American airworthiness regulatory

authority). However these were carried out in the spring of 1999 so that these changes could proceed without delay to SR Flight Services. But because manufacturer Boeing withheld its agreement to these changes for a long time, there have been extensive delays in their implementation. Boeing sees much of the program as "enhancements" and not necessarily as required safety modifications. These new Swissair safety initiatives have now become even more expensive: Three SR MD-11's have only just completed their heavy maintenance checks. But now they must return to the hangar yet again for extensive rework. But it's not necessarily a case of spending a dollar to save a penny. Once you look at the cost of SR111 and its potential for costing the airline industry as a whole, it may well have been the other way round.

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This is in reply to your series of e-mails, and to clarify the TSB position in case there is a misunderstanding. I'm sorry I have not been able to reply sooner. I shall be away for the next two work days and I had a reply to you on my "must do" list before leaving tonight.

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That said, I am not suggesting that your concerns and your analysis are all invalid. In fact, I find that you have raised some interesting points that have potential use for us in our work. To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies

to Sgt.

Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

From one of your e-mails, I now also understand the reason for your strong interest in advancing aviation safety, and I respect you for that.

If you wish to continue sending material to me, I shall continue to process it, as outlined above, to the best of my ability. However, I cannot promise immediate processing and I cannot engage in direct and detailed dialog on all the material you send me; I simply have too much other work to do.

Right now I have over 150 e-mails in my in-box to read and action; there will be well over 200 when I return next week. I am not complaining, I simply want you to understand my position with respect to your inputs.

Sincerely,

Bill Tucker.

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Monday, June 18, 2001 11:59 AM

To: Tucker, Bill

Subject: Swiss Air 111 changes

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 18 June 01

Below shows the impact of a conscientious effort by investigators to find out what happened in an accident and the good faith efforts of an airline to prevent it from happening again. Good work by TSB and Swiss Air. Not good by reluctance of Boeing to implement the changes for all.

Note the cameras in the cargo holds; that is very good.

I look forward to the opinion of Mr. Vic Gerden to my Smith AAR for Air India Flight 182. I also have concluded wiring is causing problems that were not apparent.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sunday newspaper, 6-17-2001

Swissair optimizes MD-11-Cockpits with modifications to their electrical system - as a direct consequence of their Flight 111 Crash cause deliberations.

FROM TIM VAN BEVEREN ZURICH

Two and a half years later, the consequences of the crash of SR Flight 111 near Halifax N.S. have continued to affect Swissair. Their remaining 19 MD-11 airliners are being radically converted in modifications to the electrical system in the cockpit area. For over one million Swiss Francs per jet: " ...primarily it's the electrical system that is to be significantly improved " according to Swissair documents made available to Sundays newspaper. There in Zurich the crash cause for the 111 and its 229 passengers is being assumed, despite the Canadian TSB Report being anticipated for public release not before the beginning of 2002. Already many family members of Flight 111 victims have been "paid out". So now Swissair no longer wants to wait for the outcome of the final report of the Canadian accident investigation before implementing the safety fixes that it has identified. "Safety remains our highest priority "

claims

Swissair speaker Urs Peter Naef regarding the planned changes. " Cost-saving measures never conflict with the required expenditures on flight safety, which underlie our "mode plus" modification program initiative."

In Canada Investigators of the Transportation Safety board (TSB) express

themselves reservedly over the planned SR procedure.

Investigation leader

Vic Gerden: "Swissair's efforts to reduce potential safety deficiencies

are well-known to us." As a crash cause, it is so far certain only that an

electrical fire in the wiring-bundles was crucially responsible.

Because

of the fire, important systems in the cockpit failed in quick succession,

without which captain Urs Zimmerman and Copilot Stephan Loew could no

longer control their machine.

In a few days the technical modifications will begin and they will naturally concentrate on the known SR111 trouble areas: -

significant

critical wire-bundles are to be separated out and fed, via a routing with

greater electrical integrity and individual isolation, into the cockpit.

In SR111 these wiring harnesses ran through a single focal point described

as a critical node. It was specifically within this area in the ceiling (just forward and aft of the cockpit/cabin bulkhead) that the fire had devastatingly raged. It affected not only the emergency power systems but the "last-ditch" power feeder lines to the batteries as well. Now that these systems are to be split and segregated for greatest integrity, important protections will again be in place - for example the one that controls the emergency power turbine (or ADG - air driven generator). This propeller can be unfolded from a compartment in the fuselage in an emergency and in the airflow produces current - like a hydroelectric direct current generator. In SR111 the Canadian investigators found that this critical emergency power turbine had given out no energy. Despite the crisis, its control functions had failed to deploy it - probably because, by that time, the associated wiring had been consumed by the fire. Video cameras and smoke detectors are also being installed by this "unique to Swissair" modification program. CCTV Video cameras are being installed everywhere: in the cargo-holds, in the electronics bay under the cockpit floor - as well as behind the cabin linings. allowing the pilots a never

before possible view into potential fire zones. The pictures will come up on a small 14-centimeter monitor in the cockpit. In addition more smoke detectors are being strategically positioned. The objective is that crews would no longer be condemned to helpless seated inactivity in the case of fire. Fire extinguishing agents behind the cabin linings can squirt upon any detected fire.

All Swissair aircraft are to receive a new wholly integral emergency flight attitude instrument. It is to be operable from two separate power sources and will function reliably even if all other systems have broken down (as was the case with SR111 in its last few minutes of flight). Altogether the cockpit changes are to cost 20 to 23 million Swiss Francs according to calculations of a Swiss Aviation Expert. The extensive modifications are the result of ongoing Swissair internal investigations into the accident's most likely course of events.

Shortly after the crash on 3 September 1998 a Taskforce under the leadership of retired Swissair Technical Chief Willy Schurter began its work, paralleling that being done by the official Canadian TSB

Team. They sought to track down all possible causes of the disaster. The SR MD-11 Electrical Rework is in addition to other earlier measures (such as changes in checklists and procedures) - but is seen as the most important outcome of these investigations. Although latterly consulting and then in close co-operation with the US manufacturing firm Boeing, Swissair engineers unilaterally sought to analyse all factors of the accident themselves - in order to identify any deficiencies in the original type-certificated design. In a further internal document Swissair explains: "We knew that it needed three prerequisites for the initiation and propagation of a fire: a potential ignition source (e.g. arcing wires), fuel (e.g. thermal/acoustic blankets) and oxygen (i.e. air-conditioning system ventilation or crew oxygen system lines)". As a consequence of its insights another risk-factors conclusion of the SR Halifax Taskforce presents a frightening new dimension to SR111: "We have clearly concluded that such contributing factors exist in each type of aircraft and that it is not simply a case of being type-specific to the MD-11." These were conclusions also reached by the TSB and sent to the certifying authority (the US FAA). To date the only ramifications of SR111 reaching beyond the MD-11 are the new emergency rules

retroactively affecting the STC's (Supplemental Type Certification) of Inflight Entertainment Systems on just about every type of airliner in service today.

Nevertheless, neither manufacturers Boeing nor the American FAA supervisory authority want to even recommend (let alone mandate) the new Swissair safety precautions for all remaining MD-11's. If this was to be done, such a program could then logically expand to include most other types of airline aircraft exhibiting the identical type-certification deficiencies. The first Swissair machine should be converted and ready for return to service at the end of June 2001. Before the SR MD-11 Fleet is permitted to carry passengers following the incorporation of these system safety adjustments, it must pass a strict test flight program in Zurich. Preliminary re-certification assessments would normally be monitored by representatives of the FAA (the American airworthiness regulatory authority). However these were carried out in the spring of 1999 so that these changes could proceed without delay to SR Flight Services. But because manufacturer Boeing withheld its agreement to these changes for a

long time, there have been extensive delays in their implementation. Boeing sees much of the program as "enhancements" and not necessarily as required safety modifications. These new Swissair safety initiatives have now become even more expensive: Three SR MD-11's have only just completed their heavy maintenance checks. But now they must return to the hangar yet again for extensive rework. But it's not necessarily a case of spending a dollar to save a penny. Once you look at the cost of SR111 and its potential for costing the airline industry as a whole, it may well have been the other way round.

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: June 25, 2001 11:05:37 AM PDT
To: "'John Barry Smith'" <barry@corazon.com>
Subject: **RE: Sudden loud sound on CVR**

Dear Mr. Smith,

Your reponse below prompts a further reply from me. I appreciated the understanding demonstrated in your e-mail. I do have an open mind (or at least I hope and try to), and I will strive to retain it long after I retire

from the TSB.

I am now up to date with your correspondence, except for one left to read that you sent me on 23 June. I have targetted specific elements to specific people (e.g, the Appendix on Wiring to our SWR 111 IIC (Yes, that's Vic Gerden) as well as to Dir of Inv. - Air). I shall forward this to all of them so they can note your addresses and your receptiveness to any follow-up queries they may have

Bill Tucker..

P.S. In one of the things I read, you indicated that John Garstang had been seconded to the RCMP for over a decade. That is not so; John G was loaned or seconded to the RCMP on several occasions (maybe 3 or 4) for short terms of about 1-2 months - most recently this spring. Otherwise, he has continued working as a valued employee in our Engineering Branch.

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Wednesday, June 20, 2001 9:43 PM
To: Tucker, Bill
Subject: Sudden loud sound on CVR

Dear Mr. Tucker, 20 June 01

Well, longest daylight of the year tonight, that's good.

The TSB is not presently doing further investigation of the Air India 182 accident, nor is it planning to do so. We have limited resources and a backlog of investigation work-in-process; we do not believe that cargo door or wiring problems were involved in that occurrence; and we are confident that the RCMP are doing a thorough and unbiased investigation. Therefore, we do not believe we would be justified in diverting our resources to that occurrence.

I understand the way things are now, and of course, subject to change. There is that pesky trial coming up and the RCMP is saying bomb in aft cargo compartment and the CASB and Kirpal stated explosion in forward cargo compartment, not a trifling conflict. Just where was that bomb?

I find that you have raised some interesting points that have potential use for us in our work.

Thanks. UAL 811 is a big point.

To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

Thanks. More eyeballs (or ears) is always good. I respect your personal opinion most of all. I can tell an open mind that will put emphasis on the evidence. A sudden loud sound on the CVR is the only direct evidence that exists for Air India Flight 182, all the rest is circumstantial or tangible consequence. The sudden loud sound is everything and it says, 'Not a bomb explosion' but 'Explosive decompression that matches DC 10 cargo door event.'" When in doubt, I always come back to the sudden loud sound on the CVR's on all the four early model Boeing 747s that suffered the inflight explosions forward of the wing. The sound is incontrovertible.

From one of your e-mails, I now also understand the reason for

your
strong
interest in advancing aviation safety, and I respect you for that.

Thanks. I met the sons of my savior pilot years later, three of the five children he left became Navy pilots.

If you
wish to continue sending material to me, I shall continue to
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outlined above, to the best of my ability.

Thanks, an open mind is all I ask. I would not expect detailed replies, but welcome any queries from you or your staff should they come up.

I
simply want you to understand my position with respect to your inputs.

I understand. Thanks again for your reply.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,

Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135
certificate
holder.

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Date: June 25, 2001 11:05:37 AM PDT

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the SWR111 investigation. If you wish, I can also forward copies to Sgt.

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Thanks, an open mind is all I ask. I would not expect detailed replies, but welcome any queries from you or your staff should they come up.

I
simply want you to understand my position with respect to your inputs.

I understand. Thanks again for your reply.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com
Commercial pilot, instrument rated, former FAA Part 135
certificate
holder.

From: John Barry Smith <barry@corazon.com>

Date: July 2, 2001 9:59:51 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Part One in PDF file

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,Ê
01

2 July

Attached is Part One of my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup presentation in PDF format. It is identical to the email just sent. PDF may be easier to forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: July 5, 2001 8:17:24 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: PDF Consensus on Cause of explosion in Air India Flight 182

W.T. (Bill) Tucker

Director General,
Investigation Operations

Dear Mr. Tucker,Ê
01

6 July

Attached is Part Two of my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup presentation in PDF format. It is identical to the email just sent. PDF may be easier to forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>

Date: July 6, 2001 4:45:00 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: PDF of Conclusions, Recommendations, and Implications of wiring/cargo door explanation, Part Three

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,Ê
01

6 July

Attached is Part Three of my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup presentation in PDF format. It is identical to the email just sent. PDF may be easier to forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: July 13, 2001 5:38:37 PM PDT
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Consensus on Cause of explosion in Air India Flight 182

Dear Mr. Smith,

Thanks. I was able to open the first file you sent (both formats), but I'll have to close a few applications before I can open the pictures. I am about to go on holidays, but I have printed your "conference room" text to read while I am away.

Sincerely,

Bill T..

---Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Thursday, July 05, 2001 11:17 PM

To: Tucker, Bill

Subject: PDF Consensus on Cause of explosion in Air India
Flight 182

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
6 July 01

Attached is Part Two of my shorted wiring/forward cargo
door
rupture/explosive decompression/inflight breakup
presentation in PDF

format. It is identical to the email just sent. PDF may be
easier to

forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,

Carmel Valley, CA 93924

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Thursday, July 05, 2001 11:17 PM
To: Tucker, Bill
Subject: Consensus on Cause of explosion in Air India Flight
182

<< Message: Untitled Attachment >> << File:
811nosetogether.jpg >> <<
File: 182nosetogether.jpg >>

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: July 13, 2001 6:58:00 PM PDT
To: "John Barry Smith" <barry@corazon.com>
**Subject: RE: Consensus on Cause of explosion in Air India
Flight 182**

Dear Mr. Smith.

Re: >>> I hope you have an enjoyable holiday and I await any
comments you
have when you return

Thanks very much.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Friday, July 13, 2001 9:16 PM
To: Tucker, Bill
Subject: RE: Consensus on Cause of explosion in Air India
Flight 182

Dear Mr. Tucker, 13 July 01

Fine, glad to see they were sent and received OK; there were
three parts,
Location, Cause, and Conclusions.

I hope you have an enjoyable holiday and I await any comments
you have
when you return.

(I just saw the new movie with Robert De Niro and Marlon
Brando, "The
Score" filmed on location in Montreal. It reminded me of years
ago when my
wife and I cycled all through and around the city. It was a very
bicycle
friendly city.)

Cheers,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,

Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Dear Mr. Smith,

Thanks. I was able to open the first file you sent (both formats),
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I'll

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to go on holidays, but I have printed your "conference room" text
to read

while I am away.

Sincerely,

Bill T..

From: John Barry Smith <barry@corazon.com>

Date: July 23, 2001 4:03:53 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

**Subject: Two matched events of uncommanded cargo door
openings, old and new**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 22 July 2001,

Below are two events (both UAL) which support the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for four other Boeing 747 accidents.

The alarming part of the recently discovered SDR about the uncommanded forward cargo door opening is that it occurred in a 747-400 which is supposed to have fixed the faulty PolyX/Kapton wiring situation.

The electrical fault which causes the cargo door to open when it shouldn't is still present. If event happens in flight, catastrophe ensues.

Please follow up somehow on this precursor event. Please open supplemental investigation into Air India Flight 182 which shall examine an alternative mechanical explanation with precedent and now continuing problems which support the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

Please have specialized staff contact me for further clarification.

I've notified AAIB, NTSB, and FAA of my findings but have heard nothing back yet.

The problem is intermittent which is the most difficult to resolve. It needs heavy horsepower to find and fix.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

New Service Difficulty Report SDR:

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
Engine Group : 4056
Engine Model : PW4056
Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29
A/C N Number : 199UA

Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

From AAR 92/02 United Airlines Flight 811

1.17.6 Uncommanded Cargo Door Opening--UAL B-747, JFK Airport

On June 13, 1991, UAL maintenance personnel were unable to electrically open the aft cargo door on a Boeing 747-222B, N152UA, at JFK Airport, Jamaica, New York. The airplane was one of two used exclusively on nonstop flights between Narita, Japan, and JFK. This particular airplane had accumulated 19,053 hours and 1,547 cycles at the time of the occurrence.

The airplane was being prepared for flight at the UAL maintenance hangar when an inspection of the circuit breaker panel revealed that the C-288 (aft cargo door) circuit breaker had popped. The circuit breaker, located in the electrical equipment bay just forward of the forward cargo compartment, was reset, and it popped again a few seconds later. A decision was made to defer further

work until the airplane was repositioned at the gate for the flight. The airplane was then taxied to the gate, and work on the door resumed.

The aft cargo door was cranked open manually, the C-288 circuit breaker was reset, and it stayed in place. The door was then closed electrically and cycled a couple of times without incident.

With the door closed, one of the two "cannon plug" (multiple pin) connectors was removed from the J-4 junction box located on the upper portion of the interior of the door. The wiring bundle from the junction box to the fuselage was then manipulated while readings were taken on the cannon plug pins using a volt/ohmmeter. Fluctuations in electrical resistance were noted. When the plug was reattached to the J-4 junction box, the door began to open with no activation of the electrical door open switches. The C-288 circuit breaker was pulled, and the door operation ceased. When the circuit breaker was reset, the door continued to the full open position, and the lift actuator motor continued to run for several seconds until the circuit breaker was again pulled. At this time, a flexible conduit, which covered a portion of the wiring bundle, was slid along the bundle toward the J-4 junction box, revealing several wires with insulation breaches and damage.

UAL personnel notified the Safety Board of the occurrence, and the airplane was examined at JFK by representatives of the Safety Board, United Airlines, and Boeing. After the wires in the damaged area were electrically isolated, electrical operation of the door was normal when the door was unlocked. When the door was locked (master latch lock handle closed), activation of the door control switches had no effect on the door. This indicated that the S2 master latch lock switch was operating as expected (removing power from the door when it was locked). After the on-site examinations, the wiring bundle was cut from the airplane and taken to the Safety Board's materials laboratory for further examination.

The wiring bundle with the damaged wires contained all electric control wires (28 volt DC) and power wires (115 volt AC) that pass between the fuselage and the aft cargo door. From the forward side of the J-4 junction box, the bundle progresses in the forward direction, just above the forward pressure relief door,

then upward, following the forward lift actuator arms. The bundle then enters an empty space between two floor beams, where the bundle has an approximate 180-degree bend when the door is closed. From this location, the wiring bundle progresses inboard, through a fore-to-aft intercostal between two floor beams. The wiring bundle then splits, with wires going in several directions.

The bundle is covered by the flexible conduit approximately from the lower end of the lift actuator arms to the fore-to-aft intercostal between the floor beams.

The conduit covering the wiring bundle is intended to prevent the wire bundle from being damaged during opening and closing of the door and during cargo handling operations. The conduit is a sealed flexible interconnector consisting of a convoluted helical brass innercore covered by a bronze braid. The innercore is soldered at every other convolute, and should be capable of withstanding pressures exceeding 1,000 pounds per square inch (psi). Boeing has indicated that the conduit is an evolutionary improvement and that it has been installed on all B-747 airplanes produced since 1981 (from line number 489 on). Airplane N152UA was delivered in April 1987.

Airplanes produced prior to 1981, including N4713U, used a bungee retraction system, to retract the cargo door wire bundle. Guidelines for the replacement of the bungee system with the flexible conduit were covered in Boeing Service Bulletin 747-752-2170, dated August 1981. The service bulletin was prompted by reports that the wire bundle bungee retraction system had not retracted the wire bundle sufficiently to prevent trapping the bundle between the cargo door and the door frame. UAL did not perform the retrofit on N4713U, which was line number 89, nor was the company required to do so.

Examination of the wires in the damaged area on the wiring bundle revealed that four of the wires were similar in appearance,

with insulation breaches that progressed through to the underlying conductor. Adjacent to the breach on these four wires, the insulation was blackened, as if it had been burned. Another wire contained an extensive breach but no evidence of burned insulation. The damaged area was located on the bundle at a position approximately corresponding to a conduit support bracket and attached standoff pin on the upper arm of the forward lift actuator mechanism. This support bracket was found bent in the forward direction. In addition, mechanical damage was noted on adjacent components in this area.

A second damaged area was noted on the wiring bundle at a position approximately corresponding to the conduit swivel clamp at the elbow between the two arms of the forward lift actuator mechanism. Wires in this area were missing portions of their exterior coating, but no breaches to the underlying conductors were noted.

The exterior braid on the conduit contained minor rub marks and was slightly kinked at a position corresponding to the area on the wires with breached insulation. Additional examinations revealed that the innercore of the conduit contained multiple circumferential cracks in the areas corresponding to the damage areas on the wires. The cracks were in the convoluted innercore directly adjacent to the inside diameter of the conduit.

The lock sectors, latch cams, and latch pins from the aft cargo door were examined on the incident airplane and were generally in excellent condition. There was no evidence to suggest that the cams had ever been electrically (or manually) driven into or through the lock sectors.

Boeing also informed the Safety Board that, in May of 1991, a B-747 operated by Qantas was found to have chafing of the wires in the wire bundle to the aft cargo door. This airplane also had a flexible conduit protecting the wires, and the chafing was located approximately at the standoff pin on the bracket at the

upper arm of the forward lift actuator.

The Safety Board determined that the chafing of the wires on the airplane involved in the JFK occurrence was caused by, or was greatly accelerated by, the circumferential cracks in the conduit and that the cracks in the conduit were caused either by repeated flexing of the conduit as the cargo door opens and shuts or by unusual stresses on the conduit generated concurrently with damage to the conduit guide bracket and attached standoff pin on the upper end of the forward lift actuator upper arm.

A portion of the wire bundle for the forward cargo door on many B-747 airplanes is also covered by a flexible conduit that is very similar to the conduit for the aft cargo door. However, there are substantial differences between the orientation of the flexible conduits for the two doors, and the Safety Board has not become aware of problems associated with the flexible conduit for the forward door.

Nevertheless, because of the concerns about the chafed wires and possible electrical short circuits, on August 28, 1991, the Safety Board recommended that the FAA:

Issue an Airworthiness Directive applicable to all Boeing 747 airplanes with a flexible conduit protecting the wiring bundle between the fuselage and aft cargo door to require an expedited inspection of:

- (1) the wiring bundle in the area normally covered by the conduit for the presence of damaged insulation (using either an electrical test method or visual examination);
- (2) the conduit support bracket and attached standoff pin on the upper arm of the forward lift actuator mechanism;
- (3) the flexible conduit for the presence of cracking in the convoluted innercore.

Wires with damaged insulation should be repaired before further service. Damage to the flexible conduit, conduit support bracket and standoff pin should result in an immediate replacement of

the conduit as well as the damaged parts. The inspection should be repeated at an appropriate cyclic interval. (Class II, Priority Action) (A-91-83)

Evaluate the design, installation, and operation of the forward cargo door flexible conduits on Boeing 747 airplanes so equipped and issue, if warranted, an Airworthiness Directive for inspection and repair of the flexible conduit and underlying wiring bundle, similar to the provisions recommended in A-91-83. (Class II, Priority Action) (A-91-84)

The FAA responded to these safety recommendations on November 1, 1991, stating that it agreed with the intent of the recommendations and that the issuance of an NPRM was being considered to address the issues in the safety recommendations. The Safety Board replied on November 27, 1991, classifying each of the recommendations as "Open--Acceptable Response," pending the completion of the rulemaking process. Since that exchange of correspondence, the FAA has published an NPRM which is now being reviewed by the Safety Board. Safety Recommendations A-91-83 and -84 will continue to be classified as "Open--Acceptable Response" until an acceptable final rule is published.

From: John Barry Smith <barry@corazon.com>

Date: July 26, 2001 10:41:53 AM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Electrical cause of uncommanded forward cargo door opening initiated by civilians.

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,Ê 26 July 01

Below is back story to United Airlines Flight 811 and how civilians were able to get the door retrieved and the proper cause of it opening determined as electrical and not improperly latched.

Sometimes worthy information can come from the public, especially ones who are directly involved such as family member or crewmember of victim. Kevin and Susan Campbell lost their son and I lost my pilot.

Please note comments below relating directly to Air India Flight 182.

Please start supplemental investigation into Air India Flight 182.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: SMANDKJC@aol.com
Date: Sun, 22 Aug 1999 22:39:33 EDT
Subject: From Kevin Campbell
To: barry@corazon.com
CC: rocketman@hawaii.rr.com

Dear Barry , Steve emailed on your reply , Thank you for your kind comments about our work. As you know we live in NZ but we own an apt here in Waikiki and usually spend from may till end sept here .This year we were late arriving as our first grandchild was due early may , He did not arrive until the 19th and we stayed to help out our daughter until the 1st june . Our son in law gave us a computer so they could email pictures of the new baby . I have resisted getting a computer as I cant type but seem to be managing OK . Anyway as soon as I got on line the first search I did was 811 and got your site , it all sounded very familiar to me and I could tell you had obviously done your homework . Steve had visited us in NZ in Feb just as we moved into our new apt there after selling our family home so I asked Steve if he had been in contact with you and what spurred your interest in cargo doors { I should have explored your site a bit more and I would have found the reason myself but I was just starting searching the web and only hit the one page] Steve did not know what your motives were so I thought I would contact you myself , however I had bought a lot of my documents over with me this trip as I had to fly on to Seattle to do an interview with the BBC

Panorama program
for a documentary on aircraft wiring problems following the
release to the
media of the Swissair wreckage , the doco is cofunded by the
Discovery
Channel and may show [Or a USA version of it] on TLC
depending on wether
they want to upset Boeing or not . The request to do this doco
followed a
very good doco done by Channel 9 Sydney on their Sunday
program titled "Fire
in the Sky" also about Kapton wire in Feb of this year .I had lent
BBC some
of my documents including my submission to the NTSB on the
cause of 811 and
also a document I had written in 1989 I called "Countdown to
Disaster"
detailing the sequence of events leading up to and beyond the
811 disaster .
I still have not had them returned but Steve can email them to
you if you
have never seen them.
As you are probably aware we did an investigation on 811 and
have appeared in
the media many times . We had many stories about our efforts in
NZ newspapers
,magazines and TVNZ followed us on one visit to the USA and
did a Documentry
on our investigation { the email from the guy in NZ that you sent
Steve was
from one of the team that was to do a computer simulation of my
theory
compared to the NTSB theory as soon as they tried to program

the NTSB theory
they could see it did not compute and it was then they realised I
had to be
correct and were behind me 100%. the same people did the
Americas Cup
simulations] The WALL STREET JOURNAL did a front page
article on our efforts
on 24th feb 1990 and I have done several articles with Byron
Acihido of the
Seattle Times among others .
In all we took 7 trips to the USA investigating 811 and they
started with a
look at the aircraft at Hickam AFB where we took many pictures
of the damage
and I was able to rule out corrosion as the cause . We attended the
NTSB
hearing at Seattle and managed to steal all of the documents from
the NTSB
metalurgists seat after the hearing ended . Initially they would
only give us
the list of witness`s but after complaining to the media at the first
recess
they gave us a press set and said we could have anything off the
press table
when the hearing ended two days later . At the end of
proceedings we gave an
interview to The Honolulu Advertiser and when it finished we
went back in to
get the stuff off the press table, as I was looking at it my wife
Susan
walked up to the top table and yelled out there was a good set of
stuff here
, we grabbed a box loaded it in and took off just as the NTSB

guys were
coming back in with a trolley to load it up . We hailed a taxi and
were off .
It took months to look at it and absorb it all but the result was "
Countdown
to Disaster"
We have stayed with both Dave Cronin and Al Slader many
times .On one visit
to the NTSB we got copies of all the passenger safety statements
and wrote to
everyone that had replied to the Questionair . Mainly they were
First and
Business class passengers with a few coach as well . We visited
everyone who
replied to us , Flying in to Seattle and driving to Denver New
York Florida
San Diego San Francisco Lake Tahoe and back up to Seattle .
Boeing would
never talk to us directly only through their legal people [Perkins
Coie] and
initially United would not talk to us either but a year after the
accident
when United had gone from the most popular to the carrier of
last resort for
NZ passengers we got an invitation to visit the United
maintenance base in
San Francisco . they were just going to do a PR job on us but it
did not work
out that way and we got stuck into each of the VP`s and told
them were they
had failed , when one broke down we knew we had them and it
ended up with the
Senior VP United Joe O Gorman giving us a personal escort

around the base
and getting answers to everything we wanted to know . We stood
in the cargo
bay of a 747 while they operated the door and I pointed to the
Conduit at the
top of the door and said that that was were I thought the Arc had
originated
from. as we walked back across the tarmac I spotted a newly
painted 747 with a
number I did not recognise , when we got back to the motel I
checked my
records and there was no N4724U . so asked the next day if it
was N4713U
renumbered and they had to admit it was .
We were in Hawaii for the search for the cargo door and I tried
every avenue
to be on that sub or even the recovery boat without sucess. I was
phoned
within an hour of the recovery of the door and told that they had
a
contingency plan , if the door revealed the NTSB were correct
the door was to
be released to the media in Hawaii ,if the door showed that the
Campbells
were correct the door was going straight to Boeing . He said that
the door is
going straight to Boeing . We flew to Seattle but were told we
could not see
the door , we drove to Washington to see the NTSB and as we
entered the
office we were told they could spare us 5 minutes, about 3 hours
later we held
a set of the recovered C locks and Lock sectors and they

admitted we were correct , that they would ensure that the aircraft would be fixed but not to hold our breath waiting for a new report ever to be released .

After lunch with them I asked " in light of what we now know on 811 do you still think that Air India was a bomb ?"

The reply was that we never thought that Air India was a bomb in fact the video shows a cargo door exactly the same as 811.

I wrote to both Air India and the Canadian Safety Board with my findings on 811 but did not even have the courtesy of a reply .

I was very upset to read your theory on TWA 800 as I thought we had the problem beat but it had never occurred to me that if the pull in hooks opened that the door could break in half , this is of course exactly what 811`s did but I had put it down to the fact that it struck the side of the fuselage as it opened and levered out the hinge and the section above it .

Fate intervened on 811 and the door opened on the 747 at JFK and they could no longer withhold the revised report on 811 . The new report however still does not admit that 811 got the signal to open right there at 23000 ft insisting it happened before takeoff . This is a much less scary scenario for Boeing and the NTSB as they still believe that other safeguards preclude it

from getting a signal after shutdown of the APU and the ground switch which I believe is a load of baloney .Are you aware that the original door design for the 747 called for a warning light that would have advised the cockpit of a S2 switch failure and the fact that power was still available to the door latch actuators? I had the document that showed this system deleted by whiteout and no one would ever answer my question wether the aircraft was certified with this system or not as it never made it into production . I lobbied very hard for this system to be reinstated but it wasnt , I guess that would have opened up liability problems for Boeing I lent the document to a journalist and have never got it back either . You probably have plenty of questions for me but I will run through the ones you asked Stuart Mc Clure and answer any that I can .
Dave Cronin PO Box 4263 Incline Village NV 89451-8320 Tel 702 831 7746 Fax 702 831 3615 . Dave was flying the plane manually getting the last bit of pleasure before he retired , as it blew he just let it go and it went up and sideways about 50 ft { I have the engine readouts and you can see that airflow was cut over the engine intakes } Dave and I both believe that had it

been on autopilot it would have broken the nose off at the 41 section joint which is a known weak point { This is what happened to Pan Am 103 and TWA 800] all of the beams in the business section were broken and I actually stood in the cargo hold of N4713U at Hickam and lifted the floor off the temporary struts with one hand , the floor was only held up by the cargo containers after the door went . Actually the only bit of solid floor left in business class was where our son sat in 12H But the shock wave went from the back past Lee moving the toilets beside him { forward of the hole] forward 12" it the bounced off the front of the plane came back and broke his seat off its legs or mountings , it also blew the eardrums of most of the first class passengers and in some cases blew up their teeth if they had air cavities in them Dave is a very experienced glider pilot and called on all his skills to get the plane back but it was dropping at 1000 ft p/m it was at 22000 ft 22 minutes out and at METO speed it crashed to a perfect landing at Honolulu International Airport it could never have gone around for another attempt { I have the CVR printout and it makes chilling reading } What was heard ? The CVR has a thump followed 1.8 seconds later by a

loud explosion {
I failed in my bid to listen to the actual tape ,I only wanted to
actually
hear the sound myself but was denied }Talking to the passengers
some off them
heard a hiss followed by an explosion described as being like "A
thousand
handclaps " no one saw the passengers go . One passenger in first
class {with
a Ph D in physics } nearest to the door said he heard something
start up
immediately prior to the thump . the NTSB never interviewed
him and dismissed
this as being the elevator to the galley but the steward was
already in the
galley at the time of the explosion and I dont think the elevator
was moving
. So the sequence was a whir a thump a hiss and then 1.8
seconds later the
explosion . Dave had time to say " what the # was that " and Al
replied "I
don't know "between the thump and the explosion The CVR's
power was then off
for 21.4 seconds
I have the all the NTSB photos and my own of the door frame
area,the side
frames and the sills are in perfect condition ,the 8 bottom pins are
all
goughed but otherwise OK the forward mid span pin is also
goughed and the
mtg bracket had moved outward on its bolts , the rear mid span
pin was
goughed and the bracket was held by one bolt the other 3 had

broken . It
takes 1.5 seconds for the 8 C Locks on the bottom of the door to
open
followed by the opening of the pull in hooks , with the 1.8
second time gap
when the hiss was heard I take that to be the time that the door
had blown
off the 8 C Locks and it was held by the pull in hooks until they
also opened
sufficiently for the door to blow off them as well . Something had
to be
different to PAN AM 10 out of London where the door was
closed by the
slipstream and they got back safely.
At least one passenger was ingested by engine no 3 . I have the
Coroners
report on what they found and I have seen what they removed
from the engine
apart from the body bits . It was not our son as we had to give a
DNA sample
and the result was negative Steve recently spoke to someone
who inspected
the engine the day it happened and thought the red on the turbine
was seat
material until he touched it and realised what it was They told us
that they
gave the aircraft parts a Hawaiian burial at sea but I doubt it ,
they
certainly did not give us the seat parts that we could have used in
an action
against the seat manufacturer [Weber Aircraft Co]
We have photos of damage to the wings , the top of the aircraft
and to the

vertical stabiliser , we hope that one of these killed our son as we know he could have survived the fall to the sea 22000 ft and over 4 minutes below . parts were still falling out of the sky after 811 was back on the ground in Honolulu. We have the reports from all the services that attended the accident . We found they knew Lee was missing by about 4 AM local time but it was not till about 12 Hrs later that they phoned us from Chicago and said he was missing presumed dead .The damage to No3 engine was caused by a body or bodies , luggage and aircraft parts . Damage to No 4 was mainly by luggage . N4713U did not have the lock sectors strengthened by aluminium {the first fix]but I would think that PAN AM 103 would have as PAN AM did not wait for Boeing to supply the steel kits but made their own and fitted them to their fleet after the London incident , as they realised the implications of not doing so . As detailed in "Countdown " Boeing devised a one time test to check the integrity of the cargo door locking system , they told the airlines to hit the door open switch to see what happened , a day later they stopped the test as operators were calling to say it was damaging the planes , obviously lots of aircraft had failed S2 switches and the actuators

were live
just waiting for a stray arc to doom the plane and the passengers
and the
FAA still gave up to 2 years to replace the lock sectors with steel
ones .
Regards Kevin and Susan Campbell

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: August 3, 2001 3:24:11 PM PDT
To: "'John Barry Smith'" <barry@corazon.com>
Subject: **RE: Startling SDR**

Dear Mr. Smith,

Thanks. I'm back as of Monday (though have one more week to
look forward to
in late Aug) and am catching up on e-mail again. During my
holiday, I
enjoyed reading two of the bigger docs you had sent me.

Re the info. below, I was not aware of that. I found it of interest
and
have forwarded it to 3 or 4 other people.

Re your closing para about a supplemental report on Air India
182, I don't
think we can contemplate doing so in view of present workload
and the fact
of the very extensive RCMP investigation and the upcoming
trial. We would
at least want to see what the latter generates. Also, if we were to
suggest

re-consideration of the Govt of India safety investigation report, I believe we should do so to the Govt of India.

Bill Tucker.

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Sunday, July 22, 2001 11:18 PM
To: Tucker, Bill
Subject: Startling SDR

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 22 July 2001,

Hope you had a good holiday and welcome back.

I just did research this evening and found this startling SDR in the FAA database: Capitals in original.

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA

Engine Group : 4056
Engine Model : PW4056
Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29
A/C N Number : 199UA
Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

Mr. Tucker, this is very very scary knowing what we know about forward cargo doors opening in flight from electrical causes. If that CB had been pushed in (why was it out) during flight, that forward cargo door would have ruptured/opened with known catastrophic results. What is a 'controller' and what 'malfunctioned'? UAL, above incident airline and well familiar with UAL 811, had habit of pulling door CB out and were told

to stop, order 8300.10 below. They are apparently still pulling the door
CB and it may have saved their ass.

Sir, I hope you have decided to proceed with a supplemental report on Air India Flight 182 based on subsequent similar events such as United Airlines Flight 811 and for certain because of incidents like the above.

Please do something.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

ORDER: 8300.10

APPENDIX: 4

BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
for Airworthiness (FSAW)

BULLETIN NUMBER: FSAW 93-50

BULLETIN TITLE: Inappropriate Use of Circuit Breakers
During B-747 Lower Lobe Cargo Door Operation

EFFECTIVE DATE: 06-02-94

1. SUBJECT. This FSIB informs inspectors of unsafe procedures being used by some operators to close and lock the lower lobe cargo doors of the Boeing 747 (B-747) series aircraft.

2. BACKGROUND.

A. This bulletin was developed after an inquiry by a foreign airworthiness authority into the special procedures used by a specific operator to close and lock the lower lobe cargo doors of B-747 series aircraft. The special procedure included in the operator's maintenance manual called for manual tripping of the cargo door control circuit breakers and the section 2 ground handling bus circuit breaker in order to further remove the possibility of power being applied accidentally to the cargo door control circuitry.

B. The manual tripping of the circuit breakers in special cargo door lock procedures is unnecessary and decreases the reliability of the circuit breakers to perform their intended function. Frequent switching of the breakers could cause them to trip before the point of rated voltage or not to trip at all. Both cases could have adverse effects (such as the following) in relation to the safe operation of the cargo doors:

(1) Circuit breakers that trip before the point of rated voltage would cause increased manual operation of the cargo doors.

(2) Manual operation could introduce additional failure conditions, such as out-of-sequence operation and overdriving of the cargo door mechanisms.

(3) Service history has shown that manual operation of the cargo doors is more prone to cause damage; for example, the failure of a breaker to trip at the point of rated voltage could lead to failed components and fire.

2

C. The revision to the B-747 cargo door lock sectors warning system, in airplanes compliant with Airworthiness Directive (AD)

90-09-06, provides an increased level of integrity so that manual tripping of the circuit breakers is not necessary to prevent the possibility of an uncommanded opening of the cargo doors.

Furthermore, power to the cargo door is automatically removed by

the Master Latch Lock System upon first motion of the Master Latch Lock Switch away from the fully unlocked position.

3. ACTION. Principal maintenance inspectors (PMI) having certificate management responsibilities for operators of Boeing 747 series aircraft should ensure that this information is brought to the attention of their respective operators. Any operators using this procedure should be discouraged from its continued use.

4. INQUIRIES. This FSIB was developed by SEA.AEG. Any questions regarding this information should be directed to AFS-510 at (703) 661-0333, extension 5018.

5. EXPIRATION. This FSIB will expire on 05-31-95.

/s/

Edgar C. Fell

From: John Barry Smith <barry@corazon.com>

Date: August 12, 2001 11:13:00 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: From CASB member Les Filotas

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 12 August 2001,

A few years ago Mr. Les Filotas contacted me regarding my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. He was a former member of the CASB and had some interesting things to say about Air India Flight 182 and the opinions of some.

I'm trying to use the opinion of someone you might respect in support of my explanation in order to take some action to prevent a reoccurrence, Mr. Tucker; such as an update report/a review/a supplemental/a refinement.

Sincerely,

Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: Pre-installed User <lesfilo@resudox.net>
To: "'barry@corazon.com'" <barry@corazon.com>
Subject: TWA 800 Cargo door therory
Date: Tue, 22 Jul 1997 21:05:30 -0400

Barry,

I'm a former member of the Canadian Aviation Safety Board. I spent about 5 years reflecting on the evidentiary distinctions between a mechanical failure and the in-flight explosion of a bomb (in connection with the Arrow Air DC-8 crash at Gander in Dec. 1985).

My first impression of your material is that you may be onto something missed by all others.

To: Pre-installed User <lesfilo@resudox.net>
From: John Barry Smith <barry@corazon.com>
Subject: Re: TWA 800 Cargo door therory
Cc:
Bcc:
X-Attachments:

Barry,

I'm a former member of the Canadian Aviation Safety Board. I spent about 5 years reflecting on the evidentiary distinctions between a mechanical failure and the in-flight explosion of a bomb (in connection with the Arrow Air DC-8 crash at Gander in Dec. 1985).

My first impression of your material is that you may be onto something missed by all others.

Thank you sir, I trust your second and third would sustain your conclusion. I respect an aviation safety professional and would be honored to discuss this issue of high time Boeing 747 forward cargo door malfunctions with you. I have the CASB Air India 182 aviation occurrence submission scanned in completely on the web site. It is a fascinating document.

May I answer any first impression questions? Can you receive .jpg or .gif pictures at lesfilo@resudox.net?

Cheers,

Barry

From: Pre-installed User <lesfilo@resudox.net>

To: "John Barry Smith" <barry@corazon.com>

Subject: RE: Pleased to meet you, Mr. Filotas

Date: Wed, 30 Jul 1997 12:19:22 -0400

John Barry Smith:

Thank you for your messages. Indeed, I sent my note to encourage you.

You can get some idea of my background, thoughts on aviation

accident investigation, Air India, Mr. John Garstang and the NTSB from my book "Improbable Cause" which can be obtained without charge in electronic form from Michael C. Spencer (fourdm@aloha.net). My book should also explain why I'm somewhat cynical about the whole official process of describing and recording the factual basis of politically sensitive aircraft accidents, both here and in your country.

The CASB finished its involvement in Air India prior to my appointment in early 1987. I did, however, review much of the internal documentation and had many conversations with members involved throughout. I haven't reviewed my notes, but I can tell you that the Canadian government's fear of legal and other repercussions (if found liable for lax security at its airports, for example) was not absent >from consideration. The bomb theory was accepted belatedly and reluctantly. I have kept a lot of internal documentation which I would be pleased to retrieve from storage and make available to you. I am most sceptical of influencing the NTSB's agenda, but will review the material on your web site more carefully and help you if I can.

Best regards.

From: John Barry Smith[SMTP:barry@corazon.com]

Sent: Tuesday, July 29, 1997 20:33 PM

To: lesfilo@resudox.net

Subject: Pleased to meet you, Mr. Filotas

Mr. Filotas, permit me to explain how I got your name.

1. Your email is lesfilo.
2. You mentioned Gander.
3. I checked my URLs for Gander page.
4. A Les Filotas is named.

If I can research that, I can research cargo door. And did.

Please help me with the cargo door explanation and getting the cause confirmed or ruled out.

I've been to Gander in a P2V5FS in 1962 out of Argentia Newfoundland.

Cargo door is an explosion of sorts, it's explosive decompression and

mimics a bomb in suddenness, loud sound, and blast effects.

Sincerely,

Barry Smith

Barry,

I'm a former member of the Canadian Aviation Safety Board. I spent about 5

years reflecting on the evidentiary distinctions between a mechanical

failure and the in-flight explosion of a bomb (in connection with the

Arrow Air DC-8 crash at Gander in Dec. 1985).

My first impression of your material is that you may be onto something

missed by all others.

Email: barry@corazon.com
Page: <http://www.corazon.com/>

From: Pre-installed User <lesfilo@resudox.net>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Small world
Date: Mon, 11 Aug 1997 10:22:24 -0400

Dear Barry,

Thanks for your notes and kind comment about "Improbable Cause". Six years after writing it I have no reason to substantially alter any of the conclusions.

Your inference about my opinion about Air India and Pan Am 103 is mistaken. I hope that when you finish my book it will be clear that I do my utmost not to color my impression of the evidence in one crash by the evidence in another. This trap is, in fact, the probable source of the "ice theory" and is a danger that you must continually warn yourself about and guard against in considering the "cargo door" hypothesis. My greatest fear during the Gander investigation always was the possibility of replacing one incorrect theory by another incorrect theory.

I believe the best evidence for Pan Am 103 is a bomb, but I have an open mind. I know the Air India investigation was botched and have no faith whatever in the bomb theory, which was accepted by the Canadian board without detailed consideration at the last minute to avoid conflict with the Indian report. A very experienced British investigator subsequently told me that he and his colleagues did not accept the bomb evidence. Naturally, the possibility of a bomb must be taken seriously and evaluated dilligently.

Still have not had time to carefully consider your work, but keep it up.

Regards,

Les F.

From: John Barry Smith[SMTP:barry@corazon.com]
Sent: Friday, August 08, 1997 2:29 AM
To: lesfilo@resudox.net
Subject: Small world

Dear Les, Reading book, nice research, fascinating read.
I've been to Gander in P2 out of Argentina in 1962.

Came back from Vietnam on Magic Carpet on Stretch DC-8.
Gear would not come
down over Travis AFB. We orbited for an hour and finally tried
it, gear
came down. Phew. Fuselage wavered back and forth during flight
as seen from
aft seats, eerie.

Spoke to John Garstang on phone a few months ago..

Met General Wickam in Korea in 1980.

And of course, DC-8s crash on take off and it ain't ice, Miami
today.

My friend suggested smuggled armaments by soldiers for Gander

crash, you
considered that too. Lots of vibration during takeoff, would set
off
grenades or other things.

I know you believe AI 182 and PA 103 were bombs to support
you Gander bomb.

But sorry, I believe it was mechanical, not plots, just door
popped just
like UAL 811 years later and TWA 800 last year.

But I would love to discuss it with a knowledgeable person.
<http://www.lsoft.com/flight-800.html> is group of missile and
cargo door
guys.

Regards, Barry Smith

Email: barry@corazon.com

Page: <http://www.corazon.com/>

From: John Barry Smith <barry@corazon.com>
Date: August 26, 2001 9:25:07 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **A330 fuel starvation Azores**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26Aug 2001

Below is email regarding the Transat A330 fuel starvation incident. I forward this interesting, and possible, explanation to show you, Mr. Tucker, that I follow aviation accidents closely, I have sources which are reliable, I don't make wild claims, and my explanations are supported by authoritative sources and official government documents.

This email is not a definitive cause but then the event only happened a few days ago.

My shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 and others is based upon 12 years of research through hundreds of sources and documents. It is correct. It reveals a current danger to the flying public. It needs to be further investigated. I can help.

Civilians, like me, can help the professional authority, like yourself, Mr. Tucker, by being occasionally correct and well worth the effort to rule in or rule out the safety suggestion.

Air India Flight 182 research can be done in an office reviewing the high quality film taken by underwater robots which is still available through the RCMP and CASB files. It's not that hard to do; the evidence is there and waiting to be examined from the hindsight of 16 years.

If my explanation of bad wiring causing cargo doors to open in Boeing 747 can not be refuted, then the assumption must be made that it could be correct. If possibly correct then action must be taken to confirm or rule it out. If ruled in then action must be taken to fix the problem. If ruled out then I am wrong and I

apologize for the time wasted. I do not believe I am wrong because the explanation has never been refuted, just ignored or sidestepped.

How can one man see something about a sudden fiery fatal jet plane crash that hundreds have missed? Easy. I'm the man who has been in a sudden fiery fatal jet plane crash and they haven't.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Lu Zuckerman's information (which he normally gets through industry sources):

"The two major fuel lines going into the engine fractured or became separated just upstream of the firewall shut-off on the effected engine.

This engine shut down due to fuel starvation and the remainder of the fuel drained out of the two open lines - at which time the other engine shut down."

"Just for your info gents the jettison fuel dump rate is 1150Kg's

(2536

lb's) a minute and has two switches required for its use (arm & active).

Jettison should cease when either one of the two switches are deselected, inner tank low level sensors are dry or the fuel quantity reaches the preselected figure in the FMGEC (flight management and guidance envelope computers)."

I think that the fuel dump on the ETOPS A330-200 is supposed to be an option. And if that's correct then you can probably say that because of that there's a better chance for either the manufacturer or the maintainer to get it wrong (if it's an odd-ball jet) i.e. hardware pinouts. But if it was not dump-enabled, and if Lu's information is correct, then there is a terrible failure in the a/c design (in that such an event could permit all the fuel to either depart stage left or become unavailable to the remaining engine). Although perhaps the leak simply created an unforeseen situation whereby the flow of available (and sufficient for its demands) fuel to the good engine was circumvented by:

a. The continued unconstrained flow via the leak (there being some common

manifold setup either by the pilots [manually] or the cruise-control system [automatically] [i.e. an FMEA failure]). Think of this as two hose sprinklers being fed from the one tap via a T junction and one hose separating on one side of the T piece (not enough fuel/fluid is going to get to the other sprinkler).

b. Alternatively the cruise-control system (if based upon known quantities and directional flow-rates) may have sensed that it needed to quickly reposition some fuel to retain the C of G within limits. In doing so, it may have opened up crossfeed/cross-transfer valves that would've been better left closed in the circumstances (if it had been a smarter system).

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: September 7, 2001 4:11:26 PM PDT
To: "'John Barry Smith'" <barry@corazon.com>
Subject: **RE: Defence team contact**

Dear Mr. Smith

In answer to your question, you may certainly forward the e-mail.

I'm sorry to be so late in responding. As I said before, I'll do my best to

review your e-mails and forward relevant material to other TSB staff, but I can't undertake to deal with them promptly. There is just too much information from you and too much other work for me to undertake to do otherwise.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Friday, August 10, 2001 2:54 PM
To: Tucker, Bill
Subject: Defence team contact

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 10 August 2001,

The Defence Team for Air India Flight 182 has contacted me and asked for:

At Thu Aug 9 18:48:26 2001, Jaswinder S. Parmar wrote:
Can you forward me all your correspondence with the TSB so I can forward it to the appropriate people. We have a defence team meeting on the 17th of this month and I would like to bring this issue to the for front.

Mr. Tucker, may I do so?

The reference files such as the government AARs for 182, 103, 811, and 800 and my AAR for 182 which I sent you are already available to the defence team. The emails in questions are attached below and were sent by you to me. They are all proper, correct, and consistent with Canadian policy. The value of them to the defence team is to show them that there is a responsible, fair, government official in the investigation process who can be trusted to respect the facts, data, and evidence as shown by the recorders and twisted metal. They have been battered by the RCMP and the AITF in their attempts to obtain a conviction to alleviate the grief of the public over the sudden loss of 329 persons in Air India Flight 182. The RCMP have not played fair in this, in my opinion, as they think they are trying to catch very bad guys and have not given sufficient thought to a mechanical explanation for this plane crash.

The defence team and the accused Sikhs are very leery of any Canadian official and trust very few people. I have tried to persuade them that the TSB is a potential ally in that it is independent and concentrates

on why
planes crash, not why people do bad things. I really do believe
that.
Leave the conspiracies to the RCMP and the crashes to the TSB.

I believe it is worthwhile to show the emails below to the
defence team to
show that there is a real human out there who has experience in
these
matters, has political clout to get things done, follows up on
correspondence, commands a talented staff, and is fair and polite.

The vital agencies and persons are aware of the shorted wiring/
forward
cargo door rupture/explosive decompression/inflight breakup
explanation
for Air India Flight 182: RCMP, AITF with Sgt Blachford and
John Garstang:
TSB with you, sir, and your staff, and the defence team for the
accused
which involves the Crown attorneys and therefore the
government of Canada.
In addition the AAIB and the NTSB are well aware of the wiring/
cargo door
explanation for Air India Flight 182. Only the Indian government
remains
ignorant of the alternative mechanical explanation.

I would like to see all groups talking to each other. You see, I
know this
a mechanical problem which can be fixed and needs to be fixed
quickly
before it happens again. This is not a case of crime and

punishment with
secret this and that. This is a case of a plane crash from a cause
which
can be prevented. Cooperation is needed sooner or later.

I appreciate any thoughts you have on this, Mr. Tucker.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

X-From_: Bill.Tucker@tsb.gc.ca Thu May 24 15:21:34 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <Barry@corazon.com>
Cc: "Delorme, Paulette" <Paulette.Delorme@tsb.gc.ca>
Subject: Air India Flt. 182
Date: Thu, 24 May 2001 18:22:47 -0400

Dear Mr. Smith:

Thank you for your e-mail messages of 2 May and 8 May (sent
to Ms. P.
Delorme, Office of the Executive Director) concerning the crash
of Air
India
Flight 182 that occurred on 23 June 1985.

First, I must respond that the Transportation Safety Board of Canada (TSB-C) has no mandate to re-open the aviation safety investigation of the AI Flt.182 occurrence. As you may be aware, the TSB-C was not established until 1990, and the Aviation Occurrence Report you referred to was prepared by the Canadian Aviation Safety Board, the predecessor to the TSB-C. More importantly, in accordance with ICAO Annex 13, the investigation of that accident was led by the Government of India; the CASB report was prepared as input to India's investigation.

That said, we certainly have more than a passing interest in the circumstances of the AI Flt. 182 tragedy. We are interested because of the very nature of our chosen careers. We are interested because quite a few TSB staff were working for the CASB at the time (myself included), and many of that group were involved in the AI Flt.182 investigation. Above all, we are interested because of the enormity of the tragedy, the links to

Canada

and the fact that there has not yet been closure on this matter - almost

16

years after the event. As you are aware, the RCMP have been conducting a

criminal investigation into the circumstances of the crash ever since

1985.

In accordance with Canadian law, both the CASB and the TSB-C have provided

the RCMP with copies of material from our file - excluding, of course, any

information that is privileged under our Act. The information provided

includes material that was produced by John Garstang.

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart

Blachford of the RCMP in Vancouver. The RCMP have as strong an interest

as

anyone in establishing what happened to AI Flight 182. I have also

forwarded your report to the Director of Air Investigations, the Investigator-in-Charge of our SWR Flight 111 investigation, and the

Director

of Engineering for their information.

With respect to the brief message in your second e-mail (of 8 May), there

is

one point that I must clarify in reply. It is correct that the CASB investigators' report never said it was a bomb that caused the explosion; however, the report also never said that it wasn't a bomb. In fact, to my knowledge, there was nobody on the CASB team who didn't consider a bomb to be the most likely explanation. However, the aviation safety investigation conclusion on that point was, appropriately, left to the Kirpal Commission in India.

Thank you again for your messages.

W.T. (Bill) Tucker
Director General,
Investigation Operations

-----Original Message-----

From: John Barry Smith Eudora
[SMTP:Barry@corazon.com]
Sent: Wednesday, May 02, 2001 11:37 PM
To: paulette.delorme@tsb.gc.ca
Subject: Air India Flight 182 Probable Cause

Transportation Safety Board of Canada

Dear Fellow aircraft accident investigators, 2 May 01

I am an independent investigator concentrating specifically on early model Boeing 747s that suffer inadvertent decompressions in

flight. After years of research and analysis, my conclusion is that four fatal Boeing 747 accidents were caused by faulty poly-x wiring shorting on the forward cargo door unlatch motor leading to the rupture of one or both of the midspan latches leading to explosive decompression which resulted in amidships breakup for three of the aircraft and a large hole on the right side just forward of the wing on the remaining aircraft. I refer to Air India Flight 182, Pan Am 103, United Airlines Flight 811, and Trans World Airlines Flight 800. UAL 811 is the aircraft that did not come totally apart and landed with its incontrovertible evidence that matches up with the other three in so many significant ways as to imply they all had the same probable cause for the initial event.

Regarding Air India Flight 182, an accident in which Canadian public safety organizations are intimately involved, I have written a report supporting my findings and have quoted extensively from the Canadian

Aviation Occurrence Report of 1986 of the Canadian Aviation Safety Bureau.

Please note that the Canadian aviation accident investigators never said it was a bomb that caused the agreed upon explosion in the forward cargo compartment of AI 182. The Canadian aviation accident investigators were absolutely correct in their conclusions of 1986 and only by subsequent similar accidents is the cause of that unexplained explosion now clear.

I am sending by Word file my Smith AAR for AI 182 for your evaluation. Should you find the wiring/cargo door/explosive decompression explanation a plausible, reasonable, alternative explanation with precedent for the destruction of AI 182, then the issue of a clear and present danger to the Canadian flying public becomes apparent as the cargo door wiring in early model Boeing 747s has not been inspected for the tell tale cracking that the polyimide insulation shows before shorting.

I invite your queries to me for further details by phone or email. Regardless, a supplemental AAR for AI 182 is probably warranted since TSB has never actually given its official opinion regarding one the

most
celebrated of all tragic Canadian aviation accidents, equal to the
Arrow
Gander crash and Swiss Air 111.

Swiss Air 111 showed the vulnerability of widebody
airliners to the
faulty Kapton type wiring insulation which I conclude is the
probable
cause
for Air India Flight 182. The 1972 DC-10 event over Windsor,
Ontario, when
a
cargo door inadvertently opened, presaged the Paris Turkish
Airlines DC-10
cargo door accident. Therefore, when I say that faulty wiring is
causing
cargo doors to inadvertently rupture open in wide body airliners,
I
believe
you will say it's possible but did it happen for AI 182 and ask for
the
evidence. That evidence is presented in my report.

Very Respectfully,

John Barry Smith
Independent Aircraft Accident Investigator
barry@corazon.com
www.corazon. <<http://www.corazon.com/>>
com <<http://www.corazon.com/>>831 659 3552
551 Country Club Drive,
Carmel Valley, CA USA 93924

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Tuesday, May 08, 2001 2:00 PM

To: Trans Safety Board Canada

Subject: Mounties now say 'bomb' in aft of Air India Flight
182

Yes, the Mounties are saying the 'bomb' was in the Aft
compartment
of Air India Flight 182 and want to put three guys in jail for life
for
putting it there.

Ha!

Can you do something about this nonsense?

Cheers,

John Barry Smith

X-From_: Bill.Tucker@tsb.gc.ca Wed Jun 20 18:18:46 2001

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

To: "John Barry Smith" <barry@corazon.com>

Subject: RE: Swiss Air 111 changes

Date: Wed, 20 Jun 2001 21:20:48 -0400

Dear Mr. Smith,

This is in reply to your series of e-mails, and to clarify the TSB
position

in case there is a misunderstanding. I'm sorry I have not been able to reply sooner. I shall be away for the next two work days and I had a reply to you on my "must do" list before leaving tonight.

The TSB is not presently doing further investigation of the Air India 182 accident, nor is it planning to do so. We have limited resources and a backlog of investigation work-in-process; we do not believe that door or wiring problems were involved in that occurrence; and we are confident that the RCMP are doing a thorough and unbiased investigation. Therefore, we do not believe we would be justified in diverting our resources to that occurrence.

That said, I am not suggesting that your concerns and your analysis are all invalid. In fact, I find that you have raised some interesting points that have potential use for us in our work. To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate,

to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

From one of your e-mails, I now also understand the reason for your strong interest in advancing aviation safety, and I respect you for that.

If you wish to continue sending material to me, I shall continue to process it, as outlined above, to the best of my ability. However, I cannot promise immediate processing and I cannot engage in direct and detailed dialog on all the material you send me; I simply have too much other work to do.

Right now I have over 150 e-mails in my in-box to read and action; there will be well over 200 when I return next week. I am not complaining, I simply want you to understand my position with respect to your inputs.

Sincerely,

Bill Tucker.

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Monday, June 18, 2001 11:59 AM

To: Tucker, Bill

Subject: Swiss Air 111 changes

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 18 June 01

Below shows the impact of a conscientious effort by
investigators to

find

out what happened in an accident and the good faith efforts of an
airline

to prevent it from happening again. Good work by TSB and
Swiss Air. Not

good by reluctance of Boeing to implement the changes for all.

Note the cameras in the cargo holds; that is very good.

I look forward to the opinion of Mr. Vic Gerden to my Smith
AAR for Air

India Flight 182. I also have concluded wiring is causing
problems that
were not apparent.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sunday newspaper, 6-17-2001

Swissair optimizes MD-11-Cockpits with modifications to their electrical system - as a direct consequence of their Flight 111 Crash cause deliberations.

FROM TIM VAN BEVEREN ZURICH

Two and a half years later, the consequences of the crash of SR Flight

111

near Halifax N.S. have continued to affect Swissair. Their remaining 19

MD-11 airliners are being radically converted in modifications to the

electrical system in the cockpit area. For over one million Swiss Francs

per jet: "...primarily it's the electrical system that is to be significantly improved" according to Swissair documents made available

to

Sundays newspaper. There in Zurich the crash cause for the 111 and its

229

passengers is being assumed, despite the Canadian TSB Report being anticipated for public release not before the beginning of 2002. Already many family members of Flight 111 victims have been "paid out". So now Swissair no longer wants to wait for the outcome of the final report of the Canadian accident investigation before implementing the safety fixes that it has identified. "Safety remains our highest priority " claims Swissair speaker Urs Peter Naef regarding the planned changes. " Cost-saving measures never conflict with the required expenditures on flight safety, which underlie our "mode plus" modification program initiative."

In Canada Investigators of the Transportation Safety board (TSB) express themselves reservedly over the planned SR procedure.

Investigation
leader

Vic Gerden: "Swissair's efforts to reduce potential safety deficiencies are well-known to us." As a crash cause, it is so far certain only that

an
electrical fire in the wiring-bundles was crucially responsible. Because of the fire, important systems in the cockpit failed in quick **succession,**

without which captain Urs Zimmerman and Copilot Stephan Loew could no longer control their machine.

In a few days the technical modifications will begin and they will naturally concentrate on the known SR111 trouble areas: - significant critical wire-bundles are to be separated out and fed, via a routing with greater electrical integrity and individual isolation, into the cockpit.

In SR111 these wiring harnesses ran through a single focal point described

as a critical node. It was specifically within this area in the ceiling (just forward and aft of the cockpit/cabin bulkhead) that the fire had devastatingly raged. It affected not only the emergency power systems

but the "last-ditch" power feeder lines to the batteries as well. Now that these systems are to be split and segregated for greatest integrity, important protections will again be in place - for example the one that controls the emergency power turbine (or ADG - air driven generator).

This propeller can be unfolded from a compartment in the fuselage in an emergency and in the airflow produces current - like a hydroelectric

direct current generator. In SR111 the Canadian investigators found that this critical emergency power turbine had given out no energy. Despite the crisis, its control functions had failed to deploy it - probably because, by that time, the associated wiring had been consumed by the fire. Video cameras and smoke detectors are also being installed by this "unique to Swissair" modification program. CCTV Video cameras are being installed everywhere: in the cargo-holds, in the electronics bay under the cockpit floor - as well as behind the cabin linings. allowing the pilots a never before possible view into potential fire zones. The pictures will come up on a small 14-centimeter monitor in the cockpit. In addition more smoke detectors are being strategically positioned. The objective is that crews would no longer be condemned to helpless seated inactivity in the case of fire. Fire extinguishing agents behind the cabin linings can squirt upon any detected fire.

All Swissair aircraft are to receive a new wholly integral emergency

flight attitude instrument. It is to be operable from two separate power sources and will function reliably even if all other systems have broken down (as was the case with SR111 in its last few minutes of flight). Altogether the cockpit changes are to cost 20 to 23 million Swiss Francs according to calculations of a Swiss Aviation Expert. The extensive modifications are the result of ongoing Swissair internal investigations into the accident's most likely course of events.

Shortly after the crash on 3 September 1998 a Taskforce under the leadership of retired Swissair Technical Chief Willy Schurter began its work, paralleling that being done by the official Canadian TSB Team.

They sought to track down all possible causes of the disaster. The SR MD-11 Electrical Rework is in addition to other earlier measures (such as changes in checklists and procedures) - but is seen as the most **important** outcome of these investigations. Although latterly consulting and then **in** close co-operation with the US manufacturing firm Boeing, Swissair engineers unilaterally sought to analyse all factors of the accident

themselves - in order to identify any deficiencies in the original type-certificated design. In a further internal document Swissair explains: "We knew that it needed three prerequisites for the initiation and propagation of a fire: a potential ignition source (e.g. arcing wires), fuel (e.g. thermal/acoustic blankets) and oxygen (i.e. air-conditioning system ventilation or crew oxygen system lines)". As a consequence of its insights another risk-factors conclusion of the SR Halifax Taskforce presents a frightening new dimension to SR111: "We **have** clearly concluded that such contributing factors exist in each type of aircraft and that it is not simply a case of being type-specific to the MD-11." These were conclusions also reached by the TSB and sent to the certifying authority (the US FAA). To date the only ramifications of **SR111** reaching beyond the MD-11 are the new emergency rules retroactively affecting the STC's (Supplemental Type Certification) of Inflight Entertainment Systems on just about every type of airliner in service today.

Nevertheless, neither manufacturers Boeing nor the American FAA supervisory authority want to even recommend (let alone mandate) the new

Swissair safety precautions for all remaining MD-11's. If this was to be done, such a program could then logically expand to include most other types of airline aircraft exhibiting the identical type-certification deficiencies. The first Swissair machine should be converted and ready

for

return to service at the end of June 2001. Before the SR MD-11 Fleet is

permitted to carry passengers following the incorporation of these

system

safety adjustments, it must pass a strict test flight program in Zurich.

Preliminary re-certification assessments would normally be monitored by

representatives of the FAA (the American airworthiness regulatory

authority). However these were carried out in the spring of 1999 so that

these changes could proceed without delay to SR Flight Services.

But

because manufacturer Boeing withheld its agreement to these changes for

a

long time, there have been extensive delays in their implementation.

Boeing sees much of the program as "enhancements" and not necessarily as

required safety modifications. These new Swissair safety initiatives

have

now become even more expensive: Three SR MD-11's have only just completed their heavy maintenance checks. But now they must return to the hangar yet again for extensive rework. But it's not necessarily a case of spending a dollar to save a penny. Once you look at the cost of SR111 and its potential for costing the airline industry as a whole, it may well have been the other way round.

X-From_: Bill.Tucker@tsb.gc.ca Mon Jun 25 11:04:11 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Sudden loud sound on CVR
Date: Mon, 25 Jun 2001 14:05:37 -0400

Dear Mr. Smith,

Your reponse below prompts a further reply from me. I appreciated the understanding demonstrated in your e-mail. I do have an open mind (or at least I hope and try to), and I will strive to retain it long after I retire from the TSB.

I am now up to date with your correspondence, except for one left to read

that you sent me on 23 June. I have targetted specific elements to specific people (e.g, the Appendix on Wiring to our SWR 111 IIC (Yes, that's Vic Gerden) as well as to Dir of Inv. - Air). I shall forward this to all of them so they can note your addresses and your receptiveness to any follow-up queries they may have

Bill Tucker..

P.S. In one of the things I read, you indicated that John Garstang had been seconded to the RCMP for over a decade. That is not so; John G was loaned or seconded to the RCMP on several occasions (maybe 3 or 4) for short terms of about 1-2 months - most recently this spring. Otherwise, he has continued working as a valued employee in our Engineering Branch.

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Wednesday, June 20, 2001 9:43 PM

To: Tucker, Bill

Subject: Sudden loud sound on CVR

Dear Mr. Tucker, 20 June 01

Well, longest daylight of the year tonight, that's good.

The TSB is not presently doing further investigation of the Air India

182

accident, nor is it planning to do so. We have limited resources and a

backlog of investigation work-in-process; we do not believe that cargo

door

or wiring problems were involved in that occurrence; and we are

confident

that the RCMP are doing a thorough and unbiased investigation.

Therefore,

we do not believe we would be justified in diverting our

resources to

that

occurrence.

I understand the way things are now, and of course, subject to change. There is that pesky trial coming up and the RCMP is saying

bomb in aft cargo compartment and the CASB and Kirpal stated explosion in forward cargo compartment, not a trifling conflict.

Just

where was that bomb?

I find that you have raised some interesting points that

have potential use for us in our work.

Thanks. UAL 811 is a big point.

To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

Thanks. More eyeballs (or ears) is always good. I respect your personal opinion most of all. I can tell an open mind that will put emphasis on the evidence. A sudden loud sound on the CVR is the only direct evidence that exists for Air India Flight 182, all the rest is circumstantial or tangible consequence. The sudden loud sound is everything and it says, 'Not a bomb explosion' but 'Explosive decompression that matches DC 10 cargo door event.' When in doubt, I always come back to the sudden loud sound on the CVR's on all the four early model Boeing 747s that suffered the inflight explosions forward of the wing. The sound is incontrovertible.

From one of your e-mails, I now also understand the reason for your strong interest in advancing aviation safety, and I respect you for that.

Thanks. I met the sons of my savior pilot years later, three of the five children he left became Navy pilots.

If you wish to continue sending material to me, I shall continue to process it, as outlined above, to the best of my ability.

Thanks, an open mind is all I ask. I would not expect detailed replies, but welcome any queries from you or your staff should they come up.

I simply want you to understand my position with respect to your inputs.

I understand. Thanks again for your reply.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com
Commercial pilot, instrument rated, former FAA Part 135
certificate
holder.

X-From_: Bill.Tucker@tsb.gc.ca Fri Jul 13 17:36:16 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Consensus on Cause of explosion in Air India
Flight 182
Date: Fri, 13 Jul 2001 20:38:37 -0400

Dear Mr. Smith,

Thanks. I was able to open the first file you sent (both formats),
but
I'll
have to close a few applications before I can open the pictures. I
am
about
to go on holidays, but I have printed your "conference room" text
to read
while I am away.

Sincerely,

Bill T..

---Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Thursday, July 05, 2001 11:17 PM

To: Tucker, Bill

Subject: PDF Consensus on Cause of explosion in Air India
Flight 182

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
6 July 01

Attached is Part Two of my shorted wiring/forward cargo
door
rupture/explosive decompression/inflight breakup
presentation in PDF

format. It is identical to the email just sent. PDF may be
easier to

forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Thursday, July 05, 2001 11:17 PM
To: Tucker, Bill
Subject: Consensus on Cause of explosion in Air India Flight
182

<< Message: Untitled Attachment >> << File:
811nosetogether.jpg >> <<
File: 182nosetogether.jpg >>

X-From_: Bill.Tucker@tsb.gc.ca Fri Jul 13 18:55:38 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Consensus on Cause of explosion in Air India
Flight 182
Date: Fri, 13 Jul 2001 21:58:00 -0400

Dear Mr. Smith.

Re: >>> I hope you have an enjoyable holiday and I await any
comments you
have when you return

Thanks very much.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Friday, July 13, 2001 9:16 PM
To: Tucker, Bill
Subject: RE: Consensus on Cause of explosion in Air India
Flight 182

Dear Mr. Tucker, 13 July 01

Fine, glad to see they were sent and received OK; there were
three
parts,
Location, Cause, and Conclusions.

I hope you have an enjoyable holiday and I await any comments
you have
when you return.

(I just saw the new movie with Robert De Niro and Marlon
Brando, "The
Score" filmed on location in Montreal. It reminded me of years
ago when
my
wife and I cycled all through and around the city. It was a very
bicycle
friendly city.)

Cheers,
Barry

John Barry Smith
(831) 659-3552 phone

551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Dear Mr. Smith,

Thanks. I was able to open the first file you sent (both formats),
but
I'll
have to close a few applications before I can open the pictures. I
am
about
to go on holidays, but I have printed your "conference room" text
to
read
while I am away.

Sincerely,

Bill T..

X-From_: Bill.Tucker@tsb.gc.ca Fri Aug 3 15:25:09 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Startling SDR
Date: Fri, 3 Aug 2001 18:24:11 -0400

Dear Mr. Smith,

Thanks. I'm back as of Monday (though have one more week to look forward to in late Aug) and am catching up on e-mail again. During my holiday, I enjoyed reading two of the bigger docs you had sent me.

Re the info. below, I was not aware of that. I found it of interest and have forwarded it to 3 or 4 other people.

Re your closing para about a supplemental report on Air India 182, I don't think we can contemplate doing so in view of present workload and the fact of the very extensive RCMP investigation and the upcoming trial. We would at least want to see what the latter generates. Also, if we were to suggest

re-consideration of the Govt of India safety investigation report, I believe we should do so to the Govt of India.

Bill Tucker.

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Sunday, July 22, 2001 11:18 PM

To: Tucker, Bill
Subject: Startling SDR

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 22 July 2001,

Hope you had a good holiday and welcome back.

I just did research this evening and found this startling SDR in
the FAA
database: Capitals in original.

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
Engine Group : 4056
Engine Model : PW4056
Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29

A/C N Number : 199UA
Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

Mr. Tucker, this is very very scary knowing what we know about forward cargo doors opening in flight from electrical causes. If that CB had **been** pushed in (why was it out) during flight, that forward cargo door would have ruptured/opened with known catastrophic results. What is a 'controller' and what 'malfunctioned'? UAL, above incident airline and well familiar with UAL 811, had habit of pulling door CB out and were **told** to stop, order 8300.10 below. They are apparently still pulling the door CB and it may have saved their ass.

Sir, I hope you have decided to proceed with a supplemental report on **Air** India Flight 182 based on subsequent similar events such as

United
Airlines Flight 811 and for certain because of incidents like the
above.

Please do something.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

ORDER: 8300.10

APPENDIX: 4

BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
for Airworthiness (FSAW)

BULLETIN NUMBER: FSAW 93-50

BULLETIN TITLE: Inappropriate Use of Circuit Breakers
During B-747 Lower Lobe Cargo Door Operation

EFFECTIVE DATE: 06-02-94

1. SUBJECT. This FSIB informs inspectors of unsafe
procedures

being used by some operators to close and lock the lower lobe cargo doors of the Boeing 747 (B-747) series aircraft.

2. BACKGROUND.

A. This bulletin was developed after an inquiry by a foreign airworthiness authority into the special procedures used by a specific operator to close and lock the lower lobe cargo doors of B-747 series aircraft. The special procedure included in the operator's maintenance manual called for manual tripping of the cargo door control circuit breakers and the section 2 ground handling bus circuit breaker in order to further remove the possibility of power being applied accidentally to the cargo door control circuitry.

B. The manual tripping of the circuit breakers in special cargo door lock procedures is unnecessary and decreases the reliability of the circuit breakers to perform their intended function. Frequent switching of the breakers could cause them to trip before the point of rated voltage or not to trip at all. Both cases could have adverse effects (such as the following) in relation to the safe operation of the cargo doors:

(1) Circuit breakers that trip before the point of rated voltage would cause increased manual operation of the cargo doors.

(2) Manual operation could introduce additional failure conditions, such as out-of-sequence operation and overdriving of the cargo door mechanisms.

(3) Service history has shown that manual operation of the cargo doors is more prone to cause damage; for example, the failure of a breaker to trip at the point of rated voltage could lead to

failed components and fire.

2

C. The revision to the B-747 cargo door lock sectors warning system, in airplanes compliant with Airworthiness Directive (AD) 90-09-06, provides an increased level of integrity so that manual tripping of the circuit breakers is not necessary to prevent the possibility of an uncommanded opening of the cargo doors. Furthermore, power to the cargo door is automatically removed by the Master Latch Lock System upon first motion of the Master Latch Lock Switch away from the fully unlocked position.

3. ACTION. Principal maintenance inspectors (PMI) having certificate management responsibilities for operators of Boeing 747 series aircraft should ensure that this information is brought to the attention of their respective operators. Any operators using this procedure should be discouraged from its continued use.

4. INQUIRIES. This FSIB was developed by SEA.AEG. Any questions regarding this information should be directed to AFS-510 at (703) 661-0333, extension 5018.

5. EXPIRATION. This FSIB will expire on 05-31-95.

/s/

Edgar C. Fell

--

Nothing is meaningless;
Every thing is important.

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: November 20, 2001 1:08:16 PM PST
To: "John Barry Smith" <barry@corazon.com>
Subject: **RE: Request from RCMP AITF**

Dear Mr. Smith,

This is just an interim reply. In a nutshell: I may be able to attend.

I am certainly willing to do so if you and Sgt. Blachford feel I could be of assistance. It would be much better for John Garstang to be there - as my knowledge of the subject is "orders of magnitude" below his. However, he simply can not be made available given the amount of time he has already contributed to the Air India 182 investigation and the magnitude and urgency of the work on his plate for our investigation of the Swissair 111 accident.

I must emphasize that my contribution would be essentially to attend as a detached third party with a strong functional interest in the subject matter, but no vested interest in the outcome.

I look forward to hearing from you. Meanwhile, I shall follow up with Sgt Blachford re possible date, etc.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Wednesday, November 14, 2001 4:29 PM
To: Tucker, Bill
Subject: Request from RCMP AITF

<< Message: Untitled Attachment >> << File:
blachford9nov01.jpg >>

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 14 Nov 01

Below in a scan is a request from RCMP AITF Sgt Blachford to come to California to meet and discuss my Air India Flight 182 report in some detail, taking at least a day to do so. He is asking when and

where I
would prefer to meet.

I am going to reply back soon that in my home office is a good
place
and the sooner the better. Would you or your representative like
to
join us? Note below that Mr. J. Garstang 'is not available and will
not be available in the foreseeable future.'

Is there any way possible that a TSB aviation accident
investigator
can spare a few hours for discussion of my shorted wiring/
forward
cargo door rupture/explosive decompression/inflight breakup
explanation for Air India Flight 182 with me and a representative
of
the RCMP AITF? It will be most fruitful. What dates and times
or
place would be convenient?

I'll meet you or your representative at the Monterey Airport, or, if
you drive, as I did in March to Vancouver, call me and I'll set you
up with lodging. An alternative meeting place is possible.

I've also invited an attorney from the defence assigned by the
Crown,
Mr. Keith Hamilton, to join us.

It seems the mood has changed in the past few days after AA 587
and
now the first speculation of a cause of an airliner crash is
mechanical failure instead of a terrorist act (such as believed in

1985). It looks like facts, data, and evidence, are taking priority now and that is good. There are lots of those for support of a mechanical cause for Air India Flight 182 and I would look forward to laying them out for you or your representative.

The poignant emails below between us were just prior to the WTC attacks in which obvious terrorist acts in airliners took place. It was a different world then for aviation security and I understand the added workload and budget expenditures the TSB now has.

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: November 20, 2001 1:08:41 PM PST
To: "John Barry Smith" <barry@corazon.com>
Subject: Recall: Request from RCMP AITF

Tucker, Bill would like to recall the message, "Request from RCMP AITF".

From: "Tucker, Bill" <Bill.Tucker@TSB.GC.CA>
Date: November 20, 2001 1:14:12 PM PST
To: "'John Barry Smith'" <barry@corazon.com>
Cc: "'Bart BLACHFORD'" <BART.BLACHFORD@rcmp-grc.gc.ca>
Subject: **RE: Request from RCMP AITF**

Dear Mr. Smith,

This is just an interim reply. In a nutshell: I may be able to attend.

I am certainly willing to do so if you and Sgt. Blachford feel I could be of assistance. It would be much better for John Garstang to be there - as my knowledge of the subject is "orders of magnitude" below his. However, he simply can not be made available given the amount of time he has already contributed to the Air India 182 investigation and the magnitude and urgency of the work on his plate for our investigation of the Swissair 111 accident.

I must emphasize that my contribution would be essentially to attend as a detached third party with a strong functional interest in the subject matter, but no vested interest in the outcome.

I look forward to hearing from you. Meanwhile, I shall follow up with Sgt

Blachford re his views, possible date, etc.

Bill T..

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Sent: Wednesday, November 14, 2001 4:29 PM

To: Tucker, Bill

Subject: Request from RCMP AITF

<< Message: Untitled Attachment >> << File:
blachford9nov01.jpg >>

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 14 Nov 01

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I am going to reply back soon that in my home office is a good place and the sooner the better. Would you or your representative like to join us? Note below that Mr. J. Garstang 'is not available and will

not be available in the foreseeable future.'

Is there any way possible that a TSB aviation accident investigator can spare a few hours for discussion of my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 with me and a representative of the RCMP AITF? It will be most fruitful. What dates and times or place would be convenient?

I'll meet you or your representative at the Monterey Airport, or, if you drive, as I did in March to Vancouver, call me and I'll set you up with lodging. An alternative meeting place is possible.

I've also invited an attorney from the defence assigned by the Crown, Mr. Keith Hamilton, to join us.

It seems the mood has changed in the past few days after AA 587 and now the first speculation of a cause of an airliner crash is mechanical failure instead of a terrorist act (such as believed in 1985). It looks like facts, data, and evidence, are taking priority now and that is good. There are lots of those for support of a mechanical cause for Air India Flight 182 and I would look forward to laying them out for you or your representative.

The poignant emails below between us were just prior to the WTC

attacks in which obvious terrorist acts in airliners took place. It was a different world then for aviation security and I understand the added workload and budget expenditures the TSB now has.

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: December 1, 2001 11:34:09 AM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Confirming 4/5+December meeting**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 1 Dec 01

Sgt Blachford called and confirmed you both will be flying into Monterey Airport on Tuesday night, 4 Dec, renting a car, checking into the Doubletree Inn, and coming out to my home office on Wednesday morning about 9AM. Very good. The hotel is a fine one in downtown Monterey.

Directions to my house:

From Doubletree make way to Highway 1 South, a four lane highway. Drive up large hill and then down the hill on Highway 1 to Carmel Valley Road which is left turn only road with a traffic light. Drive on Carmel Valley road about 12 miles and turn left on Country Club Drive which is a dangerous left turn only road with only a yellow blinking light to give advance notice. (Portofino Inn sign on left at entrance.) Drive up Country Club Drive a mile until coming to green mailbox on left which says Smith 541 on it and make dangerous left turn down the driveway. The up driveway is for 551 and the down driveway is the correct one. Drive down narrow driveway into circular driveway and park.

We shall walk around a bit and get the lay of the land and then get to it. As it goes, we may find that discussion past Wednesday is necessary and that is fine, some things take time to digest and sleeping on it may suggest new questions the day after.

Please call at any time, Tuesday or Wednesday, if any confusion arises.

I have prepared copies of all relevant accident reports and pictures. We shall have notepads, printer for extra material, the internet for research, and the phones for communication.

I am at your service for as long as necessary to resolve any doubts you may have that Air India Flight 182 deserves a supplemental/updated investigation conducted by TSB or AITF based upon the upcoming trial and subsequent similar accidents that suggest there is a plausible mechanical alternative explanation for the explosive decompression/inflight breakup

which constitutes a current hazard to the Canadian flying public.

Thank you again for coming.

Cheers,
Barry Smith

(831) 659 3552 landline
831 594 6493 cell
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: December 3, 2001 10:39:27 AM PST
To: "John Barry Smith" <barry@corazon.com>
Subject: **RE: Confirming 4/5+December meeting**

Dear Mr. Smith,

This is to confirm receipt of your e-mail and to thank you for the thorough directions. I shall be meeting Sgt Blachford at the Car Rental Desk at the airport, and I am expecting to be the Navigator - so your directions will come in handy.

I look forward to meeting you. I'll call you if any glitches arise.

Bill Tucker.

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Saturday, December 01, 2001 2:34 PM

To: Tucker, Bill

Subject: Confirming 4/5+December meeting

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 1 Dec 01

Sgt Blachford called and confirmed you both will be flying into Monterey

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notice. (Portofino Inn sign on left at entrance.) Drive up Country Club

Drive a mile until coming to green mailbox on left which says Smith 541 on

it and make dangerous left turn down the driveway. The up driveway is for

551 and the down driveway is the correct one. Drive down narrow driveway

into circular driveway and park.

We shall walk around a bit and get the lay of the land and then get to it.

As it goes, we may find that discussion past Wednesday is necessary and

that is fine, some things take time to digest and sleeping on it may

suggest new questions the day after.

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I am at your service for as long as necessary to resolve any doubts you

may have that Air India Flight 182 deserves a supplemental/ updated

investigation conducted by TSB or AITF based upon the upcoming trial and

subsequent similar accidents that suggest there is a plausible

mechanical
alternative explanation for the explosive decompression/inflight
breakup
which constitutes a current hazard to the Canadian flying public.

Thank you again for coming.

Cheers,
Barry Smith

(831) 659 3552 landline
831 594 6493 cell
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

--

From: John Barry Smith <barry@corazon.com>
Date: December 5, 2001 8:44:22 PM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Debrief

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 5 Dec 01

Well, thank you again for coming, I think the meeting went well. Everyone found out more than what we knew before. My trust is in the bits and pieces that you and Sgt Blachford seek to clarify

will lead to the larger picture, thus confirming the shorted wiring/
forward cargo door rupture/explosive decompression/inflight
breakup explanation. The evidence speaks better than I can.

I remain available for any questions, answers, followup that you
may have, please call anytime.

As I digest the contents of today's intense discussion, I will add
further thoughts; the aspect of Mr. Garstang's aft bomb is
particularly disturbing since it does not refute the explosion in
forward conclusion of CASB, Mr. Davis of AAIB, nor the Kirpal
findings, and does not add any significant new evidence that
supports aft bomb explosion. How to explain away the sudden
loud sound that matches an explosive decompression of a DC 10
but not a bomb?

Well, I hope Sgt Blachford does indeed stay in touch with me as
he said. We shall see.

Thanks again for the time and effort to come down to discuss the
issue. I also learned a lot from you about the workings of the
TSB, and from all indications, it is a superior structure because it
maintains true independence which is what all investigations
need.

I hope your flights back went smoothly.

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,

Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: December 11, 2001 5:46:42 AM PST
To: "John Barry Smith" <barry@corazon.com>
Subject: **RE: Debrief**

Dear Mr. Smith, - - -Barry

Thank you, too. Bart Blachford and I both found the discussion interesting and informative. We also appreciated the fact that you and your family invited us into your home for the meeting. As you have indicated, we all have more to think about. I think we all had our minds broadened by the discussion.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Wednesday, December 05, 2001 11:44 PM
To: Tucker, Bill
Subject: Debrief

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 5 Dec 01

Well, thank you again for coming, I think the meeting went well. Everyone found out more than what we knew before. My trust is in the bits and pieces that you and Sgt Blachford seek to clarify will lead to the larger picture, thus confirming the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. The evidence speaks better than I can.

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I hope your flights back went smoothly.

Cheers,
Barry

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www.corazon.com
barry@corazon.com

--

From: John Barry Smith <barry@corazon.com>
Date: December 11, 2001 1:55:17 PM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Garstang Report in text, unable to send PDF

Garstang report scanned and optical character reader interpretations with many errors below.

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AIRCRAFT OCCURRENCE INVESTIGATION REPORT

Air India Flight 182, "Kanishka"
Boeing 747-237B, VT-EFO

North Atlantic Ocean

110 Miles West of Cork, Ireland
23 June 1985

by: John H. Garstang

16 March 2001

AIRCRAFT OCCURRENCE INVESTIGATION REPORT

Air India Flight 182, "Kanishka"
Boeing 747-237B, VT-EFO
North Atlantic Ocean
110 Miles West of Cork, Ireland
23 June 1985

John H. Garstang
16 March 2001

LIST OF APPENDICES

Appendix "A": Boeing 747-200 Fuselage Diagrams showing
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Appendix "B": Boeing 747-200 3D CAD Fuselage Model with
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Appendix "C": Boeing 747-200 3D CAD Fuselage Model showing Top, Bottom, Left and Right Side Views of Skin Targets.

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Appendix "E": Top View of the Aft and Bulk Cargo Compartment Floors showing the following combinations:

Appendix "E1": Skin Targets, Pallets, Baggage Containers and Bulk Cargo Regions. Appendix "E2": Floor Targets, Pallets, Baggage Containers and Bulk Cargo Regions.

Appendix "F": Sample of Positional Data for Positively Identified Targets. Appendix "G": Plot of All Targets on a Universal Transverse Mercator Grid. Appendix "H": Plot of Targets: Northern Wreckage Trail (Sections- 41, 42, 44) and Southern Wreckage Trail (Sections: 46, 48) on a Universal Transverse Mercator Grid. Appendix "I": Plot of Targets: Northern Wreckage Trail (Sections- 41, 42, 44), Southern Wreckage Trail (Sections- 46, 48), Engine Parts (Sections: 7.11, 7.12, 7.13), 7.31), Wing Parts (Sections- 12, 14, 15, 16, 17, 18) and the first item found (Target "IA" - Suitcase) on a Universal Transverse Mercator Grid.

1.0

INTRODUCTION

1.1 This report summarizes my observations and conclusions pertaining to the investigation into the Air India Flight 182 occurrence. Some historical background information will be presented first in order to explain the role of some agencies, the timing of some events, and my involvement and/or interaction. Short briefs will then be given on the technical aspects of my work for the Royal Canadian Mounted Police (RCMP) Air India Task Force (AITF). This work was concentrated in two main areas:

Structural Break-up Analysis and, Trajectory/Wreckage Pattern Analysis

2.0

ICAO BACKGROUND

2.1

The International Civil Aviation Organization (ICAO) is the specialized agency the United Nations has designated to be responsible for establishing international standards,

recommended practices and procedures covering the technical, economic, and legal fields of international civil aviation operations. ICAO is headquartered in Montreal, Canada.

Most States are members. Canada and India are members.

2-2

Article 26 of the Convention on International Civil Aviation obliges States to institute an Aircraft Accident Inquiry in accordance with ICAO procedures. "Standards and Recommended Practices for Aircraft Accident Inquiries" were first adopted pursuant to

Article 37 of the Convention and were redesignated as Annex 13. Since

the Air India Flight 182 occurrence took place in international waters, jurisdiction to conduct the aircraft accident investigation was the responsibility of the country of aircraft registry: India (refer to ICAO Annex 13).

2. '3

The Government of Canada offered assistance to the Government of India, which was accepted. The Canadian Aviation Safety Board (CASB) provided some of that assistance and participated in the Government of India investigation as an Accredited Representative (refer to ICAO Annex 13).

CASB/TSB BACKGROUND

The CASB was created in 1984, by an Act of Parliament, as an independent federal government agency with the sole object of advancing aviation safety. It was not the object of the Board to determine or apportion any blame or liability in connection with aviation occurrences. The mandate of the CASB was to advance aviation safety by: conducting independent investigations and, if necessary, public inquiries into aviation occurrences (accidents, incidents, or safety hazards) in order to make findings as to their contributing factors and causes;

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*identifying safety deficiencies as evidenced by aviation occurrences-

*reporting publicly on its investigations and public inquiries and on the related findings-,

*making recommendations designed to eliminate or reduce safety deficiencies.

3.2

The CASB was subsequently replaced by the Transportation Safety Board (TSB) of Canada. The TSB was created by an Act of Parliament which came into force on 29 March 1990. The TSB is also an independent federal government agency with a mandate similar to the CASB, but the areas of responsibility were increased to include railway, marine, and commodity pipelines in addition to aviation. The TSB inherited the CASB aircraft accident investigation files, including the Air India Flight 182 file (CASB file number: 5002-85-F50903). The TSB has not carried out an investigation into Air India Flight 182.

4.0

C AVIATION INVESTIGATION (1985 TO 19801

4.1

Activities such as search, recovery, and analysis of floating and submerged wreckage from Air India Flight 182 was undertaken in 1985, as part of the Government of India aircraft

'dent investigation. CASB participated in these act'v' 'es (and others) as an Accredited

Representative. It should be noted that only a very small fraction of the aircraft was recovered. Subsequent RCMP AITF dive campaigns (referred to later in this report) recovered only a few additional pieces.

4.2

Internal CASB reports and correspondence were prepared on some aspects of the investigation. Copies of other reports and reference material (both domestic and foreign) were compiled by CASB (under CASB file number: 5002-85-F5090'3). This information was used by CASB to prepare a submission for the

purpose of advancing aviation safety.

4.

During the Government of India investigation into the Air India Flight 182 occurrence, I was employed at CASB and participated in this investigation. My duties involved:

- search and recovery operations,
- .providing failure analysis assistance to the CASB investigation team,
- .examining a few pieces of wreckage for post-blast damage,

Attendin- a small part of the Justice Kirpal Commission of Inquiry to provide technical advice on failure analysis and post-blast damage on a few pieces of wreckage to the CASB Investigator-in-Charge: Art LaFlamme.

5.0

ANALYSIS WORK FOR RCMP (1988 TO PRESENT)

5.1

In 1988, the RCNV requested aircraft accident investigation assistance from the CASB, as part of their on-coin- criminal investigation into Air India Flight 182. I was assigned to

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The submission was ry in India.-

carry out this work for the RCNP AITF. Work activities

involved-

a independent aircraft accident investigation review of the reports and files pertaining to the Air India Flight 182 occurrence,

mission planning and participation in the 1989 RCNU dive campaign,

participation in explosive sabotage tests conducted by the United States (US) Federal Aviation Administration (FAA) on a narrow body Boeing 707 aircraft in Tucson, Arizona in July 1989.

5.2

Through RCNW requests to the TSB, I have been seconded to the RCNT AITF to continue to provide aircraft accident investigation assistance for their on-going criminal investigation. I-Eghlights of some of the work activities I was involved in follows:

*continued independent aircraft accident investigation review of the reports and files pertaining to the Air India Flight 182 occurrence,

*invited to and participated in the British Air Accidents Investigation Branch Boeing 747-121 Pan Am Flight 103 Lockerbie investigation in 1989,

*participated in mission planning for the 1990 RCNT dive campaign (it was postponed),

*did mission planning and participated in the 1991 RCNT dive campaign,

*participated in the RCNV AITF visit to the Department of Civil Aviation Facilities in New DeN and the Air India Facility in Bombay in June, 1992, to examine all Air India Flight 182 wreckage stored in India,

*participated in explosive sabotage tests conducted on a narrow body DC-10 aircraft by the RCMP in Carp, Ontario in October 1997),

*reviewed other aviation occurrences and aircraft bombings for reference purposes during different intervals which were concentrated over the time frame from 1994 to 1997 (work continues to date),

*reviewed FAA explosive sabotage tests results conducted on a wide body Boeing 747-100 aircraft, which was destroyed in Bruntford, Leicestershire,

Leicestershire, England in May 1997,

*re-examined all wreckage in the possession of the RCNW AITF in Vancouver in July 1997,

*attended RCMP explosive sabotage tests conducted on the cargo compartment section of a wide body Boeing 747-200 aircraft in Tucson, Arizona in October 1997,

*attended explosive sabotage tests on a wide body Lockheed L-1011 aircraft in Mobile, Alabama in January of 1998,

*reviewed information on the Air France Flight 171 Boeing 747 aircraft occurrence, United States registration: N1252E, in May 1998,

examined personal effects of the victims with the RCNW AITF in February 1998.

5.3

My independent investigation work for the RCW AITF has been concentrated in two main areas:

Structural Break-up Analysis and, Trajectory/Wreckage Pattern Analysis.

A summary of this work is outlined in Sections 6.0 and 7.0 of the report. It should be noted that the Air India Flight 182 data I

used for my work is primarily based on information gleaned from:

- 0 Kirpal Commission of Inquiry records,
- 0 CASB records (CASB file number: 5002-85-F50903),
- 0 data collected by the RCMP AITF and,
- 0 information on other aircraft occurrences, tests, etc., used for reference purposes.

5.4

While carrying out my work for the RCNIP AITF, two other TSB employees have, on occasion, provided some part-time assistance to myself. These individuals are:

Louis Landfiault

Mr. Landfiault primarily provided help in the design and operation of the Computer Aided Design/Drafting (CAD) and integrated database system used in this investigation (refer to Section 6.0 of the report).

Demetrios Karafotias

Mr. Karafotias primarily provided early CAD operator assistance such as creating some initial wreckage plots. He is no longer employed at the TSB.

5.5

Two private contractors hired by the RCNP have, over different contract periods, provided full-time assistance to myself during the Air India Flight 182 investigation. These individuals are:

. Jack Melson

Mr. Melson primarily provided early wreckage target identification and fracture pattern plotting.

. Ted Slack

Slack primarily provided follow-on wreckage target identification and fracture pattern plottino,

5.6

Arrangements were also made through the RCMP to obtain specialized CAD services from the Department of National Defence (DND) Quality Engineering Test Establishment (QETE). The DND QETE employee tasked to manage this work was.-

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Fabian Allard
in

Mr. Allard was primarily responsible for convert' g two dimensional (2D) drawings of fracture patterns (produced by Mr. Melson and Mr. Slack) into three dimensional (3D) CAD model pieces. I-Es group then added the exterior paint scheme of the aircraft onto the surfaces of these items.

5.7

Further assistance was also provided by the RCW. For example, a RCNT member of the Criminal Intelligence Directorate was assigned to provide long term local liaison and support. The individual assigned was:

Sgt. Terry Goral

Sgt. Goral was the primary contact who provided records and file information. He also assisted in organizing, checking and validatin- data.

6.0

STRUCTURAL BREAKUP ANALYSIS

6.1

Some of the data referred to in paragraph 5.3 was reorganized for analysis work. An example is the following imagery:

- *all available underwater photographs (colour negative/colour positive) and underwater videos from the 1985, 1989 and 1991 dive campaigns,

- *photographs taken during the AITF examination of recovered wreckage in New Delhi and Bombay in 1992,

- *photographs taken of wreckage in the possession of the AITF in Vancouver in 1997.

6.2

The imagery listed above was indexed and entered into a database which was linked to a Computer Aided Design/Drafting (CAD) system. The photographs (in excess of 5000 in number) were scanned onto Compact Disks (CDs). All the 1985, 1989 and 1991 videos were digitized onto Digital-S video cassettes (which numbered in excess of 75). The digitization process was undertaken to preserve as well as organize the imagery. Each video segment and each CD image were then linked, where possible, to a target number and logged into the database/CAD system. The CD imagery was run on computers equipped with software that could facilitate image processing operations. These operations were used to enhance the imagery as necessary to bring out fine detail through enlargement, contrast/brightness/edge/colour adjustment, etc. The computer was also linked to printers for hard copy output. The digital video was run on equipment that could be interfaced to computers so that

electronic frame grabs could be taken of video imagery to create still pictures, as needed. The imagery was analysed to systematically trace out fracture patterns on engineering drawings. The fractures were located by plotting their relationships to engineering drawing details such as:

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doors,
windows,
paint schemes,
skin cutouts and joints,
rivet patterns,
frames,
stringers,
beams, etc.

6.3

Work was concentrated on tracing out the fracture patterns of the positively identified parts that formed the exterior skin of the fuselage. In addition, positively identified pieces associated with the floor structure of the aft cargo and bulk cargo compartments were also traced out. The flooring work was undertaken to reconstruct this area in more detail since the exterior skin was more broken up in this region. Attempts were made to also reconstruct the passenger floor in the same vicinity, however, there was insufficient information available to complete this task.

6.4

The fracture patterns were transferred from 2D drawings to a scale, 3D- CAD model of the aircraft. By doing this work, the aircraft was systematically reconstructed in the computer in 3D. Each individual piece of wreckage drawn was correlated to its

target number, and each could be color coded to designate from which Section of the aircraft it was associated with (refer to Appendix "N" for Section numbers and Station (STA) numbers). The following pieces of exterior fuselage and empennage (tail assembly) skin have been reconstructed, and transferred to the 3D aircraft model with the appropriate paint scheme (listed by target number from the front to the rear of the aircraft, in columns to be read from top to bottom, left to right):

"245"	"358/399"	cciiii	'-26"	c'9711	"6811
'419211	4'1 -17 11	"287"	"656'f	4c7491	119911
"218"	4'2 8 11	'4011	"307"	cc73 11	c'67" "204"
"711	cc81'	cc28211	"3 3 /-1 4 11	"2711	41 1 91 of
		14 1 ft	"loll,	'4658'f	4'36911 5
11	"')62/-)9611	21 11	4'71 11	'c)20"	c4-) 71 It c"37t'

6.5

Isometric views of the 3D aircraft model showing different combinations of detail are shown in Appendix "B". The exterior paint scheme on the model has been projected through onto the inside surfaces of the aircraft skin to better highlight details such as the location of windows, doors, etc. The outline of the cargo areas has been depicted by coloured LDI baggage containers, 88" x 125" pallets, and subdivided bulk cargo compartment floor regions. Cargo information is based on the aircraft load sheets and

91

other associated material. The layout of skin targets (referred to in paragraph 6.4) and the layout of the passenger floor plan (based on engineering drawing details and the passenger manifest) are also shown.

6.6

Appendix "C" shows different two dimensional views of the aircraft (top, left, bottom and right) with the outline of each skin target, which has been labelled with its target number.

The targets in this Appendix are depicted without the aircraft paint scheme, and they have not been drawn in as fine a detail as that shown on the 3D aircraft model. The outline of some primary aircraft structure (e.g. stringers and frames) appear underneath the targets for reference purposes.

6.7

The outline of other targets that make up the aft cargo and bulk cargo compartment floor structure were drawn out in a similar manner. The floor pieces that were reconstructed (listed by target number from the front to the rear of the aircraft, in columns to be read from top to bottom, left to right) are:

c'2f	c42511	'c653"
c'47'f	'c40ll	

(Note: Target "40" is in both the list above and the list in paragraph 6.4 because it is comprised of pieces from both the exterior fuselage skin, and from the aft cargo and bulk cargo compartments).

6.8

Appendix "D" depicts left and right side views of the aft fuselage showing the aft and bulk cargo compartments. It illustrates the spatial relationship of the skin targets to the pallets, baggage

containers and the bulk cargo regions. Target "24" is also shown with these items. This target is a piece of the baggage container situated at position 44R in the aft cargo compartment.

6.9

Appendix "E" is a top view of the aft and bulk cargo compartment floors showing different combinations of detail. It illustrates the spatial relationship of the skin and floor targets to the pallets, baggage containers and bulk cargo regions.

Breakup Analysis of the Forward Half of the Aircraft Fuselage (Sections 41, 42, 44)

6.10

It should be noted that systematic analysis of each piece of wreckage for both the forward and rear halves of the aircraft did not reveal any evidence of any malfunction or pre-existing defect that may have been contributory to the occurrence. The fractures and fracture patterns examined were all consistent with an overload mode of failure.

6.11

Breakup analysis of the forward half of the aircraft fuselage (Sections 41, 42 and 44) disclosed that it had fractured into large segments (e.g. targets: "192", "4218f", "I7") which were found lying in large crumpled piles or heaps, smaller pieces of wreckage tended to be found in concentrated clusters or groups of items,

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the interior was often found entrapped, entangled, attached, or in close proximity to the exterior skin and structure which initially enveloped it (this was particularly evident in the large segments previously referred to).

Detailed examination revealed that in Sections 41, 42 and 44 items such as aircraft furnishings, insulation, wiring, seats, floor structure, and fuselage frames were often found still fixed to and/or crushed/pinned within these heaps, or they were found in close proximity to them. It should be noted that the size of some of the large segments of the aircraft could not be fully delineated by tracing the fracture patterns since some areas were partially buried and/or were hidden from view. Consequently, some reconstructed portions of the aircraft are lacking data in some areas, and therefore represent conservative estimates of the overall extent of the pile or chunk. Examples of this are seen in targets "192" (Section 41), "218" (Section 42) and "137" (Section 44).

6.12

The general appearance of the piles or chunks (referred to in paragraph 6.1 1) indicated that these portions of the aircraft struck the water predominantly intact. For example, the exterior skin of the lower portion of the nose of the aircraft shows evidence where it has been sandwiched on impact. The skin is badly flattened from being crushed by the internal 'de, and dished inward by the water'impact forces on the other. This structure on one si was seen on target "245" (Section 41).

Similarly, the fuselage portion above the wing centre section (target "IJ7") has essentially remained as one massive piece. This piece was still attached to a considerable portion of the upper wing.

Breakup Analysis of the Rear Half of the Aircraft Fuselage (Sections 46 and 48)

6.13

Breakup analysis of the rear half of the aircraft (Sections 46 and

48) disclosed that in contrast to the front half of the aircraft: the structure had fractured into smaller pieces, the overall extent of fragmentation was greater, the pieces were typically found lying alone, isolated from one another, the interior was characteristically stripped away from the exterior skin and the structure which initially enveloped it.

Examination disclosed that the vast majority of exterior skin from the rear of the aircraft was essentially bare, devoid of interior items such as furnishings, insulation, seats, etc. Analysis revealed that a sudden and distinct change between the two different types of fuselage breakup patterns occurred at fuselage Station (STA) 1480. This location corresponds to the manufacturing joint between fuselage Sections 44 and 46. It is located just behind the wings of the aircraft. The forward end of the aft cargo compartment is located at a bulkhead at this location. The area of the Joint was found to have completely fractured in two. The fracture at STA 1480 is considered significant since'.

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it generates a clear dividing line between the two different breakup patterns observed.

6.14

It was previously noted that the rear of the aircraft was much more fragmented. The extent of fragmentation generally increased from STA 1480 aft until the vicinity of STA 2400, where large pieces of the empennage were encountered (e.g. fin, horizontal stabilizers). The largest pieces of wreckage in the rear of the aircraft were situated adjacent to STA 1480 (refer to target "28"), and adjacent to STA 2400 at the empennage (refer to targets "31" and "37"). On the left side of the vertical fin

(target"37")was delineated by tracing the fracture patterns since the right side was partially buried and/or hidden from view. The fin was found lying on its right side on the ocean floor.

Consequently, this delineation represents a conservative estimate of the overall extent of the fin.

6.15

The breakup of the aft cargo and bulk cargo compartments in the rear half of the aircraft were found to be unique. As such, they will be discussed separately below.

Breakup Analysis of the Aft Car2o and Bulk Cargo Compartments

6.16

The manner in which targets from this area separated is considered to be significant. The targets of specific interest are:

Target "7",
Target "8",
Target "47",
Target "307",

and other targets which exhibit deformation patterns.

Target "7"

6.17

Target "7" is a large piece of belly skin from the aft cargo compartment, along the aircraft centerline. It is approximately 32 feet in length and approximately 8 feet in width. It extends from STA 1480, which is the forward end of the aft cargo compartment, to approximately STA 1860. It extends almost the full length of the aft cargo compartment. The compartment ends at STA 1920. The keel beam extension booms are attached at one

end near STA 1480. The sides of this piece of skin generally follow stringers 45L and 45R.

6.18

Target "7" exhibits key characteristics that are considered to be very significant. The large piece of skin that makes up this target is clearly separated from the ends of all the frames it was attached to, without being grossly deformed or disfigured (e.g., bent, twisted, crushed) over the vast majority of its surface area. There were three regions that did exhibit some localized deformation. These regions were situated at the periphery at the right side where some curling of sheet metal took place near STA 1540 and STA 1760, and at the

-9-

end of target "7" near STA 1860. It is significant to note that the frames on target "47" that mate to the skin on target "7" were also found to be in very good condition, as were the other pieces of the floor assembly on target "47" (refer to paragraph 6.24).

Examination of the fracture patterns indicated that the skin and frames had been pulled apart in overload. The manner in which they were pulled apart (leaving both the skin and floor structure in such good condition, over such a large area) is unique. This is not characteristic of aerodynamic or impact damage. The only type of loading that could conceivably generate this type of failure is: internal overpressure load(s) acting on the inside surface of the belly skin, pushing the skin outward away from the frames.

The regions where localized deformation took place were found to also be consistent with this mode of failure (refer to deformation patterns in paragraph 6.28). It is significant to note

that the local deformation that took place at the end of target "7" near STA 1860 was also present on target "8" (refer to paragraph 6.22).

6.19

Another unique feature observed on target "7" was the overload failure of the keel beam splice joints situated near STA 1480. The keel beam is one of the strongest parts in the aircraft. It forms the foundation upon which the aircraft structure is built. The keel beam extends across the centre of the body gear wheel well in the aircraft centre section. Two booms are attached to the keel hewn box by splice joints near STA 1480. These booms extend aft along the underside of the aircraft and are rivetted to the belly skin of target "7". The overload failure of the splice joints is significant because of the enormous load required to break them and, the joints were broken without imparting any significant gross deformation damage to the belly skin they were attached to.

6.20

Yet another unique feature was observed on target "7". A sinusoidal displacement along the fractured left edge of the skin (near strincer 45L) was found to have taken place. In my entire career, I have never observed this phenomena on a piece like this except in one instance, which I will describe in paragraph 6.21. I have consulted with my aircraft accident investigation colleagues in other governments (e.g. AAEB, NTSB) and in industry. To date, I have found no one who has seen this phenomena on a piece like this elsewhere in any aircraft accident cases.

6.21

The only instance where I have found a similar example of a sinusoidal displacement on a piece like target "7" was when I

examined photography and video of a piece of fuselage skin from the Bruntingthorpe 747-100 destructive bomb tests. I have observed in another instance, pieces which bore a resemblance but the amplitude of the sinusoidal pattern was not as pronounced. This occurred when I examined pieces of aircraft wreckage from the Mobile LI 0 1 1 destructive bomb tests.

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Target "8"

6.22

Target "8" is a piece of belly skin that mates to the end of target "7" at STA 1860 and extends to approximately STA 1960. About half of the length of this piece of skin is situated below the luggage containers at position 44R and 44L (at the aft end of the aft cargo compartment), and the other half is situated below position 51 (at the forward end of the bulk cargo compartment). The sides of this piece of skin generally follow stringers 46L and 47R.

6.23

Target "S" is considered significant because it also exhibited separation of all of the frames from the belly skin, like target "7". It too is consistent with having been generated by internal overpressure load(s). Targets "7" and "8" essentially comprise most of the belly skin below the floor of the aft cargo compartment. The deformation and degree of damage on target "8" was much greater than target "7".

Target "47"

6.24

Target "47" is a piece of cargo compartment floor and floor

support structure. It extends from approximately STA 1590 to approximately STA 1770. This piece basically spans most of the width of the aft cargo compartment from stringers 45L to 41R. It is predominantly situated below the pallets at position 32P and 41P, in the nu'd portion of the aft cargo compartment. It is comprised of approximately 9 frames which mate to the skin of target "7".

6.25

Target "47" is considered very significant because it also exhibited a clean separation of all its frames that mate to the belly skin of target "7". The frames were found to be in very good condition, as were the other pieces of the floor assembly on it such as roller trays, retractable drive wheels, etc. The thin frangible sections of the frames exhibited minimal damage and were not significantly deformed (e.g. bent, twisted, squashed). These characteristics are also consistent with having been generated by internal overpressure load(s).

Target "307"

6.26

This item is a piece of exterior skin located from approximately STA 2060 to approximately STA 2220, and from approximately stn'n-er 28L to approximately stn'nger 42L. It forms part of the bottom and left side of the bulk cargo compartment. This piece was recovered during the RCMP 1989 dive campaign.

6.27

Some frames had cleanly separated from the skin. The skin exhibited bulges in an outward direction in between rivet lines, creating a "quiltin-" pattern. Small depressions were also present

around rivet holes, which appeared consistent with damage caused by the rivets either being pulled through the skin or failing in tension after they had plastically deformed

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the skin. The "quilting" and pull through effect of rivets are considered consistent with damage caused by internal overpressure load(s).

Deformation Patterns

6.28

The plastic deformation of individual pieces of fuselage skin from both the forward and rear halves of the aircraft were studied (pieces analysed are listed in paragraph 6.4). Outward bulging of the skin and/or the presence of petals or curls in the sheet metal of the skin were found on some targets. For the purposes of this report, petals or curls are defined as the shape formed when pieces of s have been plastically deformed in an outward direction, such that a continuous curve or near continuous curve is generated, producing a roll or part of a roll in the sheet metal. The radius of curvature typically is not constant.

6.29

Although it is possible for outward bulging of the skin and petals or curls to be made in sheet metal in some instances by aerodynamic forces during breakup or due to water impact, analysis indicated that a significant number of deformations found in the rear half of the aircraft were not associated with these types of events. An ordered and well integrated, not random, pattern was found in the rear half This was in contrast to the forward half of the aircraft where deformation was found to

be primarily associated with impact damage.

6.30

In the rear half of the aircraft numerous pieces of exterior skin on the bottom and both sides of the fuselage were found to be deformed in a manner consistent with them having been peeled or rolled outward, away from the aft cargo and bulk cargo compartment areas. Outward bulging of the skin was also present on some targets. For example, targets such as "287", cc65811, "26" and "69" on the left side of the aircraft, and corresponding targets c'321 ", "71 " and "282" on the right side showed some of these characteristics. The sheet metal of some of these targets exhibited petals and curls consistent with having been pushed outward, and in a general direction upward, toward the window lines of the aircraft, and/or some outward bulging of the skin was present. This overall pattern is considered significant. It is consistent with: damage generated by the rupture and venting of internal overpressure outward from the aft cargo and bulk cargo compartment areas.

Aircraft Pressurization

6.10

It should be noted that most of the aircraft fuselage is a pressure vessel. Except for the nose gear and main landing gear wheel wells, and the centre wing structure, the fuselage from STA 140 to STA 2160 is pressurized when the aircraft is in cruise flight. Regulation of pressure is primarily accomplished by controlling the size of the openings of outflow valves, through which ventilation air escapes from the aircraft. Failure of the aircraft

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pressurization system was studied to see if a malfunction of this

system could create rapid overpressurization in the fuselage. No scenario could be conceived that was consistent with the evidence in this case.

6.32

Detonation of a bomb (improvised explosive device) in the aft cargo compartment or bulk cargo compartment could generate sudden, large, overpressure pulses. These overpressure pulses could distribute large loads on numerous inside surfaces almost simultaneously. The layout of the lower fuselage is such that only a thin curtain separates the aft cargo compartment from the bulk cargo compartment. Both these compartments are interconnected. Cargo load information indicates that there were only two luggage containers in the aft cargo compartment (at positions 44L and 44R), and that four open pallets containing engine parts and cowlings were forward of these containers. There would have been open airspace around the pallet locations. Hence, air pressure associated with blast effects could be transferred around the pallets, and onto the bulkhead at the front of the aft cargo compartment (at STA 1480). Post-blast overpressure effects could transfer tremendous loads to the keel beam joints at this location. If the 44L and 44R luggage containers and the bulk cargo curtain were breached, air pressure could more easily be transferred to the aft cargo compartment, and vice versa. Veliting of post-blast overpressures could generate petals and curls as well as outward bulging in the aircraft skin. The structural damage analysed exhibits similarities to the damage created by the Bruntingthorpe 747-100 destructive bomb (improvised explosive device) tests.

Structural Breakup Analysis Summary

6.33

Analysis indicated that the aft cargo and bulk cargo compartments failed due to large, internal, overpressure load(s). The only plausible way to do this rapidly, and in the manner previously described, is by the detonation of a bomb (improvised explosive device). The evidence I have examined is consistent with this.

7.0

TRAJECTORY[WRECKAGE PATTERN ANALYSIS

7.1

An analysis of the trajectory of the wreckage was undertaken to see if pattern(s) were present in the debris field. This work was not undertaken with any intent of, nor should it be misconstrued to be capable of, defining the exact or precise location where a particular part will come to rest. The work was conducted to analyse the general location where parts should fall (for certain given conditions) compared to the location where parts were found. It should be noted that the breakup of an aircraft in-flight involves numerous complex reactions and interactions, some of which may be random in nature. A wide variety of wreckage pieces will be created during the break-up which vary in weight, size, shape, etc. The behaviour of these parts as they fall through the atmosphere, and descend through the ocean (approximately 6700 feet in depth) in this case, cannot be precisely determined since there are simply too many unknowns, and too many variables. For example, the exact characteristics of the atmosphere and the ocean at the time of the occurrence (such as the direction and speed of the winds and/or currents) are not known,

7.2

If it is presumed that the manner in which all the wreckage was

deposited on the ocean floor is meaningless because it is hypothesised that some unpredictable mixing of the wreckage has taken place (e.g. due to random events and/or due to the complexity of the situation), then the pattern of the parts on the ocean floor should show this. Conversely, if the wreckage has been deposited on the ocean floor in an ordered way that fits the laws of science in a predicted manner, then the pattern of the parts on the ocean floor should also show this. In order to determine which may apply in this case, I carried out my analysis.

7.3

The primary source of positional data I used in my analysis comes from the original 1985 aircraft accident investigation material, and from the RCMP AITF 1989 and 1991 dives (refer to Appendix "F" for samples of the data). The 1985 positional data was used to relocate targets during the RCW AITF 1989 and 1991 dive campaigns. The 1985 positions of the wreckage were found to be in general agreement with the positions measured in 1989 and 1991. All available data associated with the Air India Flight 182 dive campaigns (including the most recent ones) were reviewed, and relevant portions were indexed and correlated in a database. The identity of each part was logged, related to where on the aircraft it had come from, and each was colour coded to designate from which section of the aircraft it was associated with. Efforts were concentrated on wreckage classified as positively identified. The location of each piece of wreckage on the ocean floor was plotted using Computer Aided Design/Drafting (CAD) software linked to the database. By doing so, different permutations and combinations were able to be queried in the database and the results were able to be graphically displayed, and output.

7.4

Some key points I used in my analysis (based on my independent review of the case) are:

1. the aircraft was proceeding normally at a constant airspeed and altitude toward the East (essentially along the 51° 35' North line of latitude) prior to the occurrence,

2. something sudden, without warning, and catastrophic in nature occurred,

3. no evidence was found of any malfunction or pre-existing defect that may have been contributory to the occurrence,

4. meteorologic information indicated that a mainly West or West North West airflow covered the area at the cruise altitude, surface winds were forecast to generally be Westerly, no significant meteorological reports (sigmets) were valid for the area at the time of the occurrence,

5. submerged wreckage came to rest on an essentially flat, featureless, ocean floor,

6. submerged wreckage was surveyed to determine the location of each part on the ocean floor, and parts were identified to determine where on the aircraft they had come from.

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7.5

The wreckage field found on the ocean floor was generally oblong in overall shape, roughly orientated in a Northwest to Southeast direction. It was approximately 14 kilometres long from the first isolated target found at the most Westerly location (target

"IX": a tom suitcase at position 51° 02.63' North, 120 53.12' West) to the last item at the Eastern end of the debris field.

However, most of the wreckage was in an area that measured approximately 10 1/2 kilometres long by approximately 2 kilometres wide. There was a cluster of items to the North of the main body of wreckage, most of which are contained in an area that measured approximately 1 kilometre square (refer to Appendix 'I&' for an overall wreckage plot) .

7.6

Analysis of the wreckage revealed that concentrated heavy mass items (e.g. engines) were situated in the cluster of parts in the Northern portion of the debris field. Given the flight direction of the aircraft, these items (which conceptually act like cannon balls) define a base point for the trajectory analysis. Current and/or wind would have little effect on their trajectory path since they exhibit a lot of inertia (ie. once 'in motion, they want to remain in motion). When positively identified fuselage targets were plotted (by aircraft Section number), and colour coded to identify what portion of the aircraft they had come from, two distinct wreckage trails were evident. There was a slight overlap of a few pieces of each trail, which may have occurred due to factors such as the close proximity of one trail to the other. Both wreckage trails were orientated in an East South East direction (with light items predominantly deposited at the East South East ends of the trails). This indicates that the predominant wind/current drift line was to the East South East. This is consistent with a West North West airflow which defines the asymptote for each wreckage trail.

7.7

The first wreckage trail off the aircraft track was comprised almost exclusively of pieces from the rear half of the aircraft (e.g. Section numbers 46 and 48). This will be referred to as the Southern trail (coloured green). Since this trail was the first trail

encountered off the aircraft track, the trajectory analysis indicates that these items were the first group of parts to separate from the aircraft. The second wreckage trail was comprised almost exclusively of pieces from the front half of the aircraft (e.g. Section numbers 41, 42, and

44). This will be referred to as the Northern trail (coloured red). Since this trail was the second trail encountered off the aircraft track, the trajectory analysis indicates that this group of items separated from the aircraft as a second, separate event, after the first. In other words, the analysis indicates that the aircraft broke up in-flight in two major stages (refer to Appendices "H" and "I"). Parts comprising the Northern wreckage trail were found to be forward of the STA 1480 break, and parts comprising the Southern wreckage trail were aft of this break.

7.8

Trajectory analysis of the geographic distribution and concentration of wreckage indicated that the Southern green trail (Sections 46 and 48; rear half of the aircraft fuselage) was much more individually deposited as separate items, and spread out than the Northern red

-15-

trail (Sections 41, 42, and 44- forward half of the aircraft fuselage). As previously noted in the structural breakup analysis section of this report (refer to Section 6.0), the forward half of the aircraft fuselage had fractured such that it tended to be in larger, more complete chunks, clumps, or clusters of parts. In addition, more of the interior of the forward half was found intermixed or contained within exterior pieces of the skin as exemplified by targets "192", "218", and "137". This was in contrast to the rear half of the aircraft where the interior tended

to be stripped away. From a trajectory analysis perspective, these findings are consistent with the structure of the rear half of the aircraft being much more extensively broken up at altitude and scattered, than the forward half of the fuselage.

7.9

It is significant to note that the very first item found (the most Westerly part) was a tom suitcase (target "1A!"). This suitcase was situated approximately 3 1/2 kilometres West from the Western edge of the main debris field. Since it was found so early along the flight path, it is consistent that this is one of the very first items to have separated from the aircraft. In order for this to take place, it is likely that an opening in the fuselage occurred at a location where a suitcase was in proximity to the opening, such as in the vicinity of a cargo compartment or overhead locker (if an item of this type would have been allowed to be taken into the passenger compartment as carry-on luggage). In addition, some of the first items to be found at the beginning of the Southern trail were targets "8" (piece of belly skin below the aft end of the aft cargo compartment, extending to the forward end of the bulk cargo compartment), target "7" (large piece of belly skin below the aft cargo compartment) and target "2" (piece of cargo compartment floor from the aft cargo compartment). Based on the trajectory analysis, evidence indicates that the suitcase probably came from the rear of the aircraft, since the first off Southern trail of wreckage was comprised almost exclusively of pieces from the rear of the aircraft. Early breakup of the bulk cargo and aft cargo compartments was indicated by the early presence of targets '6811, "7" and "2" at the beginning of the trail.

7.10

It is significant to note that the wreckage trail patterns bear a very

strong resemblance to a known case involving the same type of aircraft, at essentially the same altitude and speed, which was proceeding normally when, without warning, something sudden and catastrophic occurred. In this reference case, there was also no evidence found of any malfunction or pre-existing defect that may have been contributory to the occurrence. The case I am referring to is the Pan Am Flight 103 occurrence (refer to United Kingdom Department of Transport, Aircraft Accident Report 2/90, "Report on the accident to Boeing 747-121, N79PA at Lockerbie, Dumfriesshire, Scotland on 21 December 1988"

There is an important distinction between the Air India Flight 182 and Pan Am Flight IO')

C,

cases. The distinction is that the wreckage trail patterns indicate that the lead Air India Flight 182 breakup event occurred in the rear of the aircraft, as opposed to the front in the Pan Am IO') case.

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Trajectory/Wreckage Pattern Summary

7.11

Trajectory/wreckage pattern analysis indicated that the aircraft broke up in-flight in two major stages that occurred in sequence. Evidence indicates that the sudden, lead, catastrophic event was associated with the early, extensive destruction of the rear half of the fuselage. The breakup of the aft cargo and bulk cargo compartment areas played a key role in this event.

8.0

SYNOPSIS

8.1

The aircraft was proceeding normally when, without warning, something sudden and catastrophic in nature occurred.

8.2

No malfunction or pre-existing defect that may have been contributory to the occurrence was found.

8.3

Trajectory/Wreckage Pattern analysis indicates that the aircraft broke up in-flight in two major stages that occurred in sequence, creating the first off Southern wreckage trail and the secondary Northern wreckage trail.

8.4

The composition of parts in the first off Southern wreckage trail indicated that the lead catastrophic event was associated with the early, extensive destruction of the rear half of the fuselage (Sections 46 and 48). The composition of parts in the Northern wreckage trail indicated that the front half of the aircraft (Sections 41, 42, and 44) broke up later in the sequence.

8.5

The presence of the following targets at the beginning of the first off Southern wreckage trail indicated that the early, extensive destruction of the rear half of the fuselage was initially associated with the breakup of the aft cargo and bulk cargo compartment areas:

*Target "8": a piece of belly skin below a portion of the aft and bulk cargo compartments,

0Target "7": a large piece of belly skin below the aft cargo compartment and,

0Target "2": a piece of aft cargo compartment floor and floor support structure.

8.6

Structural Breakup Analysis disclosed that in contrast to the front half of the aircraft where it had fractured into large segments which were found lying in large crumpled piles or heaps with the interior often found entrapped, entangled, attached or in close proximity to the exterior skin and structure which initially enveloped it-, the rear half of the aircraft was much more fragmented into smaller pieces which were typically found lying alone, isolated from one another with the interior characteristically stripped away from the exterior skin and structure which initially enveloped it.

17-

8.7

Structural Breakup Analysis disclosed that the unique manner in which target "7", target "8", and target "47", failed in overload is consistent with all these failures having been caused by large internal overpressure load(s).

8.8

The presence of a unique sine wave on target "7" is consistent with having been generated by sudden, internal overpressure pulse(s).

8.9

The enormous load required to break the keel beam splice joints situated near STA 1480, and the manner in which these joints were broken in overload without imparting any significant deformation damage to the belly skin they were attached to, are consistent with damage generated by large, internal overpressure pulse(s).

8.10

The outward bulging of skin in between rivet lines which created a "quilting" pattern on target "307" is consistent with damage caused by internal overpressure load(s).

8.11

The overall deformation pattern of the exterior skin on the bottom and both sides of the rear fuselage, which exhibited petals or curls and the outward bulging of structure, is consistent with damage generated by the rupture and venting of internal overpressure(s) outward from the aft cargo and bulk cargo compartment areas.

9.0

CONCLUSION

9.1

Analysis indicates that the sudden and catastrophic loss of the aircraft was due to the overload failure of the aft cargo compartment and the bulk cargo compartment as a result of sudden, large, internal overpressure load(s). The only plausible way to do this rapidly, and in the manner previously described, is by the detonation of a bomb (improvised explosive device). The evidence I have examined is consistent with this.

SECTION BREAKDOWN		SECTION ERS	
NOMENCLATURE	7-11	Inboard Engine Strut	7-12
Outboard Engine Strut	7-13	Engine and/or	
Cowling	11	Center Section	12
		Wing Panel	14
Leading Edge Flaps	15	Spoilers	16

Trailing Edge, Flaps, Inboard and/or Outboard 17
 Ailerons, Inboard and Outboard 18 Wing- Tit) 41
 Body Section (STA 90 to STA 520) 42 Body Section
 (STA 520 to STA 1000) 44 Body Section (STA 1000 to
 STA 1480) 46 Body Section (STA 1480 to STA 2360) 48
 Body Section (STA 2360 to STA 28')2) 61 Main
 Landing Gear - Wing 62 Nose Landing Gear 6'3
 Main Landing Gear - Body 81 Stabilizer Torque Box
 82 Stabilizer and/or Tip 8 @) Stabilizer
 Leading Edge 84 Elevators, Inboard and/or Outboard
 85 Dorsal Fin 86 Vertical Fin Assembly 87
 Vertical Fin Leading Edge 88 Rudders, Upper
 and/or Lower

Note:For the purposes of this report, empennage (tail assembly)
 pieces that comprise Section Numbers 81 to 88 will be
 grouped with Body Section Number 48 (as per reports
 prepared for the Kirpal Commission of Inquiry),

From: John Barry Smith <barry@corazon.com>
Date: December 11, 2001 1:56:18 PM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Garstang PDF Report

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: December 12, 2001 3:46:28 PM PST
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Sixteen years ago today...

Noted, thanks. In fact, I rec'd another e-mail today on the same

topic. It was from Ron Schleede - formerly of the NTSB who retired last year and who was heavily involved in the CASB investigation of the Arrow Air accident.

By the way, that cause statement below is verbatim correct, and, in my view, also correct in the sense of an appropriate conclusion to a thorough and unbiased investigation. It is quite different from what some people think (or say) that the Board said.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Wednesday, December 12, 2001 2:58 PM
To: Tucker, Bill
Subject: Sixteen years ago today...

Accident description - Status:Final

Date: 12 DEC 1985
Time: 06.46
Type: McDonnell Douglas DC- 8-63CF
Operator: Arrow Air
Registration: N950JW
C/n: 46058/433
Year built: 1969
Total airframe hrs: 50861 hours
Crew: 8 fatalities / 8 on board

Passengers: 248 fatalities / 248 on board

Total: 256 fatalities / 256 on board

Location: Gander (Canada)

Phase: Initial Climb

Nature: Non Scheduled Passenger

Flight: Gander IAP - Fort Campbell, KY (Flightnumber 1285R)

Remarks:

Crashed shortly after take-off from Runway 22. PROBABLE

CAUSE: "The

Canadian Aviation Safety Board was unable to determine the exact sequence

of events which led to this accident. The Board believes, however, that

the weight of evidence supports the conclusion that, shortly after lift-off, the aircraft experienced an increase in drag and reduction in

lift which resulted in a stall at low altitude from which recovery was not

possible. The most probable cause of the stall was determined to be ice

contamination on the leading edge and upper surface of the wing.

Other

possible factors such as a loss of thrust from the number four engine and

inappropriate take-off reference speeds may have compounded the effects of

the contamination."

Source: (also check out sources used for every accident)

AW&ST 19.12.88 (107), 20.3.89 (267), 27.3.89 (33)3.4.89 (67), 3.7.89

(66-67) ,31.7.89 (29), 1.7.1991 (29) + FI 21-28.12.1985 (2) + ICAO Adrep

Summary 1/89 (29)
Gander: the untold story

[legenda] [disclaimer]

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Aviation Safety Network; updated 5 August 2001

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From: John Barry Smith <barry@corazon.com>
Date: December 13, 2001 9:13:44 AM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Whoa, Nelly....**

Wednesday, December 12, 2001

Crazed horses on jet to Toronto
Bumpy ride prompts emergency call to airport

TORONTO (CP) -- Emergency crews were on hand for the arrival of a 747 jetliner to Pearson International Airport on Tuesday after a horse on the plane went berserk during a stretch of turbulence.

Twelve horses were in the cargo hold aboard the flight from Frankfurt, Germany, to Toronto when the ride became bumpy. "One of the horses became agitated and an effort was made to

subdue the horse with tranquillizers," said Air Canada spokeswoman Laura Cooke.

However, the horse's handlers didn't have enough tranquillizers to last the duration of the flight, so other efforts were made to calm it.

Police said one handler had to use the flat end of an axe to bring the horse under control. Cooke could not confirm if this occurred, although she did say the animal was slightly injured in the incident.

"It's expected to make a full recovery," she added.

Two groomers and one Air Canada worker suffered superficial injuries, but did not need to go to hospital, Cooke said.

The plane's pilot made an emergency call to Pearson for help with two hours left in the flight, which was not delayed.

A veterinarian was on standby in Toronto along with ambulances and firetrucks, but the situation was under control by the time the plane landed.

Air Canada routinely ships animals on passenger flights, but Cooke said Tuesday was an "unusual, isolated incident."

There were 230 passengers aboard the flight.

The horses were reportedly being flown in from Europe for use by the RCMP, CFTO-TV reported.

Cooke said Air Canada will be reviewing the matter as part of company policy.

"We want to make sure the existing policy and practice are appropriate," she said, adding that such reviews are "not unusual."

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From: John Barry Smith <barry@corazon.com>
Date: December 17, 2001 8:55:50 AM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **NTSB was with 182/Trial delay**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 17 Dec 01

Let us take advantage of this extra time to further check out the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Air India Flight 182 and others.

I'm hoping this extra time will give Sgt. Blachford and the AITF incentive to interview me again as he checks out the items of interest he discovered during our discussions such as paint smears and twisted torque tubes. I've paraphrased parts of this letter and will snail mail him a copy.

Is there any chance we can view videotapes of that door area of Air India Flight 182 together to look for those matches to United Airlines Flight 811?

During our talks down here I mentioned that the family of one of the victims of United Airlines Flight 811, the Campbells, had quoted a NTSB investigator as saying the Air India Flight 182 door looked just like the United Airlines Flight 811 door which gives a further match to a wiring cause and not a bomb. You said you believed that no NTSB investigator had access to the Air India Flight 182 photos and thus could give no opinion. I was

able to research this further and discovered that, in fact, a NTSB investigator did have access to all of the Air India Flight 182 data and thus could state with accuracy that the Air India Flight 182 door matched the United Airlines Flight 811 forward cargo door. That investigator was no less than Jim Wildey, the person who ruled out the forward cargo door of Trans World Airlines Flight 800 based on only the examination of eight of the ten latches.

Below excerpt from the Campbells of New Zealand to me:

'We flew to Seattle but were told we could not see the door , we drove to Washington to see the NTSB and as we entered the office we were told they could spare us 5 minutes,about 3 hours later we held a set of the recovered C locks and Lock sectors and they admitted we were correct , that they would ensure that the aircraft would be fixed but not to hold our breath waiting for a new report ever to be released . After lunch with them I asked " in light of what we now know on 811 do you still think that Air India was a bomb ?" The reply was that we never thought that Air India was a bomb in fact the video shows a cargo door exactly the same as 811.'

From Kirpal Report below on Air India Flight 182:

'1.5.16 The participant had all filed their affidavits by way of submissions. The Court indicated that formal hearings would be held for the purpose of cross-examining some of the witnesses

about three weeks after the receipt of all the reports of the various groups. While in Cork, in the first week of November, 1985 some of the salvaged pieces of the wreckage were brought there. After they were inspected by all the participants and their advisers, who were present in Cork, it was decided by the Court that further detailed metallurgical and other examination of those pieces would be done at BARC, Bombay. In order that there should be no undue delay the Court decided that a Group be constituted consisting of expert representatives of all the participants and also the nominees of the Court. This group was asked to carry out metallurgical and other examination of some of the critical pieces salvaged and give its report to the Court. The group constituted as a 'Committee of Experts' was as under :-

- a. Mr. A.J.W. Melson, Canadian Aviation Safety Board, Canada.
- b. Mr. R.K. Phillips, Canadian Pacific Air, Canada.
- c. Mr. T. Swift, Federal Aviation, Administration, USA.
- d. Mr. R.Q. Taylor, Boeing Commercial Airplane Co., USA.
- e. Mr. J.P. Tryzl, Boeing Commercial Airplane Co., USA.
- f. Mr. J.F. Wildey II, National Transportation Safety Board USA.
- g. Mr. S.N. Seshadri, Bhabha Atomic Research Centre, India (Coordinator).'

Small world, as the world of accident investigation may assumed to be. Ron Schleede, Jim Wildey, and John Garstang keep on turning up on these four Boeing 747 events.

The above suggests that for Air India Flight 182, the NTSB representative, Jim Wildey, said no bomb; the AAIB representative, Mr. Roy Davis, said no bomb; the Canadian Aviation Safety Board, (CASB) declined to say bomb, and only a

judicial officer, not an aircraft investigator, Judge Kirpal, said bomb, and even that opinion was given reluctantly:

From Kirpal Report:

'ANALYSIS AND CONCLUSIONS

4.1 From the evidence which is available what has now to be determined is as to what caused the accident.

4.2 Finding the cause of the accident is usually a deduction from known set of facts. In the present case known facts are not very many, but there are a number of possible events which might have happened which could have led to the crash.

4.3 The first task is to try and marshal the facts which may have a bearing as to the cause of the accident.

4.4 It is undisputed, and there is ample evidence on the record to prove it, that Air India's Kanishka had a normal and uneventful flight out of Montreal. The aircraft had been in air for about five hours and was cruising smoothly at an altitude of 31,000 feet.

The readout from the CVR shows that there was no emergency on board till the catastrophic event had occurred. This is corroborated by the printout available from the DFDR. The event occurred at approximately 0714 Z and that brought the aircraft down, and it probably hit the surface of the sea within a distance of 5 miles. The time within which the plane came down at such a steep angle could not have been more than very few minutes. There was a sudden snapping of the communication between the aircraft and the ground. The aircraft had also suddenly disappeared from the radar.

4.5 It is evident that an event had occurred at 31,000 feet which had brought down 'Kanishka'. What could have possibly happened to it? The aircraft was apparently incapacitated and this was due either to it having been hit from outside; or due to some structural failure; or due to the detonation of an explosive device

within the aircraft.

4.6 Evidence indicates that after the event had occurred, though the pilots did not or were not in a position to communicate with the ground, they nevertheless appeared to have taken some action. ...

4.7 It can further be speculated that if an explosion takes place in the forward cargo compartment, the oxygen stream might have been damaged so that when the pilots donned their masks as part of the emergency drill for explosive decompression, they were not breathing enriched oxygen and the time of useful consciousness at about 31,000 feet would be significantly less than 30 seconds under high stress and if the pilots became unconscious as a result of this, then the aircraft would have got out of control which would explain the subsequent events.

4.8 ..."The United States Norad/Space Command has confirmed that there was no incoming space debris in the vicinity of Ireland on June 23, 1985."

4.9 Thus we are left with only two of the possibilities viz., structural failure or accident having been caused due to a bomb having been placed inside the aircraft.

4.10 After going through the entire record we find that there is circumstantial as well as direct evidence which directly points to the cause of the accident as being that of an explosion of a bomb in the forward cargo hold of the aircraft. At the same time there is complete lack of evidence to indicate that there was any structural failure.'

So, that's two aviation accident investigation agencies giving an opinion that there was no bomb, one agency declining to say a bomb, and one judicial officer saying bomb out of two equal choices. That's three to one against supporting bomb. When Judge Kirpal said there 'is complete lack of evidence to indicate that there was any structural failure,' he was correct in 1986

because he did not know what a structural failure from an inadvertently opened cargo door in flight looks like on a Boeing 747, nobody did. But now we do know and the evidence matches United Airlines Flight 811, not a bomb event although initially thought to be by the crew.

I hope to hear from AAIB regarding my questions of the status of the starboard side of Pan Am Flight 103, such as ruptures at midspan latches and paint smears above the forward cargo door. Those are easy questions to answer and can be determined in fifteen minutes inside the hangar or two minutes looking at photographs. Can you get photographs of that blown out starboard side of Pan Am Flight 103 and check if there are large ruptures like Trans World Airlines Flight 800 and paint smears like United Airlines Flight 811 and Trans World Airlines Flight 800?

I wish you were not retiring so soon this coming summer.

Cheers,
Barry

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Carmel Valley, CA 93924
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barry@corazon.com

http://timesofindia.indiatimes.com/articleshow.asp?art_id=1836280357
A-I bombing trial postponed to Nov. 2002

VANCOUVER: The trial for three men charged with killing 329 passengers in the 1985 Air India bombing, expected to start in February, has been moved to November.

British Columbia Supreme Court justice Ian Bruce Josephson Friday rescheduled the trial, expected to be the most complex and longest in Canadian history, to allow more time for pretrial motions and jury selection.

The trial of Ripudaman Singh Malik, Ajaib Singh Bagri and Inderjit Singh Reyat had originally been set for February 4. Josephson's ruling is outlined in a 25-page written brief that is banned from publication until at least Wednesday, when defence lawyers will advise whether they object to any part of the decision being published.

The trial was expected to be delayed by construction of a new high-security courtroom scheduled to be ready in April.

Malik and Bagri were arrested October 27, 2000, and Reyat was added to the indictment in June.

The three remain in custody in a Vancouver jail, and only Reyat appeared in court on Friday.

The three are alleged to have been militant Sikh separatists who targeted the airline in June 1985 to retaliate against the government for a raid on Amritsar's golden temple a year earlier.
(AFP)

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Date: January 29, 2002 3:41:02 PM PST

To: "John Barry Smith" <Barry@corazon.com>

Subject: FW: Lockerbie Cago Door Photos

Dear Barry,

As per our discussion last month, I contacted Ken Smart, the "Chief

inspector of Air Accidents" in the U.K. (the head of the AAIB).
He obtained
and forwarded four photos of the Lockerbie B747 showing the
forwrd cargo
door, which I am now forwarding to you.

Ken was quite familiar with the issue of cargo door failures. His
team are
positive that was not at play in the Lockerbie occurrence - either
as a lead
event or as a consequential one.

Bill T..

-----Original Message-----

From: Ken Smart
Sent: Tuesday, January 15, 2002 3:32 AM
To: Bill.Tucker@tsb.gc.ca
Subject: Lockerbie Cago Door Photos

Bill

Please find attached four shots of the Lockerbie B747 cargo door
in
situ on the reconstruction. I hope that it can be clearly seen that
there is none of the classic upwards tearing of the structure above
the hinges.

If you need any further detail, don't hesitate to let me know.

My very best wishes for 2002.

--

Ken Smart

Chief Inspector of Air Accidents <<MVC-641F.JPG>>
<<MVC-642F.JPG>>
<<MVC-643F.JPG>> <<MVC-644F.JPG>>

Attachment converted: Master:MVC-641F.JPG (JPEG/JVWR)
(00060F1A)

Attachment converted: Master:MVC-642F.JPG (JPEG/JVWR)
(00060F1B)

Attachment converted: Master:MVC-643F.JPG (JPEG/JVWR)
(00060F1C)

Attachment converted: Master:MVC-644F.JPG (JPEG/JVWR)
(00060F1D)

This message has the following attachments:

file://localhost/Users/barry/Library/Mail/
Attachments/.DS_Store

file://localhost/Users/barry/Library/Mail/
Attachments/.DS_Store

file://localhost/Users/barry/Library/Mail/
Attachments/.DS_Store

file://localhost/Users/barry/Library/Mail/
Attachments/.DS_Store

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Date: February 1, 2002 3:30:47 PM PST

To: "John Barry Smith" <barry@corazon.com>

Subject: RE: Analysis of PA 103 cargo door photo Part III

Thanks Barry, I'll try to go through your last two e-mail on the weekend.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Friday, February 01, 2002 4:42 PM

To: Tucker, Bill

Subject: Analysis of PA 103 cargo door photo Part III

<< Message: Untitled Attachment >> << File:
skinabove103doorcrop.JPG >>

<< File: 811holewpeoplesky1.JPG >> << File:
811doorhalvesphotocropped.jpg

From: John Barry Smith <barry@corazon.com>

Date: February 22, 2002 3:29:46 PM PST

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Photos and film in TSB hands.

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 22 Feb 02

I just received a letter from Sgt. Bart Blachford of the RCMP dated 18 Feb 02, excerpt below:

"As indicated in my previous correspondence I have forwarded your previous correspondence to our aviation investigator for his consideration. He has the photographs and film footage needed to conduct any further follow up deemed necessary."

I interpret this to me than all my correspondence, photos, and

text, have gone to Mr. John Garstang, just previously reported by Sgt. Blachford to be part of TSB, not RCMP. In addition, this states that Mr. Garstang has the photos and film, and this excerpt reveals that it is up to Mr. Gartstang to 'conduct any further follow up' with the RCMP blessing. If Mr. Garstang were to conduct follow up (whatever that means) on Air India Flight 182, it would be all right from the RCMP point of view. In other words, a supplemental/updated aviation style investigation of Air India Flight 182 would be OK with the RCMP and thus the Crown.

Does that mean that the ball is in Mr. Gartstang's court? Can he drop the ball and let it lie there? Can he be persuaded to run with it? Is he the end of the line for the wiring/cargo door explanation for Air India Flight 182? Is he expected to examine some photos and come to a conclusion that is contrary to what he has believed for 17 years? Mr. Garstang may be biased towards 'bomb' for Air India Flight 182. He has not and probably will not give the wiring/cargo door explanation a chance to speak. He refused to attend our meeting in December. He refuses to correspond with me. He is apparently not interested in contrary opinion, even that which is supported by ample physical evidence. For Mr. Garstang to be the final arbiter of the wiring/cargo door explanation for Air India Flight 182 would be a tragedy if he is the final word and that would be bomb in aft cargo compartment.

I have hopes that you are the final word, Bill, and I know you have an open mind and that means examining the photos and film of the wreckage of Air India Flight 182 to compare the cargo door area to other similar accidents. If there is a match, then a more accurate cause may be determined. If a bomb cause, the bomb explanation should be strengthened by examining the photographs of the aft and forward cargo compartment, no one

should have anything to fear from decades old photographs of sterile wreckage at the bottom of the ocean.

The RCMP have refused to examine photographic evidence which is relevant to an investigation that has been ongoing for 17 years. That is very sad. The RCMP and Mr. Garstang are acting like vengeful prosecutors instead of curious investigators. They have put their 'case' above the public safety.

They have their reasons for this self imposed ignorance I suppose, but from my point of view, facts, data, and evidence are everything and there is much clear and concise wreckage that must be examined to rule out or rule in a current hazard to the flying public.

So, I guess it comes back to you, Bill, as it should as you are the Director General, Investigations Operations. I put great faith in that title.

The photos of the forward door area of Air India Flight 182 must be examined as a fingerprint to see if there is an ID match to another fingerprint, United Airlines Flight 811. Can Mr. Gerden examine the photos as he has experience with wiring problems and wreckage reconstruction of a large airliner, and an open mind not tainted by years of 'bomb' talk?

Can you look at the photographs of Air India Flight 182 forward cargo door area as you looked at the ones of Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800?

Regards,

Barry

John Barry Smith

(831) 659 3552

541 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135
certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650
hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

From: John Barry Smith <barry@corazon.com>

Date: February 27, 2002 10:51:07 AM PST

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Pic 4 exhibit list

From: John Barry Smith <barry@corazon.com>

Date: February 27, 2002 10:51:19 AM PST

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Pic 1 article

From: John Barry Smith <barry@corazon.com>

Date: February 27, 2002 10:51:29 AM PST

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Incident page 5

From: John Barry Smith <barry@corazon.com>
Date: February 27, 2002 10:51:37 AM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Incident page 4

From: John Barry Smith <barry@corazon.com>
Date: February 27, 2002 10:51:45 AM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Incident page 3

From: John Barry Smith <barry@corazon.com>
Date: February 27, 2002 10:51:54 AM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Incident page 2

From: John Barry Smith <barry@corazon.com>
Date: February 27, 2002 10:52:14 AM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Incident page 1

From: "Kevin & Susan Campbell" <smandkjc@internet.co.nz>
Date: March 3, 2002 2:07:55 PM PST
To: "John Barry Smith" <barry@corazon.com>
Subject: Re: 182 door exactly like 811 door

Hi! The main guy we visited at the NTSB that day was Ron Schleede but there were at least 2 others involved in the meeting and lunch. Fairly sure it was Ron who made the comment but he may well deny it. Michael Marx was the Chief of the Materials Lab on 811 Jim Wildey was Senior Metallurgist but Susan recalls it was Ron and Michael we had lunch with. I have found a letter I wrote to Ron Schleede and Michael Marx after our meeting making reference to our discussion about AI

182 and will email that as well.
Regards Kevin

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: March 5, 2002 3:04:28 PM PST
To: "John Barry Smith" <barry@corazon.com>
Subject: **RE: Photos and film in TSB hands.**

Dear Barry,

You are feeding me faster than I can swallow, but I'm still trying to keep up. I now have 50 e-mails in my in-box, unopened; half of them are from you. As you know, I keep mail marked "unread" so I don't forget it. Also, I will not give someone a short half-baked answer if I haven't found the time to adequately consider his/her message to me. So, I keep your mail for when I can find enough time to digest it properly.

I hope (but don't promise) that I can deal with some of it before going on one week's vacation this Saturday.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Friday, February 22, 2002 6:30 PM
To: Tucker, Bill
Subject: Photos and film in TSB hands.

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 22 Feb 02

I just received a letter from Sgt. Bart Blachford of the RCMP dated 18 Feb 02, excerpt below:

"As indicated in my previous correspondence I have forwarded your previous correspondence to our aviation investigator for his consideration. He has the photographs and film footage needed to conduct any further follow up deemed necessary."

I interpret this to mean that all my correspondence, photos, and text, have gone to Mr. John Garstang, just previously reported by Sgt. Blachford to be part of TSB, not RCMP. In addition, this states that Mr. Garstang has the photos and film, and this excerpt reveals that it is up to Mr. Garstang to 'conduct any further follow up' with the RCMP blessing. If Mr. Garstang were to conduct follow up (whatever that means) on Air India Flight 182, it would be all right from the RCMP point of view. In other words, a supplemental/updated aviation style investigation of Air

India

Flight 182 would be OK with the RCMP and thus the Crown.

Does that mean that the ball is in Mr. Gartstang's court? Can he drop the ball and let it lie there? Can he be persuaded to run with it? Is he the end of the line for the wiring/cargo door explanation for Air India Flight 182? Is he expected to examine some photos and come to a conclusion that is contrary to what he has believed for 17 years? Mr. Garstang may be biased towards 'bomb' for Air India Flight 182. He has not and probably will not give the wiring/cargo door explanation a chance to speak. He refused to attend our meeting in December. He refuses to correspond with me. He is apparently not interested in contrary opinion, even that which is supported by ample physical evidence. For Mr. Garstang to be the final arbiter of the wiring/cargo door explanation for Air India Flight 182 would be a tragedy if he is the final word and that would be bomb in aft cargo compartment.

I have hopes that you are the final word, Bill, and I know you have an open mind and that means examining the photos and film of the wreckage of

Air India Flight 182 to compare the cargo door area to other similar accidents. If there is a match, then a more accurate cause may be determined. If a bomb cause, the bomb explanation should be strengthened by examining the photographs of the aft and forward cargo compartment, no one should have anything to fear from decades old photographs of sterile wreckage at the bottom of the ocean.

The RCMP have refused to examine photographic evidence which is relevant to an investigation that has been ongoing for 17 years. That is very sad.

The RCMP and Mr. Garstang are acting like vengeful prosecutors instead of curious investigators. They have put their 'case' above the public safety.

They have their reasons for this self imposed ignorance I suppose, but from my point of view, facts, data, and evidence are everything and there is much clear and concise wreckage that must be examined to rule out or rule in a current hazard to the flying public.

So, I guess it comes back to you, Bill, as it should as you are the Director General, Investigations Operations. I put great faith in that title.

The photos of the forward door area of Air India Flight 182 must be examined as a fingerprint to see if there is an ID match to another fingerprint, United Airlines Flight 811. Can Mr. Gerden examine the photos as he has experience with wiring problems and wreckage reconstruction of a large airliner, and an open mind not tainted by years of 'bomb' talk?

Can you look at the photographs of Air India Flight 182 forward cargo door area as you looked at the ones of Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800?

Regards,

Barry

John Barry Smith

(831) 659 3552

541 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135 certificate

holder.

US Navy reconnaissance bombardier navigator, RA-5C 650 hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

--

From: John Barry Smith <barry@corazon.com>

Date: March 5, 2002 4:33:23 PM PST

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: RE: Photos and film in TSB hands.

Dear Bill, yes, the amount has been hot and heavy; it's because I've been getting a lot of good pictures and info from the Campbells about United Airlines Flight 811 that really support the goal of actually examining the photos of Air India Flight 182 to get the match to United Airlines Flight 811. Sgt Blachford is intrigued also, mainly about the NTSB saying point blank that the forward cargo door of Air India Flight 182 looked exactly like the forward cargo door of United Airlines Flight 811, and as we know, United Airlines Flight 811 was not a bomb, while Air India Flight 182 still is said by some to be so.

I understand and appreciate your efforts to digest them fully and give them the attention they deserve. Standing by for your evaluations.

Thanks for email explaining what's going on.

Cheers,
Barry

Dear Barry,

You are feeding me faster than I can swallow, but I'm still trying to keep up. I now have 50 e-mails in my in-box, unopened; half of them are from you. As you know, I keep mail marked "unread" so I don't forget it. Also, I will not give someone a short half-baked answer if I haven't found the time to adequately consider his/her message to me. So, I keep your mail for when I can find enough time to digest it properly.

I hope (but don't promise) that I can deal with some of it before going on one week's vacation this Saturday.

Bill T..

From: John Barry Smith <barry@corazon.com>
Date: March 17, 2002 1:30:17 PM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Welcome Back

Dear Bill,

Welcome back and hope you enjoyed the vacation.

Cheers,
Barry

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: March 22, 2002 3:52:17 PM PST
To: "'John Barry Smith'" <barry@corazon.com>
Subject: **RE: Welcome Back**

Hi Barry,

Thanks. By the way, I took with me much of the mat'l you had sent me and perused it during my time away. Now I have some selective forwarding to do. I'll get back to you, but will not likely be able before at least next Thursday.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Sunday, March 17, 2002 4:30 PM
To: Tucker, Bill
Subject: Welcome Back

Dear Bill,

Welcome back and hope you enjoyed the vacation.

Cheers,
Barry

--

From: John Barry Smith <barry@corazon.com>

Date: March 22, 2002 4:36:59 PM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **RE: Welcome Back**

Hi Barry,

Thanks. By the way, I took with me much of the mat'l you had sent me and perused it during my time away. Now I have some selective forwarding to do. I'll get back to you, but will not likely be able before at least next Thursday.

Bill T..

Thank you, sir, I've just completed a picture story of the shattered cargo doors and will send once refined and checked over and over for accuracy.

Cheers,
Barry

From: John Barry Smith <barry@corazon.com>
Date: March 22, 2002 10:58:44 PM PST
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Door Story in pdf**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 23 Mar 02

Attached as PDF file is door story or picture story of the cargo doors on four Boeing 747s and their similarities. I hope a pictures is worht a thousand words.

Cheers,
Barry

From: John Barry Smith <barry@corazon.com>

Date: April 11, 2002 10:05:40 AM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Mr. Ken Smart

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 11 April 2002

May I send a letter/email to Mr. Ken Smart and mention that we have been in contact regarding the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Air India Flight 182 and Pan Am Flight 103? He may give the hypothesis some attention if he understands that a fellow transportation government official is considering it.

I'll send you a copy when I send it to Mr. Smart so if he calls you will know what he is referring to. The contents will essentially be the pictures of all the forward cargo door areas of the four aircraft and the smoother port sides with a few charts and excerpts from government reports. You have already received that analysis of the door areas with my conclusion that the doors of all four opened in flight for certain and the cause of the

inadvertent rupturing open under debate.

The goal is to get further examination of Pan Am Flight 103 to either rule in or rule out the opening in flight and then consider that the cause may have been mechanical such as wiring or switch.

It's never too late for safety.

Cheers,
Barry

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: April 16, 2002 3:48:14 PM PDT
To: "John Barry Smith" <barry@corazon.com>
Subject: **RE: Letter to Mr. Ken Smart enclosed.**

Barry,

I've sent it to Ken Smart. I'll also be seeing him here in two weeks and will follow up then

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Tuesday, April 16, 2002 1:02 PM
To: Tucker, Bill
Subject: Letter to Mr. Ken Smart enclosed.

<< Message: Untitled Attachment >> << File:
103doorannotateaw.JPG >> <<

File: 103peelbackcloseup.JPG >> << File: 811bigholeaw.JPG
>> << File:
811peelbackbig.jpg >>

From: Ken Smart <ksmart@aaib.gov.uk>
Date: April 18, 2002 9:41:27 AM PDT
To: John Barry Smith <barry@corazon.com>
Cc: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Mr. Bill Tucker/wiring/cargo door for PA 103 message!**

Dear Mr Smith

Thank you for your hypothesis on the immediate cause of the PanAm 103.

During the first five days of the investigation into PanAm 103 the AAIB were pursuing two general lines of inquiry. The first was that the aircraft had suffered a structural failure in-flight as a result of a defect or induced structural overload, the second was that an improvised explosive device was responsible.

When the evidence of an improvised explosive device was found, the investigation nevertheless concentrated on discovering whether there was any evidence that a structural weakness had been exploited. In that respect the fwd. cargo door was the subject of very detailed examination. All the specialists involved were satisfied that the fwd. cargo door was correctly latched when the device detonated and that the subsequent structural failures were secondary events.

All structures by nature of their design have paths of least

resistance when subjected to abnormal loading. The structure in the vicinity of large strengthened apertures such as the fwd. cargo door provide very good examples of this. The window belt on pressurised aircraft provides another and similar example.

You should not be surprised to find similar patterns of breakup in structural failures that emanate from very different causes.

The important differences lie in the detailed examination rather than the macro features.

I'm sorry to be the one to pour cold water on your hypothesis, but the scenario that you suggest was the subject of very considerable examination in the early stages of the Lockerbie investigation.

Ken Smart

Chief Inspector of Air Accidents

From: "Postmaster" <Postmaster@aaib.gov.uk>

To: "Postmaster" <Postmaster@aaib.gov.uk>

Date: Tue, 16 Apr 2002 18:20:08 +0100

Subject: POP3 Account Warning - No Local Recipients Found in original message!

The entire message text follows:

Return-Path: <barry@corazon.com>
Received: from cpmx0.dircon.net (195.157.7.41) by
storage-2.netscalibur.it (5.5.043)
id 3BD042450FDFC415 for aaib-dot@m.dircon.co.uk; Tue,
16 Apr 2002 19:13:36 +0200
X-Envelope-To: <aaib-dot@dircon.co.uk>
Received: (qmail 29833 invoked from network); 16 Apr 2002
17:17:33 -0000
Received: from rmx3.dircon.net (HELO mx3.dircon.net)
(195.157.4.5)
by cpmx0.dircon.net with SMTP; 16 Apr 2002 17:17:33 -0000
Received: from mail.redshift.com (mail.redshift.com
[216.228.2.86])
by mx3.dircon.net (Mirapoint Messaging Server MOS
2.9.3.2)
with ESMTP id ACH87539;
Tue, 16 Apr 2002 18:17:06 +0100 (BST)
Received: from [216.200.53.25]
(216-200-53-25.corp.redshift.com [216.200.53.25])
by mail.redshift.com (8.12.2/8.12.1) with ESMTP id
g3GH1eVo009147
for <aaib-dot@dircon.co.uk>; Tue, 16 Apr 2002 10:03:34
-0700
Mime-Version: 1.0
X-Sender: barry@smtp.redshift.com
Message-Id: <p04310103b8db6dc03ff3@[216.200.53.108]>
Date: Tue, 16 Apr 2002 10:01:47 -0700
To: aaib-dot@dircon.co.uk
From: John Barry Smith <barry@corazon.com>
Subject: Mr. Bill Tucker/wiring/cargo door for PA 103
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--===== _-1193145836==_=====
Content-Type: multipart/Related;
boundary="===== _-1193145836==_mr=====
===="
; type="text/html"

--===== _-1193145836==_mr=====
Content-Type: multipart/alternative;
boundary="===== _-1193145836==_ma=====
===="

--===== _-1193145836==_ma=====
Content-Type: text/plain; charset="us-ascii" ; format="flowed"

Ken Smart
Chief Inspector of Accidents,
Accident Investigations Branch
AAIB
DRA Farnborough
United Kingdom

Dear Mr. Smart, 17 April 2002

It's never too late for safety and I really believe that since I was two seconds from dying in a sudden, night, fiery, fatal jet airplane crash. Mr. Bill Tucker of TSB and I have been in contact for about a year regarding the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Air India Flight 182. I respect Mr. Tucker immensely and value his opinions.

A few months ago he visited me in my home in Carmel Valley, California to discuss the hypothesis further. We both learned a lot.

Subsequently, I received some photographs of the forward cargo door

area of Pan Am Flight 103. They literally sent chills down my back.

For the first time I could see the actual start of the hull rupture that caused the explosive decompression that led to the destruction.

And the locus was on the shattered starboard side at the aft midspan

latch, not on the smoother port, 'bomb', side. The pictures of the cargo door area show that the skin is torn vertically in a characteristic straight line above the forward cargo door and the fuselage skin in and around the door is petalled outward from a suddenly released internal pressurized force in flight, not inward from ground impact. The latched status of the aft and bulk cargo door

is given as 'locked' whilst the forward cargo door latching status is

unstated which implies it was 'unlocked' and corroborated by the picture below showing much of the door missing, especially the lower

half where eight of the ten latches are located.

It is quite evident the forward cargo door opened in flight when compared to another Boeing 747 whose forward cargo door also opened

in flight, United Airlines Flight 811, a wiring/cargo door event.

Above two pictures show the shattered forward cargo door area of Pan Am Flight 103 with its characteristic peeled back skin from the aft midspan latch and the vertical tearing of fuselage skin above the leading and trailing edge of the door which matches United Airlines Flight 811 forward cargo door area.

Above two pictures show the shattered forward cargo door area of United Airlines Flight 811 with its characteristic peeled back skin from the aft midspan latch and the vertical tearing of fuselage skin above the leading and trailing edge of the door which matches Pan Am Flight 103 forward cargo door area.

Please permit me to further explain, Mr. Smart. For reference I have attached a pdf file with pictures and text to demonstrate that what happened to United Airlines Flight 811 happened to Air India Flight 182, Pan Am Flight 103, and Trans World Airlines Flight 800 starting with the sudden loud sound at event time for all four accidents which would occur at a sudden explosive decompression.

Yes, the implications are enormous but please let's stick to facts,

data, and evidence. The reason those three aircraft (minus United Airlines Flight 811) are always clumped together is that they do indeed have a common cause because they display common evidence such as an abrupt power cut to the recorders right after the sudden loud sound at event time, a very rare occurrence, and the cause is probably wiring or a switch but could be a bomb, or a center tank explosion, or a missile, or any other event that would cause the explosive decompression in flight for all early model Boeing 747s.

I would ask that Pan Am Flight 103 be revisited one more time and examined from the point of view of an electrical problem causing the forward cargo door to try to unlatch which resulted in a rupture at the aft midspan latch and subsequent explosive decompression. The sooty and relatively mild directed blast in the baggage container which caused a 20 inch hole on the port side of Pan Am Flight 103 was probably caused by a 'rather large shotgun', as suggested by AAIB Report 2/90, and not a powerful, plastic, spherical, loud bomb. The forward cargo door area of Pan Am Flight 103 now needs to be examined closely for torque tube damage, latch damage, locking sector cracking along with the recovered pieces of wreckage so close to the explosion

in the forward cargo compartment.

Regardless of the cause, I submit to you, Mr. Smart, with photographs, charts, and text, proof that the forward cargo door of Pan Am Flight 103 ruptured open in flight at initial event time. The cause of the inadvertent opening may have been bomb, center fuel tank explosion, missile, or electrical and each party may present its case. My belief is the cause was mechanical in that the known faulty Poly X wiring shorted on the door unlatch motor, circumstances very similar to United Airlines Flight 811, which is my model. It all comes back to United Airlines Flight 811, the plane that almost lost its nose, that almost crashed, but didn't, and came back to tell its tale; a tale which was not a bomb, (although the crew thought so and so informed the tower) and not an improperly latched cargo door, (although an NTSB AAR, 90/01, was written stating so) but after reexamination years later by government aviation safety officials proved to be an electrical/cargo door problem which was incorporated into the updated NTSB, AAR for United Airlines Flight 811, 92/02.

I have much further evidence, if given a chance to present, (in addition to these cargo door photographs,) such as charts, text, and documents that support the wiring/cargo door explanation and these

analyses are available upon request. Mr. Tucker has them also; as well as the RCMP Air India Task Force. A summary is below:
Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

	AI 182	PA103	UAL 811	TWA 800
Boeing 747	Yes	Yes	Yes	Yes
Early model -100 or -200			Yes	Yes
Polyimide wiring (Poly X type)			Yes	Yes
Sudden airframe breakup in flight (partial or total)	Yes	Yes		
Breakup occurs amidships	Yes	Yes	Yes	Yes
High flight time (over 55,000 flight hours)	No	Yes	Yes	Yes
Aged airframe (over 18 years of service)	No	Yes	Yes	Yes
Previous maintenance problems with forward cargo door	Yes	Maybe	Yes	Maybe
Initial event within an hour after takeoff	No	Yes	Yes	Yes
Initial event at about 300 knots while proceeding normally in all parameters	Yes	Yes	Yes	Yes
Initial event has unusual radar contacts	Maybe	Yes	Yes	Yes
Initial event involves hull rupture in or near forward cargo door area	Yes	Yes	Yes	Yes
Initial event starts with sudden sound	Yes	Yes	Yes	Yes
Initial event sound is loud	Yes	Yes	Yes	Yes
Initial event sound is audible to humans	Yes	Yes	Yes	Yes
Initial event followed immediately by abrupt power cut to data recorders	Yes	Yes	Yes	Yes
Initial event sound matched to explosion of bomb sound	No	No	No	No
Initial event sound matched to explosive decompression sound in wide body airliner	Yes	Yes	Yes	Yes
Torn off skin on fuselage above forward cargo door area	Yes	Yes	Yes	Yes
Unusual paint smears on and above				

forward cargo door	Maybe	Maybe	Yes	Yes
Evidence of explosion in forward cargo compartment	Yes	Yes	Yes	Yes
Foreign object damage to engine or cowling of engine number three	Yes	Yes	Yes	Yes
Fire/soot in engine number three	Maybe	Yes	Yes	Yes
Foreign object damage to engine or cowling of engine number four	Yes	Yes	Yes	Yes
Right wing leading edge damaged in flight	Yes	Maybe	Yes	Maybe
Vertical stabilizer damaged in flight	Yes	Yes	Yes	Maybe
Right horizontal stabilizer damaged in flight	Yes	Yes	Yes	Yes
More severe inflight damage on starboard side than port side	Yes	Yes	Yes	Yes
Port side relatively undamaged by inflight debris	Yes	Yes	Yes	Yes
Vertical fuselage tear lines just aft or forward of the forward cargo door	Yes	Yes	Yes	Yes
Fracture/tear/rupture at a midspan latch of forward cargo door	Maybe	Yes	Yes	Yes
Midspan latching status of forward cargo door reported as latched	No	No	No	No
Airworthiness Directive 88-12-04 implemented (stronger lock sectors)	No	No	No	No
Outwardly peeled skin on upper forward fuselage	Yes	Yes	Yes	Yes
Rectangular shape of shattered area around forward cargo door	Yes	Yes	Yes	Yes
Forward cargo door fractured in two longitudinally	Yes	Yes	Yes	Yes
Status of aft cargo door as intact and latched	Yes	Yes	Yes	Maybe
Passengers suffered decompression type injuries	Yes	Yes	Yes	Yes

Yes

At least nine missing and never recovered passenger bodies Yes Yes Yes Yes
Wreckage debris field in two main areas, forward and aft sections of aircraft Yes Yes No Yes
Initial official opinion of probable cause as bomb explosion. Yes Yes Yes Yes
Initial official determination modified from bomb explosion Yes Yes Yes Yes
Structural failure considered for probable cause Yes Yes
Yes Yes

Inadvertently opened forward cargo door considered for probable cause Yes No Yes Yes
Official probable cause as bomb explosion Yes Yes No No
Official probable cause as 'improvised explosive device' No Yes No No
Official probable cause as explosion by unstated cause Yes No No No
Official probable cause as explosion in center fuel tank with unknown ignition source No No No Yes
Official probable cause as improper latching of forward cargo door No No Yes No
Official probable cause as switch /wiring inadvertently opening forward cargo door No No Yes No
Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight
AI 182 PA103 UAL 811 TWA 80

Mr. Smart, it's never too late for safety and one implication of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Pan Am Flight 103 is

that the hazard of faulty wiring and outward opening nonplug cargo doors still exists. The hazard of potential catastrophic disaster still exists but can be prevented...if the photographs of the Pan Am Flight 103 forward cargo door area persuade you that the door opened in flight and the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation is thus worthy of further investigation.

Please enquire further of me about the wiring/cargo door explanation.

Cheers,

John Barry Smith

(831) 659 3552

541 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135 certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650 hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

--===== _-1193145836==_ma=====

Content-Type: text/html; charset="us-ascii"

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<html><head><style type="text/css"><!--

blockquote, dl, ul, ol, li { margin-top: 0 ; margin-bottom: 0 }

--></style><title>Mr. Bill Tucker/wiring/cargo door for PA

103</title></head><body>

<div>Ken Smart

Chief Inspector of Accidents,

Accident Investigations Branch

AAIB

DRA Farnborough

United Kingdom

</div>

<div>Dear Mr. Smart, 17 April 2002</div>

<div>
</div>

<div>It's never too late for safety and I really believe that since I was two seconds from dying in a sudden, night, fiery, fatal jet airplane crash. Mr. Bill Tucker of TSB and I have been in contact for

about a year regarding the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Air India Flight

182. I respect Mr. Tucker immensely and value his opinions.</div>

<div>

A few months ago he visited me in my home in Carmel Valley, California to discuss the hypothesis further. We both learned a lot.

</div>

<div>Subsequently, I received some photographs of the forward cargo door area of Pan Am Flight 103. They literally sent chills down my back. For the first time I could see the actual start of the hull rupture that caused the explosive decompression that led to the destruction. And the locus was on the shattered starboard side at the aft midspan latch, not on the smoother port, 'bomb', side. The pictures of the cargo door area show that the skin is torn vertically in a characteristic straight line above the forward cargo door and the fuselage skin in and around the door is petalled outward from a suddenly released internal pressurized force in flight, not inward from ground impact. The latched status of the aft and bulk cargo door is given as 'locked' whilst the forward cargo door latching status is unstated which implies it was 'unlocked' and corroborated by the picture below showing much of the door missing, especially the lower half where eight of the ten latches are located.</div>

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<div></div>

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Pan Am Flight 103 with its characteristic peeled back skin from the

aft midspan latch and the vertical tearing of fuselage skin above the

leading and trailing edge of the door which matches United Airlines

Flight 811 forward cargo door area.</div>

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United Airlines Flight 811 with its characteristic peeled back skin from the aft midspan latch and the vertical tearing of fuselage skin

above the leading and trailing edge of the door which matches Pan Am

Flight 103 forward cargo door area.</div>

<div>
</div>

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have attached a pdf file with pictures and text to demonstrate that what happened to United Airlines Flight 811 happened to Air India

Flight 182, Pan Am Flight 103, and Trans World Airlines Flight 800

starting with the sudden loud sound at event time for all four

accidents which would occur at a sudden explosive decompression.</div>

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<div>Yes, the implications are enormous but please let's stick to facts, data, and evidence. The reason those three aircraft (minus United Airlines Flight 811) are always clumped together is that they

do indeed have a common cause because they display common evidence

such as an abrupt power cut to the recorders right after the sudden

loud sound at event time, a very rare occurrence, and the cause is probably wiring or a switch but could be a bomb, or a center tank explosion, or a missile, or any other event that would cause the explosive decompression in flight for all early model Boeing 747s.</div>

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<div>I would ask that Pan Am Flight 103 be revisited one more time

and examined from the point of view of an electrical problem causing

the forward cargo door to try to unlatch which resulted in a rupture

at the aft midspan latch and subsequent explosive decompression. The

sooty and relatively mild directed blast in the baggage container which caused a 20 inch hole on the port side of Pan Am Flight 103 was

probably caused by a 'rather large shotgun', as suggested by AAIB

Report 2/90, and not a powerful, plastic, spherical, loud bomb.

The forward cargo door area of Pan Am Flight 103 now needs to

be
examined closely for torque tube damage, latch damage, locking
sector
cracking along with the recovered pieces of wreckage so close to
the
explosion in the forward cargo compartment.</div>

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<div>Regardless of the cause, I submit to you, Mr. Smart, with
photographs, charts, and text, proof that the forward cargo door
of

Pan Am Flight 103 ruptured open in flight at initial event time.
The

cause of the inadvertent opening may have been bomb, center
fuel tank

explosion, missile, or electrical and each party may present its
case. My belief is the cause was mechanical in that the known
faulty

Poly X wiring shorted on the door unlatch motor, circumstances
very

similar to United Airlines Flight 811, which is my model. It all
comes back to United Airlines Flight 811, the plane that almost
lost

its nose, that almost crashed, but didn't, and came back to tell its
tale; a tale which was not a bomb, (although the crew thought so
and

so informed the tower) and not an improperly latched cargo door,
(although an NTSB AAR, 90/01, was written stating so) but after
reexamination years later by government aviation safety officials
proved to be an electrical/cargo door problem which was
incorporated

into the updated NTSB, AAR for United Airlines Flight 811,
92/02.</div>

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I have much further evidence, if given a chance to present, (in addition to these cargo door photographs,) such as charts, text, and documents that support the wiring/cargo door explanation and these analyses are available upon request. Mr. Tucker has them also; as well as the RCMP Air India Task Force. A summary is below:

**Significant Direct and Tangible Evidence
Obtained for Four B747 Breakups in
Flight**

AI
182 PA 103
UAL
811 TWA 800

Boeing 747
Yes
Yes
Yes
Yes

that the hazard of faulty wiring and outward opening nonplug cargo doors still exists. The hazard of potential catastrophic disaster still exists but can be prevented...if the photographs of the Pan Am Flight 103 forward cargo door area persuade you that the door opened in flight and the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation is thus worthy of further investigation.</div>

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<div>Please enquire further of me about the wiring/cargo door explanation.</div>

<div>

Cheers,

John Barry Smith

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Commercial pilot, instrument rated, former FAA Part 135 certificate

holder.

US Navy reconnaissance bombardier navigator, RA-5C 650

hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

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Sandra Duffin

PS/Ken Smart
Chief Inspector of Air Accidents

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Ken Smart
Chief Inspector of Air Accidents

From: Mail Delivery Subsystem <MAILER-DAEMON>
Date: April 18, 2002 3:03:36 PM PDT
To: <barry@corazon.com>
Subject: Warning: could not send message for past 4 hours

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** YOU DO NOT NEED TO RESEND YOUR MESSAGE **
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The original message was received at Thu, 18 Apr 2002 10:44:25
-0700
from pm5-210.corp.redshift.com [216.228.4.210]

----- Transcript of session follows -----
<Bill.Tucker@tsb.gc.ca>... Deferred: Connection timed out with
mail.tsb.gc.ca.
Warning: message still undelivered after 4 hours
Will keep trying until message is 5 days old

Reporting-MTA: dns; mail.redshift.com
Arrival-Date: Thu, 18 Apr 2002 10:44:25 -0700

Final-Recipient: RFC822; Bill.Tucker@tsb.gc.ca
Action: delayed
Status: 4.4.1
Remote-MTA: DNS; mail.tsb.gc.ca
Last-Attempt-Date: Thu, 18 Apr 2002 15:03:36 -0700
Will-Retry-Until: Tue, 23 Apr 2002 10:44:25 -0700

Return-Path: <barry@corazon.com>
Received: from [216.228.4.210] (pm5-210.corp.redshift.com
[216.228.4.210])
by mail.redshift.com (8.12.2/8.12.1) with ESMTP id
g3IHheSk008584
for <Bill.Tucker@tsb.gc.ca>; Thu, 18 Apr 2002 10:44:25
-0700

Mime-Version: 1.0
X-Sender: barry@smtp.redshift.com
Message-Id: <p04310105b8e4b566fc67@[216.228.4.58]>
Date: Thu, 18 Apr 2002 10:43:45 -0700
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Note from Mr. Smart and my response:
Content-Type: text/plain; charset="us-ascii"

At 5:41 PM +0100 4/18/02, Ken Smart wrote:
X-From_: ksmart@aaib.gov.uk Thu Apr 18 09:41:49 2002
Date: Thu, 18 Apr 2002 17:41:27 +0100
To: John Barry Smith <barry@corazon.com>
From: Ken Smart <ksmart@aaib.gov.uk>
Subject: Mr. Bill Tucker/wiring/cargo door for PA 103 message!
Cc: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Dear Mr Smith

Thank you for your hypothesis on the immediate cause of the PanAm 103.

During the first five days of the investigation into PanAm 103 the AAIB were pursuing two general lines of inquiry. The first was that the aircraft had suffered a structural failure in-flight as a result of a defect or induced structural overload, the second was that an improvised explosive device was responsible.

When the evidence of an improvised explosive device was found, the investigation nevertheless concentrated on discovering whether there was any evidence that a structural weakness had been exploited. In that respect the fwd. cargo door was the subject of very detailed examination. All the specialists involved were satisfied that the fwd. cargo door was correctly latched when the device detonated and that the subsequent structural failures were secondary events.

All structures by nature of their design have paths of least resistance when subjected to abnormal loading. The structure in the vicinity of large strengthened apertures such as the fwd. cargo door provide very good examples of this. The window belt on pressurised aircraft provides another and similar example.

You should not be surprised to find similar patterns of breakup in structural failures that emanate from very different causes.

The important differences lie in the detailed examination rather than the macro features.

I'm sorry to be the one to pour cold water on your hypothesis, but the scenario that you suggest was the subject of very

considerable examination in the early stages of the Lockerbie investigation.

Ken Smart
Chief Inspector of Air Accidents

At 10:39 AM -0700 4/18/02, John Barry Smith wrote:
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Chief Inspector of Air Accidents

Dear Mr. Smart, 18 April 2002,

Thank you very much for your quick personal response. Please give me time to analyze and reply to your comments. I shall work on it all day today. I shall try to be polite as possible as it is difficult to offer evidence which refutes long held belief without being offensive. I shall use only AAIB, TSB, or NTSB data as support for the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Pan Am Flight 103 and others.

After a quick scan of your email, the following jumped out at me:

All the specialists involved were satisfied that the fwd. cargo door was correctly latched when the device detonated and that the subsequent structural failures where secondary events.

Sir, this seems to imply that it is accepted by AAIB that the forward cargo door opened in flight (a subsequent structural failure) and the cause was "device detonated."

If so, then we agree on a most important point: Door opened in flight. Then let me address my responsive email to the question of 'how' and 'why' it opened with consideration of 'bomb', 'missile', 'center tank explosion', or 'electrical' as the initial event.

Thank you again for your valued opinions and I'm now off to my research sources and United Airlines Flight 811 for responses.

Cheers,

Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>

Date: April 18, 2002 5:29:51 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Resend of Note from Mr. Smart and my response:

----- Transcript of session follows -----

<Bill.Tucker@tsb.gc.ca>... Deferred: Connection timed out with mail.tsb.gc.ca.

Warning: message still undelivered after 4 hours

Will keep trying until message is 5 days old

At 5:41 PM +0100 4/18/02, Ken Smart wrote:

X-From_: ksmart@aaib.gov.uk Thu Apr 18 09:41:49 2002
Date: Thu, 18 Apr 2002 17:41:27 +0100
To: John Barry Smith <barry@corazon.com>
From: Ken Smart <ksmart@aaib.gov.uk>
Subject: Mr. Bill Tucker/wiring/cargo door for PA 103 message!
Cc: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Dear Mr Smith

Thank you for your hypothesis on the immediate cause of the PanAm 103.

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When the evidence of an improvised explosive device was found, the investigation nevertheless concentrated on discovering whether there was any evidence that a structural weakness had been exploited. In that respect the fwd. cargo door was the subject of very detailed examination. All the specialists involved were satisfied that the fwd. cargo door was correctly latched when the device detonated and that the subsequent structural failures were secondary events.

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Thank you again for your valued opinions and I'm now off to my research sources and United Airlines Flight 811 for responses.

Cheers,

Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: Mail Delivery Subsystem <MAILER-DAEMON>
Date: April 19, 2002 11:17:30 PM PDT
To: <barry@corazon.com>
Subject: Warning: could not send message for past 4 hours

** THIS IS A WARNING MESSAGE ONLY **
** YOU DO NOT NEED TO RESEND YOUR MESSAGE **
**

The original message was received at Thu, 18 Apr 2002 17:29:12
-0700
from pm5-253.corp.redshift.com [216.228.4.253]

----- Transcript of session follows -----
<Bill.Tucker@tsb.gc.ca>... Deferred: Connection reset by
mail.tsb.gc.ca.
Warning: message still undelivered after 4 hours
Will keep trying until message is 5 days old

Reporting-MTA: dns; mail.redshift.com
Arrival-Date: Thu, 18 Apr 2002 17:29:12 -0700

Final-Recipient: RFC822; Bill.Tucker@tsb.gc.ca
Action: delayed
Status: 4.4.2
Last-Attempt-Date: Fri, 19 Apr 2002 23:17:30 -0700
Will-Retry-Until: Tue, 23 Apr 2002 17:29:12 -0700

Return-Path: <barry@corazon.com>
Received: from [216.228.4.253] (pm5-253.corp.redshift.com
[216.228.4.253])
by mail.redshift.com (8.12.2/8.12.1) with ESMTP id
g3J0TA7n023708
for <Bill.Tucker@tsb.gc.ca>; Thu, 18 Apr 2002 17:29:12
-0700

Mime-Version: 1.0
X-Sender: barry@smtp.redshift.com

Message-Id: <p04310100b8e515555f41@[216.228.4.210]>
Date: Thu, 18 Apr 2002 17:29:51 -0700
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Resend of Note from Mr. Smart and my response:
Content-Type: text/plain; charset="us-ascii"

----- Transcript of session follows -----

<Bill.Tucker@tsb.gc.ca>... Deferred: Connection timed out with mail.tsb.gc.ca.

Warning: message still undelivered after 4 hours
Will keep trying until message is 5 days old

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X-From_: ksmart@aaib.gov.uk Thu Apr 18 09:41:49 2002
Date: Thu, 18 Apr 2002 17:41:27 +0100
To: John Barry Smith <barry@corazon.com>
From: Ken Smart <ksmart@aaib.gov.uk>
Subject: Mr. Bill Tucker/wiring/cargo door for PA 103 message!
Cc: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

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Ken Smart

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Thank you again for your valued opinions and I'm now off to my research sources and United Airlines Flight 811 for responses.

Cheers,

Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 20, 2002 8:19:32 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Resend just in case

X-From_: MAILER-DAEMON Fri Apr 19 23:17:30 2002
Date: Fri, 19 Apr 2002 23:17:30 -0700
From: Mail Delivery Subsystem <MAILER-DAEMON>
To: <barry@corazon.com>
Subject: Warning: could not send message for past 4 hours
Auto-Submitted: auto-generated (warning-timeout)

** THIS IS A WARNING MESSAGE ONLY **
** YOU DO NOT NEED TO RESEND YOUR MESSAGE **
**

The original message was received at Thu, 18 Apr 2002 17:29:12
-0700
from pm5-253.corp.redshift.com [216.228.4.253]

----- Transcript of session follows -----

<Bill.Tucker@tsb.gc.ca>... Deferred: Connection reset by mail.tsb.gc.ca.

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Reporting-MTA: dns; mail.redshift.com

Arrival-Date: Thu, 18 Apr 2002 17:29:12 -0700

Final-Recipient: RFC822; Bill.Tucker@tsb.gc.ca

Action: delayed

Status: 4.4.2

Last-Attempt-Date: Fri, 19 Apr 2002 23:17:30 -0700

Will-Retry-Until: Tue, 23 Apr 2002 17:29:12 -0700

Return-Path: <barry@corazon.com>

Received: from [216.228.4.253] (pm5-253.corp.redshift.com [216.228.4.253])

by mail.redshift.com (8.12.2/8.12.1) with ESMTP id g3J0TA7n023708

for <Bill.Tucker@tsb.gc.ca>; Thu, 18 Apr 2002 17:29:12 -0700

Mime-Version: 1.0

X-Sender: barry@smtp.redshift.com

Message-Id: <p04310100b8e515555f41@[216.228.4.210]>

Date: Thu, 18 Apr 2002 17:29:51 -0700

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From: John Barry Smith <barry@corazon.com>

Subject: Resend of Note from Mr. Smart and my response:

Content-Type: text/plain; charset="us-ascii"

----- Transcript of session follows -----

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Chief Inspector of Air Accidents

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Thank you again for your valued opinions and I'm now off to my research sources and United Airlines Flight 811 for responses.

Cheers,

Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 22, 2002 8:04:41 AM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: My reply to Mr. Smart's email

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Mr. Ken Smart and Mr. Bill Tucker,
April 2002

21

As I think of replies to Mr. Smart's email to me of 18 April 02, I always end up thinking as if I were speaking to both of you gentlemen at the same time. Please permit me to do this at this time. And it is entirely reasonable for me to do that since you both are very high officials in the premier safety boards of two large, highly industrialized countries with large air carriers. I am aware of the high level of authority to which I speak. I understand the relationship between amateur and professional. I know the value of decades of investigation and experience. I have the lower authority, I am the amateur, and I have not made aviation safety my lifelong career although that may come true.

Mr. Smart, I will try to be polite and efficient and most of all

accurate. If I offend or appear to be rude in any of this long written discourse, please, not so. If I seem to be aggressive at times it is because I am passionate about this aviation safety issue and that is because my life was saved in a sudden night fiery fatal jet plane crash long ago. Please disregard any emotional tugs or pulls based on my lack of charm. My main worry here is to not make a mistake. So, when I name numbers and locations of things, I assume that Mr. Tucker is checking my every word. I submitted my Smith AAR for Air India Flight 182 and he noticed a few errors in my comparison chart of all four Boeing 747s, notified me when he visited, and I immediately corrected them. (Smith AAR sent by separate email with this one.)

I believe, Mr. Smart, that you are of a curious mind, of honest intent, and have a firm adherence to principal as shown by your observations of the four Pan Am Flight 103 photographs of the forward cargo door area. The curious might say, it does look shattered and outward, I wonder why; the honest would say, well, whatever the reason, we should find out; and adherence to principal is safety always comes first regardless of wishful thinking by others. Safety never sleeps.

Part I

I ask that you also be open minded, please. It's very hard to do at this stage of the event, almost fourteen years later. But worth it. I trust you would seriously consider an alternative probable cause to Pan Am Flight 103 if the alternative were:

1. Plausible.
2. Reasonable.
3. Well documented by official investigative reports.
4. Has close precedent.

5. Reveals current hazard.

Gentleman, the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 and Pan Am Flight 103 fulfills all four requirements above.

The wiring/cargo door explanation is plausible as a sequence of events from wiring short to airframe breakup as it all could happen according to physical laws of nature.

It's reasonable because we know the explosive effects of an unintentional hull rupture in a pressurized jet from the Comet experiences.

It's well documented by the Kirpal Report, the Canadian Aviation Safety Board AAR, Three NTSB AARs (90/01 and 92/02, and 00/03), AAIB Aircraft Accident Report No 2/90 (EW/C1094), and aviation safety public docket information.

It has close precedent because of United Airlines Flight 811, (AAR 92/02 sent by separate Email with this one.)

It reveals a current hazard of aging defective wiring in early Boeing 747s of which about 500 are still in service and it reveals a poorly designed outward opening nonplug cargo door.

My goal is not to persuade you that an electrical problem caused the destruction of Pan Am Flight 103 and Air India Flight 182, but to persuade you that reasonable cause exists to reconsider the probable cause for both events and conduct an updated/supplemental investigation into each from the point of view of probable cause as:

1. Missile. (Brought up by Trans World Airlines Flight 800.)
2. Center fuel tank explosion with undetermined ignition source. (Brought up by Trans World Airlines Flight 800.)
3. Shorted wiring/forward cargo door rupture/explosive

decompression/inflight breakup. (Brought up by United Airlines Flight 811.)

4. Bomb. (Brought up by Air India Flight 182 and Pan Am Flight 103 and Trans World Airlines Flight 800 and United Airlines Flight 811.)

5. Rather large shotgun. (Brought up by Pan Am Flight 103.)

But first, it would be polite of me to do a line by line reply to Mr. Smart's most welcomed and important email of 18 April.

KS>ÒDear Mr Smith

KS>Thank you for your hypothesis on the immediate cause of the Pan Am 103.

JBS>Thank you, sir, for your reply. ÔHypothesisÕ is good and implies math and science, I prefer Òexplanation,Ó with Ôprobable causeÕ reserved for the accident board.

KS>ÒDuring the first five days of the investigation into Pan Am 103 the AAIB were pursuing two general lines of inquiry. Ò

JBS>And an exciting five days they were too, I bet. I see the names The Right Honourable Cecil Parkinson, Secretary of State for Transport, D A Cooper, the Chief Inspector of Accidents, and M M Charles, Inspector of Accidents, Department of Transportation on the AAIB report and they must have had an experience to remember.

Five days was months before the fuselage reconstruction was completed to give the investigators a good view as to what happened to the shattered forward cargo door area of the fuselage and the smoother skin on port side opposite.

Five days was months before the pieces of the forward cargo compartment were retrieved to examine the latches, cams, pins, tubes, and manual locking handle of the forward cargo door, a likely culprit to the disintegration in flight. Apparently the pieces never were recovered since the lock status of the forward cargo door is not stated in the AAIB AAR while the status of the aft identical cargo door and the bulk cargo door is given as "latched and locked" which implies the forward cargo door latch status is "unlocked" or "unknown."

Five days was months before the most direct evidence, the CVR and FDR data, could have been analyzed and conclusions made as to the source of the sudden loud sound and abrupt power cut.

Five days was months before a seasoned decision could have been made to rule out your first inclination below: "...a structural failure in-flight as a result of an induced structural overload.)"

Five days was way too soon to believe the cause was a bomb and continue thence from that point of view to prove the case. Once the main path of terrorist bombing was taken so soon after the event, it was difficult, if not impossible, to take side trips to other possibilities when the whole world, the media, and the political leaders were all rightly demanding retribution if the cause had been a terrorist bombing. It was not. It was mechanical. And of course, at the time, United Airlines Flight 811 had not yet occurred and the only similar event, Air India Flight 182, was deemed a terrorist bomb by the Indians but not the Canadians so the connection was made of bomb and sealed. Too soon, sir! But not too late to amend.

Would you agree that five days was too soon to decide on

Ôbomb/device/improvised explosive deviceÕ and exclude Ò...a structural failure in-flight as a result of an induced structural overloadÓ?

KS>ÒThe first was that the aircraft had suffered a structural failure in-flight as a result of a defect or induced structural overload,Ó

JBS>Solid agreement already! I contend you were correct from day one with that probable cause as modified Ó...a structural failure in-flight [forward of the wing on the right side] as a result of an induced structural overload [when the cargo door ruptured open in flight and explosive decompression occurred which took a twenty foot by thirty foot section of skin and ribs away.] (And it was your first choice, too. Mr. Smart, AAIB were right from the very beginning with your first choice.)

KS>Ôthe second was that an improvised explosive devise was responsible.Õ

JBS>IED and still reluctant to call it a bomb, and very correct to do so as explained later.

KS>ÒWhen the evidence of an improvised explosive device was found,Ó

JBS>And very important evidence too and all explainable using hindsight because of subsequent events. ÒBombÓ evidence which appeared so convincing for Pan Am Flight 103 has now been shown to be benign because of the Trans World Airlines Flight 800 event which was another Boeing 747 thought to have been bombed, as explained later.

Evidence appeared later that ruled against an improvised explosive device. The damage in the baggage container and adjacent area is from a mild directed blast as if a rather large shotgun had gone off at close range. (AAIB stated in Aircraft Accident Report No 2/90 (EW/C1094) section: 1.12.2.1 Fuselage: "Where these panels formed the boundary of the shatter zone, the metal in the immediate locality was ragged, heavily distorted, and the inner surfaces were pitted and sooted - rather as if a very large shotgun had been fired at the inner surface of the fuselage at close range," and 8. Analysis: "With the two container reconstructions placed together it became apparent that a relatively mild blast had exited container 4041 through the rear lower face to the left of the curtain and impinged at an angle on the forward face of container 7511.")

KS>"the investigation nevertheless concentrated on discovering whether there was any evidence that a structural weakness had been exploited."

JBS>Structural weakness exploited? You could be referring to that weak Section 41 with the pear shape that causes problems with extensive compressions and decompressions and had an Airworthiness Directive for repair.

I have discovered a new structural weakness for Boeing 747s and by implication all pressurized jets with large cargo doors.

For the Boeing 747: The four nine foot vertical slices in the fuselage skin for the sides of the forward and aft cargo doors are held in place by only one latch in each side. So, each nine foot slice has one midspan latch to hold four and a half feet closed on each side of it. And the midspan latch has no locking sector on the latching cam to prevent inadvertent back driving in flight. All

the eight bottom latches on each door, for a total of sixteen latches, have locking sectors. The four midspan latches for the two cargo doors have none. The weakness is at the midspan latches and the absence of locking sectors. One latch with no locking sector for nine feet of fuselage slice is not enough. It ruptures open in flight and causes the tell tale peeled back and down skin from the latch such as in Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800 and possibly Air India Flight 182, if the photos are reexamined.

KS>In that respect the fwd. cargo door was the subject of very detailed examination.

JBS>Ah, very good, sir, their research is invaluable. Are the documents available? What is the current latch status of wreckage of door in hangar? What position is the Manual Locking Handle in? What did they think of the peeled back skin from the aft midspan latch? This evidence matches the peeled back skin from the aft midspan latch of the forward cargo door or United Airlines Flight 811 which happened a scant two months later. I suspect United Airlines Flight 811 was not compared at all to Pan Am Flight 103 because PA 103 was already compared to Air India Flight 182, as it should have been since they are both so similar. Since Air India Flight 182 was considered a bombing by the Indians, then Pan Am Flight 103 was a bombing also. Since United Airlines Flight 811 was not a bombing, it was not considered as a potential match at that time. It should and can be now, sir.

A detailed examination of a possibly defective forward cargo door was done in the later AAR for United Airlines Flight 811 (NTSB 92/02). It includes close examination of the latch pins for bluing from overpressure, the hinges for overtravel, the torque

tubes for bending, the bellcranks for slack, the overpressure relief doors for operation, the manual locking handle for status, the locking sectors for damage, and other evaluations. There is no discussion of the forward cargo door in AAIB 2/90 and in fact, the latching status is omitted as well as a picture of the starboard side door area. In drawings the door is just sketched in. That area does need the depth of examination that was conducted for United Airlines Flight 811.

Let us do it now. We have the benefit of hindsight and the rare chance to take advantage of that luxury.

KS>ÒAll the specialists involved were satisfied that the fwd. cargo door was correctly latched when the device detonated

JBS>Why so? With respect, sir, what led them to that conclusion? What was their opinion about the cargo door inadvertently opening in flight by improper latching or an electrical problem, as was suspected in United Airlines Flight 811 which also had that sudden loud sound on the CVR followed by an abrupt power cut? Did they have an mechanical alternative to the bomb explanation? It appears that five days after the event, sooty rib in hand, the bomb explanation was the working hypothesis as the safety investigation then proceeded as to what happened after the device detonated while the law enforcement people went after the ÔbombersÕ. May I ask if they thought the door was latched when the bomb went off, when did the door become unlatched? A second later or a few minutes later?

For Air India Flight 182 and Pan Am Flight 103 the assumption has been bomb from the very first few days and any accused always agrees it was a bomb but they did not plant it. I know they did not plant it because nobody ÔplantedÕ a bomb because

there were no bombs. There was something that looked, smelled, and sounded like a bomb explosion, but wasn't. It was a tremendous explosion of an explosive decompression from a hull rupture at a door. There was something for Pan Am Flight 103 that looked like a rather large shotgun had gone off in a baggage container and it probably was and it probably did.

The assumption of "device detonated" is not adequately supported by the evidence to make a conclusion, in my humble opinion, while the assumption of a rather large shotgun firing off at event time is.

Please, Mr. Smart, open your mind for just this effort: No bomb but a rather large shotgun which gave you the evidence AAIB have taken for a powerful "IED/Bomb/device".

You still are not calling the "bomb" a bomb but call it an "improvised explosive device" and now a "device".

And yet you are absolutely correct for both phrases when they are viewed objectively. The English language allows precision. Others may see a bomb when they read your words of "device" and "improvised explosive device" but I see a complex device called a forward cargo door with latches, cams, bellcranks, overpressure relief doors, manual locking handle, viewing ports, and torque tubes. I see an explosive device since I know about the Comets and United Airlines Flight 811 where the crew described the initial event as a "tremendous explosion". Improvised by whom? Improvised by fate that let polyimide aromatic insulated wiring called Poly X be installed in planes that are now flying at twice the expected in service life using wiring that is prone to chafing and cracking, especially in the presence of moisture? (The forward cargo compartment has a

special bilge built in to hold the excess moisture in the compartment from condensation.) Was the outward opening device improvised by the designers who created non plug cargo doors while making the passenger doors the plug type? The cargo doors on Boeing 747s have been subject to many Airworthiness Directives over the years to correct problems such as bent sills, exposed wiring, too soft metal, poorly placed placards, and there are many Service Difficulty Reports of leaking seals.

Cargo doors on Boeing 747s are extremely complex devices, proven capable of explosive action, poorly designed, and prone to failure. They can be, under certain conditions of flight, improvised explosive devices. They are not bombs although they may cause similar damage.

Mr. Smart, to be precise, and this is the time for it, you are correct by calling the part of the machine that caused the destruction of Pan Am Flight 103 to be a "device" or an "improvised explosive device" because it was. It was not a homemade bomb but a forward cargo door. I am not playing with words here; I am being as precise as AAIB in the use of the English language. The use of IED is proper because the evidence shows it. It does not show bomb and "bomb" was therefore not used.

I believe the location in the forward cargo compartment in the baggage container which had its lower quadrant blown away held a rather large shotgun which was stored in baggage, was loaded, and was safe unless a tremendous explosion happened nearby. A tremendous explosion did happen nearby when the opposite fuselage blew out when a huge 20 foot by forty foot hold appeared suddenly where the forward cargo door and skin above it used to be. The rather large shotgun fired, the relatively mild

explosion left soot on a rib, burst through the corner of the baggage container, went 25 inches and made a 20 inch hole in the port side of the fuselage. A sooty rib was soon found on the ground and incorrectly declared proof a bomb had gone off instead of a shotgun cartridge.

It's the classic red herring. Most everyone went for it. But the long arm of safety is now finding the bomb explanation to be false because a more likely cause is now being revealed. Safety never gave up.

KS>and that the subsequent structural failures were secondary events.

JBS>And here we come to an important interpretive point, sir. When you write, "subsequent structural failure," do you mean the rupturing open of the forward cargo door in flight? Can we agree that a sudden, huge hole on the starboard side forward of the wing where the cargo door and skin above it used to be can be called a "subsequent structural failure"? And can we agree that you believe that if that kind of structural failure occurred, it happened "secondary" or after the initial event?

If so, we are in general agreement except for a few seconds of time. Timing is so important and was examined in the AAIB report in Appendix B of wreckage distribution drawings of the sequence of destruction of Pan Am Flight 103 as it came apart in the air.

Did the forward cargo door of Pan Am Flight 103 rupture open in flight or was it latched and locked until ground impact? The photographs show enough outward force peeled skin to enable one to make an assumption it opened in flight.

If it did rupture open in flight, where in the door?

At the weak latches with no locking sectors.

But when? When did the aft midspan latch rupture?

The initial event time was officially determined to be the sudden loud sound on the CVR. I contend the initial event of sudden loud sound is the explosive decompression sound when the rupture/structural failure occurred and the air molecules rushed out making the sudden loud sound on the CVR. This initial event sudden sound on the CVR for Air India Flight 182 has been matched to a DC-10 explosive decompression sound when its cargo door opened in flight. Pan Am Flight 103 has been matched to Air India Flight 182 in the AAIB report. All four Boeing 747 sudden sound events have been matched by NTSB in Chart 12 of the public docket for Trans World Airlines Flight 800.

They are all linked together by the sudden loud sound on the CVR which I contend is the primary, not the secondary event, of the structural failure when door ruptured open and explosive decompression ensued.

The time of the structural failure of the ruptured open forward cargo door on the starboard side and the opening of the 20 inch hole on the port side was determined to be the initial event time of the sudden loud sound by the AAIB wreckage distribution drawings in Appendix B based upon the distance from the datum line of the retrieved wreckage and which showed at initial event time the large rectangular shaped fuselage skin area around the shattered forward cargo door occurred at the same time as the 20

inch hole on the smoother port side. As the seconds progressed, the subsequent drawings show the holes getting bigger and bigger with the starboard cargo door side always staying larger.

Based on wreckage distribution it can be said by the evidence that the 20 inch hole on the port side occurred at the same time as the twenty foot by thirty foot hole on starboard and both were at initial event time of the sudden loud sound on the CVR. Which hole is more likely to have caused the nose to come off a Boeing 747?

Mr. Smart, I see the difficulty a bomb theorist would have when trying to understand that if a huge structural failure forward of the wing on the right side occurred in flight at the time of the sudden loud sound, how can that failure be secondary to a "bomb explosion" that only made a small hole on the port side, was not heard by the CVR, was relatively mild, not spherical but directed, and caused damage that looked as if a rather large shotgun had gone off at close range to the fuselage skin?

If we can agree that a structural failure may have occurred forward of the wing on the right side in flight and that failure may have been caused by the forward cargo door inadvertently rupturing open at the aft midspan latch in flight after a cause, then what was it?

What caused the forward cargo door to rupture at the aft midspan latch in flight?

I think this is the point, Mr. Smart. We can look at the reasonable and possible initial events, based on knowledge gained in subsequent accidents which are:

1. Missile. (Brought up by Trans World Airlines Flight 800.)

2. Center fuel tank explosion with undetermined ignition source. (Brought up by Trans World Airlines Flight 800.)
3. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup. (Brought up by United Airlines Flight 811.)
4. Bomb. (Brought up by Air India Flight 182 and Pan Am Flight 103 and Trans World Airlines Flight 800 and United Airlines Flight 811.)
5. Rather large shotgun. (Brought up by Pan Am Flight 103.)

(Discussion of the above in Part II.)

KS>ÒAll structures by nature of their design have paths of least resistance when subjected to abnormal loading. The structure in the vicinity of large strengthened apertures such as the fwd. cargo door provide very good examples of this. The window belt on pressurised aircraft provides another and similar example. Ò

JBS>I understand, sir, and that hard lesson was learned from the Comet accidents of an extensive fuselage skin rip when explosive decompression occurred at corner of RDF window. Your observation of the belt, Mr. Smart, shows that a 20 inch hole in the fuselage skin on the port side of Pan Am Flight 103 would have stopped at the belts and other strengthened stiffeners and not get bigger, thereby limiting the damage to the small hole. The aircraft would slowly depressurize and land safely with its small hole. The damage shape of departed cargo door and skin above it did stay rectangular as the torn off skin stopped at the belts and stiffeners but the nine foot by ten foot loss of the forward cargo door and it adjacent skin was too much for structural integrity and the nose came off. The point is that the 20 inch ÔbombÕ hole was too small to cause the destruction of Pan Am Flight 103 while was the twenty foot by thirty foot hole of

missing door and skin (as shown by AAIB photographs and distribution drawings) would be large enough to cause the nose to come off.

KS>Ò You should not be surprised to find similar patterns of breakup in structural failures that emanate from very different causes.

JBS>I understand, sir. I agree wholeheartedly again. A hull rupture is a hull rupture and could be from different sources. I understand and agree that the possible structural failure (ruptured open cargo door in flight) for Pan Am Flight 103, Air India Flight 182, and United Airlines Flight 811 could have been caused by three different causes and if one of them was a bomb, the structural failure could have been after the bomb explosion...or missile hit....or center fuel tank explosion...or wiring short.

Will you agree that a cause for four Boeing 747 structural failures in flight (ruptured open forward cargo door in flight) could be from only one cause? A common cause? One cause fits all? Maybe?

Mr. Tucker made the very same point of several sources causing the same event to me, sir, when he pointed out specifically that even if the forward cargo door of Air India Flight 182 ruptured open in flight and United Airlines Flight 811 did also, the cause might be two separate reasons, and I agree wholeheartedly. I have thought about this a lot.

There are many ways for a cargo door to inadvertently rupture open in flight: (Current official opinion in parentheses)
A. Bomb explosion. (Partially accepted for two flights, ruled out for two flights.)

- B. Crew or passenger error. (Ruled out for all flights.)
- C. Electrical fault in switch or wiring. (Accepted for two flights, ruled out for two flights.)
- D. Pneumatic overpressure. (Ruled out for all flights.)
- E. Cargo shift. (Ruled out for all flights.)
- F. Compressed air tank explosion. (Ruled out for all flights.)
- G. Fire. (Ruled out for all flights.)
- H. Missile strike. (Ruled out for all flights.)
- I. Midair collision. (Ruled out for all flights.)
- J. Fuel tank explosion. (Accepted for one flight, ruled out for three flights.)
- K. Stowaway. (Ruled out for all flights.)
- L. Electromagnetic interference. (Ruled out for all flights.)
- M. Comet or meteor. (Ruled out for all flights.)
- N. Space debris. (Ruled out for all flights.)
- O. Turbulence. (Ruled out for all flights.)
- P. Out of rig door. (Ruled out for all flights.)
- Q. Lightning. (Ruled out for all flights.)
- R. Metal fatigue. (Ruled out for all flights.)
- S. Improperly latched. (Initially accepted for one flight, then ruled out for all flights.)
- T. Design error. (Accepted for one flight, ruled out for three flights.)
- U. Repair error. (Ruled out for all flights.)
- V. Maintenance error. (Accepted for one flight, ruled out for three flights.)
- W. Collision with terrain. (Ruled out for all flights.)

Mr. Smart and Mr. Tucker, may we agree for this discussion that there was structural failure in flight forward of the wing on the right side of Pan Am Flight 103 and Air India Flight 182 and United Airlines Flight 811? There may be one cause, or two, or three. The structural failure may have occurred after a bomb

explosion. A rather large shotgun could have gone off in a baggage container after a nearby explosion.

The key is pattern. The pattern is similar evidence in only four early model Boeing 747 inflight fatal events. I have discerned a pattern amongst the four fatal accidents out of the thirty odd hull losses. The pattern is clear yet complex and detailed. When a forward cargo door ruptures open in flight, certain things have to happen and they happened for Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800.

I see the pattern and now I believe, and am immensely relieved, that you two gentlemen see it also.

What is the significance of the pattern? The significance is that it is possible only one cause is for all and that cause, faulty electrical wiring or switch, still exists, is a current hazard and must be dealt with, the sooner the better. There is urgency.

The significance of the pattern is that enough current hard evidence exists to justify a supplemental safety investigation into Air India Flight 182 and Pan Am Flight 103 based upon subsequent similar accidents such as United Airlines Flight 811 and Trans World Airlines Flight 800 from which much new knowledge was gained, such as the aging aircraft study which revealed the dangers of Kapton/Poly X wiring and an electrical problem can cause a cargo door to rupture open in flight.

Permit me a moment of wistful thinking based upon little experience in the aviation safety government system for an opinion that carries little weight:

From my point of view, it would not be too much of a reaction to recommend to NTSB that an emergency AD be written to inspect all the wiring in the forward cargo door area of Boeing 747s for arcing, sooting, or fire damage. In addition, it must be an option to pull the cargo door electrical circuit breaker, as was done and maybe saved a UAL aircraft as shown by below SDR from FAA:

Difficulty Date : 10/11/00 Manufacturer : Boeing Aircraft Group : 747 Aircraft Model : 747422 Engine Manufacturer : Part/Defect Location : Cargo Door Part Condition : Malfunctioned : UALA Precautionary Procedure : A/C N Number : 199UA Aircraft Serial No. : 28717

Discrepancy/Corrective Action: Fwd cargo door opened by itself when cb pushed in. On arrival, circuit breakers were pushed in, when pressure relief door handle was opened the door latches opened and then the door opened on its own. Could not duplicate problem after initial opening.

Now that's sort of scary.

I think that enough hard evidence exists of the pattern of wiring/cargo door cause for Air India Flight 182 and Pan Am Flight 103 to justify a supplemental investigation for both and that decision can be justified to the highest authority to include the Prime Ministers via the Transportation Ministers via the heads of the safety boards via the heads of AAIB and accident investigations of TSB or whatever torturous path the news takes to the top.

The legal system may be done with Pan Am Flight 103 and starting on Air India Flight 182 in November, but are the safety people through? Safety is never finished. The safety people are really never "through" with an accident and that's why film and wreckage is archived for future evaluation based on subsequent similar events. Safety explains the past to predict the

future because history repeats itself.

The value of the CVR and FDR, the saving of wreckage and the archiving of film for decades, and the willingness for safety officials to always review the past to determine the present has been shown to be invaluable in this investigation into four Boeing 747s accidents far from each other in time and distance and yet all related by evidence.

If official aviation safety organizations announced they were doing a supplemental investigation into several airplane crashes, I believe the public would accept that as normal, prudent, and comprehensive. (A precedent of later official review was set by NTSB with its rewrite of the United Airlines Flight 811 accident with an entirely new AAR, 92/02 which superseded 90/01.) (End philosophical digression.)

KS>ÒThe important differences lie in the detailed examination rather than the macro features.Ó

JBS>I again agree wholeheartedly, Mr. Smart, and thatÕs why I have come to the conclusion of a rather large shotgun, shorted wiring, and poorly designed cargo door caused the destruction of Pan Am Flight 103 and not a powerful plastic explosive bomb by terrorists: By a detailed examination.

JBS>Detailed examination; I have it, sir. Details from text, charts, photographs, tables, reports, tests, and evaluations. ItÕs in literally thousands of pages of consideration and analysis by me and thousands of pages of related consideration by others. I have the details and do not risk inundating you with them but only send two AARs via separate email for your consideration but all details are available upon request, Mr. Smart. It takes just a few

minutes to send you anything you want on my end.

KS>ÒI'm sorry to be the one to pour cold water on your hypothesis, but the scenario that you suggest was the subject of very considerable examination in the early stages of the Lockerbie investigation.

JBS>You have not thrown cold water, sir, but added fuel to the fire. Thank you for confirmation that my subject of considerable analysis was worthy of your considerable initial analysis. I ask that the subject now have considerable examination in the late stages of the Lockerbie investigation, using the rare luxury of hindsight and the subsequent similar accidents of United Airlines Flight 811 and Trans World Airlines Flight 800.

To politely repeat, Mr. Smart and Mr. Tucker, my goal is not to persuade you that an electrical problem caused the destruction of Pan Am Flight 103 and Air India Flight 182, but to persuade you that reasonable cause exists to reconsider the probable cause for both because of subsequent similar accidents which reveals a potential common cause for all. Let TSB and AAIB create an updated/supplemental investigation into each from the point of view of a reasonable, plausible probable cause as:

1. Missile. (Brought up by Trans World Airlines Flight 800.)
2. Center fuel tank explosion with undetermined ignition source. (Brought up by Trans World Airlines Flight 800.)
3. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup. (Brought up by United Airlines Flight 811.)
4. Bomb. (Brought up by Air India Flight 182 and Pan Am Flight 103 and Trans World Airlines Flight 800 and United Airlines Flight 811.)
5. Rather large shotgun. (Brought up by Pan Am Flight 103.)

Part II

OK, what reasonably could cause the forward cargo door of a Boeing 747 to open in flight at initial event time of a sudden loud sound on the CVR?

A missile could hit the plane in flight. Where could a missile have hit Pan Am Flight 103? Only a hit in the forward cargo compartment would cause the abrupt power cut to the recorders and the sudden loud sound. What corroborative evidence is there that a missile struck Pan Am Flight 103? None that I can see. There were no military planes nearby nor reports of missing missiles, there were no reports of missile sightings at event time, there is no residual evidence of residue, missile casing, pitting, or cratering which follows a high explosive detonation, and there was no missile explosion sound on the CVR. The same reasons that a missile was ruled out for Trans World Airlines Flight 800 are the same reasons that a missile can be ruled out for Pan Am Flight 103.

Based upon lack of corroborative evidence, a missile as a probable cause for Pan Am Flight 103 may be ruled out.

Could the center fuel tank have exploded from an undetermined ignition for Pan Am Flight 103?

There was fire for the wing and engine number three but no evidence of inflight fire around the center fuel tank. The center tank may have been on fire as it fell, but it did not explode according to the wreckage. The sound on the CVR was not a fuel tank explosion sound. The pieces of wreckage which left the plane first were not from the center fuel tank. The sides of the

fuselage near the center tank are damaged in much different degrees and should be evenly bilateral. None of the passengers were burned extensively. The reasons for determining a center fuel tank exploded for Trans World Airlines Flight 800 are the same reasons for ruling it out for Pan Am Flight 103 because they did not occur.

Based upon lack of corroborative evidence, a center fuel tank explosion of undetermined ignition as a probable cause for Pan Am Flight 103 may be ruled out.

Could an electrical problem of wiring or switch have caused the destruction of Pan Am Flight 103?

The corroborative evidence is literally in volumes: NTSB AAR 90/01 and NTSB AAR 92/02 for United Airlines Flight 811 and AAIB 2/90 for Pan Am Flight 103. Below are specific matches between PA 103 and UAL 811 gleaned only from those government AARs.

Both were:

Aged.

High flight time.

Early model-100.

Poly x wired.

Boeing 747.

Experienced hull rupture forward of the wing on right side in cargo door area.

Shape of hull rupture forward of the wing on the right side is rectangle with specific rectangular shape.

Fodded number three engine.

On fire number three engine.

Sudden sound on cvr

loud sound on the cvr.

Short duration sound on the cvr.

Abrupt power cut to fdr.

Outward peeled skin in cargo door area from aft midspan latch.

Longitudinal break at midline of the forward cargo door at midspan latch.

More severe inflight damage on starboard side.

At least nine never recovered bodies.

Vertical fuselage tear lines forward of the wing and aft of cargo door.

Torn off skin in forward cargo door area on starboard side.

Outward peeled skin on upper forward fuselage.

Destruction initially thought to be have been caused by a bomb.

Based upon abundance of corroborative evidence, an electrical problem of wiring or switch as a probable cause for Pan Am Flight 103 may be ruled in pending further investigation.

Could a bomb/rather large shotgun have caused the destruction of Pan Am Flight 103?

If a powerful bomb were to explode in the forward cargo hold of Pan Am Flight 103, certain corroborating evidence would be present such as hot-gas pitting on pieces of metal, punctures, shrapnel, explosive residue, pitting, cratering, explosive type injuries to passengers sitting in the cabin, timer, fuze, and a bomb explosion sound on the cockpit voice recorder.

For Pan Am Flight 103:

A. Pitting: Present

B. Cratering: Present

C. Hot gas washing: Absent

D. Holes: Absent

E. Punctures: Absent

- F. Shrapnel: Absent
- G. Explosive residue: Found.
- H. Burn injuries to passengers sitting in the cabin: Absent
- I. Sooted metal: Found
- J. Timer: Fragment of plastic.
- K. Fuze: Absent
- L. Bomb explosion sound on the cockpit voice recorder: Absent

Bombs have been considered for Air India Flight 182 and Trans World Airlines Flight 800 as well as Pan Am Flight 103 and thus extensively investigated. The same reasons for ruling out a bomb for Trans World Airlines Flight 800 are the same reasons to rule it out for Air India Flight 182 and Pan Am Flight 103.

The NTSB states in AAR 00/03 regarding Trans World Airlines Flight 800: Page 180, footnote 368: Evidence of a bomb explosion included deformation of materials away from a location at the height of the passenger seat pan, hot-gas pitting damage on multiple pieces of wreckage that formed a pattern radiating from the same location (including into the CWT), punctures radiating from the same location, and shrapnel. Further, according to the FBI's laboratory report, No. 91204034 S YQ YB/91207052 S YQ YB, dated January 30, 1990, chemical analysis of a piece of wreckage from the right side of the CWT identified the presence of RDX and PETN high explosive. These two explosives comprise about 86 percent of the composition of SEMTEX, which is a rubberlike material manufactured by Synthesia Corporation of Semtin, Czechoslovakia, primarily for use in mining and other civil engineering activities. According to the FBI, SEMTEX has been used by criminal and terrorist elements in Europe since 1966. (SEMTEX was identified as the material used in the bomb placed on Pan Am flight 103. For additional information, see section 1.11.1.2.)

Page 257 to page 259 of NTSB AAR 00/03 2.2.1.2 Consideration of a High-Energy Explosive Device Detonation (Bomb or Missile Warhead) Several factors led to speculation that the accident might have been caused by a bomb or missile strike. These factors included heightened safety and security concerns because of the 1996 Olympics then being held in the United States, the fact that TWA flight 800 was an international flight, and the sudden and catastrophic nature of the in-flight breakup. In addition, numerous witnesses to the accident reported seeing a streak of light and then a fireball, which some people believed represented a missile destroying the airplane. Further, some anomalous primary radar targets were recorded by the Islip, New York, radar site in the general vicinity of TWA flight 800 at the time of the accident that apparently could not be explained. Accordingly, the Safety Board considered the possibility that a bomb exploded inside the airplane or that a missile warhead from a shoulder-launched missile exploded upon impact with the airplane. Testing performed by the Federal Bureau of Investigation (FBI) found trace amounts of explosives on three separate pieces of airplane wreckage (described by the FBI as a piece of canvaslike material and two pieces of floor panel). However, none of the damage characteristics typically associated with a high-energy explosion of a bomb or missile warhead (such as severe pitting, cratering, petalling, or hot gas washing) were found on any portion of the recovered airplane structure, including the pieces on which the trace amounts of explosives were found. Only about 5 percent of the airplane's fuselage was not recovered, and none of the areas of missing fuselage were large enough to have encompassed all of the damage that would have been caused by the detonation of a bomb or missile. Although several large holes are visible in the reconstructed portion of the airplane fuselage, almost all of the structure that

originally filled in these holes is attached to the remaining structure but is folded either inward or outward. No area of structure in the reconstructed portion of the airplane contained any unexplained holes large enough to represent the entry point of a missile. Further, the victims remains showed no evidence of injuries that could have been caused by high-energy explosives, nor was there any damage to the airplane seats and other interior components consistent with a high-energy explosion.

Investigators considered several scenarios to determine how the trace amounts of explosive residue might have gotten on the wreckage from the accident airplane. Trace amounts of explosive residue could have been transferred to the contaminated pieces from the military personnel (and their associated clothing, boots, and equipment) that were on board the accident airplane when it was used to transport troops during the Gulf War in 1991. In addition, explosives were placed and then removed from several locations in the accident airplane during a dog-training explosive detection exercise about 1 month before the accident. Despite being unable to determine the exact source of the trace amounts of explosive residue found on the wreckage, the lack of any corroborating evidence associated with a high-energy explosion indicates that these trace amounts did not result from the detonation of a high-energy explosive device on TWA flight 800. Accordingly, the Safety Board concludes that the in-flight breakup of TWA flight 800 was not initiated by a bomb or a missile strike.Ó

Gentlemen, most of the required evidence that corroborates a bomb explosion on Pan Am Flight 103 is missing and those few traces of residue can now be explained as benign based upon Trans World Airlines Flight 800. Evidence of Semtex was found on both Pan Am Flight 103 and Trans World Airlines Flight 800 yet called benign for one and could be for the other too.

Based upon absence or a benign finding of corroborative evidence, an explosion of a powerful explosion from a bomb as a probable cause for Pan Am Flight 103 may be ruled questionable.

Could the firing of a rather large shotgun have given evidence which led investigators to conclude a powerful bomb had been detonated causing the destruction of Pan Am Flight 103?

The evidence shows a relatively mild directed blast existed a corner of a baggage container, traveled 25 inches and caused a 20 inch hole in the fuselage skin. The sound of the mild directed blast was not heard on the cockpit voice recorder. Bombs are loud, spherical, and powerful. Shotgun blasts are relatively mild and directed.

To politely repeat: The damage in the baggage container and adjacent area is from a mild directed blast as if a rather large shotgun had gone off at close range. (AAIB stated in Aircraft Accident Report No 2/90 (EW/C1094) section: 1.12.2.1

Fuselage: "Where these panels formed the boundary of the shatter zone, the metal in the immediate locality was ragged, heavily distorted, and the inner surfaces were pitted and sooted - rather as if a very large shotgun had been fired at the inner surface of the fuselage at close range," and 8. Analysis: "With the two container reconstructions placed together it became apparent that a relatively mild blast had exited container 4041 through the rear lower face to the left of the curtain and impinged at an angle on the forward face of container 7511.)

The AAIB official who was actually there opined the cause of the damage he personally viewed to be as if a rather large shotgun had been fired at the fuselage at close range and I agree with him

and the AAIB and it may not have been a shotgun but some type of directed firearm but not a bomb.

Can we agree that this AAIB opinion may have been correct in its assessment of the cause of the mild blast, pitting, sooting, distortions, ragged, and shattered skin as if a very large shotgun had been fired at the inner surface of the fuselage at close range?

Can we agree that pitting, sooting, distortions, ragged, and shattered skin could also have been interpreted as evidence of a bomb explosion?

Loaded guns have been inserted into baggage holds of airliners before and have been accidentally discharged, (April 26, 2000 Gun goes off in bag being loaded into jet. Associated Press - Portland - A high-powered handgun went off in the baggage compartment of an Alaska Airlines jetliner on the tarmac at Portland International Airport, sending a bullet into the passenger compartment within inches of passengers' feet. Nobody was injured.)

Shotgun cartridges give sooty residue when fired. A shotgun fires in a directed manner and would give a relatively mild blast compared to a high explosive bomb. The sound of the weapon firing is not heard on the cockpit voice recorder because the power had been abruptly cut after the tremendous explosive decompression when the huge hole appeared on the starboard side of the hold or the gunshot was over shouted by the tremendous noise from the huge hole and the explosive decompression.

The evidence corroborates the detonation of a device called a rather large shotgun which caused a relatively mild directed blast

which resulted in a 20 inch hole in the fuselage skin on the port side. This damage was not sufficient to cause the nose to come off Pan Am Flight 103 because the structure was designed to withstand a hold that size in the pressurized hull by the presences of stiffeners, ribs, and belts.

Based upon the presence of corroborative evidence, the firing of rather large shotgun in the forward cargo hold Pan Am Flight 103 may be ruled in as occurring but ruled out as the cause of the subsequent structural failure pending further investigation.

To summarize some conclusions about Pan Am Flight 103 based upon subsequent events such as United Airlines Flight 811 and Trans World Airlines Flight 800:

1. Structural failure of a ruptured open forward cargo door in flight is likely because of presence of corroborative evidence.
2. Bomb explosion or missile strike or center fuel tank explosion unlikely as probable cause because of absence of corroborative evidence.
3. Detonation of rather large shotgun in baggage container is likely to have occurred because of presence of corroborative evidence.
4. Electrical problem as cause of ruptured open forward cargo door possible because of presence of corroborative evidence and the precedent of United Airlines Flight 811.

Mr. Smart and Mr. Tucker, thank you for wading through the above analysis. There are four complex fatal Boeing 747 events to cross reference/compare/sort out and it gets confusing at times. For the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation, all the evidence for four fatal crashes must remain consistent and it does. Over and over again the wiring/cargo door explanation

makes sense when investigated. The latest confirmation came with the four photographs of the forward cargo door area of Pan Am Flight 103 which revealed: The peeled back and down skin from the aft midspan latch and the longitudinal split of the door. This specific evidence matches United Airlines Flight 811 door which is the most credible model because its evidence is indisputable. There was no way for me to know the close match of the Pan Am Flight 103 door to the United Airlines Flight 811 door since there were never any photographs released of that starboard side, only two of the port side and yet, the new evidence continues to match the credible model.

The goal again, gentlemen, is not to persuade you that there were no bombs on Air India Flight 182 or Pan Am Flight 103 and that an electrical problem caused the forward cargo door to rupture open in flight causing a huge hole to appear leading to a tremendous explosion which caused the subsequent destruction of both aircraft, but the goal is to persuade you that a pattern has emerged which indicates that sequence may have happened that way based upon subsequent similar accidents and since the electrical hazard still exists to this day, supplemental investigations into the mechanical explanation are warranted.

The evidence in Air India Flight 182 and Pan Am Flight 103 still exists in hangars and high quality film and video in archives of AAIB, TSB, and RCMP. The confirming answers are there if examined. Please reexamine the metal, tubes, latches, cams, locking handles, pins, skin, paint as shown in wreckage and photographs to match up or not match up to United Airlines Flight 811 and Trans World Airlines Flight 800. Please reconsider the probable cause as electrical and conduct a supplemental investigation to rule in or rule out that current hazard.

For Air India Flight 182, please have faith in the CASB of 1986 who said an explosion occurred in the forward cargo compartment but declined to conclude it was a bomb explosion and were correct.

For Pan Am Flight 103, please have faith in the AAIB of 1988 who thought first of a structural defect induced by overload and were correct.

Thank you again, Mr. Smart, for your informative email of 18 April and I hope to continue our discussion further. Thank you, Mr. Tucker, for your continued interest and I look forward to further exchanges.

Gentlemen, I invite you both to visit me here in Carmel Valley, California for a personal visit in pleasant surroundings for a mutual exchange of ideas. Spring is very pretty here.

Best Regards,
Barry

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Enclosures:

April 26, 2000 Gun goes off in bag being loaded into jet
Associated Press -

PORTLAND _ A high-powered handgun went off in the baggage compartment of an Alaska Airlines jetliner on the tarmac at Portland International Airport, sending a bullet into the passenger compartment within inches of passengers' feet.

Nobody was injured.

The .357-caliber Ruger discharged in a suitcase as it was being thrown into the cargo hold of a Boeing 737 being loaded Monday night for a flight to Anchorage, Alaska, said Port of Portland spokesman Doug Roberts.

If the gun had fired during the flight at a high altitude and the bullet had made a large hole in a window, the aircraft would have experienced rapid decompression, said Alaska Airlines spokesman Bill MacKay. However, he said, if the bullet had penetrated the plane's outer skin, the hole would have been smaller and there would have been no threat of rapid decompression.

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

	AI 182	PA103	UAL 811
TWA 800			
Boeing 747	Yes	Yes	Yes
Early model -100 or -200			Yes
Yes			Yes
Polyimide wiring (Poly X type)			Yes
Yes			Yes
Sudden airframe breakup in flight (partial or total)			
Yes	Yes	Yes	Yes
Breakup occurs amidships			Yes
Yes			Yes
High flight time (over 55,000 flight hours)			No
Yes	Yes	Yes	
Aged airframe (over 18 years of service)			No

Yes Yes Yes
 Foreign object damage to engine or cowling of engine number
 four Yes Yes Yes Yes
 Right wing leading edge damaged in flight Yes
 Maybe Yes Maybe
 Vertical stabilizer damaged in flight Yes Yes
 Yes Maybe
 Right horizontal stabilizer damaged in flight Yes
 Yes Yes Yes
 More severe inflight damage on starboard side than port side
 Yes Yes Yes Yes
 Port side relatively undamaged by inflight debris
 Yes Yes Yes Yes
 Vertical fuselage tear lines just aft or forward of the forward
 cargo door Yes Yes Yes Yes
 Fracture/tear/rupture at a midspan latch of forward cargo door
 Maybe Yes Yes Yes
 Midspan latching status of forward cargo door reported as
 latched No No No No
 Airworthiness Directive 88-12-04 implemented (stronger lock
 sectors) No No No Yes
 Outwardly peeled skin on upper forward fuselage
 Yes Yes Yes Yes
 Rectangular shape of shattered area around forward cargo door
 Yes Yes Yes Yes
 Forward cargo door fractured in two longitudinally
 Yes Yes Yes Maybe
 Status of aft cargo door as intact and latched Yes
 Yes Yes Maybe
 Passengers suffered decompression type injuries
 Yes Yes Yes Yes
 At least nine missing and never recovered passenger bodies
 Yes Yes Yes Yes

Wreckage debris field in two main areas, forward and aft sections of aircraft	Yes	Yes
No	Yes	
Initial official determination of probable cause as bomb explosion.	Yes	Yes Yes Yes Yes
Initial official determination modified from bomb explosion	Yes	Yes Yes Yes
Structural failure considered for probable cause	Yes	Yes Yes Yes
Inadvertently opened forward cargo door considered for probable cause	Yes	No Yes Yes
Official probable cause as bomb explosion	Yes	
Yes	No	No
Official probable cause as 'improvised explosive device'	No	Yes No No
Official probable cause as explosion by unstated cause	Yes	No No No
Official probable cause as explosion in center fuel tank with unknown ignition source	No	No No No
Yes		
Official probable cause as improper latching of forward cargo door	No	No Yes No
Official probable cause as switch /wiring inadvertently opening forward cargo door	No	Yes No
"Bomb" allegedly loaded two flights previous to detonation flight	Yes	Yes N/A N/A
"Bomb" allegedly loaded one flight previous to detonation flight	N/A	N/A N/A Yes
Takeoff after sunset on fatal flight	Yes	Yes
Yes	Yes	
Takeoff after scheduled takeoff time on fatal flight	Yes	Yes Yes
Yes	Yes	Yes

"Bomb' allegedly goes off on ground after a flight N/
A N/AN/AN/A

Significant Direct and Tangible Evidence Obtained for Four
B747 Breakups in Flight

AI 182 PA103 UAL 811

Difficulty Date : 10/11/00 Operator Type : Air Carrier ATA
Code : 5210 Part Name : CONTROLLER Aircraft
Manufacturer : BOEING Aircraft Group : 747 Aircraft Model :
747422 Engine Manufacturer : PWA Engine Group : 4056
Engine Model : PW4056 Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED Submitter Code : Carrier
Operator Desig. : UALA Precautionary Procedure : NONE
Nature : OTHER Stage of Flight : INSP/MAINT District Office
Region : Western/Pacific US office #29 A/C N Number : 199UA
Aircraft Serial No. : 28717

Discrepancy/Corrective Action:Fwd cargo door opened by itself
when cb pushed in. On arrival, circuit breakers were pushed in,
when pressure relief door handle was opened the door latches
opened and then the door opened on its own. Could not duplicate
problem after initial opening.Ó

From: John Barry Smith <barry@corazon.com>
Date: April 22, 2002 8:04:45 AM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: PA 103 reply to your email, Mr. Smart

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB

DRA Farnborough
Hants GU14 6TD
United Kingdom

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Mr. Ken Smart and Mr. Bill Tucker,
April 2002

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As I think of replies to Mr. Smart's email to me of 18 April 02, I always end up thinking as if I were speaking to both of you gentlemen at the same time. Please permit me to do this at this time. And it is entirely reasonable for me to do that since you both are very high officials in the premier safety boards of two large, highly industrialized countries with large air carriers. I am aware of the high level of authority to which I speak. I understand the relationship between amateur and professional. I know the value of decades of investigation and experience. I have the lower authority, I am the amateur, and I have not made aviation safety my lifelong career although that may come true.

Mr. Smart, I will try to be polite and efficient and most of all accurate. If I offend or appear to be rude in any of this long written discourse, please, not so. If I seem to be aggressive at times it is because I am passionate about this aviation safety issue and that is because my life was saved in a sudden night fiery fatal jet plane crash long ago. Please disregard any emotional tugs or pulls based on my lack of charm. My main worry here is to not make a mistake. So, when I name numbers

and locations of things, I assume that Mr. Tucker is checking my every word. I submitted my Smith AAR for Air India Flight 182 and he noticed a few errors in my comparison chart of all four Boeing 747s, notified me when he visited, and I immediately corrected them. (Smith AAR sent by separate email with this one.)

I believe, Mr. Smart, that you are of a curious mind, of honest intent, and have a firm adherence to principal as shown by your observations of the four Pan Am Flight 103 photographs of the forward cargo door area. The curious might say, it does look shattered and outward, I wonder why; the honest would say, well, whatever the reason, we should find out; and adherence to principal is safety always comes first regardless of wishful thinking by others. Safety never sleeps.

Part I

I ask that you also be open minded, please. It's very hard to do at this stage of the event, almost fourteen years later. But worth it. I trust you would seriously consider an alternative probable cause to Pan Am Flight 103 if the alternative were:

1. Plausible.
2. Reasonable.
3. Well documented by official investigative reports.
4. Has close precedent.
5. Reveals current hazard.

Gentleman, the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 and Pan Am Flight 103 fulfills all four requirements above.

The wiring/cargo door explanation is plausible as a sequence of events from wiring short to airframe breakup as it all could happen according to physical laws of nature.

It's reasonable because we know the explosive effects of an unintentional hull rupture in a pressurized jet from the Comet experiences.

It's well documented by the Kirpal Report, the Canadian Aviation Safety Board AAR, Three NTSB AARs (90/01 and 92/02, and 00/03), AAIB Aircraft Accident Report No 2/90 (EW/C1094), and aviation safety public docket information.

It has close precedent because of United Airlines Flight 811, (AAR 92/02 sent by separate Email with this one.)

It reveals a current hazard of aging defective wiring in early Boeing 747s of which about 500 are still in service and it reveals a poorly designed outward opening nonplug cargo door.

My goal is not to persuade you that an electrical problem caused the destruction of Pan Am Flight 103 and Air India Flight 182, but to persuade you that reasonable cause exists to reconsider the probable cause for both events and conduct an updated/supplemental investigation into each from the point of view of probable cause as:

1. Missile. (Brought up by Trans World Airlines Flight 800.)
2. Center fuel tank explosion with undetermined ignition source. (Brought up by Trans World Airlines Flight 800.)
3. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup. (Brought up by United Airlines Flight 811.)
4. Bomb. (Brought up by Air India Flight 182 and Pan Am Flight 103 and Trans World Airlines Flight 800 and United Airlines Flight 811.)
5. Rather large shotgun. (Brought up by Pan Am Flight 103.)

But first, it would be polite of me to do a line by line reply to Mr. Smart's most welcomed and important email of 18 April.

KS> Dear Mr Smith

KS> Thank you for your hypothesis on the immediate cause of the Pan Am 103.

JBS> Thank you, sir, for your reply. "Hypothesis" is good and implies math and science, I prefer "explanation" with "probable cause" reserved for the accident board.

KS> During the first five days of the investigation into Pan Am 103 the AAIB were pursuing two general lines of inquiry.

JBS> And an exciting five days they were too, I bet. I see the names The Right Honourable Cecil Parkinson, Secretary of State for Transport, D A Cooper, the Chief Inspector of Accidents, and M M Charles, Inspector of Accidents, Department of Transportation on the AAIB report and they must have had an experience to remember.

Five days was months before the fuselage reconstruction was completed to give the investigators a good view as to what happened to the shattered forward cargo door area of the fuselage and the smoother skin on port side opposite.

Five days was months before the pieces of the forward cargo compartment were retrieved to examine the latches, cams, pins, tubes, and manual locking handle of the forward cargo door, a likely culprit to the disintegration in flight. Apparently the pieces never were recovered since the lock status of the forward cargo door is not stated in the AAIB AAR while the status of the aft

identical cargo door and the bulk cargo door is given as "latched and locked" which implies the forward cargo door latch status is "unlocked" or "unknown."

Five days was months before the most direct evidence, the CVR and FDR data, could have been analyzed and conclusions made as to the source of the sudden loud sound and abrupt power cut.

Five days was months before a seasoned decision could have been made to rule out your first inclination below: "...a structural failure in-flight as a result of an induced structural overload.)"

Five days was way too soon to believe the cause was a bomb and continue thence from that point of view to prove the case. Once the main path of terrorist bombing was taken so soon after the event, it was difficult, if not impossible, to take side trips to other possibilities when the whole world, the media, and the political leaders were all rightly demanding retribution if the cause had been a terrorist bombing. It was not. It was mechanical. And of course, at the time, United Airlines Flight 811 had not yet occurred and the only similar event, Air India Flight 182, was deemed a terrorist bomb by the Indians but not the Canadians so the connection was made of bomb and sealed. Too soon, sir! But not too late to amend.

Would you agree that five days was too soon to decide on "bomb/device/improvised explosive device" and exclude "...a structural failure in-flight as a result of an induced structural overload"?

KS>"The first was that the aircraft had suffered a structural failure in-flight as a result of a defect or induced structural overload,"

JBS>Solid agreement already! I contend you were correct from day one with that probable cause as modified Ó...a structural failure in-flight [forward of the wing on the right side] as a result of an induced structural overload [when the cargo door ruptured open in flight and explosive decompression occurred which took a twenty foot by thirty foot section of skin and ribs away.] (And it was your first choice, too. Mr. Smart, AAIB were right from the very beginning with your first choice.)

KS>Ôthe second was that an improvised explosive device was responsible.Õ

JBS>IED and still reluctant to call it a bomb, and very correct to do so as explained later.

KS>ÔWhen the evidence of an improvised explosive device was found,Ó

JBS>And very important evidence too and all explainable using hindsight because of subsequent events. ÒBombÓ evidence which appeared so convincing for Pan Am Flight 103 has now been shown to be benign because of the Trans World Airlines Flight 800 event which was another Boeing 747 thought to have been bombed, as explained later.

Evidence appeared later that ruled against an improvised explosive device. The damage in the baggage container and adjacent area is from a mild directed blast as if a rather large shotgun had gone off at close range. (AAIB stated in Aircraft Accident Report No 2/90 (EW/C1094) section: 1.12.2.1 Fuselage: ÒWhere these panels formed the boundary of the shatter zone, the metal in the immediate locality was ragged,

heavily distorted, and the inner surfaces were pitted and sooted - rather as if a very large shotgun had been fired at the inner surface of the fuselage at close range, Ó and 8. Analysis: ÒWith the two container reconstructions placed together it became apparent that a relatively mild blast had exited container 4041 through the rear lower face to the left of the curtain and impinged at an angle on the forward face of container 7511.)

KS>Òthe investigation nevertheless concentrated on discovering whether there was any evidence that a structural weakness had been exploited. Ò

JBS>Structural weakness exploited? You could be referring to that weak Section 41 with the pear shape that causes problems with extensive compressions and decompressions and had an Airworthiness Directive for repair.

I have discovered a new structural weakness for Boeing 747s and by implication all pressurized jets with large cargo doors.

For the Boeing 747: The four nine foot vertical slices in the fuselage skin for the sides of the forward and aft cargo doors are held in place by only one latch in each side. So, each nine foot slice has one midspan latch to hold four and a half feet closed on each side of it. And the midspan latch has no locking sector on the latching cam to prevent inadvertent back driving in flight. All the eight bottom latches on each door, for a total of sixteen latches, have locking sectors. The four midspan latches for the two cargo doors have none. The weakness is at the midspan latches and the absence of locking sectors. One latch with no locking sector for nine feet of fuselage slice is not enough. It ruptures open in flight and causes the tell tale peeled back and down skin from the latch such as in Pan Am Flight 103, United

Airlines Flight 811, and Trans World Airlines Flight 800 and possibly Air India Flight 182, if the photos are reexamined.

KS>In that respect the fwd. cargo door was the subject of very detailed examination.

JBS>Ah, very good, sir, their research is invaluable. Are the documents available? What is the current latch status of wreckage of door in hangar? What position is the Manual Locking Handle in? What did they think of the peeled back skin from the aft midspan latch? This evidence matches the peeled back skin from the aft midspan latch of the forward cargo door or United Airlines Flight 811 which happened a scant two months later. I suspect United Airlines Flight 811 was not compared at all to Pan Am Flight 103 because PA 103 was already compared to Air India Flight 182, as it should have been since they are both so similar. Since Air India Flight 182 was considered a bombing by the Indians, then Pan Am Flight 103 was a bombing also. Since United Airlines Flight 811 was not a bombing, it was not considered as a potential match at that time. It should and can be now, sir.

A detailed examination of a possibly defective forward cargo door was done in the later AAR for United Airlines Flight 811 (NTSB 92/02). It includes close examination of the latch pins for bluing from overpressure, the hinges for overtravel, the torque tubes for bending, the bellcranks for slack, the overpressure relief doors for operation, the manual locking handle for status, the locking sectors for damage, and other evaluations. There is no discussion of the forward cargo door in AAIB 2/90 and in fact, the latching status is omitted as well as a picture of the starboard side door area. In drawings the door is just sketched in. That area does need the depth of examination that was conducted for

United Airlines Flight 811.

Let us do it now. We have the benefit of hindsight and the rare chance to take advantage of that luxury.

KS>ÒAll the specialists involved were satisfied that the fwd. cargo door was correctly latched when the device detonated

JBS>Why so? With respect, sir, what led them to that conclusion? What was their opinion about the cargo door inadvertently opening in flight by improper latching or an electrical problem, as was suspected in United Airlines Flight 811 which also had that sudden loud sound on the CVR followed by an abrupt power cut? Did they have an mechanical alternative to the bomb explanation? It appears that five days after the event, sooty rib in hand, the bomb explanation was the working hypothesis as the safety investigation then proceeded as to what happened after the device detonated while the law enforcement people went after the ÔbombersÕ. May I ask if they thought the door was latched when the bomb went off, when did the door become unlatched? A second later or a few minutes later?

For Air India Flight 182 and Pan Am Flight 103 the assumption has been bomb from the very first few days and any accused always agrees it was a bomb but they did not plant it. I know they did not plant it because nobody ÔplantedÕ a bomb because there were no bombs. There was something that looked, smelled, and sounded like a bomb explosion, but wasnÕt. It was a tremendous explosion of an explosive decompression from a hull rupture at a door. There was something for Pan Am Flight 103 that looked like a rather large shotgun had gone off in a baggage container and it probably was and it probably did.

The assumption of "device detonated" is not adequately supported by the evidence to make a conclusion, in my humble opinion, while the assumption of a rather large shotgun firing off at event time is.

Please, Mr. Smart, open your mind for just this effort: No bomb but a rather large shotgun which gave you the evidence AAIB have taken for a powerful "IED/Bomb/device".

You still are not calling the "bomb" a bomb but call it an "improvised explosive device" and now a "device".

And yet you are absolutely correct for both phrases when they are viewed objectively. The English language allows precision. Others may see a bomb when they read your words of "device" and "improvised explosive device" but I see a complex device called a forward cargo door with latches, cams, bellcranks, overpressure relief doors, manual locking handle, viewing ports, and torque tubes. I see an explosive device since I know about the Comets and United Airlines Flight 811 where the crew described the initial event as a "tremendous explosion". Improvised by whom? Improvised by fate that let polyimide aromatic insulated wiring called Poly X be installed in planes that are now flying at twice the expected in service life using wiring that is prone to chafing and cracking, especially in the presence of moisture? (The forward cargo compartment has a special bilge built in to hold the excess moisture in the compartment from condensation.) Was the outward opening device improvised by the designers who created non plug cargo doors while making the passenger doors the plug type? The cargo doors on Boeing 747s have been subject to many Airworthiness Directives over the years to correct problems such as bent sills, exposed wiring, too soft metal, poorly placed placards, and there

are many Service Difficulty Reports of leaking seals.

Cargo doors on Boeing 747s are extremely complex devices, proven capable of explosive action, poorly designed, and prone to failure. They can be, under certain conditions of flight, improvised explosive devices. They are not bombs although they may cause similar damage.

Mr. Smart, to be precise, and this is the time for it, you are correct by calling the part of the machine that caused the destruction of Pan Am Flight 103 to be a "device" or an "improvised explosive device" because it was. It was not a homemade bomb but a forward cargo door. I am not playing with words here; I am being as precise as AAIB in the use of the English language. The use of IED is proper because the evidence shows it. It does not show bomb and "bomb" was therefore not used.

I believe the location in the forward cargo compartment in the baggage container which had its lower quadrant blown away held a rather large shotgun which was stored in baggage, was loaded, and was safe unless a tremendous explosion happened nearby. A tremendous explosion did happen nearby when the opposite fuselage blew out when a huge 20 foot by forty foot hold appeared suddenly where the forward cargo door and skin above it used to be. The rather large shotgun fired, the relatively mild explosion left soot on a rib, burst through the corner of the baggage container, went 25 inches and made a 20 inch hole in the port side of the fuselage. A sooty rib was soon found on the ground and incorrectly declared proof a bomb had gone off instead of a shotgun cartridge.

It's the classic red herring. Most everyone went for it. But the

long arm of safety is now finding the bomb explanation to be false because a more likely cause is now being revealed. Safety never gave up.

KS>Òand that the subsequent structural failures were secondary events.Ó

JBS>And here we come to an important interpretive point, sir. When you write, Òsubsequent structural failure,Ó do you mean the rupturing open of the forward cargo door in flight? Can we agree that a sudden, huge hole on the starboard side forward of the wing where the cargo door and skin above it used to be can be called a Òsubsequent structural failureÓ? And can we agree that you believe that if that kind of structural failure occurred, it happened ÔsecondaryÕ or after the initial event?

If so, we are in general agreement except for a few seconds of time. Timing is so important and was examined in the AAIB report in Appendix B of wreckage distribution drawings of the sequence of destruction of Pan Am Flight 103 as it came apart in the air.

Did the forward cargo door of Pan Am Flight 103 rupture open in flight or was it latched and locked until ground impact? The photographs show enough outward force peeled skin to enable one to make an assumption it opened in flight.

If it did rupture open in flight, where in the door?

At the weak latches with no locking sectors.

But when? When did the aft midspan latch rupture?

The initial event time was officially determined to be the sudden loud sound on the CVR. I contend the initial event of sudden loud sound is the explosive decompression sound when the rupture/structural failure occurred and the air molecules rushed out making the sudden loud sound on the CVR. This initial event sudden sound on the CVR for Air India Flight 182 has been matched to a DC-10 explosive decompression sound when its cargo door opened in flight. Pan Am Flight 103 has been matched to Air India Flight 182 in the AAIB report. All four Boeing 747 sudden sound events have been matched by NTSB in Chart 12 of the public docket for Trans World Airlines Flight 800.

They are all linked together by the sudden loud sound on the CVR which I contend is the primary, not the secondary event, of the structural failure when door ruptured open and explosive decompression ensued.

The time of the structural failure of the ruptured open forward cargo door on the starboard side and the opening of the 20 inch hole on the port side was determined to be the initial event time of the sudden loud sound by the AAIB wreckage distribution drawings in Appendix B based upon the distance from the datum line of the retrieved wreckage and which showed at initial event time the large rectangular shaped fuselage skin area around the shattered forward cargo door occurred at the same time as the 20 inch hole on the smoother port side. As the seconds progressed, the subsequent drawings show the holes getting bigger and bigger with the starboard cargo door side always staying larger.

Based on wreckage distribution it can be said by the evidence that the 20 inch hole on the port side occurred at the same time as the twenty foot by thirty foot hole on starboard and both were at

initial event time of the sudden loud sound on the CVR. Which hole is more likely to have caused the nose to come off a Boeing 747?

Mr. Smart, I see the difficulty a bomb theorist would have when trying to understand that if a huge structural failure forward of the wing on the right side occurred in flight at the time of the sudden loud sound, how can that failure be secondary to a bomb explosion that only made a small hole on the port side, was not heard by the CVR, was relatively mild, not spherical but directed, and caused damage that looked as if a rather large shotgun had gone off at close range to the fuselage skin?

If we can agree that a structural failure may have occurred forward of the wing on the right side in flight and that failure may have been caused by the forward cargo door inadvertently rupturing open at the aft midspan latch in flight after a cause, then what was it?

What caused the forward cargo door to rupture at the aft midspan latch in flight?

I think this is the point, Mr. Smart. We can look at the reasonable and possible initial events, based on knowledge gained in subsequent accidents which are:

1. Missile. (Brought up by Trans World Airlines Flight 800.)
2. Center fuel tank explosion with undetermined ignition source. (Brought up by Trans World Airlines Flight 800.)
3. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup. (Brought up by United Airlines Flight 811.)
4. Bomb. (Brought up by Air India Flight 182 and Pan Am Flight 103 and Trans World Airlines Flight 800 and United Airlines

Flight 811.)

5. Rather large shotgun. (Brought up by Pan Am Flight 103.)

(Discussion of the above in Part II.)

KS>ÒAll structures by nature of their design have paths of least resistance when subjected to abnormal loading. The structure in the vicinity of large strengthened apertures such as the fwd. cargo door provide very good examples of this. The window belt on pressurised aircraft provides another and similar example. Ò

JBS>I understand, sir, and that hard lesson was learned from the Comet accidents of an extensive fuselage skin rip when explosive decompression occurred at corner of RDF window. Your observation of the belt, Mr. Smart, shows that a 20 inch hole in the fuselage skin on the port side of Pan Am Flight 103 would have stopped at the belts and other strengthened stiffeners and not get bigger, thereby limiting the damage to the small hole. The aircraft would slowly depressurize and land safely with its small hole. The damage shape of departed cargo door and skin above it did stay rectangular as the torn off skin stopped at the belts and stiffeners but the nine foot by ten foot loss of the forward cargo door and it adjacent skin was too much for structural integrity and the nose came off. The point is that the 20 inch ÔbombÕ hole was too small to cause the destruction of Pan Am Flight 103 while was the twenty foot by thirty foot hole of missing door and skin (as shown by AAIB photographs and distribution drawings) would be large enough to cause the nose to come off.

KS>Ò You should not be surprised to find similar patterns of breakup in structural failures that emanate from very different causes.

JBS>I understand, sir. I agree wholeheartedly again. A hull rupture is a hull rupture and could be from different sources. I understand and agree that the possible structural failure (ruptured open cargo door in flight) for Pan Am Flight 103, Air India Flight 182, and United Airlines Flight 811 could have been caused by three different causes and if one of them was a bomb, the structural failure could have been after the bomb explosion...or missile hit...or center fuel tank explosion...or wiring short.

Will you agree that a cause for four Boeing 747 structural failures in flight (ruptured open forward cargo door in flight) could be from only one cause? A common cause? One cause fits all? Maybe?

Mr. Tucker made the very same point of several sources causing the same event to me, sir, when he pointed out specifically that even if the forward cargo door of Air India Flight 182 ruptured open in flight and United Airlines Flight 811 did also, the cause might be two separate reasons, and I agree wholeheartedly. I have thought about this a lot.

There are many ways for a cargo door to inadvertently rupture open in flight: (Current official opinion in parentheses)

- A. Bomb explosion. (Partially accepted for two flights, ruled out for two flights.)
- B. Crew or passenger error. (Ruled out for all flights.)
- C. Electrical fault in switch or wiring. (Accepted for two flights, ruled out for two flights.)
- D. Pneumatic overpressure. (Ruled out for all flights.)
- E. Cargo shift. (Ruled out for all flights.)
- F. Compressed air tank explosion. (Ruled out for all flights.)
- G. Fire. (Ruled out for all flights.)

- H. Missile strike. (Ruled out for all flights.)
- I. Midair collision. (Ruled out for all flights.)
- J. Fuel tank explosion. (Accepted for one flight, ruled out for three flights.)
- K. Stowaway. (Ruled out for all flights.)
- L. Electromagnetic interference. (Ruled out for all flights.)
- M. Comet or meteor. (Ruled out for all flights.)
- N. Space debris. (Ruled out for all flights.)
- O. Turbulence. (Ruled out for all flights.)
- P. Out of rig door. (Ruled out for all flights.)
- Q. Lightning. (Ruled out for all flights.)
- R. Metal fatigue. (Ruled out for all flights.)
- S. Improperly latched. (Initially accepted for one flight, then ruled out for all flights.)
- T. Design error. (Accepted for one flight, ruled out for three flights.)
- U. Repair error. (Ruled out for all flights.)
- V. Maintenance error. (Accepted for one flight, ruled out for three flights.)
- W. Collision with terrain. (Ruled out for all flights.)

Mr. Smart and Mr. Tucker, may we agree for this discussion that there was structural failure in flight forward of the wing on the right side of Pan Am Flight 103 and Air India Flight 182 and United Airlines Flight 811? There may be one cause, or two, or three. The structural failure may have occurred after a bomb explosion. A rather large shotgun could have gone off in a baggage container after a nearby explosion.

The key is pattern. The pattern is similar evidence in only four early model Boeing 747 inflight fatal events. I have discerned a pattern amongst the four fatal accidents out of the thirty odd hull losses. The pattern is clear yet complex and detailed. When a

forward cargo door ruptures open in flight, certain things have to happen and they happened for Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800.

I see the pattern and now I believe, and am immensely relieved, that you two gentlemen see it also.

What is the significance of the pattern? The significance is that it is possible only one cause is for all and that cause, faulty electrical wiring or switch, still exists, is a current hazard and must be dealt with, the sooner the better. There is urgency.

The significance of the pattern is that enough current hard evidence exists to justify a supplemental safety investigation into Air India Flight 182 and Pan Am Flight 103 based upon subsequent similar accidents such as United Airlines Flight 811 and Trans World Airlines Flight 800 from which much new knowledge was gained, such as the aging aircraft study which revealed the dangers of Kapton/Poly X wiring and an electrical problem can cause a cargo door to rupture open in flight.

Permit me a moment of wistful thinking based upon little experience in the aviation safety government system for an opinion that carries little weight:

From my point of view, it would not be too much of a reaction to recommend to NTSB that an emergency AD be written to inspect all the wiring in the forward cargo door area of Boeing 747s for arcing, sooting, or fire damage. In addition, it must be an option to pull the cargo door electrical circuit breaker, as was done and maybe saved a UAL aircraft as shown by below SDR from FAA:
Difficulty Date : 10/11/00 Manufacturer : Boeing Aircraft

Group : 747 Aircraft Model : 747422 Engine Manufacturer :
Part/Defect Location : Cargo Door Part Condition :
Malfunctioned : UALA Precautionary Procedure : A/C N
Number : 199UA Aircraft Serial No. : 28717
Discrepancy/Corrective Action: Fwd cargo door opened by itself
when cb pushed in. On arrival, circuit breakers were pushed in,
when pressure relief door handle was opened the door latches
opened and then the door opened on its own. Could not duplicate
problem after initial opening.Ó

Now thatÕs sort of scary.

I think that enough hard evidence exists of the pattern of wiring/
cargo door cause for Air India Flight 182 and Pan Am Flight 103
to justify a supplemental investigation for both and that decision
can be justified to the highest authority to include the Prime
Ministers via the Transportation Ministers via the heads of the
safety boards via the heads of AAIB and accident investigations
of TSB or whatever torturous path the news takes to the top.

The legal system may be done with Pan Am Flight 103 and
starting on Air India Flight 182 in November, but are the safety
people through? Safety is never finished. The safety people are
really never ÓthroughÕ with an accident and thatÕs why film
and wreckage is archived for future evaluation based on
subsequent similar events. Safety explains the past to predict the
future because history repeats itself.

The value of the CVR and FDR, the saving of wreckage and the
archiving of film for decades, and the willingness for safety
officials to always review the past to determine the present has
been shown to be invaluable in this investigation into four
Boeing 747s accidents far from each other in time and distance

and yet all related by evidence.

If official aviation safety organizations announced they were doing a supplemental investigation into several airplane crashes, I believe the public would accept that as normal, prudent, and comprehensive. (A precedent of later official review was set by NTSB with its rewrite of the United Airlines Flight 811 accident with an entirely new AAR, 92/02 which superseded 90/01.) (End philosophical digression.)

KS>ÒThe important differences lie in the detailed examination rather than the macro features.Ó

JBS>I again agree wholeheartedly, Mr. Smart, and thatÕs why I have come to the conclusion of a rather large shotgun, shorted wiring, and poorly designed cargo door caused the destruction of Pan Am Flight 103 and not a powerful plastic explosive bomb by terrorists: By a detailed examination.

JBS>Detailed examination; I have it, sir. Details from text, charts, photographs, tables, reports, tests, and evaluations. ItÕs in literally thousands of pages of consideration and analysis by me and thousands of pages of related consideration by others. I have the details and do not risk inundating you with them but only send two AARs via separate email for your consideration but all details are available upon request, Mr. Smart. It takes just a few minutes to send you anything you want on my end.

KS>ÒI'm sorry to be the one to pour cold water on your hypothesis, but the scenario that you suggest was the subject of very considerable examination in the early stages of the Lockerbie investigation.

JBS>You have not thrown cold water, sir, but added fuel to the fire. Thank you for confirmation that my subject of considerable analysis was worthy of your considerable initial analysis. I ask that the subject now have considerable examination in the late stages of the Lockerbie investigation, using the rare luxury of hindsight and the subsequent similar accidents of United Airlines Flight 811 and Trans World Airlines Flight 800.

To politely repeat, Mr. Smart and Mr. Tucker, my goal is not to persuade you that an electrical problem caused the destruction of Pan Am Flight 103 and Air India Flight 182, but to persuade you that reasonable cause exists to reconsider the probable cause for both because of subsequent similar accidents which reveals a potential common cause for all. Let TSB and AAIB create an updated/supplemental investigation into each from the point of view of a reasonable, plausible probable cause as:

1. Missile. (Brought up by Trans World Airlines Flight 800.)
2. Center fuel tank explosion with undetermined ignition source. (Brought up by Trans World Airlines Flight 800.)
3. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup. (Brought up by United Airlines Flight 811.)
4. Bomb. (Brought up by Air India Flight 182 and Pan Am Flight 103 and Trans World Airlines Flight 800 and United Airlines Flight 811.)
5. Rather large shotgun. (Brought up by Pan Am Flight 103.)

Part II

OK, what reasonably could cause the forward cargo door of a Boeing 747 to open in flight at initial event time of a sudden loud sound on the CVR?

A missile could hit the plane in flight. Where could a missile have hit Pan Am Flight 103? Only a hit in the forward cargo compartment would cause the abrupt power cut to the recorders and the sudden loud sound. What corroborative evidence is there that a missile struck Pan Am Flight 103? None that I can see. There were no military planes nearby nor reports of missing missiles, there were no reports of missile sightings at event time, there is no residual evidence of residue, missile casing, pitting, or cratering which follows a high explosive detonation, and there was no missile explosion sound on the CVR. The same reasons that a missile was ruled out for Trans World Airlines Flight 800 are the same reasons that a missile can be ruled out for Pan Am Flight 103.

Based upon lack of corroborative evidence, a missile as a probable cause for Pan Am Flight 103 may be ruled out.

Could the center fuel tank have exploded from an undetermined ignition for Pan Am Flight 103?

There was fire for the wing and engine number three but no evidence of inflight fire around the center fuel tank. The center tank may have been on fire as it fell, but it did not explode according to the wreckage. The sound on the CVR was not a fuel tank explosion sound. The pieces of wreckage which left the plane first were not from the center fuel tank. The sides of the fuselage near the center tank are damaged in much different degrees and should be evenly bilateral. None of the passengers were burned extensively. The reasons for determining a center fuel tank exploded for Trans World Airlines Flight 800 are the same reasons for ruling it out for Pan Am Flight 103 because they did not occur.

Based upon lack of corroborative evidence, a center fuel tank explosion of undetermined ignition as a probable cause for Pan Am Flight 103 may be ruled out.

Could an electrical problem of wiring or switch have caused the destruction of Pan Am Flight 103?

The corroborative evidence is literally in volumes: NTSB AAR 90/01 and NTSB AAR 92/02 for United Airlines Flight 811 and AAIB 2/90 for Pan Am Flight 103. Below are specific matches between PA 103 and UAL 811 gleaned only from those government AARs.

Both were:

Aged.

High flight time.

Early model-100.

Poly x wired.

Boeing 747.

Experienced hull rupture forward of the wing on right side in cargo door area.

Shape of hull rupture forward of the wing on the right side is rectangle with specific rectangular shape.

Fodded number three engine.

On fire number three engine.

Sudden sound on cvr

loud sound on the cvr.

Short duration sound on the cvr.

Abrupt power cut to fdr.

Outward peeled skin in cargo door area from aft midspan latch.

Longitudinal break at midline of the forward cargo door at midspan latch.

More severe inflight damage on starboard side.

At least nine never recovered bodies.

Vertical fuselage tear lines forward of the wing and aft of cargo door.

Torn off skin in forward cargo door area on starboard side.

Outward peeled skin on upper forward fuselage.

Destruction initially thought to be have been caused by a bomb.

Based upon abundance of corroborative evidence, an electrical problem of wiring or switch as a probable cause for Pan Am Flight 103 may be ruled in pending further investigation.

Could a bomb/rather large shotgun have caused the destruction of Pan Am Flight 103?

If a powerful bomb were to explode in the forward cargo hold of Pan Am Flight 103, certain corroborating evidence would be present such as hot-gas pitting on pieces of metal, punctures, shrapnel, explosive residue, pitting, cratering, explosive type injuries to passengers sitting in the cabin, timer, fuze, and a bomb explosion sound on the cockpit voice recorder.

For Pan Am Flight 103:

A. Pitting: Present

B. Cratering: Present

C. Hot gas washing: Absent

D. Holes: Absent

E. Punctures: Absent

F. Shrapnel: Absent

G. Explosive residue: Found.

H. Burn injuries to passengers sitting in the cabin: Absent

I. Sooted metal: Found

J. Timer: Fragment of plastic.

K. Fuze: Absent

L. Bomb explosion sound on the cockpit voice recorder: Absent

Bombs have been considered for Air India Flight 182 and Trans World Airlines Flight 800 as well as Pan Am Flight 103 and thus extensively investigated. The same reasons for ruling out a bomb for Trans World Airlines Flight 800 are the same reasons to rule it out for Air India Flight 182 and Pan Am Flight 103.

The NTSB states in AAR 00/03 regarding Trans World Airlines Flight 800: Page 180, footnote 368: Evidence of a bomb explosion included deformation of materials away from a location at the height of the passenger seat pan, hot-gas pitting damage on multiple pieces of wreckage that formed a pattern radiating from the same location (including into the CWT), punctures radiating from the same location, and shrapnel. Further, according to the FBI's laboratory report, No. 91204034 S YQ YB/91207052 S YQ YB, dated January 30, 1990, chemical analysis of a piece of wreckage from the right side of the CWT identified the presence of RDX and PETN high explosive. These two explosives comprise about 86 percent of the composition of SEMTEX, which is a rubberlike material manufactured by Synthesia Corporation of Semtin, Czechoslovakia, primarily for use in mining and other civil engineering activities. According to the FBI, SEMTEX has been used by criminal and terrorist elements in Europe since 1966. (SEMTEX was identified as the material used in the bomb placed on Pan Am flight 103. For additional information, see section 1.11.1.2.)

Page 257 to page 259 of NTSB AAR 00/03 2.2.1.2 Consideration of a High-Energy Explosive Device Detonation (Bomb or Missile Warhead) Several factors led to speculation that the accident might have been caused by a bomb or missile strike. These factors included heightened safety and security concerns because of the 1996 Olympics then being held in the United

States, the fact that TWA flight 800 was an international flight, and the sudden and catastrophic nature of the in-flight breakup. In addition, numerous witnesses to the accident reported seeing a streak of light and then a fireball, which some people believed represented a missile destroying the airplane. Further, some anomalous primary radar targets were recorded by the Islip, New York, radar site in the general vicinity of TWA flight 800 at the time of the accident that apparently could not be explained. Accordingly, the Safety Board considered the possibility that a bomb exploded inside the airplane or that a missile warhead from a shoulder-launched missile exploded upon impact with the airplane. Testing performed by the Federal Bureau of Investigation (FBI) found trace amounts of explosives on three separate pieces of airplane wreckage (described by the FBI as a piece of canvaslike material and two pieces of floor panel). However, none of the damage characteristics typically associated with a high-energy explosion of a bomb or missile warhead (such as severe pitting, cratering, petalling, or hot gas washing) were found on any portion of the recovered airplane structure, including the pieces on which the trace amounts of explosives were found. Only about 5 percent of the airplane's fuselage was not recovered, and none of the areas of missing fuselage were large enough to have encompassed all of the damage that would have been caused by the detonation of a bomb or missile. Although several large holes are visible in the reconstructed portion of the airplane fuselage, almost all of the structure that originally filled in these holes is attached to the remaining structure but is folded either inward or outward. No area of structure in the reconstructed portion of the airplane contained any unexplained holes large enough to represent the entry point of a missile. Further, the victims remains showed no evidence of injuries that could have been caused by high-energy explosives, nor was there any damage to the airplane seats and other interior

components consistent with a high-energy explosion. Investigators considered several scenarios to determine how the trace amounts of explosive residue might have gotten on the wreckage from the accident airplane. Trace amounts of explosive residue could have been transferred to the contaminated pieces from the military personnel (and their associated clothing, boots, and equipment) that were on board the accident airplane when it was used to transport troops during the Gulf War in 1991. In addition, explosives were placed and then removed from several locations in the accident airplane during a dog-training explosive detection exercise about 1 month before the accident. Despite being unable to determine the exact source of the trace amounts of explosive residue found on the wreckage, the lack of any corroborating evidence associated with a high-energy explosion indicates that these trace amounts did not result from the detonation of a high-energy explosive device on TWA flight 800. Accordingly, the Safety Board concludes that the in-flight breakup of TWA flight 800 was not initiated by a bomb or a missile strike.Ó

Gentlemen, most of the required evidence that corroborates a bomb explosion on Pan Am Flight 103 is missing and those few traces of residue can now be explained as benign based upon Trans World Airlines Flight 800. Evidence of Semtex was found on both Pan Am Flight 103 and Trans World Airlines Flight 800 yet called benign for one and could be for the other too.

Based upon absence or a benign finding of corroborative evidence, an explosion of a powerful explosion from a bomb as a probable cause for Pan Am Flight 103 may be ruled questionable.

Could the firing of a rather large shotgun have given evidence which led investigators to conclude a powerful bomb had been

detonated causing the destruction of Pan Am Flight 103?

The evidence shows a relatively mild directed blast existed a corner of a baggage container, traveled 25 inches and caused a 20 inch hole in the fuselage skin. The sound of the mild directed blast was not heard on the cockpit voice recorder. Bombs are loud, spherical, and powerful. Shotgun blasts are relatively mild and directed.

To politely repeat: The damage in the baggage container and adjacent area is from a mild directed blast as if a rather large shotgun had gone off at close range. (AAIB stated in Aircraft Accident Report No 2/90 (EW/C1094) section: 1.12.2.1 Fuselage: "Where these panels formed the boundary of the shatter zone, the metal in the immediate locality was ragged, heavily distorted, and the inner surfaces were pitted and sooted - rather as if a very large shotgun had been fired at the inner surface of the fuselage at close range," and 8. Analysis: "With the two container reconstructions placed together it became apparent that a relatively mild blast had exited container 4041 through the rear lower face to the left of the curtain and impinged at an angle on the forward face of container 7511.")

The AAIB official who was actually there opined the cause of the damage he personally viewed to be as if a rather large shotgun had been fired at the fuselage at close range and I agree with him and the AAIB and it may not have been a shotgun but some type of directed firearm but not a bomb.

Can we agree that this AAIB opinion may have been correct in its assessment of the cause of the mild blast, pitting, sooting, distortions, ragged, and shattered skin as if a very large shotgun had been fired at the inner surface of the fuselage at close range?

Can we agree that pitting, sooting, distortions, ragged, and shattered skin could also have been interpreted as evidence of a bomb explosion?

Loaded guns have been inserted into baggage holds of airliners before and have been accidentally discharged, (April 26, 2000 Gun goes off in bag being loaded into jet. Associated Press - Portland) A high-powered handgun went off in the baggage compartment of an Alaska Airlines jetliner on the tarmac at Portland International Airport, sending a bullet into the passenger compartment within inches of passengers' feet. Nobody was injured.

Shotgun cartridges give sooty residue when fired. A shotgun fires in a directed manner and would give a relatively mild blast compared to a high explosive bomb. The sound of the weapon firing is not heard on the cockpit voice recorder because the power had been abruptly cut after the tremendous explosive decompression when the huge hole appeared on the starboard side of the hold or the gunshot was over shouted by the tremendous noise from the huge hole and the explosive decompression.

The evidence corroborates the detonation of a device called a rather large shotgun which caused a relatively mild directed blast which resulted in a 20 inch hole in the fuselage skin on the port side. This damage was not sufficient to cause the nose to come off Pan Am Flight 103 because the structure was designed to withstand a hold that size in the pressurized hull by the presences of stiffeners, ribs, and belts.

Based upon the presence of corroborative evidence, the firing of

rather large shotgun in the forward cargo hold Pan Am Flight 103 may be ruled in as occurring but ruled out as the cause of the subsequent structural failure pending further investigation.

To summarize some conclusions about Pan Am Flight 103 based upon subsequent events such as United Airlines Flight 811 and Trans World Airlines Flight 800:

1. Structural failure of a ruptured open forward cargo door in flight is likely because of presence of corroborative evidence.
2. Bomb explosion or missile strike or center fuel tank explosion unlikely as probable cause because of absence of corroborative evidence.
3. Detonation of rather large shotgun in baggage container is likely to have occurred because of presence of corroborative evidence.
4. Electrical problem as cause of ruptured open forward cargo door possible because of presence of corroborative evidence and the precedent of United Airlines Flight 811.

Mr. Smart and Mr. Tucker, thank you for wading through the above analysis. There are four complex fatal Boeing 747 events to cross reference/compare/sort out and it gets confusing at times. For the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation, all the evidence for four fatal crashes must remain consistent and it does. Over and over again the wiring/cargo door explanation makes sense when investigated. The latest confirmation came with the four photographs of the forward cargo door area of Pan Am Flight 103 which revealed: The peeled back and down skin from the aft midspan latch and the longitudinal split of the door. This specific evidence matches United Airlines Flight 811 door which is the most credible model because its evidence is indisputable. There was no way for me to know the close match

of the Pan Am Flight 103 door to the United Airlines Flight 811 door since there were never any photographs released of that starboard side, only two of the port side and yet, the new evidence continues to match the credible model.

The goal again, gentlemen, is not to persuade you that there were no bombs on Air India Flight 182 or Pan Am Flight 103 and that an electrical problem caused the forward cargo door to rupture open in flight causing a huge hole to appear leading to a tremendous explosion which caused the subsequent destruction of both aircraft, but the goal is to persuade you that a pattern has emerged which indicates that sequence may have happened that way based upon subsequent similar accidents and since the electrical hazard still exists to this day, supplemental investigations into the mechanical explanation are warranted.

The evidence in Air India Flight 182 and Pan Am Flight 103 still exists in hangars and high quality film and video in archives of AAIB, TSB, and RCMP. The confirming answers are there if examined. Please reexamine the metal, tubes, latches, cams, locking handles, pins, skin, paint as shown in wreckage and photographs to match up or not match up to United Airlines Flight 811 and Trans World Airlines Flight 800. Please reconsider the probable cause as electrical and conduct a supplemental investigation to rule in or rule out that current hazard.

For Air India Flight 182, please have faith in the CASB of 1986 who said an explosion occurred in the forward cargo compartment but declined to conclude it was a bomb explosion and were correct.

For Pan Am Flight 103, please have faith in the AAIB of 1988

who thought first of a structural defect induced by overload and were correct.

Thank you again, Mr. Smart, for your informative email of 18 April and I hope to continue our discussion further. Thank you, Mr. Tucker, for your continued interest and I look forward to further exchanges.

Gentlemen, I invite you both to visit me here in Carmel Valley, California for a personal visit in pleasant surroundings for a mutual exchange of ideas. Spring is very pretty here.

Best Regards,
Barry

John Barry Smith
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Enclosures:

April 26, 2000 Gun goes off in bag being loaded into jet
Associated Press -

PORTLAND _ A high-powered handgun went off in the baggage compartment of an Alaska Airlines jetliner on the tarmac at Portland International Airport, sending a bullet into the passenger compartment within inches of passengers' feet.

Nobody was injured.

The .357-caliber Ruger discharged in a suitcase as it was being thrown into the cargo hold of a Boeing 737 being loaded Monday

night for a flight to Anchorage, Alaska, said Port of Portland spokesman Doug Roberts.

If the gun had fired during the flight at a high altitude and the bullet had made a large hole in a window, the aircraft would have experienced rapid decompression, said Alaska Airlines spokesman Bill MacKay. However, he said, if the bullet had penetrated the plane's outer skin, the hole would have been smaller and there would have been no threat of rapid decompression.

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

	AI 182	PA103	UAL 811	TWA 800
Boeing 747	Yes	Yes	Yes	Yes
Early model -100 or -200			Yes	Yes
Yes				
Polyimide wiring (Poly X type)			Yes	Yes
Yes				
Sudden airframe breakup in flight (partial or total)				
Yes	Yes	Yes	Yes	Yes
Breakup occurs amidships			Yes	Yes
Yes				
High flight time (over 55,000 flight hours)				No
Yes	Yes	Yes		
Aged airframe (over 18 years of service)				No
Yes	Yes	Yes		
Previous maintenance problems with forward cargo door				
Yes	Maybe	Yes	Maybe	
Initial event within an hour after takeoff			No	Yes
Yes	Yes			
Initial event at about 300 knots while proceeding normally in all parameters				Yes

Yes	Yes	Yes		
Initial event has unusual radar contacts				Maybe
Yes	Yes	Yes		
Initial event involves hull rupture in or near forward cargo door area	Yes	Yes	Yes	Yes
Initial event starts with sudden sound				Yes
Yes	Yes	Yes		
Initial event sound is loud				Yes
Yes	Yes	Yes		Yes
Initial event sound is audible to humans				Yes
Yes	Yes			Yes
Initial event followed immediately by abrupt power cut to data recorders	Yes	Yes	Yes	Yes
Initial event sound matched to explosion of bomb sound	No	No	No	No
Initial event sound matched to explosive decompression sound in wide body airliner				Yes
Torn off skin on fuselage above forward cargo door area	Yes	Yes	Yes	Yes
Unusual paint smears on and above forward cargo door	Maybe	Maybe	Yes	Yes
Evidence of explosion in forward cargo compartment	Yes	Yes	Yes	Yes
Foreign object damage to engine or cowling of engine number three	Yes	Yes	Yes	Yes
Fire/soot in engine number three				Maybe
Yes	Yes	Yes		
Foreign object damage to engine or cowling of engine number four	Yes	Yes	Yes	Yes
Right wing leading edge damaged in flight				Yes
Maybe	Yes	Maybe		
Vertical stabilizer damaged in flight				Yes
Yes	Maybe			Yes

Right horizontal stabilizer damaged in flight	Yes
Yes Yes Yes	
More severe inflight damage on starboard side than port side	
Yes Yes Yes Yes	
Port side relatively undamaged by inflight debris	
Yes Yes Yes Yes	
Vertical fuselage tear lines just aft or forward of the forward cargo door	Yes Yes Yes Yes
Fracture/tear/rupture at a midspan latch of forward cargo door	Maybe Yes Yes Yes
Midspan latching status of forward cargo door reported as latched	No No No No
Airworthiness Directive 88-12-04 implemented (stronger lock sectors)	No No No Yes
Outwardly peeled skin on upper forward fuselage	Yes Yes Yes Yes
Rectangular shape of shattered area around forward cargo door	Yes Yes Yes Yes
Forward cargo door fractured in two longitudinally	Yes Yes Yes Maybe
Status of aft cargo door as intact and latched	Yes
Yes Yes Maybe	
Passengers suffered decompression type injuries	Yes Yes Yes Yes
At least nine missing and never recovered passenger bodies	Yes Yes Yes Yes
Wreckage debris field in two main areas, forward and aft sections of aircraft	Yes Yes
No Yes	
Initial official determination of probable cause as bomb explosion.	Yes Yes Yes Yes
Initial official determination modified from bomb explosion	Yes Yes Yes Yes

Structural failure considered for probable cause
 Yes Yes Yes Yes

Inadvertently opened forward cargo door considered for probable
 cause Yes No Yes Yes

Official probable cause as bomb explosion Yes
 Yes No No

Official probable cause as 'improvised explosive device'
 No Yes No No

Official probable cause as explosion by unstated cause
 Yes No No No

Official probable cause as explosion in center fuel tank
 with unknown ignition source No No No
 Yes

Official probable cause as improper latching of forward cargo
 door No No Yes No

Official probable cause as switch /wiring
 inadvertently opening forward cargo door No
 No Yes No

"Bomb' allegedly loaded two flights previous to detonation flight
 Yes Yes N/A N/A

"Bomb' allegedly loaded one flight previous to detonation flight
 N/A N/A N/A Yes

Takeoff after sunset on fatal flight Yes Yes
 Yes Yes

Takeoff after scheduled takeoff time on fatal flight
 Yes Yes Yes Yes

"Bomb' allegedly goes off on ground after a flight N/
 A N/A N/A N/A

Significant Direct and Tangible Evidence Obtained for Four
 B747 Breakups in Flight

AI 182 PA103 UAL 811

Difficulty Date : 10/11/00 Operator Type : Air Carrier ATA
Code : 5210 Part Name : CONTROLLER Aircraft
Manufacturer : BOEING Aircraft Group : 747 Aircraft Model :
747422 Engine Manufacturer : PWA Engine Group : 4056
Engine Model : PW4056 Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED Submitter Code : Carrier
Operator Desig. : UALA Precautionary Procedure : NONE
Nature : OTHER Stage of Flight : INSP/MAINT District Office
Region : Western/Pacific US office #29 A/C N Number : 199UA
Aircraft Serial No. : 28717
Discrepancy/Corrective Action:Fwd cargo door opened by itself
when cb pushed in. On arrival, circuit breakers were pushed in,
when pressure relief door handle was opened the door latches
opened and then the door opened on its own. Could not duplicate
problem after initial opening.Ó

From: John Barry Smith <barry@corazon.com>
Date: April 22, 2002 8:04:58 AM PDT
To: ksmart@aaib.gov.uk
Subject: Smith AAR for Air India Flight 182/103

Ken Smart
Chief Inspector of Air Accidents

Dear Mr. Smart,

Attached as pdf file is my AAR for Air India Flight 182 which
includes evaluations for Pan Am Flight 103, United Airlines
Flight 811, and Trans World Airlines Flight 800.

Cheers,
Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 22, 2002 8:05:12 AM PDT
To: ksmart@aaib.gov.uk
Subject: **AAR United Airlines Flight 811 92/02 NTSB**

Ken Smart
Chief Inspector of Air Accidents

Dear Mr. Smart,

Attached as pdf file is the NTSB AAR for United Airlines Flight 811 which has much relevance to Pan Am Flight 103 and others.

Cheers,
Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:26:24 AM PDT

To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Smith AAR PA 103, Appendices A-K**

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Smart,

Attached is Smith AAR PA 103, Appendices A-K in PDF format.

Cheers,

Barry

John Barry Smith
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541 Country Club Drive,
Carmel Valley, CA 93924
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From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:26:26 AM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Smith AAR PA 103, Appendix M**

Ken Smart
Chief Inspector of Accidents,

Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Smart,

Attached is Smith AAR PA 103, Appendix M, NTSB AAR 92/02
for United Airlines Flight 811 in PDF format.

Cheers,

Barry

John Barry Smith
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From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:26:27 AM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Smith AAR PA 103, Appendix L**

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD

United Kingdom

Dear Mr. Smart,

Attached is Smith AAR PA 103, Appendix L, AAIB 2/90 for Pan Am Flight 103 in PDF format.

Cheers,

Barry

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From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:26:29 AM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Smith AAR PA 103, Part IV**

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Smart,

Attached is Smith AAR PA 103, Part IV in PDF format.

Cheers,

Barry

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From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:26:31 AM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Smith AAR PA 103, Part III**

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Smart,

Attached is Smith AAR PA 103, Part III in PDF format.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:26:42 AM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Smith AAR PA 103, Part II**

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Smart,

Attached is Smith AAR PA 103, Part II in PDF format.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:26:47 AM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Smith AAR PA 103, Part I**

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Smart,

Attached is Smith AAR PA 103, Part I in PDF format.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>

Date: April 30, 2002 9:26:54 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Smith AAR PA 103, Appendix L

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Bill,

Attached is Smith AAR PA 103, Appendix L, AAIB AAR Pan Am Flight 103, in PDF format.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:26:59 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Smith AAR PA 103, Appendix M

W.T. (Bill) Tucker
Director General,

Investigation Operations
Transportation Safety Board
Canada

Dear Bill,

Attached is Smith AAR PA 103, Appendix M, NTSB AAR
United Airlines Flight 811, in PDF format.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:27:01 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Smith AAR PA 103, Appendices A-K**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Bill,

Attached is Smith AAR PA 103, Appendices A-K in PDF format.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:27:05 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Smith AAR PA 103, Part I**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Bill,

Attached is Smith AAR PA 103, Part I in PDF format.

Cheers,

Barry

John Barry Smith

(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:27:10 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Smith AAR PA 103, Part IV**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Bill,

Attached is Smith AAR PA 103, Part IV in PDF format.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:27:12 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Smith AAR PA 103, Part III

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Bill,

Attached is Smith AAR PA 103, Part III in PDF format.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:27:15 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Smith AAR PA 103, Part II

W.T. (Bill) Tucker
Director General,

Investigation Operations
Transportation Safety Board
Canada

Dear Bill,

Attached is Smith AAR PA 103, Part II in PDF format.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:31:28 AM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: Smith AAR for PA 103 completed and sent

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

W.T. (Bill) Tucker

Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Mr. Ken Smart and Mr. Bill Tucker, 30 April 2002

Good morning, gentlemen. I've just completed my masterpiece, the aircraft accident report for Pan Am Flight 103. It's quite large in file size and paper sheets. I shall send it in pieces.

It's in four parts, I, II, III, and IV, and 13 appendices, A through M. They are all in PDF files for compatibility and efficiency. If any trouble receiving files, please tell me and I can send them via plain text or other format.

I'll attach the four parts each in four emails, then appendices A-K in one email, appendix M in one email, and appendix L in one email for a total of seven emails.

I think you'll find the report comprehensive, maybe too much as I have repeated some things over and over.

Essentially:

Shotgun firing misled investigators with red herring of bomb explosion.

Real culprit is shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

Hazard exists today.

Supplemental investigation by professionals warranted.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: April 30, 2002 9:31:29 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Smith AAR for PA 103 completed and sent**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Bill Tucker and Mr. Ken Smart, 30 April 2002

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It's in four parts, I, II, III, and IV, and 13 appendices, A through M. They are all in PDF files for compatibility and efficiency. If any trouble receiving files, please tell me and I can send them via plain text or other format.

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Supplemental investigation by professionals warranted.

Cheers,

Barry

John Barry Smith

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541 Country Club Drive,

Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: May 1, 2002 1:05:08 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Additional considerations to AAR PA 103, Smith**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Bill Tucker and Mr. Ken Smart, 1 May 2002

There are additional considerations regarding Pan Am Flight 103 and the others:

There are similar anomalies among them regarding the two pressure relief doors inside the forward cargo door. They are missing, unstated, or jammed.

Text below from Appendix N, added to Smith AAR regarding pressure relief doors and attached to this email as a pdf file:

The more the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup is used to match up the actual evidence of the four aircraft, the more the explanation holds true. I await any questions or comments, or corrections regarding the new AAR on Pan Am Flight 103

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Pan Am Flight 103 Forward cargo door showing missing aft and forward pressure relief doors.

No reference is made in AAIB AAR 2/90 for Pan Am Flight 103 to any pressure relief door in any cargo door for Pan Am Flight 103.

*

Trans World Airlines Flight 800 Forward cargo door showing missing aft pressure relief door.

No reference is made to any pressure relief door in any cargo door in NTSB AAR 00/03 for Trans World Airlines Flight 800.

*

Trans World Airlines Flight 800 Forward cargo door showing separated and replaced forward pressure relief door.

No reference is made to any pressure relief door in any cargo door in NTSB AAR 00/03 for Trans World Airlines Flight 800.

*

Air India Flight 182 Forward cargo door showing missing top half of door including the aft and forward pressure relief doors.

No reference to any pressure relief door in any cargo door in CASB and Kirpal AAR for Air India Flight 182

Even if an explosion or a shotgun fired, there is still only a twenty inch shatter hole which is not big enough to cause the forward section to come off because the airframe is designed to withstand such a sized hole when hull is pressurized and, indeed, a Boeing 747, United Airlines Flight 811, successfully withstood a much larger hole in the same area of the aircraft on the starboard side.

Any firing of a weapon or small directed explosion which caused a twenty inch hole on the port side would have instantly decreased internal pressure of the hull which was impinging on the forward cargo door making it less likely that door area would rupture in flight at initial event time. The evidence of the recovered wreckage and illustrated by the wreckage distribution charts in Appendix B of AAIB AAR 2/90 shows that the forward cargo door area did suffer a large and catastrophic hull rupture at initial event time.

The pressure waves of the relatively mild explosion did not destroy a nearby fiberglass baggage container and were thus unlikely to blow out a strengthened side of a fuselage. The firing of a weapon in the forward cargo hold was very unlikely to have caused the extensive damage on the starboard side.

Was a weapon found in the wreckage that might have caused the mild directed blast against the port side fuselage which might have been a rather large shotgun?

A weapon may have been recovered in the wreckage, logged in, and therefore the wreckage database must be searched for any recovered weapons.

Were there there any passengers on board who might have been reasonably expected to carry weapons in their baggage?

There may have been experts in firearms, or weapon salesmen, or gun collectors on board who might have put their products in their baggage. The passenger manifest needs to be checked for such persons.

Are there any other possible explanations for the mild directed explosion on the port side of the forward baggage compartment for Pan Am Flight 103?

Diplomatic pouches are often carried on international flights which do not go through security checks. A pouch may have held a weapon or have been booby trapped to explode into the face of the unauthorized person attempting to open it. Antique guns are often shipped by air. Flares and blasting caps might have been inadvertently ignited. There are several reasonable explanations that offer alternative to a bomb causing the mild directed explosion in the forward baggage compartment on the port side.

Since the opinion was given by the AAIB of a rather large shotgun, is it possible for a further description?

Based upon the evidence recovered, it should be possible for the FBI or Scotland Yard to determine the caliber, the type of powder, and the type and model of the weapon that would have caused the mild directed blast that exited one container, struck another and caused a twenty inch hole in the fuselage leaving

soot and pitted metal behind.

How can the problems revealed be fixed?

1. Faulty Poly X wiring can be fixed by:
 1. Turning off all unnecessary electrical circuits.
 2. Removing all unnecessary wiring. Only that wiring which is needed for safe aircraft flight is required to be wired such as engines, communications, navigation, and cockpit instruments.
 3. All other electrical needs can be wireless or battery driven.

2. Rupturing open cargo doors can be fixed by:
 1. Making the doors plug type, or,
 2. Barring the doors mechanically so that they can never open, and,
 3. Entering cargo compartments from inside the hull to store items.

Are the repairs suggested economically feasible?

It is in the best interests of the airlines, the manufacturer, the government, and the passengers and flight crews that all known hazards to flight safety be removed as soon as possible. Flying is dangerous and all hazards can not be removed but those that are discovered must be corrected. A safer airplane is a best selling airplane. A best selling airplane is a popular airplane. A popular airplane creates secure jobs.

From the Canadian Aviation Occurrence Report: 2.11.4.6 All cargo doors were found intact and attached to the fuselage structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the

forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed. Because the damage appeared to be different than that seen on other wreckage pieces, an attempt to recover the door was made by CCGS John Cabot. Shortly after the wreckage broke clear of the water, the area of the door to which the lift cable was attached broke free from the cargo door, and the wreckage settled back onto the sea bed. An attempt to relocate the door was unsuccessful.Õ

Conclusion:

The missing and jammed pressure relief doors in the forward cargo doors of aircraft that suffer and explosive decompression in the forward cargo compartment indicate that internal pressures were not normal and require satisfactory explanation. The status of the pressure relief doors needs to be determined for Pan Am Flight 103, Trans World Airlines Flight 800, and Air India Flight 182.

The pressure relief doors are not designed to blow out if abnormal internal pressure detected. They are mechanically linked to the latching mechanisms. If the latches inadvertently turn towards the unlatched position in flight, the pressure relief doors would slightly open also. When the pieces of the cargo door fell from a great height, the relief doors might have become jammed or lost upon ground or water impact. The pressure relief doors may have been recovered in the wreckage but not hung on the wreckage reconstruction.

At this time, this investigator has no explanation for the similar anomalies of the jammed and missing pressure relief doors in the

cargo doors.

Appendix N: Pressure Relief Doors

*

Normal Boeing 747 forward cargo door showing aft and forward pressure relief doors near top hinge.

From NTSB AAR 92/02 for United Airlines Flight 811: The cargo doors on the B-747 have a master latch lock handle installed on the exterior of the door. The handle is opened and closed manually. The master latch lock handle simultaneously controls the operation of the latch lock sectors, which act as locks for the latch cams, and the two pressure relief doors located on the door. The final securing operation is the movement of lock sectors across the latch cams. These are manually moved in place across the open mouth of each of the eight lower cams through mechanical linkages to the master latch lock handle. The position of the lock sectors is indicated indirectly by noting visually the closed position of the two pressure relief doors located on the upper section of each cargo door. The pressure relief doors are designed to relieve any residual pressure differential before the cargo doors are opened after landing, and to prevent pressurization of the airplane should the airplane depart with the cargo doors not properly secured. The pressure relief doors are mechanically linked to the movement of the lock sectors. This final procedure also actuates the master latch lock switch, removing electrical control power from the opening and closing control circuits, and also extinguishes the cockpit cargo door warning light through a switch located on one of the pressure relief doors.

*

United Airlines Flight 811 forward cargo door showing missing

aft pressure relief door and jammed open status of forward pressure relief door according to NTSB AAR 92/02.

Below excerpts for NTSB AAR 92/02 for United Airlines Flight 811:

ÔThe ramp service personnel said that they had verified that the forward cargo door was flush with the fuselage of the airplane, that the master door latch handle was stowed, and that the pressure relief doors were flush with the exterior skin of the cargo door. The dispatch mechanic stated that, in accordance with UAL procedures, he had performed a "circle check" prior to the airplane's departure from the HNL gate. This check included verification that the cargo doors were flush with the fuselage of the airplane, that the master latch lock handles were stowed, and that the pressure relief doors were flush or within 1/2 inch of the cargo door's exterior skin. He said a flashlight was used during this inspection.Õ

SB-747-52-2097, "Pressure Relief Door Shroud Installation-- Lower Lobe and Side Cargo Doors," was issued on June 27, 1975. Revision 1 to SB-747-52-2097 was issued November 14, 1975. In general, the SB recommended the installation of shrouds on the inboard sides of the cargo door pressure relief door openings. The purpose of the shrouds was to prevent the possibility of the pressure relief doors being rotated (blown) to the closed position during the pressurization cycle. This condition could only occur if the master latch lock handle had been left open and the flightcrew failed to note the cargo door open warning before takeoff.Õ

ÔUAL records for N4713U indicated that SB-747-52-2097 had been complied with and the shrouds had been installed on the forward and aft cargo doors. However, examination of the aft

cargo door on N4713U revealed that the shrouds were not in place. UAL could not find records to verify if the shrouds had been installed or if they had been removed from either door. There was no evidence of the pressure relief door shrouds found on the forward door; however, most of the inner door lining to which the shrouds attach was missing.Õ

ÔThe lower two connecting rods between the lock sector torque tube and the torque tube below the pressure-relief doors were undamaged; however, the upper connecting rod had separated at the upper, tapered end. The torque tube below the pressure-relief doors were missing, and the pressure-relief door connecting rods had separated at the lower, tapered end. The remaining portion of each rod was undamaged, but the forward pressure-relief door was jammed open into the cutout.Õ

ÔThe examination of the recovered forward cargo door did not provide confirmation that the pressure relief door shrouds were actually installed on the forward door, although UAL records showed that they had been installed on both cargo doors of N4713U, in accordance with SB-747-52-2097. However, the shrouds were found not to be installed on the aft door, contrary to UAL records, and therefore may not have been installed on the forward door. Without the shrouds, the pressure relief doors could have rotated shut during the pressurization cycle. Because the closure of the pressure relief doors would back-drive the lock sectors, this scenario would presume previous damage to the sectors, which would permit the sectors to move over the unlatched cams.Õ

From: John Barry Smith <barry@corazon.com>

Date: May 1, 2002 1:05:17 PM PDT

To: Ken Smart <ksmart@aaib.gov.uk>

Subject: **Additional considerations to AAR PA 103, Smith**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Bill Tucker and Mr. Ken Smart, 1 May 2002

There are additional considerations regarding Pan Am Flight 103 and the others:

There are similar anomalies among them regarding the two pressure relief doors inside the forward cargo door. They are missing, unstated, or jammed.

Text below from Appendix N, added to Smith AAR regarding pressure relief doors and attached to this email as a pdf file:

The more the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup is used to match up the actual evidence of the four aircraft, the more the explanation holds true. I await any questions or comments, or corrections

regarding the new AAR on Pan Am Flight 103

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Pan Am Flight 103 Forward cargo door showing missing aft and forward pressure relief doors.

No reference is made in AAIB AAR 2/90 for Pan Am Flight 103 to any pressure relief door in any cargo door for Pan Am Flight 103.

*

Trans World Airlines Flight 800 Forward cargo door showing missing aft pressure relief door.

No reference is made to any pressure relief door in any cargo door in NTSB AAR 00/03 for Trans World Airlines Flight 800.

*

Trans World Airlines Flight 800 Forward cargo door showing separated and replaced forward pressure relief door.

No reference is made to any pressure relief door in any cargo door in NTSB AAR 00/03 for Trans World Airlines Flight 800.

*

Air India Flight 182 Forward cargo door showing missing top

half of door including the aft and forward pressure relief doors.

No reference to any pressure relief door in any cargo door in CASB and Kirpal AAR for Air India Flight 182

Even if an explosion or a shotgun fired, there is still only a twenty inch shatter hole which is not big enough to cause the forward section to come off because the airframe is designed to withstand such a sized hole when hull is pressurized and, indeed, a Boeing 747, United Airlines Flight 811, successfully withstood a much larger hole in the same area of the aircraft on the starboard side.

Any firing of a weapon or small directed explosion which caused a twenty inch hole on the port side would have instantly decreased internal pressure of the hull which was impinging on the forward cargo door making it less likely that door area would rupture in flight at initial event time. The evidence of the recovered wreckage and illustrated by the wreckage distribution charts in Appendix B of AAIB AAR 2/90 shows that the forward cargo door area did suffer a large and catastrophic hull rupture at initial event time.

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Since the opinion was given by the AAIB of a rather large shotgun, is it possible for a further description?

Based upon the evidence recovered, it should be possible for the FBI or Scotland Yard to determine the caliber, the type of powder, and the type and model of the weapon that would have caused the mild directed blast that exited one container, struck another and caused a twenty inch hole in the fuselage leaving soot and pitted metal behind.

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 1. Turning off all unnecessary electrical circuits.

2. Removing all unnecessary wiring. Only that wiring which is needed for safe aircraft flight is required to be wired such as engines, communications, navigation, and cockpit instruments.

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damage appeared to be different than that seen on other wreckage pieces, an attempt to recover the door was made by CCGS John Cabot. Shortly after the wreckage broke clear of the water, the area of the door to which the lift cable was attached broke free from the cargo door, and the wreckage settled back onto the sea bed. An attempt to relocate the door was unsuccessful.Õ

Conclusion:

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At this time, this investigator has no explanation for the similar anomalies of the jammed and missing pressure relief doors in the cargo doors.

Appendix N: Pressure Relief Doors

*

Normal Boeing 747 forward cargo door showing aft and forward pressure relief doors near top hinge.

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*

United Airlines Flight 811 forward cargo door showing missing aft pressure relief door and jammed open status of forward pressure relief door according to NTSB AAR 92/02.

Below excerpts for NTSB AAR 92/02 for United Airlines Flight 811:

ÔThe ramp service personnel said that they had verified that the forward cargo door was flush with the fuselage of the airplane, that the master door latch handle was stowed, and that the pressure relief doors were flush with the exterior skin of the cargo door. The dispatch mechanic stated that, in accordance with UAL procedures, he had performed a "circle check" prior to the airplane's departure from the HNL gate. This check included verification that the cargo doors were flush with the fuselage of the airplane, that the master latch lock handles were stowed, and that the pressure relief doors were flush or within 1/2 inch of the cargo door's exterior skin. He said a flashlight was used during this inspection.Õ

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ÔUAL records for N4713U indicated that SB-747-52-2097 had been complied with and the shrouds had been installed on the forward and aft cargo doors. However, examination of the aft cargo door on N4713U revealed that the shrouds were not in place. UAL could not find records to verify if the shrouds had been installed or if they had been removed from either door. There was no evidence of the pressure relief door shrouds found on the forward door; however, most of the inner door lining to

which the shrouds attach was missing.Ö

ÔThe lower two connecting rods between the lock sector torque tube and the torque tube below the pressure-relief doors were undamaged; however, the upper connecting rod had separated at the upper, tapered end. The torque tube below the pressure-relief doors were missing, and the pressure-relief door connecting rods had separated at the lower, tapered end. The remaining portion of each rod was undamaged, but the forward pressure-relief door was jammed open into the cutout.Ö

ÔThe examination of the recovered forward cargo door did not provide confirmation that the pressure relief door shrouds were actually installed on the forward door, although UAL records showed that they had been installed on both cargo doors of N4713U, in accordance with SB-747-52-2097. However, the shrouds were found not to be installed on the aft door, contrary to UAL records, and therefore may not have been installed on the forward door. Without the shrouds, the pressure relief doors could have rotated shut during the pressurization cycle. Because the closure of the pressure relief doors would back-drive the lock sectors, this scenario would presume previous damage to the sectors, which would permit the sectors to move over the unlatched cams.Ö

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Date: May 9, 2002 1:46:28 PM PDT

To: "John Barry Smith" <barry@corazon.com>

Subject: RE: TWA 800 justification for reconsideration

Dear Barry,

As indicated to you, I did discuss your correspondence about PanAm 103 with Ken Smart when he was here last week. However, I must tell you that the outcome was nothing like what you were thinking/hoping (about an international team to reconsider the probable causes of various B747 accidents).

As I explained in an e-mail last year, the TSB-C does not have the mandate to open another investigation into the Air India 182 accident. Moreover, in my opinion, based on consideration of the potential to advance transportation safety (which is the only reason the TSB-C exists), it would not be an appropriate use of our resources to undertake such an investigation. I have neither the omniscience nor the ego to make an absolute statement about a bomb or a cargo door. However, based on a reasonable (but certainly not perfect) knowledge of the occurrence and the investigation, I believe that, while other explanations are possible, the weight of evidence supports the conclusion of a bomb having exploded in that aircraft. Canada still has a strong interest in that occurrence, not the least because so many of its citizens were killed. That interest is reflected in the level of effort that is still being exercised in the RCMP

investigation and the upcoming trial.

I have less knowledge of the PanAm 103 occurrence, but I have considerable familiarity with Ken Smart and his team at the U.K. AAIB. I have high respect for their dedication, their technical competence and their integrity. Ken has told me that his team considered various theories in the course of their investigation, including the one you espouse about the cargo door, and they did not reject any of them without good reason. He is quite satisfied that they came to the correct conclusions. AT the time we met, Ken had not seen some of the correspondence you sent him (i.e. e-mail in the last week of April). My understanding is that he is always willing to consider new information, as he did with what you sent before, however he saw nothing so far to prompt him to re-open the investigation.

With respect to TWA 800, my position is the same as for PanAm 103. I don't have a lot of detailed knowledge of the occurrence, but I know several of the key NTSB people very well. I have great respect for people like Ron Schleede, Bernard Loeb, Barry Sweedler and Vern Ellingstad. I believe the NTSB's conclusions that there was no bomb, but that there was a centre fuel

tank explosion, are well supported.

While I can understand that various people may not accept various conclusions of the above safety investigations, I have no doubts about the integrity of any of those investigations. I am sincerely sorry that you do not have the same level of comfort - especially since I am also certain of your integrity. Unfortunately, it is a fact of life that honest people can have honest differences of opinion.

For my part, I shall continue to do what I undertook to do last year. That is: to review your material to the extent that I can; to relay pertinent extracts to our Director of Air Investigations, Director of Engineering, and IIC of the SwissAir 111 investigation; but to only sometimes reply to your mail. In that vein, I am continuing to forward info from you to them, and I still have some to forward. I repeat my advice that you should send Air India 182 related material directly to Sgt. Bart Blachford. I am not competent to serve as a filter for material pertinent to his investigation, and I could not undertake to perform that role.

Finally, on a personal note, I want to tell you that I have decided

to
retire this year. I absolutely had not decided when we met in
December, but
you seemed to have I decided a month or so ago that I would
retire by
this summer. I haven't picked the exact date yet, but the farewell
party is
booked for the 12th of June, so I guess I'll have to pull the plug
within a
couple of weeks of that date. I shall certainly be writing to you
again
before I leave.

Sincerely,

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Sunday, May 05, 2002 2:43 PM

To: Tucker, Bill

Subject: TWA 800 justification for reconsideration

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Bill, 6 May 2002

As you can imagine, I am very curious as to the outcome of your
meetings

with Mr. Smart and your opinion of my AAR for Pan Am Flight 103 sent by .PDF. I hope all went well.

I'm left to guess on the progress, so I'm thinking/hoping you are putting together a team of international aviation safety experts to reconsider the probable causes of all Boeing 747s that suffered similar events to United Airlines Flight 811.

The team would be led by you representing Canada and Air India Flight 182, Mr. Smart of UK AAIB for Pan Am Flight 103, and two representatives are needed from NTSB for United Airlines Flight 811 and Trans World Airlines Flight 800.

Regarding Trans World Airlines Flight 800: The rebuttal from NTSB to the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Trans World Airlines Flight 800 rests upon one document, Exhibit 15C, which reported: 'Metallurgist's Factual Report, Exhibit 15C 'Examination of the lower lobe forward cargo door showed that all eight of the door latching cams remain attached (along with pieces of the door itself) to the pins along the lower door sill.'

Bill, there are several things seriously wrong with that conclusion and they are serious enough to justify a reexamination of the entire rejection of the wiring/cargo door explanation:

1. Photographs of the forward cargo door area show the 'door' to be in many pieces with an additional many important pieces missing. There is no 'door' to examine.

2. There are ten, not eight latches in that door. Eight is not enough. Even if the required ten latches had been found (but were not) and had been latched (none reported so), the door could have ruptured open in the middle, inside the latches.

3. The two midspan latches are not in the NTSB wreckage database of recovered wreckage parts.

4. Photographs of the wreckage reconstruction of the forward cargo door area show large rupture holes exactly where the midspan latches used to be.

5. The eight latches reported to be 'attached' make no mention of 'latched' and could in fact be unlatched but attached to pins. There is no status report on the locking sectors, the manual locking handle, the pressure relief doors, the torque tubes, bellcranks, or door wiring.

6. Only one sill was found and it was determined to be the

aft cargo door sill. There is no forward cargo door sill in the wreckage database. There are two identical cargo doors on a Boeing 747 and TWA 800 and both have an identical lower door sill. Only one was recovered for Trans World Airlines Flight 800 and it was not the forward cargo door sill. It was the aft cargo door sill. The sill was found in the aft fuselage debris field along with other items identified as coming from the aft cargo compartment. The area of the forward cargo compartment debris field was spread out far and wide and no forward cargo door sill was found. Conclusion: There is a very real probability that the wrong sill was hung on the wreckage reconstruction and called the forward sill when it is in fact the aft cargo door sill. That aft cargo door sill may have had the bottom eight latches attached as there is no information in the AAR about the aft cargo door.

So, the conclusion that the forward cargo door was latched and locked until water impact is a flawed conclusion. It justifies further examination. There are many other discrepancies/contradictions like the above in areas such as CVR analysis, sequence of disintegration, and

engine breakdown report.

Emails below from Mr. Schleede show that he made his conclusion of a latched and locked forward cargo door even before the NTSB wreckage lot shows the pieces and the sill recovered from the ocean: 11 Aug 96 for Mr. Schleede to state he examined the 'door' and 26 August 96 for the aft sill to be recovered. Some of the forward fuselage parts were recovered on the 29th of Aug 96.

If there is a forward cargo door sill recovered, it is not in the official NTSB wreckage database supplied by CD ROM to me from NTSB. (Database enclosed.)

I hope you were able to persuade Mr. Smart to an agreed course of action.

I hope my AAR on Pan Am Flight 103 persuades you that a supplemental investigation is warranted. I hope the below can help persuade NTSB that a reconsideration is due for the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Trans World Airlines Flight 800.

Looking forward to a follow up.

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

At 6:48 PM -0400 4/16/02, Tucker, Bill wrote:

X-From_: Bill.Tucker@tsb.gc.ca Tue Apr 16 15:47:47 2002
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Letter to Mr. Ken Smart enclosed.
Date: Tue, 16 Apr 2002 18:48:14 -0400

Barry,

I've sent it to Ken Smart. I'll also be seeing him here in two weeks and will follow up then

Bill T..

Below excerpts from NTSB wreckage database for Trans World Airlines Flight 800 supplied by NTSB on CD ROM:

8/18/96-6 40 39 47.00 -72 37 27.90 FS XXXX frame 40 39
46.90 -72 37 27.90

aft cargo door - lower sill latches & locks

8/26/96-36 40 39 46.40 -72 37 27.80 FS 1800 RIB 40 39 46.40
-72 37 27.80

FS 1810; outer frame aft cargo door panel stringer STR 24R-28R
(aft upper
main cargo door sill)

8/29/96-1 40 39 07.70 -72 38 27.50 metal strap with internal
cargo door

switch for forward cargo door; FS 560;

Metallurgist's Factual Report, Exhibit 15C:

'Examination of the lower lobe forward cargo door showed that
all eight

of the door latching cams remain attached (along with pieces of
the door

itself) to the pins along the lower door sill.

From: Schleede Ron <SCHLEDR@ntsb.gov>

To: barry <barry@corazon.com>

Subject: RE: TWA crash cause ATTN Robert Francis

Date: Mon, 29 Jul 1996 15:24:00 -0400

Encoding: 17 TEXT

Status:

Be assured that we are checking that. I was the investigator in
charge of

the UAL flight 811 case and fully knowledgeable in its causes
and factors.

Thanks for the interest.

From: Schleede Ron <SCHLEDR@ntsb.gov>

To: barry <barry@corazon.com>

Subject: RE: TWA crash cause

Date: Sun, 11 Aug 1996 11:39:00 -0400

Encoding: 13 TEXT

Status:

I have examined the cargo door from twa 800--it is locked and latched!

From: Schleede Ron <SCHLEDR@NTSB.gov>

To: "John Barry Smith" <barry@corazon.com>

Subject: RE: What is 'backup theory'?

Date: Mon, 19 May 1997 13:51:11 -0400

Encoding: 135 TEXT

As I have told you before, the cargo door was locked and latched at impact. ron

Microsoft Word 6.0 Document MSWordDoc Word.Document.6

C:\WORD6\TEMPLATE\NORMAL.DOT X5000 Hong tao

Hong tao 40 37 34.00

-72 42 38.00 TWA carpet TWA headphone sachel, hair dryer and misc items 40

39 18.42 -72 40 45.99 plastic cover 6"(4" beige 40 38 27.29 -72 40 19.15

"levis" T-shirt, red, black, white 10/02/96-1 40 39 08.06 -72 40 10.92 40

38 51.68 -72 39 54.32 food tray holder; 3 trays w/ food

8/08/96-14 40 38

45.26 -72 39 51.96 front spar RH web LBL 75-115 8/08/96-14

40 39 07.56 -72
39 47.89 nylon bag with cord 9/11/96-4 40 38 46.39 -72 39 47.31
beer
shelf; pan, black plastic 8/16/96-10 40 38 57.30 -72 39 45.38
white
plastic piece 9/27/96-1 40 38 44.44 -72 39 43.97 2 CD's;
clothing; small
metal wreckage 40 38 57.00 -72 39 4.200 small piece of channel
(green)
8/19/96-13 40 38 51.48 -72 39 38.58 black plastic box
8/14/96-11 40 38
43.85 -72 39 37.31 metal fragments (yellowish-green) 40 38
47.34 -72 39
36.77 ladies purse 10/02/96-1 40 39 18.03 -72 39 31.78 small
piece of
metal 1'(10", shirt 10/08/96-4 40 38 42.99 -72 39 29.48 4'(6"(2"
strut
8/14/96-9 40 38 49.80 -72 39 27.50 pack (air cond) inlet air
scoop
8/20/96-15 40 38 56.53 -72 39 26.78 bag of gum 8/14/96-11 40
38 52.50 -72
39 26.60 aspirator inlet, black circular object with items inside
attached
to yellow/silver 8/12/96-4 40 38 46.79 -72 39 25.61 forward
lower cargo
bay structure FS 800-840 L/H CW w/motor and wheels (cargo
floor 4'(3'(2';
ac motor w/brake 8/14/96-9 40 38 53.15 -72 39 25.08 air cycle
mach #3 Part
719238.7, serial # KE10372 8/04/96-66 40 38 51.24 -72 39
24.06 metal
tubing; LH front spar 8/15/96-11 40 38 48.50 -72 39 24.00 small
clear

bottle 8/20/96-15 40 38 51.70 -72 39 23.30 fan inlet diffuser housing for
pack #3 8/14/96-11 40 38 51.70 -72 39 23.30 small aluminum box with toggle
switch and red toggle switch safety cover 8/12/96-4 40 38 58.50 -72 39
23.16 black plastic box 8/14/96-11 40 38 36.99 -72 39 22.38 roller on
track 8/15/96-11 40 38 42.98 -72 39 21.70 3'(2' green aluminum 8/24/96-7
40 38 58.02 -72 39 21.24 white piece of canvas 40 38 46.46 -72 39 21.01
part of seat and cord 10/02/96-1 40 38 46.44 -72 39 21.00 seat arm 40 38
35.90 -72 39 20.71 #2 Ram Air duct 40 38 01.40 -72 39 20.64 white plastic
piece 9/27/96-1 40 38 47.24 -72 39 20.58 flow control valve S/N SNKB5189-764476-2 P214-9, #3 pack 8/05/96-2 40 38 47.24 -72 39 20.58 A/C
unit K3283; TWA 1848; S/N 910424-separator water; catalytic ozone
converter S/N02089 8/05/96-2 40 38 36.99 -72 39 20.25 ram air inlet screen
8/19/96-11 40 38 36.39 -72 39 19.99 insulated tubing 1120363320 8/22/96-7
40 38 43.19 -72 39 19.80 forward lower cargo bay structure FS 900-960 L/H
CW w/ motor and wheels, pn 747-5100-5-0 8/03/96-85 40 38 43.10 -72 39
19.80 FS 740-780 stringers 15R-26R with R2 door attached (#5804951 7 on
bottom inner door frame) 8/03/96-85 40 38 53.62 -72 39 19.51 row 19 seat

4-5 8/06/96-46 40 38 55.26 -72 39 19.08 projector 8/15/96-11 40
38 34.66
-72 39 18.72 misc. metal 10/17/96-1 40 38 42.10 -72 39 18.53
piping/U
shaped 8', # 65B4093-5-1; Bleed Air Tubing, #3 pack ducting,
forward end
8/03/96-85 40 38 48.80 -72 39 18.30 blower assembly w/ piping
part # 1923;
Air Cycle Machine #1. casting P/N 18488, ACM valve turbo
bypass; P/N 71
8/05/96-2 40 39 03.06 -72 39 18.00 pants/shorts? tray 10/06/96-3
40 38
53.47 -72 39 17.98 row 19, seat 6-7 8/12/96-4 40 38 54.02 -72 39
17.76
seat parts row 19, seat 4, panel, 8/15/96-11 40 38 48.54 -72 39
17.76 seat
track 8/16/96-10 40 38 40.74 -72 39 17.46 victim 40 38 39.30
-72 39 17.22
1) 2.5" (1" (1" BAC27EBY-51 2) 18" (1" (2" metal assy
69B60682-1
8/19/96-11 40 38 41.50 -72 39 17.14 zone multiplexer s/n
0390234 (box 50)
Zone B, p/n 51030 8/03/96-85 40 38 43.63 -72 39 16.20
8/16/96-10 40 38
41.47 -72 39 15.82 1(1 alum. and honeycomb side 8/03/96-85 40
39 00.87 -72
39 15.80 6" (2" honey comb insulation 1/4" thick; static cable
guide;
support bracket assembly #69840527-1 8/05/96-2 40 38 55.30
-72 39 15.60
interior bulkhead 8/16/96-10 40 38 44.90 -72 39 15.49 #3 pos air
cycle
machine/heat exchanger w/ ducts, dual heat exchanger #3 40 38

44.68 -72 39
15.42 metal strap, 1" wide 8/04/96-66 40 38 45.13 -72 39 15.35
40 38 41.29
-72 39 15.25 FS 760-960; stringer 22R-37R; p/n 6580173 40 38
41.29 -72 39
15.25 keel beam section box; also refer to LF 55D 40 38 41.29
-72 39 15.25
floor beam w/ fiberglass floor panel #101, FS 860-880; RBL
55-76;
9/19/96-1 40 38 41.75 -72 39 15.19 ozone catalytic converter p/n
D-19333-2
s/n 02103 8/06/96-1 40 38 43.89 -72 39 15.14 alum/plastic strut;
3' long (
5" wide 8/04/96-66 40 38 55.00 -72 39 15.00 side and bottom of
meal
cart/serving cart 8/16/96-10 40 38 55.00 -72 39 15.00 row 19,
seats 8,9,10
40 38 45.00 -72 39 15.00 AC access panel; right fuselage FS
1112-1170 40
38 39.45 -72 39 15.00 2 coach seats # stenciled on frame
823566404
8/03/96-85 40 38 39.45 -72 39 14.98 black tote bag 8/04/96-66
40 38 52.86
-72 39 14.94 scarf red white and blue 10/02/96-1 40 38 41.25 -72
39 14.87
possible wing section, "caution on antenna" 40 38 40.87 -72 39
14.82 first
class galley 40 38 40.87 -72 39 14.82 galley parts (3' (3' metal
piece w/
latch on side) 8/03/96-85 40 38 40.87 -72 39 14.82 alum. door
(Plastic +
honeycomb piece) 40 38 40.87 -72 39 14.82 6' (2' inner galley
room liner

40 38 49.70 -72 39 14.80 gasper air hose 8/26/96-32 40 38 27.80
-72 39
14.80 fuselage stringer, 7' section 8/26/96-32 40 39 05.29 -72 39
14.76
debris 10/06/96-3 40 38 41.99 -72 39 14.67 AC motor p/n
747-5117-1-0 s/n
1638; 4(4 alum siding 8/06/96-1 40 38 41.99 -72 39 14.67 green
metal strut
(04366-100) 8/04/96-66 40 38 50.50 -72 39 14.60 oxygen
cylinder 8/26/96-32
40 39 00.50 -72 39 14.50 suitcase, baggage # TW194392
8/14/96-11 40 38
53.40 -72 39 14.30 ram air inlet to air cycle machine/heat
exchanger
8/12/96-4 40 38 54.80 -72 39 14.20 coffee maker 8/26/96-32 40
39 00.20 -72
39 13.90 2 shirts on hangers 8/14/96-11 40 38 47.00 -72 39 13.40
row 18,
Seats 4,5,6,7 40 38 37.56 -72 39 13.38 cargo bin structure, upper
track
(roller tray), bent twisted metal piece 8/12/96-4 40 38 43.63 -72
39 13.03
zone trim air duct 8/16/96-10 40 38 40.00 -72 39 12.60 row 20,
Seats
4,5,6,7 8/3/96-85 FBM11A 40 38 37.29 -72 39 12.46 floor beam
with seat
track; FS 840-880; RBL 33.99 8/04/96-66 40 38 37.29 -72 39
12.46 floor
beam upper chord FS 920, RBL 16-37 40 38 58.90 -72 39 12.00
side of galley
cart; galley carrier 8/16/96-10 40 38 44.55 -72 39 11.93 chrome
brazing
8/04/96-66 40 38 40.01 -72 39 11.67 outer body fuselage skin

fairing, pn

192L 8/04/96-66 40 38 46.70 -72 39 11.60 ice hammer

8/16/96-10 40 38 57.66

-72 39 11.34 one 12"(24" tan fiberglass piece marked
"823564-1A"

8/19/96-11 40 38 33.10 -72 39 11.10 Pile of debris: 4' piece of
metal

tubing; short 6" piece of framing with several screws; interior
framing

with w/ hydraulics 8/12/96-4 40 38 55.01 -72 39 10.78 black suit
case

8/05/96-2 40 38 55.01 -72 39 10.78 blue TWA carpet 15'(5'; ball
cap of

Florida Marlins; 2-6" (6" dinner trays; 6" (3" aluminum plate
with wire

coming 8/05/96-2 40 38 54.70 -72 39 10.69 2 misc. pieces; 2 1/2
(2 1/2

plastic, 3(2 alum sheet 8/06/96-46 40 38 57.40 -72 39 10.60 food
cart w/4

drawers 8/08/96-31 40 39 00.00 -72 39 10.55 levi's jeans size
W28 L34

10/02/96-1 40 38 32.87 -72 39 10.47 10' heavy framing

8/19/96-12 40 38

38.64 -72 39 10.44 inlet valve 8/16/96-10 40 38 27.88 -72 39
10.07 metal

part GD5340A wire attached 8/16/96-9 40 38 54.80 -72 39 09.90
food service

cart 40 38 54.80 -72 39 09.90 Food carts 40 38 54.80 -72 39
09.90 galley

"C" frame 40 38 54.80 -72 39 09.90 galley "C" frame 40 38
54.80 -72 39

09.90 galley "C" frame 40 38 54.80 -72 39 09.90 coffee maker
40 38 54.80

-72 39 09.90 galley "C" structure 40 38 54.80 -72 39 09.90 food service
cart 40 38 54.80 -72 39 09.90 galley "C" frame 40 38 55.04 -72 39 09.76 4
pieces of alum framing from galley ID on framing. pn
1681001-101
8/06/96-46 40 38 55.04 -72 39 09.76 small plastic trays, broken;
armrest
46-5, armrest support 48-3 8/06/96-46 40 38 54.72 -72 39 09.61
about 100
small plastic galley pieces 8/06/96-46 40 38 35.80 -72 39 09.00
fan inlet
& diffuser housing for air cycle machine 8/12/96-4 40 38 35.80
-72 39
09.00 Right belly and cargo track between FS 800-940; stringer
37R-44R
8/12/96-4 40 38 35.80 -72 39 09.00 forward lower cargo bay
structure FS
800-840 centerline (FS 980 floor beam - LBL 20 to RBL 11.
Cargo track (fwd
8/12/96-4 40 38 44.94 -72 39 08.97 wing front spar web LBL
20-70
8/03/96-85 40 38 38.54 -72 39 08.77 front spar RBL 66 - LBL
28; (8(6 frame
65B1029858 front spare BL O;) CW front spar 40 39 05.98 -72
39 08.64
suitcase 10/06/96-3 40 38 45.08 -72 39 08.48 wire plug DL9404
8/04/96-66
40 38 47.80 -72 39 08.40 front spar; LBL 60-95 8/16/96-10 40
38 52.30 -72
39 08.20 galley piece 8/16/96-10 40 39 06.08 -72 39 07.92 black
shoe w/
glass imbedded in heel 10/06/96-3 40 38 36.06 -72 39 07.68 air

cond heat
exchanger tubing 8/16/96-10 40 39 12.20 -72 39 07.56 tan hat
10/06/96-3 40
38 39.55 -72 39 07.45 plastic travel light 8/04/96-66 40 38 39.55
-72 39
07.45 metal/ wood framing 8' long 8/04/96-66 40 38 39.55 -72
39 07.45 lip
stick (Honey Ginger color) 8/04/96-66 40 38 39.55 -72 39 07.45
3' angle
iron 8/03/96-85 40 38 39.55 -72 39 07.45 misc. pieces 40 38
39.55 -72 39
07.45 misc. pieces 40 38 39.55 -72 39 07.45 air cycle machine
ducting (fan
inlet & diffuser housing) 40 38 39.55 -72 39 07.45 misc. pieces
8/03/96-85
40 38 39.55 -72 39 07.45 FS 800-840; stringer 13R-16R with R2
door frame
40 38 41.57 -72 39 07.30 FS 780-920; stringer 23L-37L
8/03/96-85 40 38
53.00 -72 39 07.00 galley debris 8/16/96-10 40 39 06.62 -72 39
06.84
debris 10/06/96-3 40 39 00.63 -72 39 06.83 debris - black plastic
10/02/96-1 40 38 41.77 -72 39 06.83 gear door, 65B10020-574,
8/03/96-85 40
38 41.77 -72 39 06.83 hatch :Part # 65B10020-574, Serial #
000160, MFR
Code 82918 40 38 53.20 -72 39 06.80 bottom side and door to
galley cart;
serving cart bottom & 2 sides 8/16/96-10 40 38 32.94 -72 39
06.78 5 misc
pieces wired together largest 3' (.5' (2" 8/19/96-11 40 38 47.33
-72 39
06.68 minolta camera, lens on camera & and separate lens in bag

all in zip

lock bag sitting on bottom 8/03/96-85 40 38 25.71 -72 39 06.68

Forward

lower cargo bay structure FS 820 right hand side 8/17/96-4 40 38
22.77 -72

39 06.67 approx 1' long curved piece of fiberglass 10/02/96-1 40
38 50.80

-72 39 06.50 aluminum tube seat frame; passenger seat bar
8/16/96-10 40 38

26.58 -72 39 06.48 part of tire 8/16/96-9 40 38 26.58 -72 39
06.48 seat

part, tray table piece 8/16/96-9 40 38 24.28 -72 39 06.17 1' (1"
broken

heavy metal strut 8/17/96-4 40 39 06.37 -72 39 06.12 10/08/96-2
40 38

46.63 -72 39 06.02 3 lights from interior of plane 10/02/96-1 40
38 33.24

-72 39 05.70 duct work 8/16/96-10 40 38 39.90 -72 39 05.50
small metal

piece 8/26/96-32 40 38 31.08 -72 39 05.10 front spar; FS web
RBL 66-RBL

45; cw tank 8/08/96-14 40 38 50.80 -72 39 04.80 O2 cylinder
8/16/96-10 40

38 51.98 -72 39 04.74 TWA M 88801-1 food cart 8/09/96-37 40
38 51.98 -72

39 04.74 2 food box holders 40 38 51.98 -72 39 04.74 TWA M
88801-1 1068;

outer frame for food carts s/n B972; M.O. 80E41 8/09/96-37 40
38 31.20 -72

39 04.68 FS 980 lower frame Stringer 40L-42R 8/08/96-14 40 38
30.60 -72 39

04.56 wire basket/ rubber coated 2"(2 1/2"(4"/6"(4" framing/
2'(1" strut

8/08/96-14 40 38 41.10 -72 39 04.30 panel, wires, 110v outlet
(per
TWA-elec. relay panel, fwd cargo bin) p/n 65B40474-22 &
65B40476-10 RA164
8/26/96-32 40 38 30.38 -72 39 04.30 3 piece framing 1 1/2(2 1/2
8/08/96-14 40 38 30.38 -72 39 04.30 alum strut 4' long, circular
tubing
18" diam; rubber/plastic w/ metal strap; assembly 65341207-1 40
39 00.10
-72 39 03.60 black tray 8/14/96-11 40 38 51.50 -72 39 03.60 24"
piece of
structure 8/16/96-10 40 38 31.50 -72 39 03.54 telephone
8/16/96-10 40 38
31.50 -72 39 03.54 2' framing w/ hydraulic hose 8/19/96-11 40
38 51.40 -72
39 03.31 seat 14 (8 9 0) 8/04/96-66 40 39 02.10 -72 39 03.20
plastic grate
8/20/96-15 40 38 33.20 -72 39 03.20 White support 8/24/96-8 40
38 33.59
-72 39 03.15 1/2 black hard side suitcase with hair dryer and
misc items
40 39 01.20 -72 39 03.00 metal strap 3' long 8/20/96-15 40 38
28.11 -72 39
02.61 front spar web and stiffner++ 8/17/96-4 40 38 59.74 -72 39
02.41
2-1/2' (3' piece of wreckage; 3 castor wheels 8/04/96-66 40 38
29.19 -72
39 02.40 #1 heat exchanger ram air door 8/05/96-2 40 39 00.06
-72 39 02.37
food cart 8/06/96-1 40 38 44.20 -72 39 02.37 seats 19 (123) 40
38 44.20
-72 39 02.37 3 seats; row 19 seats 1,2,3 8/03/96-85 40 38 50.28
-72 39

02.17 fuse box galley complete 6'(3"(2"; galley B & C
8/08/96-14 40 38
34.80 -72 39 01.90 part of cargo conveyor system 8/26/96-32 40
39 09.72
-72 39 01.80 shirt, small piece of plastic 10/08/96-2 40 39 16.67
-72 39
01.63 gray garment bag w/ red plping 10/08/96-2 40 38 34.70
-72 39 01.40
arm rest 8/26/96-32 40 38 26.64 -72 39 01.31 fiberglass rib
3'(1'(3"
8/20/96-15 40 38 59.90 -72 39 01.20 plastic tray 8/14/96-11 40
38 59.90
-72 39 01.20 small metal framing in bag 8/14/96-11 40 38 39.90
-72 39
01.20 3'(2' molded metal 8/14/96-11 40 39 01.50 -72 39 01.10
victim 40 38
28.43 -72 39 01.03 9/10/96-4 40 38 30.78 -72 39 00.90 air plane
wreckage?
(literal quote from tag) 8/19/96-11 40 38 29.30 -72 39 00.40
connector
panel 8/24/96-8 40 38 34.48 -72 39 00.37 FS 800-1000; stringer
40L-40R
with forward lower cargo bay structure w/rollers attached
8/05/96-2 40 38
34.34 -72 39 00.14 light alum framing; 2' and 3' long; arm rest
Row 17,
Seat 8 and 10 8/06/96-1 40 39 00.90 -72 38 59.90 plastic strips
8/22/96-7
40 38 30.66 -72 38 59.76 3 pieces: 1) metal 10"(18"; 2) spring/
hinge,
small; 3) plastic cowling 6"(6"(2" 8/20/96-15 40 38 30.66 -72 38
59.76
Forward lower cargo bay structure FS 940 left hand side

8/20/96-15 40 38
54.22 -72 38 59.50 blue seat backing 8/08/96-14 40 38 53.96 -72
38 59.50
black suit case 8/08/96-14 40 38 28.68 -72 38 59.46 clothing
9/10/96-4 40
38 31.20 -72 38 59.30 cargo floor 8/24/96-8 40 38 54.19 -72 38
59.18 row
?? Seats 8,9,10 8/06/96-46 40 38 53.37 -72 38 59.07 row 15 seat
8-9-10
8/06/96-46 40 38 37.30 -72 38 59.00 air filter (galley) 8/26/96-32
40 38
31.03 -72 38 59.00 fiberglass framing 3(3(3 8/06/96-1 40 38
26.76 -72 38
58.74 #1267448 - 65808074-39 Green piece w/ gasket;
horizontal stabilizer
fairing 8/17/96-4 40 38 31.09 -72 38 58.69 forward lower cargo
bay
structure FS 860-880 left hand cargo floor 8/05/96-2 40 39 13.07
-72 38
58.56 magazine 10/06/96-3 40 39 02.02 -72 38 58.56 shoe
headphone volume
control, debris 10/03/96-4 40 38 55.60 -72 38 58.48 row 10;
seats 8,9, 10
8/04/96-66 40 38 53.99 -72 38 58.22 umbrella, sweat shirt
8/06/96-46 40 38
45.30 -72 38 58.10 luggage carrier, yellow blow dryer; AIWA
walkman;
Boeing p/n 60B40125-10 8/08/96-31 40 38 45.30 -72 38 58.10
right SOB CW
rib; web between SWB 1 and mid spar. Lat/long is in Red field
40 38 45.30
-72 38 58.10 right SOB CW rib; web between R.S. and SWB 1.
40 38 32.10 -72

38 58.08 same mark, 6' strut; 9302356 8/19/96-11 40 38 32.10
-72 38 58.08
1) fluorescent light fixture p/n BR6219-401 2) bracket 4" (18" 3)
small
3" piece of plastic 8/19/96-23 40 39 01.90 -72 38 58.00 seat
frame, round
tube w/foot rest 8/20/96-15 40 38 44.17 -72 38 57.89 row 15 seat
4-5-7
8/04/96-66 40 39 00.20 -72 38 57.80 personal effects 8/14/96-11
40 38
59.76 -72 38 57.77 clothing and CD 8/14/96-11 40 38 42.70 -72
38 57.46
lighting strut; red shirt size 44 8/04/96-66 40 38 59.88 -72 38
57.10 row
21, seat 1-2-3 8/08/96-14 40 38 33.80 -72 38 57.00 rib w/ pulley;
strut
with wheels 8/24/96-8 40 38 59.50 -72 38 56.90 electric part
(personal)
8/17/96-2 40 38 59.80 -72 38 56.60 "Star Wars" book 8/08/96-14
40 38 38.00
-72 38 56.50 support rod 8/24/96-8 40 38 44.45 -72 38 56.32
food warmer
box 8"(20"(14" plastic TWA 44-0842 8/06/96-46 40 38 31.07 -72
38 56.26
forward lower cargo bay structure, FS 800 Right hand side
8/06/96-1 40 38
31.07 -72 38 56.26 3 small pieces; 18" long assembly
65B41247-79 8/06/96-1
40 38 30.23 -72 38 56.20 framage curved 40 38 48.23 -72 38
55.86 row 12
seat 10 8/16/96-10 40 39 02.88 -72 38 55.68 luggage 10/03/96-4
40 39 02.12
-72 38 55.68 personal effects, camera 10/03/96-4 40 39 02.12 -72

38 55.68

luggage & rack 10/03/96-4 40 38 32.09 -72 38 55.64 spanwise
beam #3; LHS

web; LBL 20-83 8/19/96-11 40 38 51.90 -72 38 55.60 nylon bag
40 39 02.88

-72 38 55.6 blue shirt, 2 pieces plastic debris 10/03/96-4 40 38
59.40 -72

38 55.40 wiring hanging off item, part of seat with audio cables
seat

track RBL 33.99; STA 950 to 995 w/ seat leg attached 8/12/96-4
40 38 25.50

-72 38 55.40 Forward lower cargo bay structure FS 960 left hand
side

8/24/96-8 40 38 31.77 -72 38 55.37 1) metal frame with electric
plug &

wire assy "69B71009-1" 2) metal tube 12" assy "65B41247.79"
8/19/96-23 40

38 31.77 -72 38 55.37 1) metal strap 4'(1" p/n 65B41247-5; 2)
4'(2"(11"

possible fiberglass 8/20/96-15 40 39 01.94 -72 38 55.32 piece of
step

10/06/96-3 40 38 40.51 -72 38 55.05 FS 940 tension tie;
665B09631-57 753

8/05/96-2 FBM11D 40 38 40.51 -72 38 55.05 seat track LBL
33.99 FS 840-880

40 38 46.20 -72 38 55.00 cargo track with cargo pallet stop
8/12/96-4 8 16

96-10 40 38 40.70 -72 38 55.00 overhead reading light
8/16/96-10 40 38

40.70 -72 38 55.00 forward lower cargo bay structure FS 800 left
hand side

8/12/96-4 FMB20D 40 38 40.70 -72 38 55.00 12" floor beam
upper chord STA

800, RBL 55 to RBL 70 8/16/96-10 40 38 40.70 -72 38 55.00
8/16/96-10 40 38
29.80 -72 38 55.00 stringer 8/24/96-8 40 38 45.77 -72 38 54.89
row 18 seat
8 10 8/04/96-66 40 38 48.14 -72 38 54.86 recovered white cable
and a
circuit box 10/02/96-1 40 38 45.83 -72 38 54.78 luggage bin 3(2
(3
8/05/96-2 40 38 45.83 -72 38 54.78 6"(4 piece 8/05/96-2 40 38
45.83 -72 38
54.78 wire harness 8/05/96-2 40 38 34.20 -72 38 54.50 plastic
door
8/24/96-8 40 38 30.70 -72 38 54.50 ducting 900 RH Zone C
8/24/96-8 40 38
31.20 -72 38 54.42 1'(4" alum strut 8/19/96-11 40 38 31.20 -72
38 54.42
body fairing 8/19/96-11 40 38 45.58 -72 38 54.36 blower/fan (air
search)
#1166735 8/03/96-85 40 38 45.55 -72 38 54.30 stewardess chairs
(2) CO2
bottle on side, side strut, #971E13020-2 Rev E lot #12 2-6-71
A-2 40 38
29.20 -72 38 54.30 forward lower cargo bay structure FS 1000
left hand CW
outer skin (canted press bulkhead w/some body skin) 8/24/96-8
40 38 26.85
-72 38 53.82 Partial seat arm with green mesh att'd 8/22/96-7 40
38 26.85
-72 38 53.82 8'(2" metal frame 8/16/96-10 40 38 51.80 -72 38
53.80 coffee
pot with silver 8/17/96-2 40 37 54.37 -72 38 53.54 15'(10' siding
"TR" on
side; FS 840-960; stringer 6R-25R with window frame

8/14/96-11 40 38 32.50
-72 38 53.40 long piece of framing 8/19/96-12 40 38 54.80 -72
38 53.30
seat row 15 seat 2 (do not place in Aircraft Station) 8/17/96-2 40
38
54.80 -72 38 53.30 row 15 seat 1-2-3 8/17/96-2 40 38 54.80 -72
38 53.20
brown luggage with clothes 8/17/96-2 40 38 51.40 -72 38 53.20
luggage,
black with green insert and gold lettered monogram (American
Tourister)
8/17/96-2 40 38 41.69 -72 38 53.14 framing; alum light
8/06/96-46 40 38
41.69 -72 38 53.14 row 23 seat 5-6-7; row 12 seat 8 armrest-
A2041
8/06/96-46 40 38 41.69 -72 38 53.14 olympus camera 8/06/96-46
40 38 41.69
-72 38 53.14 seat 12 (8) armrest 40 38 42.18 -72 38 53.04 seat
track
8/16/96-10 FBM10B 40 38 32.40 -72 38 53.00 floor beam lower
chord FS 880
LBL 5-25 8/24/96-8 40 38 39.15 -72 38 52.96 SWB #3 RBL 23
to LBL 20; p/n
65B01110 19 8/06/96-46 LW05,LW06 40 38 39.15 -72 38 52.96
LW05 lower wing
skin outboard; LW06 upper wing skin outboard; both are
attached to A2018
8/06/96-46 40 39 02.61 -72 38 52.94 plastic drink holders
8/06/96-1 40 38
43.38 -72 38 52.90 1' green light framing 8/06/96-1 40 38 55.00
-72 38
52.80 empty hard side suitcase, gray (Samsonite) 8/17/96-2 40
38 29.20 -72

38 52.80 white "L" shaped brace 8/24/96-8 40 38 33.03 -72 38
52.61 2 small
pieces of frame 1"(1"(3' (left leg to seats 17 (1 2 3) 8/04/96-66 40
38
57.70 -72 38 52.50 personal effects 8/15/96-11 40 38 57.70 -72
38 52.50
black carry-on plastic luggage 8/15/96-11 40 38 57.70 -72 38
52.50 galley
compartment door see A623 8/16/96-10 40 38 57.70 -72 38
52.50 black carry
on bag 40 38 57.70 -72 38 52.50 see A623, galley debris
8/16/96-10 40 39
02.42 -72 38 52.48 food cart 8/06/96-1 40 38 31.93 -72 38 52.42
small
frame section with green rod 8/19/96-11 40 38 57.70 -72 38
52.30 Row 16
Seats 1,2,3 8/15/96-11 40 38 55.00 -72 38 52.30 green fabric
luggage
(Olympia) 8/17/96-2 40 38 38.18 -72 38 52.30 FS 780 900;
1'(2' (Possibly a
floater) 8/09/96-37 40 39 00.80 -72 38 52.20 victim 40 39 00.80
-72 38
52.20 seat recovered with victim (a645) numbers on seat
89490-1 & 89493-2
8/17/96-2 40 38 30.10 -72 38 51.96 red seat back w/ frame;
fiberglass
round dome 2 1/2' diameter.; seat 16 (10) seat with no back -
from cabin
interior d 8/05/96-2 40 38 39.73 -72 38 51.81 row 21, seat 4-5-6
8/14/96-11 40 38 35.58 -72 38 51.54 seat rail 8/19/96-13 40 39
01.23 -72
38 51.09 row 23, seat 4 8/06/96-1 40 38 31.50 -72 38 51.00 seat
piece

8/24/96-8 40 38 59.10 -72 38 50.90 plastic tray / underwear
8/15/96-11 40
38 35.64 -72 38 50.90 right nose gear wheel well door 8/05/96-2
40 38
30.50 -72 38 50.50 metal fragments 8/24/96-8 40 38 35.22 -72
38 50.32 blue
towel; underwear; cosmetic bag 8/29/96-1 40 38 35.22 -72 38
50.32 TWA ID
FBM11C 40 38 42.21 -72 38 50.28 seat track RBL 33-99 FS
800-840, 1 bra
8/06/96-1 40 38 30.84 -72 38 49.80 14" angle structure; white
stringer 40
38 38.79 -72 38 49.77 metal parts and framing 8/14/96-11 40 38
56.07 -72
38 49.74 suitcase 8/04/96-66 40 38 28.29 -72 38 49.71 structural
member
w/holes 8/24/96-8 40 38 38.09 -72 38 49.68 M320001-10 on
plastic O2
holder; air ent lot #057 8/14/96-9 40 38 28.17 -72 38 49.64
clothing -
panties 8/22/96-7 40 38 28.17 -72 38 49.64 frame #L220 40 38
28.17 -72 38
49.64 1.5' frame 8/16/96-10 40 38 51.76 -72 38 49.56 clothes
hanger
10/06/96-3 40 38 39.24 -72 38 49.50 camera tripod 8/19/96-12
40 38 53.50
-72 38 49.40 suitcase blue with clothes (Samsonite) 8/17/96-2 40
38 47.80
-72 38 49.20 black carry on with handle top 8/19/96-12 40 38
26.19 -72 38
49.05 galley serving traycontainer 8/16/96-10 40 38 27.71 -72 38
48.87
forward lower cargo bay structure FS 1000 left hand side

8/22/96-7 40 38
27.71 -72 38 48.87 3' bent metal # 86-4040 8/22/96-7 40 38
27.71 -72 38
48.87 strut p/n 65B41247-83 & 84 8/16/96-10 40 38 27.21 -72
38 48.87 8'
wire, white 8/22/96-7 40 38 36.38 -72 38 48.52 plastic bucket &
light
8/19/96-11 40 38 26.08 -72 38 48.49 forward lower cargo bay
structure FS
920 left hand side (Cargo floor beam left hand station 920)
8/17/96-4 40
38 24.53 -72 38 48.31 Arm rest 8/17/96-4 40 38 25.73 -72 38
48.05 floor
support 8/17/96-4 40 38 51.72 -72 38 48.02 1/2 suitcase; open
with
clothing 8/04/96-66 40 38 51.72 -72 38 48.02 fuselage skin w/
red paint 40
38 51.72 -72 38 48.02 FS 300-340 stringer 27R-41R; 8/04/96-66
40 38 51.72
-72 38 48.02 fuselage skin 40 38 51.72 -72 38 48.02 fuselage
skin 40 38
54.80 -72 38 47.90 black hand cart luggage (jaguar) 8/17/96-2 40
38 54.80
-72 38 47.90 misc clothing in various cloth cases 8/17/96-2 40 38
54.80
-72 38 47.90 misc jewelry in various cloth cases 8/17/96-2 40 39
12.96 -72
38 47.76 debris 10/06/96-3 40 38 31.60 -72 38 47.50 floor beam
upper chord
FS 940, RBL 12-33 8/19/96-11 40 38 48.21 -72 38 47.28 blue
luggage w/
green trim 8/06/96-1 40 38 22.91 -72 38 46.91 misc. metal
9/28/96-1 40 38

25.67 -72 38 46.82 access door frame 8/17/96-4 40 38 37.80 -72
38 46.70
row 22 Seats 4,5,6 8/05/96-2 40 38 41.52 -72 38 46.61 row 14
seat 4-5-6-7
8/19/96-12 40 38 32.82 -72 38 46.25 four foot piece of ducting
8/19/96-11
40 38 50.80 -72 38 46.10 12" (12" black plastic grating
8/17/96-2 40 38
34.80 -72 38 46.00 food galley tray 8/19/96-13 40 38 51.31 -72
38 45.83
luggage cart 8/06/96-1 40 38 30.93 -72 38 45.73 stainless band
with green
rod 8/19/96-13 40 38 27.90 -72 38 45.31 12" green metal strut;
6"(2"
yellow plastic w/black clip 162-1013-3 8/11/96-1 40 38 41.10
-72 38 45.30
2' long white framing piece with a flange in the center 8/12/96-4
40 38
38.90 -72 38 45.30 stainless steel band 8/19/96-13 40 38 24.22
-72 38
45.25 piece of wire 8/30/96-5 40 39 12.64 -72 38 45.24 debris
10/06/96-3
40 38 51.45 -72 38 45.21 nail polish, debris 10/03/96-4 40 38
40.86 -72 38
45.07 yellow glass case w/ glasses 8/05/96-2 40 38 40.86 -72 38
45 07 L2
door 65B04425-411 8/05/96-2 40 38 40.86 -72 38 45.07 pull
latch assembly,
overhead storage piece, 2'(4" honeycomb 8/05/96-2 40 38 35.92
-72 38 44.95
nose gear door/hatch p/n 65B10019-2; 3'(6'(4" thick; RH nose
gear wheel
well door/first 6'; joins A152 8/06/96-46 40 38 55.25 -72 38

44.56 row 14,
Seats 1,2,3 8/08/96-14 40 38 51.80 -72 38 44.52 pocket planner
8/06/96-1
40 38 36.01 -72 38 44.44 metal container appearing to be for
food service
8/06/96-22 40 38 24.11 -72 38 44.40 overhead light 8/17/96-4 40
38 51.80
-72 38 44.00 insulation found in the red zone 8/06/96-1 40 38
36.97 -72 38
44.00 seat assembly p/n S403359-402 s/n 1234 Mod 901
8/06/96-1 40 38 34.80
-72 38 44.00 8" piece of green metal; support 8/24/96-8 40 38
24.57 -72 38
43.94 misc metal 9/28/96-1 40 38 21.80 -72 38 43.80 Structure
Framing 1' (
3'; white fiberglass support 40 38 52.35 -72 38 43.68 metal rack
w/ wheels
8/04/96-66 40 38 52.35 -72 38 43.68 green suitcase 8/04/96-66
40 38 30.80
-72 38 43.50 metal section marked "FWD Unit No. 284"
8/19/96-13 40 38
54.74 -72 38 43.34 10" (2" fiberglass part with Insulation 40 38
50.49
-72 38 43.30 coat hanger 8/06/96-1 40 38 50.49 -72 38 43.30 bar
cart
8/06/96-1 40 38 37.20 -72 38 43.30 frame piece 8/19/96-11 40
38 35.00 -72
38 42.90 white metal strip with rivets 8/19/96-11 40 38 33.74 -72
38 42.75
plastic box w/tubing' rectangular metal tube 3" 8/08/96-31 40 38
33.74 -72
38 42.75 frame FS 820 & 5' Piece of 5/8" O2 Tubing 8/06/96-46
40 38 50.89

-72 38 42.73 suitcase 8/06/96-1 40 38 22.20 -72 38 42.70 2" (4'
green
frame 8/04/96-66 40 38 46.80 -72 38 42.60 JVC power supply
8/19/96-13 40
38 46.80 -72 38 42.60 frame in shape of cross with rivets
8/19/96-13 40 38
40.20 -72 38 42.30 circular item 12" to 18" diam. honeycombed
8/19/96-11
FBM10A 40 38 40.20 -72 38 42.30 floor beam lower chord; FS
880; RBL 35-86
40 38 33.55 -72 38 42.25 FS 900-940; stringer 0-6R, 5(3 rounded
alum
siding; inside p/n 4111-4#158; 7380-2DBLR; RH fuselage crown
skin;
8/06/96-1 40 38 33.80 -72 38 42.06 light framing 2' long
8/06/96-1 40 38
36.07 -72 38 42.01 backpack 8/19/96-13 40 37 42.80 -72 38
42.00 very large
net entangled with debris 9/27/96-1 40 38 37.69 -72 38 41.92
metal strut;
green 653B36 48864080 Rh; 2-3' pieces 8/05/96-2 40 38 47.40
-72 38 41.50
small pieces of metal with light flexible material 8/19/96-12 40
38 48.40
-72 38 41.40 3' long alum trim- 1" wide 8/08/96-14 40 38 56.70
-72 38
41.20 black hard suit case w/clothes (8/22/96-7 40 38 50.26 -72
38 41.20
jar facial cream 8/08/96-14 40 38 23.77 -72 38 40.56 misc. metal
9/28/96-1
40 38 23.82 -72 38 40.48 "L" shaped plastic piece 10/02/96-1 40
38 53.92
-72 38 40.36 canyas suitcase (green) name tag -personal effects-

8/15/96-11 40 38 53.92 -72 38 40.36 row 2 seats 4-5-6-7
8/15/96-11 40 38
29.17 -72 38 40.13 1.5' (2" strut 8/19/96-23 40 38 29.17 -72 38
40.12
Overhead compartment 8/17/96-4 40 38 33.79 -72 38 40.07 fair
lead assembly
3' 8/05/96-2 40 38 24.01 -72 38 40.06 misc. metal 9/28/96-1 40
38 47.88
-72 38 39.91 row 11, Seats 1,2,3 8/06/96-1 40 38 51.85 -72 38
39.75
suitcase 8/06/96-1 40 38 51.59 -72 38 39.75 wire connection;
4"(4"
aluminum 8/06/96-1 40 38 29.27 -72 38 39.52 slide compartment
8/17/96-4 40
38 39.20 -72 38 39.50 luggage rack cart 8/22/96-7 40 38 26.42
-72 38 39.48
several small pieces of wire 8/19/96-23 40 38 26.42 -72 38 39.48
FS 920
Body Frame Segment 40 38 58.20 -72 38 39.40 misc pieces
8/19/96-10 40 38
32.85 -72 38 39.36 coiled white wire; W848-5(38 2 alum pieces
1' long each
8/06/96-46 40 38 32.85 -72 38 39.36 strut 3' long and black
window molding
9/26/96-17 40 38 32.18 -72 38 39.28 18"(4" strut framing
assembly#65B54207-3 8/06/96-46 40 38 45.38 -72 38 39.15
suitcase w/ puller
and insulation 8/15/96-11 40 38 32.79 -72 38 38.98 4'(4" light
framing w
3" diam hole through part of framing 8/06/96-1 40 38 32.79 -72
38 38.98
food cart frame, levi's shorts 8/06/96-1 40 38 35.21 -72 38 38.96
plastic

holders/tray 65B60108; 65B0174-1 40 38 37.71 -72 38 38.95 2.5
(2.5
fiberglass w/PBE holder p/n 4566M37-B-042NM S/N E955016
8/06/96-1 40 38
32.33 -72 38 38.95 framing 3(1 rollers on bottom; cargo floor
framing
8/06/96-1 40 38 32.33 -72 38 38.95 pulley bracket FS 960-980
8/06/96-46 40
38 36.39 -72 38 38.91 suitcase 8/05/96-2 40 38 53.10 -72 38
38.90 black,
hard side suitcase containing misc items (sunglasses, books); --
Personal
Effects- 8/22/96-7 40 38 48.20 -72 38 38.80 2 pair shorts, 1 shirt,
4"
tube seat framing 8/08/96-14 40 38 24.40 -72 38 38.59 one blue
bottle
"Crystal" 8/19/96-11 40 38 24.40 -72 38 38.59 1.5' long framing
& various
small pieces 8/19/96-11 40 39 19.74 -72 38 38.52 clothing
9/11/96-4 40 38
48.99 -72 38 38.41 forward galley 8/08/96-14 40 38 48.99 -72 38
38.41
T-shirt @W513?? 40 38 32.60 -72 38 38.37 front spar web RBL
76 8/19/96-11
40 38 35.99 -72 38 38.36 arm rest row 15 Seat 4, foot rest bar, 3'
alum
strut FBM10F 40 38 35.99 -72 38 38.36 STA 880 floor beam
lower chord LBL
25-70 40 38 26.56 -72 38 38.30 1) metal 14"(6"(1.5" p/n
65B38600-137; 2)
yellow oxygen mask; 3) 2.5' metal pipe 3/4" diameter plus hose
and toggl
8/20/96-15 40 38 26.56 -72 38 38.30 small metal piece 3'(2' p/n:

65B08060-12n/c ADCN 1-2-3 7075-T6, s/n: 252 sept 11 1970 40
38 47.50 -72
38 38.10 bottom half of seat no seat or row # 8/08/96-14 40 38
35.99 -72
38 37.89 3(3(6" framing w/ honeycombing; #10-390#112, 114
hand written on
honeycomb 8/05/96-2 40 38 35.99 -72 38 37.89 floor beam and
frame
connection FS 960, LBL 110 to SOB S25-29 8/05/96-2 40 38
32.43 -72 38
37.87 spanwise beam #3 -mid right side; p/n 65B10683 2
8/06/96-46 40 38
57.40 -72 38 37.80 clothing, black 8/15/96-11 40 38 57.40 -72 38
37.80
personal items, small plastic parts, insulation 8/15/96-11 40 38
57.40 -72
38 37.80 row 20, seat 8-9-10 8/15/96-11 40 38 57.40 -72 38
37.80 misc
wiring bundle 40 38 57.40 -72 38 37.80 sensor, zone temp
8/19/96-10 40 38
23.71 -72 38 37.78 small metal piece 3"(7"(0.25" metal 40 38
32.48 -72 38
37.73 floor beam upper chord & web FS 920, LBL 102-72
8/06/96-46 40 39
02.30 -72 38 37.50 piece of plastic from interior 8/26/96-31 40
38 39.80
-72 38 37.50 long structure piece w/crack on one end 8/19/96-11
40 38
33.00 -72 38 37.42 frame 2' long w/ wire connectors 8/05/96-2
40 38 23.70
-72 38 37.30 4'(1' framing and wire harness 8/14/96-11 40 38
23.70 -72 38
37.30 seat track RBL 11.33 FS 940-960 40 38 05.24 -72 38 37.29

large
section of metal (8' (6') changed from Z3453 to X2201 to match
actual
debris field (Kurt and Deb) 40 38 05.24 -72 38 37.29 40 38 34.09
-72 38
37.28 mans loafer; assy #493780-0001A (19) light box; 5"(2"
alum angle FS
820 8/08/96-31 40 38 34.10 -72 38 37.25 1) plastic housing
2' (8" (4"
assy 493780-0002A" 8/19/96-23 40 38 27.70 -72 38 37.20
2-1/2'(5"(1'
framing 40 38 46.20 -72 38 37.00 black suitcase with strip
(american
tourister) 8/19/96-12 40 38 46.20 -72 38 37.00 cargo track and
rollers
8/12/96-4 40 38 19.90 -72 38 37.00 metal strip w/rivets; white
curtain
attachment 40 38 19.90 -72 38 37.00 3' piece of white metal w/
holes;
overhead support 40 38 37.20 -72 38 36.84 floor assy STA
760-800 RBL 33 to
RBL 72, 3(3 alum framing possible cargo area 8/05/96-2 40 38
37.20 -72 38
36.84 10' long 3/8" piping 8/05/96-2 FBM10C 40 38 37.54 -72
38 36.75 floor
beam lower chord FS 880 LBL 70-121 (SOB) 8/19/96-13 40 38
34.61 -72 38
36.68 tea can 3(3(4 8/05/96-2 40 38 32.68 -72 38 36.48 AC vents
light/alum
frame, green; FS 1140 BAC 27ECT-158 8/06/96-1 40 38 32.68
-72 38 36.48
floor beam segment 40 38 43.20 -72 38 36.00 section of
bulkhead; life raft

support eam (fragment 40" length) FS 800-860, LHS 8/19/96-12
40 38 48.67
-72 38 35.96 clothing; 7'1" piping, door hinge 8/06/96-1 40 38
48.07 -72
38 35.95 FS 820-900; stringers 14L-25L 8/06/96-1 40 39 17.96
-72 38 35.91
clothing 9/10/96-4 40 39 17.96 -72 38 35.91 misc. plastic parts
9/11/96-4
40 39 17.96 -72 38 35.91 misc. plastic piece 9/11/96-4 40 38
28.24 -72 38
35.85 3(2 1/2 inner light framing/2' seat rail 8/08/96-14 40 38
34.67 -72
38 35.41 frame work speaker 8/05/96-2 40 38 19.90 -72 38 35.14
thick
rubber piece 1' (4" (1" / clear plastic cover 8/17/96-4 40 38
32.20 -72
38 35.00 Small electrical access panel with 2 plugs 8/24/96-8 40
38 29.20
-72 38 35.00 Small metal structure with rivets 8/24/96-8 40 38
33.00 -72
38 34.80 2 small pieces of channel 8/24/96-8 40 38 18.00 -72 38
34.70 lamp
frame L517 40 38 26.39 -72 38 34.66 FS 800-880; stringer
36L-40L
8/08/96-14 40 38 26.39 -72 38 34.66 FS 800-860; stringer
39L-44L 40 38
27.14 -72 38 34.54 18" light braising; 1(6 alum bulkhead
8/08/96-14 40 38
27.14 -72 38 34.54 cw spanwise beam #1 section 40 38 26.92 -72
38 34.47 6"
plastic piece 8/19/96-11 40 38 22.55 -72 38 34.25 green 5' strut
8/14/96-11 40 38 20.80 -72 38 34.10 "Y" shaped Metal with
holes; overhead

support 40 38 23.87 -72 38 34.01 6' piece of red wire 8/19/96-23
40 38
22.70 -72 38 33.40 exit sign w/ electronics; spring hinged arm;
4" tubing
8/10/96-9 40 39 09.35 -72 38 33.29 small O2 bottle; metal strut;
plastic
strap 8/28/96-14 40 38 53.00 -72 38 33.00 Black suitcase
(softside)
containing misc items.-Personal Effects- 8/22/96-7 40 38 36.81
-72 38
33.00 blank photos/men's tie 8/28/96-24 40 38 27.78 -72 38
32.88 strut
5'(3" p/n 65B04366-145; 4'(3' p/n 86-4638 s/n AC668 8/11/96-1
40 38 27.78
-72 38 32.88 metal piece with possible foot rest, 1.5' (1.5' 40 38
17.80
-72 38 32.84 forward lower cargo bay structure FS 960 right
hand side
(intercostal fairing ES 920-960) 8/17/96-4 40 38 17.80 -72 38
32.84 FS 960
lower body frame stringer 43L-47L 40 38 39.27 -72 38 32.83
floor panel 2(4
BMS4-17F, TY.2; Lot# 903140 MFGR.CIBA - GEIGY
8/06/96-46 FBM 19 40 38
39.27 -72 38 32.83 floor assy. STA 780 -840 RBL3 to LBL 94
8/06/96-46 40
38 39.27 -72 38 32.83 fuselage skin 40 38 39.27 -72 38 32.83
fuselage skin
40 38 39.27 -72 38 32.83 fuselage belly skin 40 38 39.27 -72 38
32.83
fuselage skin 40 38 36.96 -72 38 32.76 blue chair(no seat #)
8/05/96-2 40
38 33.02 -72 38 32.52 3' strut 1'(1 green FS 920 8/08/96-14 40

38 18.64
-72 38 32.52 cargo bin ceiling 8/17/96-4 40 38 29.10 -72 38
32.34 6'
length of rectangular metal tubing 6'(.5"(1" 8/20/96-15 40 39
19.96 -72 38
32.32 misc clothing (bagged) 40 38 39.85 -72 38 32.29 small
suitcase
frame, MT-Personal Effects- 8/19/96-11 40 38 20.64 -72 38
32.05 fuselage
fairing frame 8/17/96-4 40 38 20.64 -72 38 32.04 wire harness in
bag
8/17/96-4 40 38 20.64 -72 38 32.04 piece of bracket w/section of
stringer
& fiberglass/plastic sheet; cargo compartment support 40 39
03.00 -72 38
32.00 Motor actuator cargo door 40 39 03.00 -72 38 32.00 BAC
65B07943-931
40 39 03.00 -72 38 32.00 power unit F+D wheel drive cargo 40
39 03.00 -72
38 32.00 TWA 38003; 12" diam press relief valve 40 39 03.00
-72 38 32.00
cabin; 10"(12" door frame 40 39 03.00 -72 38 32.00 1'(2' white
structure
w/90 deg 2' track 40 39 03.00 -72 38 32.00 white bulkhead
unknown location
40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 813/96-85 40
39 03.00
-72 38 32.00 TWA 14002; see B053 40 39 03.00 -72 38 32.00
40" piece spiral
staircase center support 40 39 03.00 -72 38 32.00 same as B049;
press
relief valve 40 39 03.00 -72 38 32.00 canted bulkhead FS 400 40
39 03.00

-72 38 32.00 forward bulkhead FS 400 40 39 03.00 -72 38 32.00
40 39 03.00
-72 38 32.00 stringer 26R - 38R Canted bulkhead FS 260-280 40
39 03.00 -72
38 32.00 canted bulkhead FS 400 40 39 03.00 -72 38 32.00
row?? Seat 9
8/3/96-145 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00
canted
bulkhead FS 260; 2(4 Bulkhead W/L323 Equip Center Light -
FWD 40 39 03.00
-72 38 32.00 L-1 door slide raft housing 40 39 03.00 -72 38
32.00 upper
portion FS 140; bulkhead 40 39 03.00 -72 38 32.00 40 39 03.00
-72 38 32.00
FS 240-287; stringer 22R-26R (Right fuselage; w/ pitot tube) 40
39 03.00
-72 38 32.00 power drive 747-5100-5-0; 5"(6"(8" 40 39 03.00
-72 38 32.00
Rain repellent 40 39 03.00 -72 38 32.00 Puritan plastic valve
BAC#
60B50016-1 40 39 03.00 -72 38 32.00 2' section seat rail w/ floor
40 39
03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38
32.00 cargo
floor w/ wheels 40 39 03.00 -72 38 32.00 cargo handling drive
wheel 40 39
03.00 -72 38 32.00 10"(30" green assy p/n 65B0173240 40 39
03.00 -72 38
32.00 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 see 35;
5"(13"
roller latch-cargo 40 39 03.00 -72 38 32.00 PA system 40 39
03.00 -72 38
32.00 2'(3' red & white skin peeled 40 39 03.00 -72 38 32.00 R1

Door Top

40 39 03.00 -72 38 32.00 power unit F+D wheel drive cargo 40
39 03.00 -72

38 32.00 controlled thermostat 2BACR158A5AD 40 39 03.00
-72 38 32.00 40 39

03.00 -72 38 32.00 FS 600-640 stringers 26R-25R with portion
of floor beam

40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 western
power drive scd

60B60006 40 39 03.00 -72 38 32.00 RF 3 Cargo door hinge; 2
rollers 40 39

03.00 -72 38 32.00 cargo 3"(4"(4" red latch 40 39 03.00 -72 38
32.00

actuator 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 FS
340 bulkhead

40 39 03.00 -72 38 32.00 LF22-05 40 39 03.00 -72 38 32.00 FS
740; stringer

39L-44L 40 39 03.00 -72 38 32.00 RH wing upper skin plank;
Right Hand Wing

Upper Skin Plank 40 39 03.00 -72 38 32.00 SWB #2 RBL 33-3.
was cut by

NTSB, its associated piece is B2003 or (CW 704) 40 39 03.00
-72 38 32.00

bag support 3" base; EMCO 3 phase motor D2113 40 39 03.00
-72 38 32.00 RH

Nose Wheel & Tire 40 39 03.00 -72 38 32.00 nose wheel well
sidewall and FS

340 Bulkhead 40 39 03.00 -72 38 32.00 FS 680-720 Stringer
26R-36R 40 39

03.00 -72 38 32.00 small 3"(8" sheet structure w/latch arm 2 40
39 03.00

-72 38 32.00 cargo floor 40 39 03.00 -72 38 32.00 4"(40" beam
LF22-19 40

39 03.00 -72 38 32.00 FS 580-600; stringer L38-L39 40 39 03.00
-72 38
32.00 LF22-14 40 39 03.00 -72 38 32.00 FS 600-620; stringer
42L-39L 40 39
03.00 -72 38 32.00 floor heater, electrical 40 39 03.00 -72 38
32.00
6"(26" green structure; stiffener p/n 65B38600-36 40 39 03.00
-72 38 32.00
40 39 03.00 -72 38 32.00 cargo tie down latch;AL 5"(14"track
red latch 40
39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 1'(1'(1' green
structure
w/12"armature shaft 40 39 03.00 -72 38 32.00 6"(20" twisted
white like box
6 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 FS 740-760
40 39 03.00
-72 38 32.00 linear actuator 747-5700-2-0 40 39 03.00 -72 38
32.00 R/A
gear box for fixed wheel drive 40 39 03.00 -72 38 32.00
65B01731-402 40 39
03.00 -72 38 32.00 Seat Frame 40 39 03.00 -72 38 32.00
513-28-8750; 1"(10"
casting w/eccentric groves 40 39 03.00 -72 38 32.00 2'(3' cargo
structure
w/2-6" rubber wheels 40 39 03.00 -72 38 32.00 white 40" roller
ball track
w/balls 40 39 03.00 -72 38 32.00 spanwise beam #2 RBL 11
stiffener 40 39
03.00 -72 38 32.00 right hand fuselage window bays; FS
620-740 stringer
19R-26R with windows 40 38 23.46 -72 38 31.94 FS 840-880.
Stringer R1-R6
8/19/96-11 40 39 09.49 -72 38 31.92 galley "A" kitchen galley

ovens A6,
A6a, A6b, A6c, A6c, A6d (3 pieces) 8/08/96-14 40 39 09.49 -72
38 31.92
dish tray box; 1'(16"(6" w/2 dishes 8/08/96-31 40 39 09.49 -72
38 31.92 2
pieces alum sheet; ea 3'(2' 8/08/96-31 40 39 09.49 -72 38 31.92
galley A 4
ovens, coffee maker & drawers 8/08/96-14 40 39 09.49 -72 38
31.92 seat 52
(3) armrest/tray, 40 39 09.49 -72 38 31.92 Fuselage skin 40 39
09.49 -72
38 31.92 FS 160-180 stringer 24R-26R 40 39 06.38 -72 38 31.72
insulation /
lining; misc debris 8/31/96-3 40 39 01.66 -72 38 31.62 p/n
58607, DME
Receiver 40 38 56.80 -72 38 31.50 lavatory door 8/22/96-7 40 38
35.44 -72
38 31.49 strut 1.5'(2' / light fixture 8/28/96-22 40 39 06.77 -72 38
31.47
luggage carrier; black dress 8/08/96-31 40 38 30.40 -72 38 31.43
10(2(3
Metal box; 967-A stenciling inside 8/04/96-66 40 38 23.58 -72
38 31.23
9/28/96-1 40 39 08.46 -72 38 31.20 debris, fuel line 10/06/96-2
40 38
24.30 -72 38 31.08 1) floor beam and frame segment FS 920
LBL 100-SOB
S25L-27.5 2) 1.5(6" skin 3) drawer 1.5'(2'(3" p/n A0 8/19/96-23
40 38
24.30 -72 38 31.08 fuselage skin 40 38 24.30 -72 38 31.08 cargo
container
piece 40 38 30.10 -72 38 31.07 white wire, marked 02125 or
C2125 (xeroxed

dive report) approx 2' long 8/22/96-7 40 38 36.22 -72 38 30.98
shirt /
metal siding 8/28/96-25 40 38 24.01 -72 38 30.95 6" piece of J
channel;
white brace 40 38 18.57 -72 38 30.89 wiring 8/17/96-4 40 38
29.76 -72 38
30.84 7' long strut; small piece 6"(2.5"(4" p/n 65B38600-154;
small piece
1'(5" no number; small metal shard with 2 whee 8/22/96-7 40 38
17.46 -72
38 30.72 Plastic window frame 8/17/96-4 40 38 19.98 -72 38
30.60 4'(2"
Med. wtr Framing 8/17/96-4 40 39 01.90 -72 38 30.00 piece of
aircraft
interior panel (insulation) 8/22/96-7 40 38 33.00 -72 38 30.00
metal
w/vent holes "ZONE C" on side 8/24/96-8 40 38 22.30 -72 38
30.00 FS 900
frame stringer 25R-21R 40 38 18.96 -72 38 30.00 wire harness/
small framing
8/17/96-4 40 38 18.96 -72 38 30.00 3' fiberglass duct, 1' bent
metal;
Insulated duct 40 38 36.18 -72 38 29.99 plastic bag containing 1.
pencil
sharpener, 2. pen "Reynolds" 3. stapler 4. little box of staples
8/28/96-23 40 38 27.97 -72 38 29.96 4' light alum framing
8/14/96-11 40 38
27.97 -72 38 29.96 upper portion of galley "B" 8/14/96-11 40 38
35.98 -72
38 29.95 magna filter frame box structure p/n GB52424A30X
2'(2'(4"
8/06/96-46 40 38 42.43 -72 38 29.73 empty plastic bag 40 38
24.90 -72 38

29.43 seat electronic box 85 8/06/96-1 40 38 22.97 -72 38 29.33
1) rubber
window molding 2) piece of Insulation with plastic latch 3)
angled plastic
molding 6" (3" p/n 162-103-8 8/19/96-23 40 38 58.70 -72 38
29.30 black
plastic tray 8/22/96-7 40 38 32.71 -72 38 29.30 floor beam lower
chord (3'
long); FS 920; LBL 28-71 40 38 32.71 -72 38 29.30 floor beam
lower chord
(12") 40 38 21.70 -72 38 29.30 Interior Metal Piece with Support
Struts;
metal panel 40 39 04.02 -72 38 29.25 various aircraft parts in
basket 40
38 25.38 -72 38 29.22 5 pieces 69B517061 HC 8/19/96-11 40 39
06.10 -72 38
29.21 TWA AKN7415 cargo container 40 38 17.01 -72 38 28.97
1' (1' siding
/ light framing 8/17/96-4 40 38 47.80 -72 38 28.78 row 11 seat 6
armrest
8/03/96-85 40 38 43.63 -72 38 28.78 2 seats one red, one blue #
row 11'
seat 6 40 38 28.80 -72 38 28.70 metal piece w/jagged edge 10" in
length-green 8/24/96-8 40 39 04.12 -72 38 28.52 wallet 40 38
57.30 -72 38
28.50 black suitcase, softside, full of misc items 8/26/96-31 40
38 20.94
-72 38 28.49 body stringer cargo floor Area 4' long 40 38 20.94
-72 38
28.49 stringer p/n 65B04366-144 8/19/96-23 40 39 03.74 -72 38
28.43 green
bag containing personal effects (inside clear bag) 8/21/96-3 40
39 03.74

-72 38 28.43 misc debris inside Black Bag 8/21/96-3 40 39 03.74
-72 38
28.43 misc debris placed inside black plastic bag 8/21/96-3 40 39
03.74
-72 38 28.42 Black Bag (Tag inside) contains Misc Debris
8/21/96-3 40 39
03.70 -72 38 28.40 misc pieces 8/19/96-10 40 39 03.70 -72 38
28.40 victim
40 39 03.70 -72 38 28.40 misc pieces 8/19/96-10 40 39 03.70 -72
38 28.40
miscellaneous small pieces 8/19/96-10 40 39 03.70 -72 38 28.40
fuselage
skin, small fragment TBD 40 39 06.27 -72 38 28.39 tubing &
parts in
plastic bag 8/17/96-1 40 39 06.27 -72 38 28.39 4' tubing section
"65B40128-756" 8/17/96-1 40 39 06.27 -72 38 28.39 8' frame
piece 8/17/96-1
40 39 13.28 -72 38 28.32 1 green carry on bag 10/10/96-1 40 39
03.80 -72
38 28.30 fuselage LHS FS 600-760 40 38 34.72 -72 38 28.27
harlem NY shirt;
Alum shelf siding 8/05/96-2 40 39 03.60 -72 38 28.20 window
frame interior
8/29/96-1 40 39 03.60 -72 38 28.20 window frame 8/26/96-31
FBM-8A 40 38
31.73 -72 38 27.88 FS 900 floor beam & frame LBL 85 to SOB;
this part is
part of LF36 & FBM-8A 8/08/96-14 40 38 31.73 -72 38 27.88
piece of cabin
overhead compartment 20" (4" 40 39 04.853 -72 38 27.85 bag of
small misc.
debris 8/24/96-9 40 39 04.853 -72 38 27.85 bag of misc. debris
8/24/96-9

40 39 04.853 -72 38 27.85 bag of misc. debris 8/24/96-9 40 39
04.85 -72 38
27.85 insulated hose with fittings 8/24/96-9 40 38 43.99 -72 38
27.81 40
38 21.75 -72 38 27.64 body crown fuselage; changed from B561
to A2031 to
match actual debris field 40 39 04.63 -72 38 27.62 human
remains (spine)
8/23/96-13 40 39 04.63 -72 38 27.62 bag of misc. debris
8/24/96-9 40 39
04.63 -72 38 27.62 bag of misc. debris 8/24/96-9 40 39 04.63 -72
38 27.62
bag of misc. debris 8/24/96-9 40 39 04.63 -72 38 27.62 bag of
misc. debris
8/24/96-9 40 39 04.63 -72 38 27.62 bag of misc. debris 8/24/96-9
40 39
04.63 -72 38 27.62 bag of misc. debris 8/24/96-9 40 39 07.70 -72
38 27.50
fuselage skin 40 39 07.70 -72 38 27.50 Misc. Personal
Electronics and pr.
women's glasses 8/29/96-1 40 39 07.70 -72 38 27.50 part of
intercoastal
with # 326 8/29/96-1 40 39 07.70 -72 38 27.50 fuselage
forming with 660
written on it 8/29/96-1 40 39 07.70 -72 38 27.50 row 10 seat 2
label-cap
8/29/96-1 40 39 07.70 -72 38 27.50 Baggage Claim TW 210981
8/29/96-1 40 39
07.70 -72 38 27.50 part of RADOME 8/29/96-1 40 39 07.70 -72
38 27.50 misc
small debris 8/29/96-1 40 39 07.70 -72 38 27.50 misc. debris
8/29/96-1 40
39 07.70 -72 38 27.50 metal strap with internal cargo door switch

for

forward cargo door; FS 560; WL 164; RBL 96 40 38 58.80 -72
38 27.48 misc.

debris 8/29/96-1 40 38 58.80 -72 38 27.48 misc. debris 8/29/96-1
40 38

58.80 -72 38 27.48 misc. debris 8/29/96-1 40 38 58.80 -72 38
27.48 misc.

debris 8/29/96-1 40 38 58.80 -72 38 27.48 misc. debris 8/29/96-1
40 38

58.80 -72 38 27.48 misc. debris 8/29/96-1 40 39 05.70 -72 38
27.40 crate

containing misc plane fragments aluminum, fiberglass, liner
plastic, wood,

plexiglass, personal clothing, paper 8/28/96-9 40 39 05.70 -72 38
27.40

crate containing misc plane fragments aluminum, fiberglass, liner
plastic,

wood, plexiglass, personal clothing 8/28/96-8 40 39 01.00 -72 38
27.40

bone possibly human 40 39 01.00 -72 38 27.40 bone, possibly
human 40 39

01.00 -72 38 27.40 Cargo Net of Misc wreckage Debris
8/26/96-31 40 39

04.30 -72 38 27.20 personal luggage 8/03/96-145 40 39 04.30
-72 38 27.20

personal luggage 8/03/96-145 40 39 04.30 -72 38 27.20 row 5
seat 5 & 6

8/03/96-145 40 39 04.30 -72 38 27.20 debris-sweepings
8/05/96-7 40 39

04.30 -72 38 27.20 personal luggage 8/03/96-145 40 39 04.30
-72 38 27.20

personal luggage 40 39 04.30 -72 38 27.20 1 pair eyeglass
frames 40 39

04.30 -72 38 27.20 FS 420-440; stringer 20R-27R 8/03/96-145
40 39 04.30
-72 38 27.20 forward fuselage bulkhead 8/03/96-145 40 39 04.30
-72 38
27.20 sweepings 8/05/96-11 40 39 04.30 -72 38 27.20 victim 40
39 04.30 -72
38 27.20 5' round spiral staircase ceiling panel 8/03/96-145 40 39
04.30
-72 38 27.20 1 jacket with contents of B138 8/04/96-65 LF22-04
40 39 04.30
-72 38 27.20 FS 741; stringer 45L-43R (1'(2'(5' twisted AL w/U
stiffeners;
cargo bin white w/primer) 8/05/96-5 40 39 04.30 -72 38 27.20
nose wheel
well skin surrounding nose seal FS 320-260 8/03/96-145 40 39
04.30 -72 38
27.20 right side cargo door, FS 640-760 aft stringer 28R-43R
8/04/96-65 40
39 04.30 -72 38 27.20 1 large suitcase 8/04/96-65 40 39 04.30
-72 38 27.20
personal luggage 8/04/96-65 40 39 04.30 -72 38 27.20 circuit
board
8/05/96-6 40 39 04.30 -72 38 27.20 personal luggage 8/04/96-65
40 39 04.30
-72 38 27.20 row 5; seat 8-9 8/04/96-65 40 39 04.30 -72 38
27.20 personal
luggage 8/04/96-65 40 39 04.30 -72 38 27.20 FWD cargo door
lift 8/04/96-65
40 39 04.30 -72 38 27.20 personal luggage 8/04/96-65 40 39
04.30 -72 38
27.20 personal luggage 8/04/96-65 40 39 04.30 -72 38 27.20
personal
luggage 8/04/96-65 40 39 04.30 -72 38 27.20 tan sport jacket

containing

B208 (travelers checks/ticket) 40 39 04.30 -72 38 27.20 one pair of pants

8/04/96-65 40 39 04.30 -72 38 27.20 personal luggage

8/04/96-65 40 39

04.30 -72 38 27.20 row 4, seat 8 8/04/96-65 40 39 04.30 -72 38 27.20

personal luggage 8/04/96-65 40 39 04.30 -72 38 27.20 armrest 54- 8, 10

8/04/96-54 40 39 04.30 -72 38 27.20 5 gal fiber drum small parts wire and

plastic 8/03/96-145 40 39 04.30 -72 38 27.20 cockpit debris; armrest,

partial frame 34-9 -10, armrest 45-8, seat 45-10 8/04/96-64 40 39 04.30

-72 38 27.20 light fixture 8/04/96-57 40 39 04.30 -72 38 27.20

personal

property 8/04/96-64 40 39 04.30 -72 38 27.20 cockpit wreckage 8/04/96-64

40 39 04.30 -72 38 27.20 FS 488-560 stringer 13R-31R, aft and beneath R-1

door (Aircraft door frame and 3 window frames) 8/04/96-65 40 39 04.30 -72

38 27.20 L-1 door 40 39 04.30 -72 38 27.20 personal property 8/03/96-145

40 39 04.30 -72 38 27.20 personal luggage 8/04/96-65 40 39 04.30 -72 38

27.20 FS 380-488; stringer 17L-30L includes door L1 8/04/96-65 40 39 04.30

-72 38 27.20 canted bulkhead FS 400 8/04/96-65 40 39 04.30 -72 38 27.20

personal luggage 8/04/96-65 40 39 04.30 -72 38 27.20 L2 door 65B04425-411

8/04/96-65 40 39 04.30 -72 38 27.20 forward fuselage
8/03/96-145 40 39
04.30 -72 38 27.20 wallets, passports, cash 8/04/96-65 40 39
04.30 -72 38
27.20 operations manual 8/04/96-64 40 39 04.30 -72 38 27.20
clothing
8/05/96-10 40 39 04.30 -72 38 27.20 personal luggage 8/06/96-2
40 39 04.30
-72 38 27.20 personal luggage 8/06/96-2 40 39 04.30 -72 38
27.20 portion
of a cargo bin 8/05/96-34 40 39 04.30 -72 38 27.20 personal
luggage
8/05/96-34 40 39 04.30 -72 38 27.20 4'(6' floor FS 580-520; left
butt line
75 to RBL 11 8/05/96-34 40 39 04.30 -72 38 27.20 INS battery
8/03/96-145
40 39 04.30 -72 38 27.20 scraps, pieces 8/05/96-34 40 39 04.30
-72 38
27.20 Three(3) human feet and tissue 40 39 04.30 -72 38 27.20
avionics
bay; seat 9-10 8/05/96-17 40 39 04.30 -72 38 27.20 3'(4-1/2'
cargo floor
w/roller balls 8/03/96-145 40 39 04.30 -72 38 27.20 victim white
female
8/03/96-145 40 39 04.30 -72 38 27.20 victim white male
8/03/96-145 40 39
04.30 -72 38 27.20 row 2, seat 8 and 9; row 3 seat 1 and 2 (See
tag B2070)
8/05/96-34 40 39 04.30 -72 38 27.20 victim 8/03/96-145 40 39
04.30 -72 38
27.20 victim 40 39 04.30 -72 38 27.20 FS 380-580; stringer
23L-40L
8/05/96-34 40 39 04.30 -72 38 27.20 personal effects

8/03/96-145 40 39
04.30 -72 38 27.20 Cargo bin 7866 (FC2) 8/06/96-2 40 39 04.30
-72 38 27.20
Cargo bin 8/06/96-2 40 39 04.30 -72 38 27.20 Victim-w/m Row
92, seat 1,
wallet attached in clear plastic bag 40 39 04.30 -72 38 27.20
fuselage
skin; FS 340-360; stringer 37R-41R 8/06/96-2 40 39 04.30 -72
38 27.20
personal effects 8/05/96-34 40 39 04.30 -72 38 27.20 40 39
04.30 -72 38
27.20 fuselage part 8/06/96-2 40 39 04.30 -72 38 27.20 misc.
debris
8/05/96-34 40 39 04.30 -72 38 27.20 cargo bin 8/05/96-34 40 39
04.30 -72
38 27.20 travelers checks and ticket found in B207 40 39 04.30
-72 38
27.20 FS 540-580 stringers 24R-30R with top right corner of
forward cargo
door 8/06/96-2 40 39 04.30 -72 38 27.20 personal luggage
8/06/96-2 40 39
04.30 -72 38 27.20 FS 260-400; stringer 23L-42L from window
belt to nose
wheel well 8/05/96-34 40 39 04.30 -72 38 27.20 personal
luggage 8/06/96-2
40 39 04.30 -72 38 27.20 frame member 8/05/96-34 40 39 04.30
-72 38 27.20
forward fuselage bulkhead 8/03/96-145 LF22-27 40 39 04.30 -72
38 27.20 FS
560; stringer 44R 8/06/96-2 40 39 04.30 -72 38 27.20 FS 240,
skin splice,
fuselage; FS 260-280 8/06/96-2 40 39 04.30 -72 38 27.20
8/03/96-145 40 39

04.30 -72 38 27.20 1 large brown suitcase 40 39 04.30 -72 38
27.20 row 4
seat 9 8/05/96-3 40 39 04.30 -72 38 27.20 right hand skin R1
door FS
460-520 40 39 04.30 -72 38 27.20 FS 340-380, stringer 23R-37R
8/06/96-2 40
39 04.30 -72 38 27.20 personal effects 8/03/96-145 40 39 04.30
-72 38
27.20 FS 420-480 stringers 11R-19R, door 1 upper door cutout;
8/06/96-2 40
39 04.30 -72 38 27.20 crash ax 8/04/96-65 40 39 04.30 -72 38
27.20
8/03/96-145 40 39 04.30 -72 38 27.20 FS 440-580; stringer
42L-37R
8/06/96-2 40 39 04.30 -72 38 27.20 fwd portion lower right
cargo door; FS
560-670; target # 2931.2S 40 39 04.30 -72 38 27.20 section of
cargo bin
8/06/96-2 40 39 04.30 -72 38 27.20 personal effects 8/03/96-145
40 39
04.30 -72 38 27.20 personal effects, scarf 8/06/96-2 40 39 04.30
-72 38
27.20 personal luggage 8/06/96-2 40 39 04.30 -72 38 27.20
personal effects
8/03/96-145 40 39 04.30 -72 38 27.20 support beam, fwd cargo
8/06/96-2
LF04, RF04 40 39 04.30 -72 38 27.20 FS 520-800; stringer
4L-24L (Note: saw
cut above from RF04) 8/03/96-145 40 39 04.30 -72 38 27.20
clothing from
debris field row 5 seat 5 8/05/96-9 40 39 04.30 -72 38 27.20
personal
effects 8/03/96-145 40 39 04.30 -72 38 27.20 row 92, seat 1,2

8/06/96-2 40
39 04.30 -72 38 27.20 personal effects 8/03/96-145 40 39 04.30
-72 38
27.20 clothing 8/05/96-12 40 39 04.30 -72 38 27.20 FS 340, skin
8/05/96-4
40 39 04.30 -72 38 27.20 personal effects 8/03/96-145 40 39
04.30 -72 38
27.20 FS 340-360; stringer 19R-22R with window 40 39 04.30
-72 38 27.20
fuselage skin w/red paint 40 39 04.30 -72 38 27.20 FS 360-380;
stringer
19R-23R with window 40 39 04.30 -72 38 27.20 FS 140-380;
stringer 0-45L;
top of skin below cockpit window structure 8/07/96-15 40 39
04.30 -72 38
27.20 FS 240-287; stringer 8A-14R 8/07/96-15 LF22-34 40 39
04.30 -72 38
27.20 FS 500-540; stringer 40R-45R 40 39 04.30 -72 38 27.20
seat 36 (9)
armrest 40 39 04.30 -72 38 27.20 fuselage skin 40 39 04.30 -72
38 27.20
fuselage skin 40 39 04.30 -72 38 27.20 Seat 8 (1 2 3) 8/23/96-1
40 39
04.30 -72 38 27.20 fuselage skin 40 39 04.30 -72 38 27.20 lower
140
bulkhead structure 40 39 04.30 -72 38 27.20 fuselage skin 40 39
04.30 -72
38 27.20 seat 3 (8) 40 39 04.30 -72 38 27.20 first ACM seat 40
39 04.30
-72 38 27.20 personal luggage; black bag w/wallet 8/07/96-15 40
39 04.30
-72 38 27.20 LBL 70, Frame FS 320 (approx 50" fragment)
@WL 302 with

fragment of floor beam about 30" length 8/04/96-64 40 39 04.30
-72 38
27.20 personal computer 8/07/96-15 40 39 04.30 -72 38 27.20
personal
luggage- 8/07/96-15 40 39 04.30 -72 38 27.20 personal luggage
8/07/96-15
40 39 04.30 -72 38 27.20 personal luggage pants w/wallet
8/07/96-15 40 39
04.30 -72 38 27.20 nose gear wheel well FWD bulkhead w/
actuator 8/07/96-15
40 39 04.30 -72 38 27.20 fuselage skin w/red paint 40 39 04.30
-72 38
27.20 second ACM seat 40 39 04.30 -72 38 27.20 FS 1480-1550,
1480 bulkhead
WL 220 to stringer 36R; 8/04/96-64 40 39 04.30 -72 38 27.20 FS
580-800;
stringer 23L-39L (upper deck floor beam segment (approx 20"
length)) 40 39
04.30 -72 38 27.20 pulley bracket assy 40 39 04.30 -72 38 27.20
upper deck
floor 40 39 04.30 -72 38 27.20 upper deck floor 40 39 04.30 -72
38 27.20
Upper deck floor beam segment, about 7' length, FS 740
Stateroom
8/04/96-64 40 39 04.30 -72 38 27.20 FS 440-520; stringer
9R-14R 40 39
04.30 -72 38 27.20 personal luggage; black handbag 40 39 04.30
-72 38
27.20 cargo bin floor 40 39 04.30 -72 38 27.20 cockpit windows
to FS 400.
S 9L - 15 R 40 39 04.30 -72 38 27.20 FS 380-400 stringer
22R-23R (piece of
window frame) 40 39 04.30 -72 38 27.20 Fuselage skin 40 39

04.30 -72 38

27.20 cargo bin piece 40 39 04.30 -72 38 27.20 personal luggage, electronics 8/07/96-15 40 39 04.30 -72 38 27.20 nose wheel well structure

upper pressure panel 40 39 04.30 -72 38 27.20 cargo bin support from B222

8/07/96-15 40 39 04.30 -72 38 27.20 FS 520-560; aft; 40" long stringer

12R-19R 40 39 04.30 -72 38 27.20 structural support 40 39

04.30 -72 38

27.20 aircraft skin, 65B04705 410 40 39 04.30 -72 38 27.20 small section

of upper forward cargo door 40 39 04.30 -72 38 27.20 FS 460-520; stringer

31R-38R 40 39 04.30 -72 38 27.20 cargo bin floor 40 39 04.30 -72 38 27.20

oxygen bottle 8/07/96-15 40 39 04.30 -72 38 27.20 cockpit windows to FS

400 stringer 9L-15R includes B211 and B238; skin with wash nozzles and

crew service door 40 39 04.30 -72 38 27.20 wheel well structure 8/07/96-15

8 07 96-15 40 39 04.30 -72 38 27.20 row 91, seat 1,2 8/07/96-15 40 39

04.30 -72 38 27.20 passport 8/07/96-15 40 39 04.30 -72 38 27.20 cockpit

floor 40 39 04.30 -72 38 27.20 personal luggage, personal computer

8/07/96-15 40 39 04.30 -72 38 27.20 FS 560-640; stringer 19R-23R with

window belt 8/07/96-15 40 39 04.30 -72 38 27.20 aircraft debris 8/07/96-15

LF22-23 40 39 04.30 -72 38 27.20 FS 640-660; stringer

44R-46R 8/07/96-15
40 39 04.30 -72 38 27.20 FS 600-780 stringer 23R-44R with
attached cargo
door 40 39 04.30 -72 38 27.20 forward pressure bulkhead
8/07/96-15 LF22-20
40 39 04.30 -72 38 27.20 FS 600-620; stringer 44R-47R
8/07/96-15 40 39
04.30 -72 38 27.20 cardboard box 8/07/96-15 40 39 04.30 -72 38
27.20 FS
220-287; stringer 14A-22R with window belt 8/07/96-15 40 39
04.30 -72 38
27.20 section 41 FS 300-340. NWW Right fuselage side panel
8/07/96-15 40
39 04.30 -72 38 27.20 FS 600-720, stringers 24R-26R with rear
top portion
of forward cargo door 8/07/96-15 40 39 04.30 -72 38 27.20
personal items
8/07/96-15 40 39 04.30 -72 38 27.20 skin section FS 200-260;
stringer
34-43 8/07/96-15 40 39 04.30 -72 38 27.20 upper deck floor 40
39 04.30 -72
38 27.20 FS 720 frame fragment w/fragment of upper deck floor
beam
8/04/96-64 LF22-11 40 39 04.30 -72 38 27.20 right fuselage FS
580-560
stringer 40-44 8/07/96-15 LF22-06 40 39 04.30 -72 38 27.20
belly piece; FS
780-800 Stringer 40L-45L 8/07/96-15 40 39 04.30 -72 38 27.20
cargo bin
8/07/96-15 LF22-13 40 39 04.30 -72 38 27.20 FS 660-680;
stringer 41L-45L
8/07/96-15 40 39 04.30 -72 38 27.20 side panel, nose wheel well,
FS

245-340, p/n65B07942 pressure panel 8/07/96-15 40 39 04.30
-72 38 27.20 FS
740-800; stringer 44L-43R 40 39 04.30 -72 38 27.20 skin section
8/07/96-15
40 39 04.30 -72 38 27.20 cargo bin 7430(FC4) 8/07/96-15 40 39
04.30 -72 38
27.20 crew door 8/07/96-15 40 39 04.30 -72 38 27.20 seat 4 (9)
40 39 04.30
-72 38 27.20 floor assy; FS 720-740; LBL 2 to LBL72
8/03/96-145 40 39
04.30 -72 38 27.20 floor assy FS 740-800; RBL 11.33 to RBL
11.33
8/03/96-145 40 39 04.30 -72 38 27.20 FS 180-120 stringer
26R-36R, two
pieces 40 39 04.30 -72 38 27.20 seat 3 (1 2) 40 39 04.30 -72 38
27.20 FS
200-240 stringer 24R-45R 40 38 24.48 -72 38 27.12 3' piece of
circular
green metal 8/19/96-11 40 38 24.48 -72 38 27.12 spanwise beam
#2 RH web
door RBL 8-30 8/19/96-11 40 38 24.48 -72 38 27.12 Forward
lower cargo bay
structures, FS 900 8/19/96-11 40 39 02.70 -72 38 27.10 blue and
white
shirt, TWA face cloth, white sock 8/26/96-31 40 39 04.00 -72 38
27.00
green bag of misc pieces, airplane debris, wiring 8/26/96-26 40
39 04.00
-72 38 27.00 green bag misc pieces airplane debris, insulation
8/26/96-25
40 39 03.10 -72 38 27.00 small body parts/tissue 40 39 03.10 -72
38 27.00
personal effects including tickets 8/29/96-1 40 39 03.10 -72 38

27.00
landing gear safety pin 8/29/96-1 40 39 03.10 -72 38 27.00
luggage tag
8/29/96-1 40 39 03.10 -72 38 27.00 TWA employee ID 8/29/96-1
40 39 03.10
-72 38 27.00 personal checkbook 8/29/96-1 40 38 28.22 -72 38
26.96 small
piece of wire 8/19/96-23 40 38 28.22 -72 38 26.96 piece of
insulation
found in vicinity of DIG268 8/19/96-23 40 38 29.30 -72 38 26.90
Black
plastic with two hinged pieces -white 8/24/96-8 40 38 21.39 -72
38 26.86
white plastic box cover p/n 60B40053-3 8/19/96-23 40 39 04.70
-72 38 26.80
frame part; 65 B 14073-1 8/08/96-31 40 39 04.70 -72 38 26.80
frame part;
65B14006-2 8/08/96-31 40 39 04.70 -72 38 26.80 debris parts
8/12/96-4 40
39 04.70 -72 38 26.80 general aircraft debris 8/08/96-31 40 39
04.70 -72
38 26.80 FS 570-600 stringers 22R-23R 8/08/96-31 40 39 04.70
-72 38 26.80
window frame 8/08/96-31 40 39 04.70 -72 38 26.80 FS 500 part
8/08/96-31 40
39 04.70 -72 38 26.80 floor frame deck 8/08/96-31 40 39 04.70
-72 38 26.80
8/12/96-4 40 39 04.70 -72 38 26.80 8/12/96-4 40 39 04.70 -72 38
26.80 FS
740-760 stringer 32R-36R 8/12/96-4 40 39 04.70 -72 38 26.80
aircraft skin
8/12/96-4 40 39 04.70 -72 38 26.80 debris/parts 8/12/96-4
LF22-24 40 39

04.70 -72 38 26.80 skin/frame; FS 760-780 Stringer 40L-42L
8/12/96-4 40 39
04.70 -72 38 26.80 8/12/96-4 40 39 04.70 -72 38 26.80 cargo
bin/part
8/12/96-4 40 39 04.70 -72 38 26.80 electronic bay 8/12/96-4 40
39 04.70
-72 38 26.80 personal effects 8/08/96-31 40 39 04.70 -72 38
26.80 aircraft
skin/frame; FWD Cargo Door skin 8/12/96-4 40 39 04.70 -72 38
26.80
aircraft skin/frame 8/12/96-4 40 39 04.70 -72 38 26.80 FS
675-725;
stringer 34L-38L 8/12/96-4 40 39 04.70 -72 38 26.80 personal
effects
8/12/96-4 40 39 04.70 -72 38 26.80 personal effects 8/12/96-4 40
39 04.70
-72 38 26.80 plastic frame with darl 8/08/96-31 40 39 04.70 -72
38 26.80
plastic frame 8/08/96-31 40 39 04.70 -72 38 26.80 electronic box
8/12/96-4
40 39 04.70 -72 38 26.80 personal effects 8/08/96-31 40 39
04.70 -72 38
26.80 FS 380-400; stringer 19R-23R with window (skin panel;
w/ window)
8/08/96-31 40 39 04.70 -72 38 26.80 section 42 - skin 8/08/96-31
40 39
04.70 -72 38 26.80 cargo floor 8/08/96-31 40 39 04.70 -72 38
26.80 720
main deck floor beam 8/08/96-31 40 39 04.70 -72 38 26.80 belly
skin
8/08/96-31 40 39 04.70 -72 38 26.80 cargo liners 8/08/96-31 40
39 04.70
-72 38 26.80 FS 580, upper floor support beam 8/08/96-31 40 39

04.70 -72

38 26.80 FS 340-400 stringer 15R-19R(passenger cabin skin, section 410)

8/08/96-31 40 39 04.70 -72 38 26.80 personal luggage

8/08/96-31 40 39

04.70 -72 38 26.80 frame section 8/08/96-31 40 39 04.70 -72 38 26.80

personal luggage 8/08/96-31 40 39 04.70 -72 38 26.80 personal luggage

8/08/96-31 40 39 04.70 -72 38 26.80 personal effects 8/08/96-31 40 39

04.70 -72 38 26.80 Row 92 seats 8-9 8/08/96-31 40 39 04.70 -72 38 26.80

cargo liner 8/08/96-31 40 39 04.70 -72 38 26.80 TWA cargo container skin

8/08/96-31 40 39 04.70 -72 38 26.80 FS 160-220; stringer 22R-24A with

window belt. 8/08/96-31 40 39 04.70 -72 38 26.80 cargo container top frame

- 7866 8/08/96-31 40 39 04.70 -72 38 26.80 galley cabinet; row 10, seat

1-3 8/08/96-31 40 39 04.70 -72 38 26.80 generator control unit 8/08/96-31

40 39 04.70 -72 38 26.80 FS 340-380; stringer 9L - 19L 8/08/96-31 40 39

04.70 -72 38 26.80 air-conditioning cabin duct 8/08/96-31 40 39 04.70 -72

38 26.80 personal effects 8/08/96-31 40 39 04.70 -72 38 26.80 load

controller 8/08/96-31 40 39 04.70 -72 38 26.80 wheel well part 8/08/96-31

40 39 04.70 -72 38 26.80 personal effects 8/08/96-31 40 39 04.70 -72 38

26.80 frame w/pheniolic block 8/08/96-31 40 39 04.70 -72 38
26.80 personal effects 8/08/96-31 40 39 04.70 -72 38 26.80 personal effects
8/08/96-31 40
39 04.70 -72 38 26.80 FS 400-420; stringer 18R-23R with
window 8/08/96-31
LF22-02 40 39 04.70 -72 38 26.80 FS 680-700; stringer 41L-47R
8/08/96-31
40 39 04.70 -72 38 26.80 generator control 8/08/96-31 40 39
04.70 -72 38
26.80 belly skin 8/08/96-31 40 39 04.70 -72 38 26.80 personal
effects
8/08/96-31 40 39 04.70 -72 38 26.80 FS 720 frame 8/08/96-31
40 39 04.70
-72 38 26.80 FS 540-560; stringer 34R (cargo door skin; RF
FWD) 8/08/96-31
40 39 04.70 -72 38 26.80 belly frame 8/08/96-31 40 39 04.70 -72
38 26.80
FS 800 frame 8/08/96-31 40 39 04.70 -72 38 26.80 galley floor
8/08/96-31
40 39 04.90 -72 38 24.80 personal luggage, 8/07/96-15 40 39
00.90 -72 38
24.80 piece of plastic & hair spray cylinder 8/26/96-31 40 38
27.00 -72 38
24.60 seat belt and buckle 8/24/96-8 40 38 26.90 -72 38 24.50
Aluminum
Pipe 8/24/96-8 40 38 23.00 -72 38 24.50 metal object w/loose
wire assembly
8/24/96-8 40 38 53.30 -72 38 24.40 plastic box 8/26/96-31 40 38
54.17 -72
38 24.36 2 pictures (photographs) & wallet type picture holder
10/02/96-1
40 38 35.07 -72 38 24.27 3' light siding trim 8/19/96-11 40 38

19.20 -72

38 24.26 1'(3"(3" green metal brace, piece of white electrical wire

8/22/96-7 40 38 52.70 -72 38 24.20 electronic box "AIDS DATA ACQUISITION

UNIT" part # 2222228 mod dav-70-101 ser. 30 TWA part # 53502 8/26/96-31 40

39 00.00 -72 38 24.00 various aircraft debris / parts 8/10/96-9 40 39

00.00 -72 38 24.00 vent part FS 380 8/10/96-9 40 39 00.00 -72 38 24.00

seat 1 (1), 8/10/96-9 40 39 00.00 -72 38 24.00 fuselage skin 40 39 00.00

-72 38 24.00 air-conditioning/vent part station 11-15 8/10/96-9 40 39

00.00 -72 38 24.00 aircraft skin 8/10/96-16 40 39 00.00 -72 38 24.00

generator control unit 8/10/96-9 40 39 00.00 -72 38 24.00 personal effects

8/10/96-9 40 39 00.00 -72 38 24.00 row 9 seat (8 9 10), 8/10/96-9 40 39

00.00 -72 38 24.00 personal effects 8/10/96-9 40 39 00.00 -72 38 24.00

various aircraft debris / parts 8/10/96-9 40 39 00.00 -72 38 24.00 personal effects 8/10/96-9 40 39 00.00 -72 38 24.00 various aircraft

debris 8/10/96-9 40 38 20.83 -72 38 23.95 light alum/plastic 1' (1'

8/06/96-1 40 38 20.83 -72 38 23.95 light alum/plastic 1'(1' 40 38 29.23

-72 38 23.90 3 short metal pieces w/ wires # stamped; must bend alum to

see # 8/05/96-2 40 38 23.00 -72 38 23.90 Duct 5" in diameter

8/24/96-8 40
38 19.51 -72 38 23.68 forward lower cargo bay structure FS 840
left hand
side (3(1 light inner framing) 8/06/96-46 40 38 16.37 -72 38
23.68 O2 mask
& overhead 8/17/96-4 40 38 20.38 -72 38 23.58 small piece of
metal frame
12"(3"(3" attached to coil spring 8/22/96-7 40 39 05.10 -72 38
23.50 3'
aluminum pc. 8/26/96-31 40 39 03.41 -72 38 23.26 personal
effects & a
light fixture moved by ROV from unknown point, also wire and
fiber glass
moved from 12597.4P 8/22/96-8 40 38 47.50 -72 38 22.95 tag
"towel disposal
no cigarette disposal" - paper towel disposal door 10/02/96-1 40
38 19.04
-72 38 22.74 coil of white electrical wire 8/22/96-7 40 38 26.32
-72 38
22.71 vent screen 2(8" LH#9 C ZONE AC#17119 40 38 18.40
-72 38 22.61 1(1
light alum framing assembly# 65B52747 8/06/96-46 40 38 20.48
-72 38 22.58
18" alum light framing 1" thick 8/06/96-46 40 38 21.02 -72 38
22.57 alum
angle 2"(1"; 1" u shape angle; alum sheet w/brackets & hole
18"(12"; flex
hose 10"; plastic window frame 8/08/96-31 40 39 04.50 -72 38
22.50 life
vest and cover 8/26/96-31 40 39 04.50 -72 38 22.50 TWA label
book
8/26/96-31 40 38 28.55 -72 38 22.39 small duffel; containing
books,

walkman, tapes; 8/08/96-31 40 38 20.04 -72 38 21.80 metal/alum framing w/
smoke detector type II; p/n 30-231-7B, S/N 30336 8/06/96-1 40
38 28.55 -72
38 21.78 egress system power supply M9412 8/04/96-66 40 38
19.29 -72 38
21.50 FS 900 fuselage frame stringer 34L-36L 8/06/96-1 40 38
21.00 -72 38
21.21 TWA Plate, 8", Broken, White 40 38 21.00 -72 38 21.21
TWA Plate, 8"
broken, white 40 38 23.05 -72 38 20.74 3"(2" piece of aluminum
8/31/96-2
40 38 20.35 -72 38 20.68 1) oxygen mask, 2) 6'(1" brown rubber
molding, 3)
5"(1" green metal bracket #69B50687-1, 4) navy blue TWA seat
40 38 24.38
-72 38 20.64 misc metal 9/28/96-1 40 39 01.62 -72 38 20.60 1
small bone 40
39 03.10 -72 38 20.50 misc pieces 8/19/96-10 40 39 03.10 -72 38
20.50 misc
pieces 8/19/96-10 40 39 05.21 -72 38 20.20 bra, alum angle
18"(1"; 5"(3"
misc honey comb 8/08/96-31 40 38 59.90 -72 38 20.20 Passport -
French,
8/26/96-31 40 38 23.52 -72 38 20.02 4' black wire with modular
plug (#cory
71771) 1'(10" piece of aluminum 8/31/96-1 40 38 52.00 -72 38
20.00 metal
box w/handle 8/26/96-31 40 38 53.60 -72 38 19.80 seat row 22
seat 7
8/26/96-31 40 38 34.34 -72 38 19.49 40 38 34.34 -72 38 19.49 3"
metal
structure, 6" (4" white plastic serving tray 10/13/96-4 40 39

04.40 -72

38 19.20 passengerair & lightvent 8/26/96-31 40 39 02.00 -72 38 19.00

pilot op manual; plastic window frame; 1' tubing alum "T", plastic

insulation 8/08/96-31 40 39 02.00 -72 38 19.00 American tourister

suitcase; black 8/08/96-31 40 39 02.00 -72 38 19.00 Clothing and misc

debris; personal effects 8/08/96-31 40 38 25.47 -72 38 18.91 multi color

wires 8/28/96-13 40 39 06.51 -72 38 18.88 misc personal effects and small

parts 8/08/96-31 40 39 06.51 -72 38 18.88 seat 9 (1), 40 38 19.78 -72 38

18.43 1 shirt; wire 8/30/96-6 40 38 17.94 -72 38 18.42 5/16" socket

driver; phenolic latch; alum metal w/bolts; alum angle 5'(10" rib 8/08/96-31 40 39 04.55 -72 38 18.27 metal 1'(1'; pieces of ceramic plate;

white pouch; wire; white slide; spiral notebook 8/28/96-20 40 38 17.60 -72

38 18.17 8" flex tubing; 2" diameter 8/06/96-1 40 38 45.45 -72 38 17.91

aluminum frame 8/03/96-85 40 39 06.50 -72 38 17.90 stainless tray

8/26/96-31 40 39 01.21 -72 38 17.89 multicolored suitcase, misc. luggage

pieces 8/22/96-8 40 39 01.21 -72 38 17.89 wallet 8/22/96-8 40 39 01.21 -72

38 17.89 metal scraps (duty free cart) 8/22/96-8 40 39 01.21 -72 38 17.89

stainless metal drawer 8/22/96-8 40 38 55.76 -72 38 17.87 row 8

seat (8,
9, 10) 8/24/96-9 40 38 27.07 -72 38 17.83 7' long 1" wide light
strut 40
38 26.69 -72 38 17.81 green suitcase/black hairclip 8/11/96-1 40
38 26.69
-72 38 17.81 plastic tube #B18-5 3 1; metal green; 5'(5" metal p/
n
65B54114-9SK; white insulation 8/11/96-1 40 38 23.06 -72 38
17.78 light
framing with trim "Assy 65B54____" 8/19/96-11 40 38 13.88 -72
38 17.29
siding with 65B54890-1 4 3071 / O2 mask 8/17/96-4 40 39 02.80
-72 38 16.90
small debris/parts 8/12/96-4 40 39 02.80 -72 38 16.90 personal
effects
8/12/96-4 40 39 02.80 -72 38 16.90 personal effects 8/12/96-4 40
39 02.80
-72 38 16.90 digital computer central air data 8/12/96-4 40 39
02.80 -72
38 16.90 various aircraft debris/parts 8/12/96-4 40 39 02.80 -72
38 16.90
personal effects 8/12/96-4 40 38 23.99 -72 38 16.84 1) metal seat
frame
"5403359-404"; 2) electrical wire; 3) plastic tray small 3" (6"
8/19/96-11 40 38 39.44 -72 38 16.82 P/N 863703 dispenser for
head
8/04/96-66 40 39 04.00 -72 38 16.80 windowgasket 8/26/96-31
40 38 28.51
-72 38 16.55 overhead flood light mfr p/n 30-0418-5/TWA
291-0191 8/10/96-9
40 38 16.20 -72 38 16.53 body stringer segment (approx 6") 40
38 16.20 -72
38 16.53 white frame 1' (10" (2" 8/19/96-23 40 38 19.20 -72 38

16.32 3

pieces 1) Porthole frame 2) Piece of porthole frame 3)

"147/1074-98" green

brace 8/19/96-11 40 38 24.03 -72 38 16.17 seat back 8/08/96-31

40 38 15.00

-72 38 16.16 rubber window gasket 8/11/96-1 40 39 13.18 -72 38

15.72 pair

of shorts 10/08/96-2 40 38 13.35 -72 38 15.71 1) 1-2' piece of

pipe 3/4"

diam, 2) 6"(1.5" piece (1621012B), 3) 3'(1/2(1/8 strip, 4) 1' with

bend

with snap hook (69B 40 38 13.98 -72 38 14.91 forward lower

cargo bay

structure FS 860 left hand side (5'(2.5'(1" metal piece p/n

65B107; also a

1.5'(2" metal piec 8/22/96-7 40 38 15.28 -72 38 14.65 green

angle iron 20"

(1.5" (1.5" 8/19/96-23 40 38 22.60 -72 38 14.47 1) pair of

socks; 2)

piece of window 8/19/96-11 40 38 13.44 -72 38 14.47 wires,

magnetic

cassette tape, passenger headphones, bungie cord material, hair

tie, 2

pieces of fiberglass, 2'(1' & 1' 8/22/96-7 40 38 20.34 -72 38

13.50 5

pieces 1) TWA 44-0842 1' (2' plastic door 2) Plastic bin 3) small

plastic

tray 3 (6 4) RayBan Cats Eyeglass frame 8/19/96-11 40 38 13.09

-72 38

13.50 18" piece of wire 8/19/96-23 40 38 12.18 -72 38 13.50

honeycomb

insulation 18"(5" 8/19/96-11 40 39 02.09 -72 38 13.45 green

strut 6"(2"(1"

8/28/96-15 40 39 03.68 -72 38 12.85 misc. metal debris
8/22/96-8 40 39
03.68 -72 38 12.85 flex tubing p/n 4811-189 8/28/96-10 40 38
24.50 -72 38
12.79 8" green light strut 8/19/96-11 40 38 16.53 -72 38 12.68
seat tray
8/08/96-31 40 38 12.43 -72 38 12.68 forward lower cargo bay
structure FS
880 center line (7'(2 1/2" light interior framing; wire harness
W552-M621) 8/08/96-14 40 38 15.48 -72 38 12.33 aluminum
trim rail, green
honeycombed fiberglass (2 pcs) 8/24/96-8 40 39 04.97 -72 38
12.28 blue
shirt 8/28/96-11 40 39 02.93 -72 38 12.02 ID card and business
card
8/28/96-29 40 38 58.14 -72 38 11.61 cargo container AKN 9737
TWA 8/11/96-1
40 38 55.16 -72 38 11.53 black umbrella 8/11/96-1 40 39 16.97
-72 38 11.44
plastic piece - white, interior (possible window frame)
10/02/96-1 40 38
20.26 -72 38 11.40 3' light alum strut 8/06/96-46 40 38 20.32 -72
38 11.38
1. 10"(4" fiberglass duct 2. metal strut 5"(1.5" "621012D" 3.
white wire
8/30/96-4 40 39 01.82 -72 38 11.36 metal tube 1.5'(0.5"; small
luggage
lock 8/28/96-21 40 38 58.57 -72 38 11.25 2(2 white metal panel
w. many
connectors and wiring 8/11/96-1 40 39 01.47 -72 38 11.04 blue
suitcase of
8/22/96-8 40 39 01.47 -72 38 11.04 green suitcase of 8/22/96-8
40 39 01.47

-72 38 11.04 blue soft side bag of 8/22/96-8 40 39 01.47 -72 38
11.04
unidentified blue suitcase 8/22/96-8 40 39 01.47 -72 38 11.04
metal box
misc. metal pieces 8/22/96-8 40 39 01.47 -72 38 11.04 black soft
luggage
of 8/22/96-8 40 38 15.40 -72 38 10.97 intercostal door frame FS
434 (p/n
69B50675 DEC 9) 8/22/96-7 40 38 06.10 -72 38 10.80 human
body 40 39 00.17
-72 38 10.35 brown soft luggage 8/11/96-1 40 39 00.65 -72 38
10.15 6'(2'
metal structure w/ ribs and insulation assmbl # ASSY
65B103305000085
8/11/96-1 40 38 57.39 -72 38 10.07 1. 3' flexible tubing (1.5"
2.2'
flexible tubing plus pipe with clear plastic box attached
"4811-189" 3.
jockey underwe 8/28/96-12 40 38 55.24 -72 38 09.74 8/11/96-1
40 38 35.38
-72 38 08.94 fuselage FS 940-820; stringer 6L-17L 8/04/96-66
40 38 35.38
-72 38 08.94 FS 270-290; stringer 39R: 40 38 35.38 -72 38 08.94
FS
400-420; stringer 24A-32A right hand fuselage: 40 38 35.38 -72
38 08.94
fuselage skin FS 360-400 stringer 34R-41R; 8/04/96-66 40 38
35.38 -72 38
08.94 FS 300-340; stringers 29R-41R; 8/04/96-66 40 38 35.38
-72 38 08.94
fuselage skin FS 260; stringer 39R-41R; 8/04/96-66 40 38 49.39
-72 38
08.49 food container 8/28/96-21 40 38 12.01 -72 38 08.21 2' (6"

aluminum

siding; #3 spanwise center fuel tank beam 8/19/96-11 40 38
58.75 -72 38

08.09 2 bottle O2 container attached to a wire protective blowout
panel

8/08/96-14 40 38 17.24 -72 38 07.67 1) 1 blanket, 2) 1
1/2' (2" (1/4"

angle bracket, 3) 1 1/2' (1/4" (1 1/2' metal piece 40 39 02.50 -72
38

07.25 clothing 8/28/96-16 40 38 12.41 -72 38 06.75 1) 3' strut -
white 2)

contact panel 4" (6" 8/19/96-11 40 38 08.67 -72 38 05.68 2
pieces 1)

1.5'(1' shard R644 R645 BAC27EEL652 2) 2'(8" metal stamped
TWA 8/20/96-15

40 38 08.67 -72 38 05.68 floor beam lower chord FS 980 RBL
8-28 40 38

59.90 -72 38 05.53 curved white exterior piece 4(4; TWA colored
nose cone

8/08/96-14 40 38 59.90 -72 38 05.53 p/n 65B50570-121 p/n 2-3
Order #

E330894; 12(1(1 framing 8/08/96-14 40 38 57.56 -72 38 05.50
fiberglass w/

honeycomb insulation, approx 1'(1'. p/n 69B55044-1
SL648A3-500 8/22/96-7

40 38 49.88 -72 38 04.92 3"(2" white clear plastic piece w/3
small holes

10/02/96-1 40 38 59.44 -72 38 04.65 yellow inflatable slide (p/n
3A2065-21

on handle)/strap^{*}10 knife cut by riggers 8/08/96-14
40 38 15.94

-72 38 02.36 food tray (plastic) 8/19/96-11 40 38 52.19 -72 38
01.22 metal

box; sneaker; piece of plate 9/25/96-2 40 38 52.19 -72 38 01.20
luggage
9/22/96-1 40 38 50.05 -72 38 00.75 metal food storage unit
10/03/96-4 40
38 07.32 -72 38 00.70 plastic piece p/n 65B50174 "breathing
oxygen"
8/11/96-1 40 39 02.88 -72 37 59.88 debris 10/03/96-4 40 39
02.88 -72 37
59.88 clothing in plastic bag 10/03/96-4 40 38 57.66 -72 37
59.51 plastic
bag w/ unknown contents 10/03/96-4 40 38 45.05 -72 37 59.05
lg. piece of
debris 10/03/96-4 40 38 05.10 -72 37 57.40 right forward cargo
bin STA
780; 3'(1' alum siding -ribbed on back 8/10/96-9 40 38 05.04 -72
37 57.40
2'(10"(1/8" fiberglass w/ hinge p/n 69B52864-1 8/20/96-15 40 38
19.28 -72
37 57.32 1. 7" plastic curved tube 2. 2.5'(1' metal 3. white wire 4
dirty
white panties "hanes her way" 8/30/96-8 40 38 08.06 -72 37
55.95 3'(1'
piece of aluminum; 1'(2" piece of rubber 8/30/96-3 40 38 18.65
-72 37
55.58 plastic top of phone; metal shard curved 1'(6" 8/30/96-9 40
38 53.95
-72 37 55.20 knife & signal mirror in plastic bag 10/03/96-4 40
38 08.68
-72 37 54.73 1) grill cover assy 65B64174-2 2) green strut
2.5'(1"(1" assy
65B50404-27 8/19/96-23 40 38 47.67 -72 37 54.52 misc. piece
of metal from
aircraft 8/29/96-5 40 39 04.57 -72 37 54.12 debris 10/06/96-3 40

38 51.92
-72 37 52.92 metal tray and plastic 10/02/96-1 40 38 54.67 -72
37 52.68
rubber like debris & butter knife 10/02/96-1 40 38 05.10 -72 37
51.18
12"(18" thin alum sheet 8/10/96-9 40 38 49.23 -72 37 51.08
metal piece of
airplane 8/29/96-5 40 38 19.51 -72 37 50.33 metal shelf
3'(1.5'(10"
8/30/96-7 40 39 53.12 -72 37 49.96 green metal piece
8" (1.5" (angular,
riveted) 10/13/96-3 40 40 02.93 -72 37 49.86 2 pieces aircraft
structural
metal 40 38 07.75 -72 37 49.44 4'(1.5' piece of aluminum
8/30/96-2 40 39
42.59 -72 37 49.29 plastic fuse cover TWA p/n 291-1570
10/11/96-10 40 39
13.30 -72 37 48.31 pictures 10/08/96-2 40 39 52.00 -72 37 48.26
plastic
bag w/ unknown contents 10/08/96-1 40 39 49.47 -72 37 48.12 1
plastic bag
various items 10/17/96-2 40 40 07.60 -72 37 47.90 metal ribbing
40 39
47.94 -72 37 47.61 3 oxygen masks, assorted wires, plastic
tubing
10/11/96-10 40 39 47.95 -72 37 47.61 plastic time piece wrapped
in
plastic, 10"(2" small green metal, 2"(1" fabric scrap, one photo
10/13/96-3 40 39 51.83 -72 37 47.43 plastic bag w/ debris
10/08/96-1 40 40
01.80 -72 37 47.40 aircraft structural metal with rib attached 40
39 54.64
-72 37 47.05 green twisted metal w/ rivets p/n 65B38600-350

209

10/11/96-10 40 40 46.40 -72 37 46.50 structural framing 40 39
47.96 -72 37

45.44 white plastic 6" (6", and black plastic cover with one
metal prong

10/11/96-10 40 39 59.83 -72 37 44.60 skin yellow/green with
electrical

wiring and ribs attached 10/18/96-3 40 40 04.70 -72 37 44.40
aircraft skin

with structural partition attached white one side 40 39 56.69 -72
37 43.72

twisted green metal 10/13/96-3 40 40 00.14 -72 37 43.57 plastic
bag with

small debris 10/02/96-1 40 40 00.14 -72 37 43.51 debris
9/22/96-1 40 40

05.11 -72 37 43.28 honeycombed skin 10/13/96-3 40 39 52.14
-72 37 41.94

plastic bag w/ debris 10/08/96-1 40 39 49.68 -72 37 40.14 auto
transformer; misc. metal; cloth; photos 9/27/96-1 40 39 39.92 -72
37 40.12

1 twisted 12" (6" aluminum w/seams and rivets 1 small piece tan
2"(3"

plastic - 1 piece light g Z2592a 40 39 43.30 -72 37 4.95 some
kind of

carpet; nylon bag other debris 40 39 51.12 -72 37 39.99 debris w/
pipe

protruding, & plastic bag of unknown debris 10/08/96-1 40 39
49.23 -72 37

39.54 curved plastic w/ black shirt 10/11/96-10 40 39 51.08 -72
37 39.54

curved plastic attached to metal section w/ screws & nuts
10/11/96-10 40

39 41.47 -72 37 38.90 aluminum piece with spring; skin plastic

10/11/96-10
40 40 00.73 -72 37 38.85 small piece curled aluminum
10/17/96-1 40 40
01.60 -72 37 38.80 aluminum beam 10/17/96-1 40 40 01.60 -72
37 38.80 arm
rest 10/17/96-1 40 39 55.18 -72 37 38.76 various white metal
strips
10/17/96-2 40 39 57.97 -72 37 38.75 debris 10/08/96-1 40 39
57.05 -72 37
38.35 metal debris and other debris in clear plastic bags
10/02/96-1 40 39
57.05 -72 37 38.35 debris 9/22/96-1 40 39 55.05 -72 37 38.35
debris
9/22/96-1 RF114A 40 39 49.80 -72 37 38.30 window; fuselage
9/28/96-1 40 40
00.03 -72 37 38.22 debris & plastic bag containing debris
10/08/96-1 40 39
49.80 -72 37 38.10 black melted plastic w/ tubing 9/28/96-1 40
39 59.78
-72 37 37.55 small piece bent skin, aluminum 10/17/96-1 40 39
50.80 -72 37
37.47 fuselage bulkhead parts, 8'(2' 8/16/96-5 40 40 04.90 -72 37
37.00
10/17/96-1 40 39 44.60 -72 37 36.90 carpet; seatbelt; wires;
motor; misc.
metal 9/27/96-1 40 39 42.18 -72 37 36.79 plastic and metal cover
10/13/96-3 40 39 42.20 -72 37 36.78 unknown type of motor
10/09/96-1 40 39
42.20 -72 37 36.78 6' (3' (3' piece of wreckage 10/09/96-1 40 40
01.10
-72 37 36.70 aluminum strip w/ red material attached 10/17/96-1
40 40
09.16 -72 37 36.54 2 small pieces of wreckage, s/n 65B82330 on

larger

piece 10/10/96-1 40 40 09.16 -72 37 36.54 1 piece of skin s/n
65B02424-53

10/10/96-1 40 40 09.16 -72 37 36.54 arm rest passenger seat
10/10/96-1 40

39 46.70 -72 37 36.51 front spar web; RBL 65-112; CW
MOCKUP 9/08/96-2 40

39 46.70 -72 37 36.51 fire extinguisher tanks and pipes; debris
9/21/96-1

40 39 46.70 -72 37 36.51 white piece of metal 10/17/96-2 40 39
46.70 -72

37 36.51 green metal piece w/ black metal piece (twisted)
attached

10/13/96-3 40 39 46.70 -72 37 36.51 window; carpet; debris;
human jaw bone

9/21/96-1 40 39 46.70 -72 37 36.51 riveting, fuel filter
10/18/96-3 40 39

58.10 -72 37 36.50 aluminum strip 10/17/96-1 40 39 11.05 -72
37 36.48

debris 40 39 10.84 -72 37 36.12 debris 40 40 00.30 -72 37 35.60
6" piece

of aluminum 10/17/96-1 40 40 00.30 -72 37 35.60 small sheet
metal piece

10/17/96-1 40 40 03.40 -72 37 35.60 small light structural piece

10/17/96-1 40 39 45.57 -72 37 35.30 twisted metal, riveted

10/13/96-3 40

39 45.40 -72 37 35.20 fuselage skin w/2 skin patches 40 39 45.40
-72 37

35.20 Fwd belly skin 40 39 45.40 -72 37 35.20 Belly skin w/
stringer 40 39

45.40 -72 37 35.20 Portion of engine 40 39 45.40 -72 37 35.20
FS 2412-2436

(3'(2.5')); stringer 18L-23L PARTS BAY 8/29/96-2 40 39 45.40

-72 37 35.20

one piece of metal from aircraft 8/29/96-2

C1652 40 39 45.40 -72 37 35.20 engine exhaust; tail cone

8/29/96-2 40 39

45.40 -72 37 35.20 misc. debris 8/29/96-2 40 39 45.40 -72 37

35.20 misc.

debris 8/29/96-2 40 39 45.40 -72 37 35.20 small piece or cw tank
side of

body rib web (2" (3") CW MOCKUP 40 39 45.40 -72 37 35.20

Fuselage skin 40

39 45.40 -72 37 35.20 fwd belly skin 40 39 45.40 -72 37 35.20

Portion of

fan reverser 40 40 04.45 -72 37 35.18 skin w/ red paint, mangled

10/17/96-1 40 39 49.00 -72 37 34.83 curved alum. w/

honeycombs 10/17/96-1

40 40 00.43 -72 37 34.66 skin part 10/17/96-1 40 39 58.10 -72

37 34.50

small irregular piece of aluminum 10/17/96-1 40 39 47.70 -72 37

34.30

misc. wires; metal; flourny pipes; plastic 9/27/96-1 40 39 47.70

-72 37

34.30 personal effects - 2 fanny packs; jacket; white shoe; waist

band of

pants 9/27/96-1 40 39 56.68 -72 37 34.24 duct work and metal

9/11/96-5 40

39 56.68 -72 37 34.24 debris 10/02/96-1 40 39 51.51 -72 37

34.22 film

projection device 10/10/96-1 40 39 53.38 -72 37 34.22 debris

10/07/96-1 40

39 53.38 -72 37 34.22 debris 10/07/96-1 40 39 53.38 -72 37

34.22 piece of

black pipe, 2 pieces of debris 10/07/96-1 40 39 51.51 -72 37

34.22 plastic

bag w/ unknown contents 10/08/96-1 40 39 53.38 -72 37 34.22
part of filter
system 10/07/96-1 40 40 01.50 -72 37 34.20 skin piece
10/17/96-1 40 39
56.88 -72 37 34.02 debris 10/07/96-1 40 39 45.00 -72 37 34.00
#2 engine
fan casing ENG HGR 8/10/96-16 40 39 45.00 -72 37 34.00 #2
engine ENG HGR
8/10/96-16 40 39 45.00 -72 37 34.00 #2 engine oil tank and main
gear box
ENG HGR 8/10/96-16 40 39 45.00 -72 37 34.00 variable camber
flap section
ENG HGR 8/10/96-16 40 39 45.00 -72 37 34.00 #2 engine tail
pipe ENG HGR
8/10/96-16 40 39 45.00 -72 37 34.00 aircraft hydraulic filter
assembly ENG
HGR 8/10/96-16 40 40 06.10 -72 37 33.79 long piece of stringer
10/17/96-1
40 39 46.89 -72 37 33.74 spanwise beam 3 web + stiffener RBL
83.24 CW
MOCKUP 10/03/96-4 CW1020 40 39 46.89 -72 37 33.74 LBL
66; rear spar web
segment with stiffener flange CW MOCKUP 10/03/96-4 40 39
46.89 -72 37
33.74 debris 9/22/96-1 40 39 46.89 -72 37 33.74 debris and black
bag of
debris 9/22/96-1 40 39 46.89 -72 37 33.74 misc. metal debris
9/24/96-16 40
39 46.89 -72 37 33.74 debris and black bag of debris 9/22/96-1
Z3500 40 39 46.89 -72 37 33.74 misc. metal debris 9/24/96-16
40 39 46.89
-72 37 33.74 misc. metal debris 9/24/96-16 40 39 46.89 -72 37
33.74 misc.

metal debris 9/24/96-16 40 39 46.89 -72 37 33.74 VISA card and
photographs
9/24/96-16 40 39 46.89 -72 37 33.74 large fuel flange 9/22/96-1
40 39
46.89 -72 37 33.74 debris and black bag of debris 9/22/96-1 40
39 54.40
-72 37 33.70 coupler antenna; large piece of metal 9/27/96-1 40
39 54.40
-72 37 33.70 misc. metal debris; clothing; rubber hose 9/27/96-1
40 39
54.46 -72 37 33.57 FS 1350-1394 stringer 23L - 33L 9/19/96-1
40 39 54.46
-72 37 33.57 misc. metal debris 9/19/96-1 40 39 54.46 -72 37
33.57 plastic
bag and air duct 9/11/96-5 40 40 01.50 -72 37 33.40 aluminum
structural
10/17/96-1 40 39 49.80 -72 37 33.20 green metal strip 40 39
49.80 -72 37
33.20 misc. metal; plastic; lifevest; wires; rope 9/27/96-1 40 39
49.80
-72 37 33.20 large metal green piece 9/27/96-1 40 39 49.80 -72
37 33.20
misc. metal; plastic tray table 9/27/96-1 40 39 52.37 -72 37 33.01
burnt
skin part & structure skin 10/17/96-1 40 39 52.37 -72 37 33.01
2' (3'
piece of skin 40 39 30.48 -72 37 32.98 one woman's shoe
(black).
10/17/96-1 40 40 04.30 -72 37 32.76 yellow structural piece
10/17/96-1 40
39 58.71 -72 37 32.73 piece of tubing 10/07/96-1 40 39 56.90
-72 37 32.71
green metal piece 1.5" (7" 10/13/96-3 40 39 29.95 -72 37 32.61

aircraft

skin 10/17/96-3 40 39 48.20 -72 37 32.60 black boot; misc. metal
9/27/96-1

40 40 05.30 -72 37 32.55 small metal piece, purple on one side,
yellow on

the other 10/12/96-3 40 40 05.30 -72 37 32.55 fuselage skin 40
40 05.30

-72 37 32.55 cloth insulation (2 1/2"(2 1/2") 10/12/96-3 40 40
05.30 -72

37 32.55 fuselage skin w/ frames (1' (1') 10/12/96-3 40 40 05.30
-72 37

32.55 3' strip aluminum frame 10/12/96-3 40 39 47.20 -72 37
32.40 misc.

metal wires attached; seat back; plastic; flashlight 9/28/96-1 40
39 49.18

-72 37 32.15 green metal 40 38 12.04 -72 37 32.11 40 39 52.70
-72 37 32.10

grey "U" shaped metal 40 39 52.70 -72 37 31.90 heavy gauge
green metal w/

rivet holes 40 38 11.33 -72 37 31.77 FS 880-900 stringer 1R-3R
RHS 1'(1'

fuselage crown skin/6"(2"(2" alum strut; 8/10/96-9 40 39 53.85
-72 37

31.41 debris 10/07/96-1

Z1783 40 39 53.85 -72 37 31.41 2 blazers, blue slacks, garment
bag, 3

hangers 10/07/96-1 40 40 03.12 -72 37 31.34 green american
tourister

luggage 10/17/96-1 40 40 04.07 -72 37 31.31 towel dispenser 40
39 48.10

-72 37 31.20 7'(9' section of metal debris 9/25/96-2 40 39 48.10
-72 37

31.20 2 cameras; personal hygiene items 9/25/96-2 40 39 48.10

-72 37 31.20

1 hydro pump (vickers s/n MX438017); misc. metal debris
9/25/96-2 40 39

47.00 -72 37 31.00 #2 engine left hand side cowl door ENG
HGR 8/10/96-16

40 39 47.00 -72 37 31.00 #2 engine fuel pump and control ENG
HGR

8/10/96-16 40 39 47.00 -72 37 31.00 aircraft fire bottle
8/10/96-16 40 39

47.00 -72 37 31.00 #2 engine angle gear box ENG HGR
8/10/96-16 40 39 47.00

-72 37 31.00 #2 engine tail pipe lining ENG HGR 8/10/96-16 40
39 47.00 -72

37 31.00 40 39 47.00 -72 37 31.00 40 39 47.00 -72 37 31.00 40
39 47.00 -72

37 31.00 #2 engine strut ENG HGR 8/10/96-16 40 39 47.00 -72
37 31.00 #2

engine inlet duct ENG HGR 8/10/96-16 40 39 47.00 -72 37
31.00 APU exhaust

duct ENG HGR 8/10/96-16 40 39 47.00 -72 37 31.00 #2 engine
reverser air

motor ENG HGR 8/10/96-16 40 39 47.00 -72 37 31.00 #1 engine
LPT rub strip

ENG HGR 8/10/96-16 40 39 47.00 -72 37 31.00 fuselage skin
cargo door

surround FS 1920-1960; stringer 27R-34R 8/10/96-16 40 39
47.00 -72 37

31.00 power unit EEMCO 60B0037-25 ENG HGR 8/10/96-16
40 39 47.00 -72 37

31.00 bulkhead section PARTS BAY 8/10/96-16 40 39 47.00 -72
37 31.00 FS

2275-2360 stringer 11R-23R, aft lower body skin; 8/10/96-16 40
39 47.00

-72 37 31.00 FS 1870-1930; stringer 22R-23R with window frame (fuselage strip with 3 window frame portions) 8/10/96-16 40 39 47.00 -72 37 31.00 FS 1920-1965, right side fuselage bulkhead frame 8/10/96-16 40 39 47.00 -72 37 31.00 FS 2290-2230, fuselage section 8/10/96-16 40 39 47.00 -72 37 31.00 FS 2460, frame 8/10/96-16 40 39 47.00 -72 37 31.00 FS 2340-2360; stringer 8R-4L aft portion of RHS crown skin 8/10/96-16 40 39 47.00 -72 37 31.00 bulk cargo door structure FS 1960-2060; stringer 23R-46R 8/10/96-16 40 39 47.00 -72 37 31.00 #2 engine inlet duct ENG HGR 8/10/96-16 40 39 47.00 -72 37 31.00 door crank mechanism/actuator arm EEMCO 60B40037-25 8/10/96-16 40 39 47.00 -72 37 31.00 FS 1640 frame section 8/10/96-16 40 39 47.00 -72 37 31.00 cw lower skin-left S-14 to S-15 CW MOCKUP 40 39 48.10 -72 37 30.90 hazmat bag containing human spine 40 39 45.70 -72 37 30.90 camera (Nikkormat); lens; luggage tag brown 9/26/96-17 40 39 45.70 -72 37 30.90 piece of luggage 9/26/96-17 Z3534 40 39 45.70 -72 37 30.90 seat 32 (7) arm and rail; window section (skin); motor exhaust (TWA#1501); misc metal debris 9/26/96-17 40 39 56.00 -72 37 30.80 piece of metal 1'(2" 10/09/96-1 40 39 50.40 -72 37 30.80

misc. metal/rubber debris 9/25/96-2 40 39 47.90 -72 37 30.80
actuator
pneumatic drive s/n 40P-1126C; misc. debris 9/27/96-1 40 39
32.72 -72 37
30.72 18"(10" insulation PARTS BAY 8/09/96-37 40 39 13.31
-72 37 30.69
blank photo 10/07/96-1 40 39 49.68 -72 37 30.51 bag of debris
10/02/96-1
40 39 49.68 -72 37 30.51 debris and black bag of debris
9/22/96-1 40 39
49.68 -72 37 30.51 debris and black bag of debris 9/22/96-1 40
39 49.70
-72 37 30.50 hazmat bag containing human bone 40 39 49.70 -72
37 30.50
lower center wing STR 13; 3"(4" piece; Lot # 9-24-96-16 CW
MOCKUP 40 39
49.70 -72 37 30.50 lower center wing skin panel; RBL 85;
stringer 14-15;
Lot# 9-24-96-16 CW MOCKUP 40 39 49.70 -72 37 30.50 lower
center wing skin
panel; RBL 57-75; stringer 13-14; Lot # 9-24-96-16 CW
MOCKUP 40 39 49.70
-72 37 30.50 misc. debris; camera; clothing (womens)
9/24/96-16 40 39
49.70 -72 37 30.50 long metal tube 9/24/96-16 40 39 48.00 -72
37 30.40
6'(2' section of metal 9/25/96-2 40 39 49.40 -72 37 30.40
aluminum strip
10/17/96-1 40 39 48.00 -72 37 30.40 misc. metal doors 9/25/96-2
40 39
45.17 -72 37 30.39 metal pump 10/13/96-3 40 39 43.58 -72 37
30.35
honeycombed metal 10/13/96-3 40 39 50.10 -72 37 30.30

external aircraft

skin #65B15697-5 approx. 10'(8' CW MOCKUP 9/24/96-16 40
39 50.20 -72 37

30.30 misc. metal debris; 1 pressure regulation bypass valve
9/25/96-2 40

39 56.10 -72 37 30.30 small structural piece 10/09/96-1 40 39
50.10 -72 37

30.30 misc. debris 9/24/96-16 40 39 50.20 -72 37 30.30 misc.
metal debris

9/25/96-2 40 39 47.17 -72 37 30.13 #1 engine cascade support
ring ENG HGR

8/08/96-39 40 39 47.17 -72 37 30.13 FEGV casing #1 engine
ENG HGR

8/08/96-39 40 39 47.50 -72 37 30.10 drivers license/camera
9/25/96-2 40 39

59.50 -72 37 30.10 small piece of aluminum 10/17/96-1 40 39
53.90 -72 37

30.08 fuselage fragment or flight control surface or wing
9/11/96-5 40 39

53.90 -72 37 30.08 metal and pipe 9/11/96-5 40 39 53.90 -72 37
30.08

debris 9/21/96-1 40 39 53.90 -72 37 30.08 misc. metal; rubber
gasket

material 9/27/96-1 40 39 53.90 -72 37 30.08 metal tubing; scrap
metal

9/27/96-1 40 39 47.17 -72 37 30.01 #1 engine ENG HGR
8/08/96-39 40 39

47.17 -72 37 30.01 inlet duct half ENG HGR 8/08/96-39 40 39
47.17 -72 37

30.01 #1 engine fan case ENG HGR 8/08/96-39 40 39 47.17 -72
37 30.01

turbine exhaust casing #1 engine ENG HGR 8/08/96-39 40 39
47.17 -72 37

30.01 #1 engine half intake duct ENG HGR 8/08/96-39 40 39
49.40 -72 37
30.00 misc. metal debris; wiring; plastic 9/25/96-2 40 39 48.00
-72 37
30.00 long metal piece 9/24/96-16 40 39 51.50 -72 37 30.00
yellow metal 40
39 48.00 -72 37 30.00 misc. debris 9/24/96-16 40 39 48.00 -72
37 30.00
misc. debris 9/24/96-16 40 39 49.40 -72 37 30.00 seat 49 (6) cap
and
ashtray only CABIN HGR 40 39 49.40 -72 37 30.00 SOB web
CW MOCKUP 40 39
48.00 -72 37 30.00 luggage w/ wheels 9/24/96-16 40 39 47.18
-72 37 30.00
misc. metal debris 10/13/96-3 40 39 48.50 -72 37 30.00 misc.
metal debris
9/26/96-17 40 39 49.40 -72 37 30.00 seat 46 (0) armrest only 40
39 48.50
-72 37 30.00 camera; perfume; clothing 9/26/96-17 40 39 48.50
-72 37 30.00
metal debris 9/26/96-17 40 39 49.40 -72 37 30.00 green metal
piece
10/17/96-1 40 39 42.74 -72 37 29.97 aircraft skin 10/18/96-3 40
39 48.50
-72 37 29.90 misc. metal debris 9/26/96-17 40 39 47.90 -72 37
29.90 misc.
metal debris 9/25/96-2 40 39 51.50 -72 37 29.90 small piece of
aluminum &
section of fiberglass panel 10/17/96-1 40 39 49.40 -72 37 29.80
wallet
9/24/96-16 40 39 49.40 -72 37 29.80 watches, US currency,
personal effects
9/24/96-16 40 39 49.40 -72 37 29.80 black canvas carry-on bag

9/24/96-16

40 39 49.40 -72 37 29.80 #65B9753-1EMG position 1&2, 3&4

9/24/96-16 40 39

47.80 -72 37 29.60 leading edge flap; drive torque tube

8/30/96-22 40 39

47.80 -72 37 29.60 misc. piece of metal from aircraft 8/29/96-4

40 39

47.80 -72 37 29.60 misc. metal debris PARTS BAY 8/29/96-4 40

39 47.80 -72

37 29.60 human bones 40 39 47.80 -72 37 29.60 misc. piece of metal from

aircraft 8/29/96-4 40 39 47.80 -72 37 29.60 stainless steel tubing (hydro

line) 8/30/96-23 40 39 47.80 -72 37 29.60 FS 2220-2330 (lower L5 door)

stringer 23-31 8/29/96-4 40 39 47.80 -72 37 29.60 wallet, earring set;

8/29/96-4 40 39 47.80 -72 37 29.60 FS 2360-2506; stringer

8L-20L; piece of

outer skin of aircraft 8/29/96-4 40 39 47.80 -72 37 29.60 misc metal piece

from aircraft PARTS BAY 8/29/96-4 40 39 47.80 -72 37 29.60

misc. metal

pieces of aircraft PARTS BAY 8/29/96-4

C1656 40 39 47.80 -72 37 29.60 misc piece of metal from aircraft 8/29/96-4

40 39 47.80 -72 37 29.60 FS 2440-2500, aft fuselage, upper crown skin

8/29/96-4 40 39 47.80 -72 37 29.60 frame #5 door; fragments probably from

R5 door area 40 39 47.80 -72 37 29.60 aft fuselage FS 2436 angle bulkhead

40 39 47.80 -72 37 29.60 FS 1480 bulkhead outer cord; fragment

approximately 16" in length at WL 186 8/29/96-14 40 39 47.80
-72 37 29.60
vertical fin canted rib #3, section 86 40 39 47.80 -72 37 29.60 aft
fuselage FS 2502 upper bulkhead 40 39 47.80 -72 37 29.60 rod-
to-cap/web;
truss; 48 section 40 39 47.80 -72 37 29.60 misc. debris from
aircraft
PARTS BAY 8/30/96-23 40 39 47.80 -72 37 29.60 stabilizer trim
quadrant and
cable 40 39 47.80 -72 37 29.60 8/29/96-4 40 39 47.80 -72 37
29.60 cabin
entry door R5 upper flap seal (upper gate #5R door FS 2261);
stringer 17R
8/29/96-4 40 39 47.80 -72 37 29.60 Piece of fuselage 40 39
47.80 -72 37
29.60 rudder web, rudder FS 32.865 8/29/96-4 40 39 47.80 -72
37 29.60 FS
1480-1500; stringer 10R-13R 8/29/96-4 40 39 47.80 -72 37
29.60 misc. piece
of metal from aircraft PARTS BAY 8/30/96-21 40 39 47.80 -72
37 29.60 left
wing outboard aileron - outer 1/3 of the aileron 8/29/96-4 40 39
47.80 -72
37 29.60 misc. piece of metal from aircraft PARTS BAY
8/29/96-4 40 39
47.80 -72 37 29.60 fragment bulk cargo door; forward end with
tee-stop 40
39 47.80 -72 37 29.60 piece of fuselage, left side 8/29/96-4 40 39
47.80
-72 37 29.60 Piece of fuselage - red (2' (1') PARTS BAY 40 39
47.80 -72
37 29.60 fuselage skin, aft belly (3' (1') 40 39 47.80 -72 37 29.60
Left

side belly fuselage 40 39 47.80 -72 37 29.60 Piece of fuselage 40
39 47.80
-72 37 29.60 FS 2320-2340 stringer 20R-21R 8/29/96-4 40 39
47.80 -72 37
29.60 piece of fuselage, red/white/silver 40 39 47.80 -72 37
29.60 Portion
of fuselage - red - aft belly PARTS BAY 40 39 47.80 -72 37
29.60 misc.
personal effects including watch 8/29/96-4 40 39 47.80 -72 37
29.60 misc.
metal pieces from aircraft 8/29/96-4 40 39 47.80 -72 37 29.60 FS
1500-1600; stringer 12R-21R; with window belt 8/29/96-4 40 39
47.80 -72 37
29.60 misc. metal pieces from aircraft 8/29/96-4 40 39 47.80 -72
37 29.60
misc. metal pieces from aircraft 8/29/96-4 40 39 47.80 -72 37
29.60 misc.
part (tail section) of aircraft 8/29/96-4 40 39 47.80 -72 37 29.60
misc.
body parts 40 39 47.80 -72 37 29.60 Piece of fuselage - left side
40 39
47.80 -72 37 29.60 piece of keel beam
C2214 40 39 47.80 -72 37 29.60 fuselage section w/fairing
attachments 40
39 47.80 -72 37 29.60 fuselage skin. red/white paint aft FS 520
40 39
47.80 -72 37 29.60 fuselage skin-red/white paint (1' (1') 40 39
47.80 -72
37 29.60 Galley cart 40 39 47.80 -72 37 29.60 Portion of
fuselage 40 39
47.80 -72 37 29.60 Lower left side fuselage - red PARTS BAY
40 39 47.80
-72 37 29.60 Piece of belly fuselage aft 40 39 47.80 -72 37 29.60

Right

side floor of duty free module. FS 2223-2253 CABIN HGR 40
39 47.80 -72 37

29.60 FS 2436-2484; stringer 17L-23L 8/29/96-4 40 39 47.80
-72 37 29.60

Piece of fuselage - aft PARTS BAY 40 39 47.80 -72 37 29.60

Piece of

fuselage - red - right side PARTS BAY 40 39 47.80 -72 37 29.60

Piece of

fuselage white/red PARTS BAY 40 39 47.80 -72 37 29.60

portion of fuselage

8/29/96-4 40 39 47.80 -72 37 29.60 cabin entry door R5 lower
section; FS

2240-2285, stringer 24R-25R 8/29/96-4 40 39 47.80 -72 37
29.60 FS

2280-2345, stringer 42R-51L 8/29/96-4 40 39 47.80 -72 37 29.60

long piece

of metal 8/29/96-4 40 39 47.10 -72 37 29.60 misc. metal debris
to include:

metal fragment labeled p/n 65B97321B s/n RR005402 and
9.5'(6" ch

9/26/96-17 40 40 01.78 -72 37 29.57 piece of bulkhead

10/17/96-1 40 39

41.70 -72 37 29.56 piece of metal 10/17/96-2 40 39 47.31 -72 37
29.56

misc. metal debris 10/13/96-3 40 39 46.27 -72 37 29.52 metal
piping

10/17/96-1 40 40 04.97 -72 37 29.44 aluminum skin 10/12/96-3
40 40 04.97

-72 37 29.44 plastic valve assembly 10/12/96-3 40 39 47.50 -72
37 29.36

misc. metal debris 10/13/96-3 40 39 49.20 -72 37 29.20 metal
tubes and

misc. debris 9/24/96-16 40 39 49.20 -72 37 29.20 wire and fabric
9/24/96-16 40 39 49.20 -72 37 29.20 long metal tube 9/24/96-16
40 39 49.29
-72 37 29.20 white plastic bag containing misc. debris
9/24/96-16 40 39
49.20 -72 37 29.20 large riveted metal piece of debris 9/24/96-16
40 40
06.70 -72 37 29.13 small piece of fiberglass honeycomb
10/12/96-3 40 39
49.10 -72 37 29.10 FS 940-960; stringer 38L-40L; fuselage skin
under body
fairing; lot # 9-25-96-2 9/25/96-2 40 39 49.10 -72 37 29.10 misc.
metal
debris 9/25/96-2 40 39 49.10 -72 37 29.10 right wing upper
surface near
rear spar WS 1250 9/25/96-2 40 39 49.10 -72 37 29.10 SOB rib
segment CW
MOCKUP 40 39 47.00 -72 37 29.00 frame fragment, white and
green, 2'(3'
8/14/96-9 40 39 47.00 -72 37 29.00 fuselage fragment,
green/white/partially charred 6'(8'
8/14/96-9 40 39 47.00 -72 37
29.00
fuselage fragment 12'(10' w/windows and door, FS 2140-2280
8/14/96-9 40 39
47.00 -72 37 29.00 portion aft section bulkhead 8/14/96-9 40 39
47.00 -72
37 29.00 fuselage fragment green/white 3'(2' 8/14/96-9 40 39
47.00 -72 37
29.00 fuselage, red heavy frame 3'(2' 8/14/96-9 40 39 47.00 -72
37 29.00
human remains 40 39 47.00 -72 37 29.00 left fuselage FS 2200 -
2240. S34L
- 46L; fuselage bulkhead w/window, red and white 3'(4'

8/14/96-9 40 39
47.00 -72 37 29.00 fuselage fragment 3'(1' 8/14/96-9 40 39 47.00
-72 37
29.00 fuselage fragment 10'(8' green/white; STA 2320-2489,
stringer 3L-11L
8/14/96-9 40 39 47.00 -72 37 29.00 actuator outflow valve,
electric MOTOR
BAY 8/14/96-9 40 39 47.00 -72 37 29.00 cabin entry door R5,
partial
structure (window damage distinctive); FS 2240-2285; stringer
18R-22
8/14/96-9 40 39 47.00 -72 37 29.00 fuselage, exterior, red 1'(1'
8/14/96-9
40 39 46.90 -72 37 29.00 2 cameras; US mail; perfume; watches
9/26/96-17
40 39 46.90 -72 37 29.00 misc. metal debris 9/26/96-17 40 39
49.00 -72 37
29.00 1 camera; 1 watch; 1 cassette recorder 9/26/96-17 40 39
49.00 -72 37
29.00 plastic bag containing small copper pieces 9/26/96-17 40
39 49.00
-72 37 29.00 a/c motor s/n 325P205; metal fragment marked
"93" and misc.
debris 9/26/96-17 40 39 49.00 -72 37 29.00 misc. metal debris
9/26/96-17
40 39 55.61 -72 37 28.97 green metal piece 9/16/96-2 40 39
55.61 -72 37
28.97 pipe; material (cloth); little piece of filter; debris
9/20/96-33 40
39 52.40 -72 37 28.90 misc. debris and large camber shaped
piece of metal
9/24/96-16 40 39 45.39 -72 37 28.90 debris 9/22/96-1 40 39
50.90 -72 37

28.90 piece of door 9/25/96-2 40 39 45.80 -72 37 28.70 8' metal shaft w/
u-joint attached 9/26/96-17 40 39 45.00 -72 37 28.70 3' aircraft skin
9/21/96-1 40 39 46.00 -72 37 28.60 FS 1394-1880 fuselage; stringer 26L-12R
40 39 49.20 -72 37 28.60 4 watches and 1 Visa gold card; 2 cassette
recorders 9/25/96-2 40 40 59.50 -72 37 28.60 curved piece w/ bulkhead &
honeycomb 10/17/96-1 40 39 49.20 -72 37 28.60 misc. metal debris 9/25/96-2
40 39 49.20 -72 37 28.60 misc. metal debris to include: 1 large and heavy
circular shaped section of metal 9/25/96-2 40 39 51.76 -72 37 28.59 metal
tube and misc. parts 9/24/96-16 40 39 51.76 -72 37 28.59 misc. metal;
wires; window frame 9/27/96-1 40 39 51.76 -72 37 28.59 numerous pieces of
debris 9/20/96-33 40 39 51.76 -72 37 28.59 misc. metal piece 9/27/96-1 40
39 46.44 -72 37 28.55 seat 32 (6) CABIN HGR 40 39 49.55 -72 37 28.39 8"
air vent line; 5' long 9/30/96-1 40 39 49.55 -72 37 28.39 misc. siding
Z2552 40 39 49.55 -72 37 28.39 various siding (bagged); hydraulic framing
40 39 49.55 -72 37 28.39 cargo deck roller, red encased- piece of tubing
joint, small green tubing, green plastic, misc. wires, 10/03/96-1 40 39
49.55 -72 37 28.39 various siding (bagged)/ hydraulic framing 40

39 49.55
-72 37 28.39 misc. siding 40 39 49.55 -72 37 28.39 debris
10/06/96-1 40 39
49.55 -72 37 28.39 misc debris, details on hard copy 40 39 49.55
-72 37
28.39 misc. metal debris from plane 10/13/96-3 40 39 49.55 -72
37 28.39
misc. metal debris from plane 10/13/96-3 40 39 49.55 -72 37
28.39 misc.
wire, small pieces of metal, large circular piece of metal
10/13/96-3 40
39 49.55 -72 37 28.39 misc wires; metal; metal coupling; skin
10/13/96-3
40 39 49.55 -72 37 28.39 a/c skin, life jacket, tubing, actuator
valve,
black plastic bag 40 39 49.55 -72 37 28.39 debris, beeper? hose,
computer
disk 10/06/96-1 40 39 49.55 -72 37 28.39 black electronics part,
3' gray
metal tube w/ ball joint @ one end 10/06/96-4 40 39 45.02 -72
37 28.38
bulkhead with hinge 9/30/96-1 40 39 41.67 -72 37 28.38 large
metal riveted
pipe and channel and skin 10/13/96-3 40 39 41.67 -72 37 28.38
5' piece of
metal section 10/13/96-3 40 39 49.10 -72 37 28.20 aluminum
strip 40 39
48.70 -72 37 28.20 two full baskets of debris 8/30/96-1 40 39
48.30 -72 37
28.20 metal debris 10/13/96-3 40 39 48.70 -72 37 28.20 two full
baskets of
debris 8/30/96-1 40 39 49.60 -72 37 28.10 upper CW skin; RH
side R.S. to

STR 19 CW MOCKUP 8/08/96-15 RW08, CW8 40 39 49.60 -72
37 28.10 right
wing/part of fuselage FS 1140-1319; mid spar upper SOB
paddle/fitting/web;
right wing upper CW MOCKUP 8/08/96-15 40 39 49.60 -72 37
28.10 right
wing/part of fuselage FS 1140-1319 8/08/96-15 40 39 49.60 -72
37 28.10
right wing/part of fuselage FS 1140-1319 8/08/96-15 40 39 49.60
-72 37
28.10 lower aft CW skin S1 to S5; LBL 76 to RBL 98 CW
MOCKUP 8/08/96-15 40
39 49.60 -72 37 28.10 right wing/part of fuselage FS 1140-1319
8/08/96-15
40 39 49.60 -72 37 28.10 right wing/part of fuselage FS
1140-1319
8/08/96-15 40 39 49.60 -72 37 28.10 right wing/part of fuselage
FS
1140-1319 8/08/96-15 CW1003 40 39 49.60 -72 37 28.10 rear
spar RBL33 to
RBL87 CW MOCKUP CW1004 40 39 49.60 -72 37 28.10 rear
spar web RBL-21
-LBL11 CW MOCKUP 40 39 49.60 -72 37 28.10 spanwise beam
#2; RBL 83-110 at
lower chord CW MOCKUP CW1012 40 39 49.60 -72 37 28.10
rear spar RBL85 CW
MOCKUP CW1011 40 39 49.60 -72 37 28.10 rear spar right side
RBL 70 to RBL
33 at lower chord CW MOCKUP CW1001 40 39 49.60 -72 37
28.10 #3 of 3 tags
on same piece right side CW rear spar (see also C2278 (RF17),
C2279 (CW CW
MOCKUP 40 39 49.60 -72 37 28.10 lower CW skin; RBL

98-127.5; R.S. to STR 1

CW MOCKUP 40 39 49.60 -72 37 28.10 #2 of 3 on same piece
right side CW

upper segment SOB rib (see also C2278 (RF17), C2280 (CW
CW MOCKUP

C2278 40 39 49.60 -72 37 28.10 right hand body attached to
right hand

upper wing with 3R door opening; (#1 of 3 tags (see also C2 CW
MOCKUP 40

39 48.20 -72 37 28.10 3'(5' section of twisted metal 9/26/96-17
40 40

01.00 -72 37 28.10 aluminum strips & wires 10/17/96-1 40 39
48.20 -72 37

28.10 misc. metal debris 9/26/96-17 40 39 48.20 -72 37 28.10
watch; note

recorder; nail polish 9/26/96-17 40 39 48.20 -72 37 28.10 2'(1'
metal

section 9/26/96-17 40 39 46.50 -72 37 28.00 row 54 seat 3

CABIN HGR

8/14/96-9 40 39 46.50 -72 37 28.00 skull fragment 8/14/96-9 40
39 46.50

-72 37 28.00 row 42 seat 1 CABIN HGR 8/14/96-9 40 39 46.50
-72 37 28.00 FS

1900-1960; stringer 49L-51R 8/14/96-9 40 39 46.50 -72 37 28.00
spar

fragment 8"(1' 8/14/96-9 40 39 46.50 -72 37 28.00 fuselage skin
fragment

1'(2' 8/14/96-9 40 39 46.50 -72 37 28.00 spar fragment 1-1/2'(2'

PARTS BAY

8/14/96-9 40 39 46.50 -72 37 28.00 bulkhead fragment 2'(2'

PARTS BAY

8/14/96-9 40 39 46.50 -72 37 28.00 cargo container base

CARGO BAY

8/14/96-9 40 39 46.50 -72 37 28.00 1/2 wing rib fragment 4'(8'
8/14/96-9
40 39 51.00 -72 37 28.00 longitudinal floor beam overhead
pressure deck 40
39 51.00 -72 37 28.00 body landing gear trunion support backup
fitting aft
1450 inner and outer 40 39 51.00 -72 37 28.00 stabilizer hinge
fitting
with hinge pin FS 2598 diagonal braces 40 39 51.00 -72 37 28.00
misc.
debris 9/24/96-16 40 39 51.00 -72 37 28.00 misc. debris
9/24/96-16 40 39
51.00 -72 37 28.00 misc. debris 9/24/96-16 40 39 51.00 -72 37
28.00 misc.
debris CW MOCKUP 9/24/96-16 40 39 49.35 -72 37 27.93
65B07810917 section
w/tubing & debris (tubing lost) 10/09/96-1 40 39 49.35 -72 37
27.93 metal
labeled oil tank capacity 9/24/96-16 40 39 49.35 -72 37 27.93
seat 34 (1)
CABIN HGR CW1105 40 39 49.35 -72 37 27.93 CW tank BL0
web aft of midspar
CW MOCKUP 10/9/96-1 40 39 47.00 -72 37 27.90 pneumatic
duct (blue
stainless) 40 39 47.00 -72 37 27.90 pneumatic duct (blue
stainless) 40 39
47.00 -72 37 27.90 row 26 seat 2-3, armrest & frame 26-1
CABIN HGR 40 39
47.00 -72 37 27.90 fire extinguisher 40 39 47.00 -72 37 27.90
row 26 seat
4-5 CABIN HGR 40 39 47.00 -72 37 27.90 seat frame seat 44 (3)
seat
(partial) CABIN HGR 40 39 47.00 -72 37 27.90 row 30 seat 8

CABIN HGR 40 39

47.00 -72 37 27.90 fuselage sect w/parts of 3 window apertures,
FS

2020-2100 40 39 47.00 -72 37 27.90 cargo container wall

CARGO BAY 40 39

47.00 -72 37 27.90 recirculation fan 40 39 47.00 -72 37 27.90
wing

bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 wing bulkhead
8/08/96-30 40

39 47.00 -72 37 27.90 row 45 seats 2-6 armrest 45-1 seat 45-2

CABIN HGR

8/06/96-46 40 39 47.80 -72 37 27.90 row 44 seat 2 (partial)

CABIN HGR 40

39 47.00 -72 37 27.90 wing bulkhead 8/08/96-30 40 39 47.00 -72
37 27.90

wing bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 wing
bulkhead 8/08/96-30

40 39 47.00 -72 37 27.90 wing bulkhead 8/08/96-30 40 39 47.00
-72 37 27.90

wing bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 wing
bulkhead 8/08/96-30

40 39 47.00 -72 37 27.90 tire w/ section of hub (Imbedded) - 6R
40 39

47.00 -72 37 27.90 wing bulkhead 8/08/96-30 40 39 47.00 -72 37
27.90 wing

bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 wing bulkhead
with attached

ACM ducting 8/08/96-30 40 39 47.00 -72 37 27.90 right cw
body rib

in-between rear spar and SWB #1 CW MOCKUP 8/08/96-30 40
39 47.00 -72 37

27.90 hydraulic filter assembly 8/08/96-30 40 39 47.00 -72 37
27.90 #7

flap track 8/08/96-30 CW203, CW 40 39 47.00 -72 37 27.90
lower CW skin,
STR 1-3, LBL 60-13 CW MOCKUP 8/08/96-30 40 39 47.00 -72
37 27.90 galley 40
39 47.00 -72 37 27.90 wing bulkhead 8/08/96-30 40 39 47.00 -72
37 27.90
misc fuselage skin sect w/ red paint; FS 1960-2020; stringers 30L
- 37L
8/06/96-46 40 39 47.00 -72 37 27.90 wing section 40 39 47.00
-72 37 27.90
FS XXXX frame 40 39 47.00 -72 37 27.90 FS 2120-2180;
stringer 13L-22L with
window belt 40 39 47.00 -72 37 27.90 misc fuselage skin sect w/
red paint
40 39 47.00 -72 37 27.90 misc fuselage skin sect w/ red paint 40
39 47.00
-72 37 27.90 misc fuselage skin sect w/ red paint; FS 1080-1120
stringer
24R-27R 8/06/96-46 40 39 47.00 -72 37 27.90 FS 1080-1120;
stringer 24R-39R
40 39 47.00 -72 37 27.90 misc fuselage skin sect w/ red paint 40
39 47.00
-72 37 27.90 FS XXXX frame 40 39 47.00 -72 37 27.90 LF FS
1980-2020
8/06/96-46 40 39 47.00 -72 37 27.90 FS XXXX frame 40 39
47.00 -72 37 27.90
LF FS 1840-1940; Stringer 22L - 30L 8/06/96-46 40 39 47.00
-72 37 27.90 LF
FS 1840-1940-part of C149, tag removed 40 39 47.00 -72 37
27.90 misc
fuselage skin sect w/ red paint-part of C149, tag removed 40 39
47.00 -72
37 27.90 misc fuselage skin sect w/ red paint 40 39 47.00 -72 37

27.90 LF

FS 1940-1960 8/06/96-46 40 39 47.00 -72 37 27.90 LF FS

1960-2020

8/06/96-46 40 39 47.00 -72 37 27.90 misc fuselage skin sect w/
red paint

40 39 47.00 -72 37 27.90 misc fuselage skin sect w/ red paint 40
39 47.00

-72 37 27.90 FS 1060-1120; stinger 19R-24R, fuselage skin sect
w/2

windows, 8/06/96-46 40 39 47.00 -72 37 27.90 left wing section
w/variable

camber scissors around WS 1516.6 CW204, CW 40 39 47.00 -72
37 27.90 lower

CW skin - STR R.S. -3; LBL 104-62 CW MOCKUP 40 39 47.00
-72 37 27.90 misc

fuselage skin sect w/ red paint 40 39 46.90 -72 37 27.90 bulk
cargo door

structure FS 1960-2080; stringer 23R-45R (Fuselage skin, FS
1960)

8/05/96-70 40 39 46.90 -72 37 27.90 FS 1480-1860; stringers
2R-23R with

window belt and R4 door frame 8/04/96-111 40 39 46.90 -72 37
27.90 right

body gear L22-24 8/04/96-55 40 39 46.90 -72 37 27.90 left body
gear

8/04/96-56 40 39 46.90 -72 37 27.90 speaker system overhead
mounting

assembly 52747; position 9714 - 9352 8/04/96-64 40 39 46.90
-72 37 27.90

cargo container AP7309 CARGO BAY 8/04/96-64 40 39 46.90
-72 37 27.90 LH

keel chord FS 1480-1620 8/04/96-64 40 39 47.00 -72 37 27.90
hydraulic

sequence valve assembly MOTOR BAY 8/08/96-30 40 39 47.80
-72 37 27.90 aft
pressure bulkhead (approx 50%); 40 39 46.90 -72 37 27.90 lower
portion
bulk cargo door surround FS 1960 - 2080; stringer 36R - 45R
8/18/96-6 40
39 47.00 -72 37 27.90 FS XXXX frame 40 39 46.90 -72 37 27.90
aft cargo
door - lower sill latches & locks 8/05/96-70 40 39 47.00 -72 37
27.90 Left
FS 1760-1800. S25L -31L 8/06/96-46 40 39 46.90 -72 37 27.90
entrance door
40 39 46.90 -72 37 27.90 tire on rim; main wheel 40 39 46.90
-72 37 27.90
fuel pump w/on-off valve and check valve 40 39 47.00 -72 37
27.90 FS
2664-2742, LH APU access door hinge 40 39 47.00 -72 37 27.90
corner of
passenger entry door 40 39 47.00 -72 37 27.90 FS XXXX frame
40 39 47.00
-72 37 27.90 FS XXXX frame 40 39 47.00 -72 37 27.90 FS
XXXX frame 40 39
47.00 -72 37 27.90 FS XXXX frame 40 39 47.00 -72 37 27.90
FS XXXX frame 40
39 47.00 -72 37 27.90 FS XXXX frame 40 39 46.90 -72 37 27.90
5 bales
jeans/jean jackets 40 39 46.90 -72 37 27.90 BL 0 keel beam
center web from
FS 1330-1241 8/04/96-111 40 39 47.00 -72 37 27.90 var. L.E.
device torque
tube 40 39 46.90 -72 37 27.90 aft cargo door cutout (#1860)/
seats/fuselage
40 39 46.90 -72 37 27.90 FS frame 1350 stringer 22L-29L

LW07, CW10 40 39
46.90 -72 37 27.90 left upper wing skin; SOB to WBL 200; part
of CW106,
LW07, & CW401 CW MOCKUP 8/05/96-70 40 39 46.90 -72 37
27.90 door (R4)
8/05/96-70 40 39 46.90 -72 37 27.90 misc debris/black suitcase/
red seat/2
bales (partial seat 42-6, seat 42-7 (armrest 42-9, armrest 43
8/05/96-70
40 39 46.90 -72 37 27.90 FS 2280-2340 includes saw cut RF9A/
B 40 39 46.90
-72 37 27.90 left lower wing skin jack point to LWS 670
8/04/96-111 40 39
46.90 -72 37 27.90 spoiler panel 40 39 46.90 -72 37 27.90 E-
galley counter
top 40 39 46.90 -72 37 27.90 FS 2000-2120; stringer 8L-22L
with window
belt 8/05/96-70 RF109B 40 39 47.00 -72 37 27.90 FS
1580-1620, stringer
30R-39R fuselage bulkhead w/frame section 8/06/96-46 40 39
46.90 -72 37
27.90 FS 2200-2310 stringer 21R-38R, cargo bulk door right side
lower
8/05/96-70 40 39 47.00 -72 37 27.90 fuel pump maint pad 40 39
46.90 -72 37
27.90 wing section, top landing gear FS 469-820 8/05/96-70 40
39 47.00 -72
37 27.90 row 24 seat 4-5-6-7 CABIN HGR 40 39 46.90 -72 37
27.90 bottom
left wing 8/05/96-70 40 39 47.00 -72 37 27.90 wing leading edge
w/picelo
tube/triangle 40 39 47.00 -72 37 27.90 hinged panel 40 39 46.90
-72 37

27.90 fuselage skin FS 1740-1760; stringer 42R-44R 8/05/96-70
40 39 46.90
-72 37 27.90 FS 1660-1700; stringers 40R-43R 8/05/96-70 40 39
46.90 -72 37
27.90 FS 1840-1960; stringer 23R-26R 8/05/96-70 40 39 46.90
-72 37 27.90
FS 1820-1840 stringer 23R-27R with aft cargo door hinge
8/05/96-70 40 39
46.90 -72 37 27.90 lower cw skin- right fwd side S21 to S23 CW
MOCKUP 40
39 46.90 -72 37 27.90 lower cw skin-right fwd side STR 1-21
CW MOCKUP 40
39 46.90 -72 37 27.90 FS 1720-1820; stringers 49L-51L, 51R
8/14/96-9 40 39
46.90 -72 37 27.90 FS 1840; stringer 45R-46R 8/05/96-70 40 39
46.90 -72 37
27.90 FS 1630-1680; stringer 22R-30R, with R4 door structure
8/05/96-70 40
39 46.90 -72 37 27.90 fuselage skin FS 1760-1780; stringer
41R-35R
8/05/96-70 LF16A, CW1 40 39 46.90 -72 37 27.90 part of
CW1002; Note: saw
cut separates part into two pieces; rear spar RBL 0 - RBL 76 CW
MOCKUP 40
39 46.90 -72 37 27.90 portion of aft press bulkhead FS 2360
8/05/96-70 40
39 46.90 -72 37 27.90 FS 1620-1680; stringers 45L-51L,51R
8/12/96-3 40 39
46.90 -72 37 27.90 fuselage skin FS 1720-1760; stringer
40R-41R 8/05/96-70
40 39 46.90 -72 37 27.90 FS 1960-2080 stringer 36R-45R bulk
cargo door
surround 8/5/96-70 40 39 46.90 -72 37 27.90 FS 1620-1680;

stringer 36R-42R
8/05/96-70 40 39 46.90 -72 37 27.90 FS 2040 stringer 32R-33R
8/05/96-70 40
39 46.90 -72 37 27.90 FS 1680-1720; stringers 36R-41R
8/05/96-70
C2242 40 39 46.90 -72 37 27.90 FS 1640-1740; stringers
43R-51R and 51L-49L
40 39 47.80 -72 37 27.90 portion aft press bulkhead FS 2360
LF16B, CW1 40
39 46.90 -72 37 27.90 part of CW1006; Note: saw cut separate
part into two
pieces; rear spar web LBL21-LBL57 CW MOCKUP 40 39 46.90
-72 37 27.90 seat
52 (7) CABIN HGR 40 39 46.90 -72 37 27.90 seat 50 (5) armrest
partial
frame CABIN HGR 40 39 46.90 -72 37 27.90 seat 52 (6) armrest
partial frame
CABIN HGR 40 39 46.90 -72 37 27.90 FS 1900-2320 stringers
10L-6R Note: saw
cut from RHS for RF9B and RF15 40 39 44.30 -72 37 27.90
9/12/96-2 40 39
46.90 -72 37 27.90 FS 1810-1836; stringer 27R-30R; forward
right upper
corner of aft cargo door 8/05/96-70 40 39 46.90 -72 37 27.90 left
lower
wing skin; SOB - WS600 40 39 46.90 -72 37 27.90 FS
1980-2010, stringer
38R; handle from aft bulk cargo door 8/04/96-111 40 39 46.90
-72 37 27.90
FS 1900-2140; stringer 6R-22R with window Note: saw cut from
RF 9A and
RF15 40 39 46.90 -72 37 27.90 FS 1480-1520 stringer 26R-30R,
from lot #

8-5-96-70 8/05/96-70 40 39 46.90 -72 37 27.90 seat 49 (7)
armrest, CABIN
HGR 40 39 46.90 -72 37 27.90 seat 42 (2 3) armrest, CABIN
HGR 40 39 46.90
-72 37 27.90 fow 41 seat 10 seat CABIN HGR 40 39 46.90 -72
37 27.90 seat
50 (6) armrest, partial frame CABIN HGR 40 39 46.90 -72 37
27.90 seat 48
(9) armrest, CABIN HGR 40 39 46.90 -72 37 27.90 FS
1480-1580, stringer
19R-26R with window frame 40 39 46.90 -72 37 27.90 FS
1982-2020 36R-39R;
section of aft bulk cargo door 8/04/96-111 40 39 46.90 -72 37
27.90 50 (8)
armrest, partial frame, CABIN HGR 40 39 46.90 -72 37 27.90
seat 33 (1 2
3), CABIN HGR 40 39 46.90 -72 37 27.90 FS 1760 stringer
42R-43R 8/05/96-70
40 39 46.90 -72 37 27.90 armrest for seat 35 (2), CABIN HGR
8/04/96-111 40
39 46.90 -72 37 27.90 seat 35 (8 9 0) armrest/partial seat CABIN
HGR
8/04/96-64 40 39 46.90 -72 37 27.90 seat 37 (8) armrest/partial
seat, seat
37 (10) armrest, CABIN HGR 40 39 46.90 -72 37 27.90 FS
1960-1980; stringer
28R-31R 8/05/96-70 40 39 44.30 -72 37 27.90 FS 1060 stub
beam 9/12/96-2 40
39 46.90 -72 37 27.90 seat 47 (5) armrest CABIN HGR 40 39
46.90 -72 37
27.90 FS 2060-3000; stringer 29R-36R 40 39 47.00 -72 37 27.90
FS 1820-1840
stringer 31L-34L 8/06/96-46 40 39 46.90 -72 37 27.90 left wing

outboard

tip HF antenna portion 40 39 46.90 -72 37 27.90 seat 26 (8 9 0)
CABIN HGR

40 39 46.90 -72 37 27.90 seat 43 (9) CABIN HGR 40 39 46.90
-72 37 27.90

seat 44 (6) CABIN HGR 40 39 46.90 -72 37 27.90 seat 45 (6 7)
CABIN HGR

C2367 40 39 46.90 -72 37 27.90 seat 42 (6 7) CABIN HGR

RF109A 40 39 46.90

-72 37 27.90 FS 1610-1640 stringer 37R-40R 8/05/96-70 40 39
46.90 -72 37

27.90 seat 42 (9) armrest only CABIN HGR 40 39 46.90 -72 37
27.90 FS

1416-1480 stringers 28L-33L with chord beam 8/04/96-111

RF109E 40 39 46.90

-72 37 27.90 FS 1660-1680 stringer 31R-35R 8/05/96-70 40 39
46.90 -72 37

27.90 seat 51 (6) armrest, cap, and tray table 40 39 46.90 -72 37
27.90

LHS body gear drag brace reaction fitting common to the keel
beam box FS

1350-1416 40 39 47.96 -72 37 27.84 seat 54 (1) CABIN HGR
8/12/96-3 CW104

CW 40 39 46.40 -72 37 27.80 upper right fwd CW skin, double
plus chord,

STR 19-30; also a portion of right SOB CW rib (CW30 CW

MOCKUP 40 39 46.40

-72 37 27.80 lower CW skin; left SOB to LBL 100; R.S. to STR
3; (wing

center section, lower skin segment, 20" CW MOCKUP 40 39
46.40 -72 37 27.80

fuselage skin FS 1780-1800; stringer 34R-40R 8/26/96-36 40 39
46.40 -72 37

27.80 landing gear trunion support segment; FS 1480 8/26/96-36
40 39 46.40
-72 37 27.80 FS 1916-1960; stringer 48R-51R 8/26/96-36 40 39
46.40 -72 37
27.80 FS 1480-1570; stringer 36R-45R with body landing gear
trunion
8/26/96-36 40 39 46.40 -72 37 27.80 Body Belly skin 3' (2'. Red
paint 40
39 46.40 -72 37 27.80 FS 1900-1940 aft cargo door surround;
stringer
41R-44R L 15.8 8/26/96-36 40 39 46.40 -72 37 27.80 Bulkhead
Aft wheelwell
lower 40 39 46.40 -72 37 27.80 Body belly skin 2' (2'. Red paint
40 39
46.40 -72 37 27.80 a/c 1/2" tubing TUBING BAY 8/26/96-36 40
39 46.40 -72
37 27.80 L5 - door threshold 8/26/96-36 40 39 46.40 -72 37
27.80
unidentified landing gear brace with connected hydraulic line
8/26/96-36
40 39 46.40 -72 37 27.80 FS 1536-1620, stringer 42R-49R
8/26/96-36 40 39
46.40 -72 37 27.80 FS 1800 RIB 40 39 46.40 -72 37 27.80 FS
1810; outer
frame aft cargo door panel stringer STR 24R-28R (aft upper
main cargo door
sill) 8/26/96-36 40 39 46.40 -72 37 27.80 Aft cargo step 40 39
46.40 -72
37 27.80 RHS keel chord aft of FS 1480 40 39 46.40 -72 37
27.80 FS 1480
Frame 40 39 46.40 -72 37 27.80 aircraft motor (main landing
gear and
anti-skid valves, MOTOR BAY 8/26/96-36 40 39 46.40 -72 37

27.80
unidentified piece of wreckage PARTS BAY 8/26/96-36 40 39
46.40 -72 37
27.80 cargo bin stanchion, marked "STA 1680" 8/26/96-36 40 39
46.40 -72 37
27.80 part of cargo bin structure 8/26/96-36 40 39 46.40 -72 37
27.80 food
storage box 40 39 46.40 -72 37 27.80 support beam 8/26/96-36
40 39 46.40
-72 37 27.80 unidentified piece of wreckage 8/26/96-36 40 39
46.40 -72 37
27.80 partial seat assembly 8/26/96-36 40 39 46.40 -72 37 27.80
FS
1920-1940; stringer 39R-45R 8/26/96-36
C1098 40 39 46.40 -72 37 27.80 partial seat assembly armrest
8/26/96-36 40
39 46.40 -72 37 27.80 seat 49 (5) armrest CABIN HGR
8/26/96-36 40 39 46.40
-72 37 27.80 portion of bottom of food service cart 8/26/96-36
40 39 46.40
-72 37 27.80 seat 48 (10) armrest CABIN HGR 8/26/96-36 40 39
46.40 -72 37
27.80 seat 43 (10) armrest and partial frame CABIN HGR
8/26/96-36 40 39
51.30 -72 37 27.80 3 bags of small metal shards and plastic
debris, one
bag contains 3' length of 3" pipe marked fuel 9/24/96-16 40 39
51.30 -72
37 27.80 3 bags of small metal shards and plastic debris, one bag
contains
3' length of 3" pipe marked fuel 9/24/96-16 40 39 46.40 -72 37
27.80 seat
38 (6) armrest, not previously in database CABIN HGR

8/26/96-36 40 39
46.40 -72 37 27.80 seat 32 (3) armrest and partial frame CABIN
HGR
8/26/96-36 40 39 46.40 -72 37 27.80 seat 49 (10), armrest and
partial
frame CABIN HGR 40 39 46.40 -72 37 27.80 FS 1940-1961,
stringer 30R-34R.
Lot # 8-26-96-36 8/26/96-36 40 39 46.40 -72 37 27.80 FS
1920-1940,
stringer 34R-40R. Lot # 8-26-96-36 8/26/96-36 40 39 46.40 -72
37 27.80
main landing gear wheel half 8/26/96-36 40 39 46.40 -72 37
27.80 LHS
fuselage segment FS 1416 8/26/96-36 40 39 46.40 -72 37 27.80
unidentified
piece of wreckage marked with STA 1580 8/26/96-36 40 39
46.40 -72 37 27.80
cargo compartment barrier net, 8/26/96-36 40 39 46.40 -72 37
27.80
horizontal jack screw 8/26/96-36 40 39 46.40 -72 37 27.80 main
landing

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Date: May 9, 2002 1:46:28 PM PDT

To: "'John Barry Smith'" <barry@corazon.com>

Subject: RE: TWA 800 justification for reconsideration

gear wheel half 8/26/96-36 40 39 46.40 -72 37 27.80 partial seat
assembly
seat 50 (9) 8/26/96-36 40 39 46.40 -72 37 27.80 B. L. 0 keel
beam web
(wheel well) FS 1460-1480 8/26/96-36 40 39 51.30 -72 37 27.80
3 bags of

small metal shards & plastic debris, one bag contains 3' length of 3" pipe

marked fuel 9/24/96-16 40 39 46.40 -72 37 27.80 unidentified aircraft part

8/26/96-36 40 39 46.40 -72 37 27.80 seat 38 (7) armrest, partial frame

CABIN HGR 8/26/96-36 40 39 46.40 -72 37 27.80 seat 46 (8), armrest,

partial frame CABIN HGR 40 39 46.40 -72 37 27.80 wheel half with brake

assembly 8/26/96-36 40 39 46.40 -72 37 27.80 main landing gear wheel half

8/26/96-36 40 39 46.40 -72 37 27.80 seat 52 (0), armrest CABIN HGR 40 39

46.40 -72 37 27.80 cargo bin stanchion, secondary structure marked "STA

1680" 8/26/96-36 40 39 46.40 -72 37 27.80 unidentified piece of wreckage

8/26/96-36 40 39 46.40 -72 37 27.80 hydraulic shutoff valves

8/26/96-36 40

39 46.40 -72 37 27.80 possible gear well bulkhead piece

8/26/96-36 40 39

46.40 -72 37 27.80 partial floor track and seat assembly with purple

backpack remnants attached. Note: char marks o 8/26/96-36 40 39 46.40 -72

37 27.80 main landing gear wheel half 8/26/96-36 40 39 46.40 -72 37 27.80

partial brake assembly with torque rod 8/26/96-36 40 39 46.40 -72 37 27.80

black wallet 8/26/96-31 40 39 46.40 -72 37 27.80 one swiss army watch and

one set of keys 8/26/96-31

C2386 40 39 46.40 -72 37 27.80 FS 1720-1750 stringer 45L-48L
8/26/96-36 40
39 46.40 -72 37 27.80 misc clothing and personal effects
8/26/96-31 40 39
46.40 -72 37 27.80 US passport 8/27/96-9 40 39 46.40 -72 37
27.80 human
remains appearing to be 2 hip bones and one skull bone,
8/27/96-9 40 39
46.40 -72 37 27.80 possible human skull fragment 8/26/96-31 40
39 46.40
-72 37 27.80 FS 2160-2200 stringer 35L-42L 8/26/96-36 40 39
46.40 -72 37
27.80 black fanny pack containing identification 8/26/96-31 40
39 46.40
-72 37 27.80 misc personal clothing, intact camera, other effects
8/26/96-31 40 39 46.40 -72 37 27.80 misc clothing and personal
effects
8/26/96-31 40 39 46.40 -72 37 27.80 apparent piece of jawbone
with tooth
8/26/96-31 40 39 46.40 -72 37 27.80 human remains 8/26/96-31
40 39 46.40
-72 37 27.80 human remains 8/26/96-31 40 39 46.40 -72 37
27.80 human
remains 8/26/96-31 40 39 46.40 -72 37 27.80 human remains
8/26/96-31 40 39
51.00 -72 37 27.80 flat yellow metal approx 4"(6" 40 39 46.40
-72 37 27.80
possible human hair 40 39 46.40 -72 37 27.80 social security
card
8/27/96-9 40 39 46.40 -72 37 27.80 misc clothing and various
personal
effects 8/27/96-9 40 39 46.40 -72 37 27.80 six apparent human
bones with

tissue, 8/26/96-31 40 39 46.40 -72 37 27.80 gold necklace
8/27/96-9 40 39
46.40 -72 37 27.80 wallet containing French passport 8/27/96-9
40 39 46.40
-72 37 27.80 human remains appearing to be 1 knee + 1 arm
8/27/96-9 40 39
46.40 -72 37 27.80 misc clothing and personal effects including a
US mail
plastic bag, empty 8/27/96-9 40 39 46.40 -72 37 27.80 black
fanny pack
with green trim 8/27/96-9 40 39 46.40 -72 37 27.80 photo album
of children
8/26/96-31 40 39 46.40 -72 37 27.80 misc personal clothing +
effects
8/26/96-31 40 39 46.40 -72 37 27.80 possible human remains
8/26/96-31 40
39 47.36 -72 37 27.71 personal effects 40 39 47.36 -72 37 27.71
personal
items - glasses in case 40 39 47.36 -72 37 27.71 miscellaneous
personal
items 8/19/96-16 40 39 47.36 -72 37 27.71 cargo bin handling
tires CARGO
BAY 8/19/96-22 40 39 47.36 -72 37 27.71 miscellaneous
hydraulic line
8/19/96-22 40 39 47.36 -72 37 27.71 personal effects - red box
2" (4" 40
39 47.36 -72 37 27.71 belly skin aft cargo bin 8/19/96-22 40 39
47.36 -72
37 27.71 small portion (2' (2' section) wing skin 40 39 47.36 -72
37
27.71 Trash can lid aft of L-5 Door 40 39 47.36 -72 37 27.71
miscellaneous
clothing, pocket calculator 40 39 47.36 -72 37 27.71 cargo

container CARGO

BAY 8/19/96-22 40 39 47.36 -72 37 27.71 FS 1920-2020;
stringer 44L-49R

8/19/96-22 40 39 47.36 -72 37 27.71 miscellaneous parts &
pieces PARTS BAY

8/20/96-12 40 39 47.36 -72 37 27.71 cargo bin CARGO BAY

8/20/96-12 40 39

47.36 -72 37 27.71 aircraft 1/2" tubing (miscellaneous cargo bin
parts &

pieces, carpet roll, passenger seats, floor board TUBING BAY

8/20/96-12 40

39 47.36 -72 37 27.71 personal items 40 39 47.36 -72 37 27.71

miscellaneous parts & pieces PARTS BAY 8/20/96-12 40 39

47.36 -72 37 27.71

miscellaneous parts & pieces PARTS BAY 8/20/96-12 40 39

47.36 -72 37 27.71

fuselage frame circa 1980 and miscellaneous parts 8/20/96-12 40
39 47.36

-72 37 27.71 personal effects black box 2" (4" 40 39 47.36 -72
37 27.71

row 52 seat 2 duty free module CABIN HGR 8/19/96-22 40 39
47.36 -72 37

27.71 miscellaneous cargo bin parts & pieces, carpet roll,
passenger

seats, floor board, cargo lock; row 4 CABIN HGR 8/20/96-12 40
39 47.36 -72

37 27.71 cargo bin CARGO BAY 8/20/96-12 40 39 47.36 -72 37
27.71

miscellaneous cargo bin parts & pieces, carpet roll, passenger
seats,

floor board, cargo lock 8/20/96-12 40 39 47.36 -72 37 27.71

Bulkhead Web

40 39 47.36 -72 37 27.71 6" Piece of turbine blade ENG HGR 40

39 47.36 -72
37 27.71 Anti-Skid Hydraulic Part 40 39 47.36 -72 37 27.71
pickup for fuel
tank FUEL ROOM 40 39 47.36 -72 37 27.71 seat Row 50 seats 1
& 2 40 39
47.36 -72 37 27.71 lot -seat parts CABIN HGR 40 39 47.36 -72
37 27.71 FS
1847-1877, stringer 20R-23R 8/20/96-12 40 39 47.36 -72 37
27.71 Fuselage
Section PARTS BAY 40 39 47.36 -72 37 27.71 FS 1800-1900;
stringers 50R-50L
40 39 47.36 -72 37 27.71 FS 1680-1720, stringer 27R-31R
8/20/96-12 40 39
47.36 -72 37 27.71 armrest 44-5 40 39 47.36 -72 37 27.71 cabin
flooring
PARTS BAY 40 39 47.36 -72 37 27.71 seat arm rest 43-5 40 39
48.60 -72 37
27.70 misc metal debris 9/20/96-33 40 40 01.10 -72 37 27.70
small piece of
aluminum w/ flap 10/17/96-1 40 39 47.36 -72 37 27.66 misc.
green metal
10/13/96-3 40 39 47.36 -72 37 27.66 misc. metal debris
10/13/96-3 40 39
47.36 -72 37 27.66 misc. green metal 10/13/96-3 40 39 47.36 -72
37 27.66
misc. green metal 10/13/96-3 40 39 47.36 -72 37 27.66 misc.
wires,
possible engine components, cylinder gear 40 39 47.41 -72 37
27.64 cargo
container CARGO BAY 8/20/96-12 40 39 47.41 -72 37 27.64
seat part foot
rest 8/20/96-12 40 39 47.41 -72 37 27.64 Mail, FED EX, DHL,
manual 40 39

47.41 -72 37 27.64 row 42, seat 8 armrest CABIN HGR 40 39
47.41 -72 37
27.64 Miscellaneous personal items 40 39 47.41 -72 37 27.64
cargo
container CARGO BAY 8/20/96-12 40 39 47.41 -72 37 27.64
piece of fuel line
8/20/96-12 40 39 47.41 -72 37 27.64 cargo flooring CABIN
HGR 40 39 47.41
-72 37 27.64 Intercostal fuel tank 40 39 47.41 -72 37 27.64
miscellaneous
parts & pieces 8/20/96-12 40 39 47.41 -72 37 27.64 FS
1760-1850; stringers
44R-48R 8/20/96-12 40 39 47.41 -72 37 27.64 cargo pallet floor
CARGO BAY
40 39 47.41 -72 37 27.64 FS 1740-1780; stringers 46L-49L.
fuselage skin
8/20/96-12 40 39 47.41 -72 37 27.64 miscellaneous parts
8/20/96-12 40 39
47.41 -72 37 27.64 miscellaneous body parts 40 39 47.41 -72 37
27.64 skin
& stiffeners-stringers, Crown, white-exterior apparent skin splice
AF FS
1241 8/20/96-12 40 39 47.41 -72 37 27.64 miscellaneous parts
8/20/96-12 40
39 47.41 -72 37 27.64 miscellaneous parts 8/20/96-12 40 39
47.41 -72 37
27.64 personal effects, memorex tape players, casio watches 40
39 47.41
-72 37 27.64 miscellaneous body parts 40 39 47.41 -72 37 27.64
miscellaneous parts 8/20/96-12 40 39 47.41 -72 37 27.64 misc
parts
8/20/96-12 40 39 47.41 -72 37 27.64 misc parts 8/20/96-12 40 39
47.41 -72

37 27.64 miscellaneous body parts 40 39 47.41 -72 37 27.64
portion of
cargo bin CARGO BAY 8/20/96-12 40 39 47.41 -72 37 27.64
miscellaneous
parts 40 39 47.41 -72 37 27.64 Portion of Cargo bin CARGO
BAY 8/20/96-12
40 39 47.41 -72 37 27.64 miscellaneous personal items 40 39
47.41 -72 37
27.64 personal effects (wallet) 40 39 47.41 -72 37 27.64 Rt Hand
rear
spar, inboard in; left landing gear beam FS 1350 8/20/96-12 40
39 47.41
-72 37 27.64 FS 2600-2640; station 4L-46L 8/20/96-12 40 39
47.41 -72 37
27.64 personal effects, 3 women's make-up purses 40 39 47.41
-72 37 27.64
miscellaneous body parts 40 39 47.41 -72 37 27.64
miscellaneous body parts
40 39 47.41 -72 37 27.64 spanwise beam #1BL 0 - 60 / chord
segment CW
MOCKUP 8/20/96-12 40 39 47.41 -72 37 27.64 Cabin flooring
CABIN HGR 40 39
47.41 -72 37 27.64 seat 53 (3) armrest, CABIN HGR
C2311 40 39 47.41 -72 37 27.64 seat 54 (5) armrest CABIN
HGR 40 39 47.41
-72 37 27.64 FS 1780-1840, stringer 38R-46R forward lower
corner of aft
cargo door cut-out. Lot # 8-20-96-12 40 39 47.41 -72 37 27.64
seat 45 (4)
armrest, CABIN HGR 40 39 47.41 -72 37 27.64 seat 45 (5)
armrest, CABIN HGR
40 39 47.41 -72 37 27.64 portion of aft pressure bulkhead
8/20/96-12 40 39

47.41 -72 37 27.64 FS 1660-1700 stringer 39L-42L 8/20/96-12
40 39 47.41
-72 37 27.64 FS 1480-1500 stringer 23L-27L w/ frame support
8/20/96-12 40
39 49.10 -72 37 27.60 aircraft skin, red on one side 10/17/96-1
40 39
48.02 -72 37 27.46 row 27, seats 1-2-3 CABIN HGR 8/12/96-3
40 39 48.90 -72
37 27.40 misc metal debris 9/20/96-33 40 39 52.39 -72 37 27.31
some kind
of pipes with (TWA 15201/ s/n 237) 9/21/96-1 40 39 49.70 -72
37 27.30 CW
stringer CW MOCKUP 40 39 49.70 -72 37 27.30 CW stringers-
upper CW MOCKUP
40 39 49.70 -72 37 27.30 right SOB web (9-23-96-5) CW
MOCKUP 40 39 49.70
-72 37 27.30 terminal fitting rear spar wing CW MOCKUP 40 39
49.70 -72 37
27.30 CW lower skin CW MOCKUP 40 39 49.70 -72 37 27.30
CW lower skin CW
MOCKUP 40 39 49.70 -72 37 27.30 Fuel vent 9/23/96-5 40 39
49.70 -72 37
27.30 black camera bag 9/23/96-5 40 39 49.70 -72 37 27.30
riveted piece of
metal 9/23/96-5 40 39 49.70 -72 37 27.30 metal tube 9/23/96-5
40 39 49.70
-72 37 27.30 misc. debris 9/23/96-5 40 39 49.70 -72 37 27.30
CW lower skin
CW MOCKUP 40 39 49.60 -72 37 27.30 center tank lower
stringer CW MOCKUP 40
39 49.70 -72 37 27.30 spanwise beam section CW MOCKUP 40
39 49.70 -72 37
27.30 CW fuel capacitance probe 40 39 49.70 -72 37 27.30 CW

stringer end

CW MOCKUP 40 39 49.70 -72 37 27.30 spanwise beam section

CW MOCKUP 40 39

49.70 -72 37 27.30 bio hazard bag containing skull fragment

9/23/96-5 40

39 49.60 -72 37 27.30 misc. debris 9/22/96-1 40 39 49.60 -72 37

27.30 1

cargo net (misc. debris, passenger seats, 1 shoe 9/22/96-1 40 39

46.00 -72

37 27.30 green metal rod 20' long 9/12/96-2 40 39 46.00 -72 37

27.30 green

metal rod 15' long 9/12/96-2 40 39 49.60 -72 37 27.30 1 long

tube

9/22/96-1 40 39 49.60 -72 37 27.30 #8 flap track assembly and

carriage

transmission 9/22/96-1 40 39 49.60 -72 37 27.30 fuel probe

9/22/96-1

Z3387 40 39 49.60 -72 37 27.30 1 long piece of debris 9/22/96-1

40 39

49.60 -72 37 27.30 misc. debris (1 long piece) 9/22/96-1 40 39

47.24 -72

37 27.28 AKN7488 cargo container CARGO HGR 40 39 47.24

-72 37 27.28 cargo

container 40 39 47.24 -72 37 27.28 one bag of jeans &

miscellaneous

personal effects 40 39 47.24 -72 37 27.28 fuselage skin 3' (2', aft

cargo

belly section 46 40 39 47.24 -72 37 27.28 cargo bin ballmat

8/20/96-12 40

39 47.24 -72 37 27.28 oxygen bottle 8/20/96-12 40 39 47.24 -72

37 27.28 FS

1480 bulkhead & skin 8/20/96-12 40 39 47.24 -72 37 27.28 piece

of cargo

floor with rollers 40 39 47.24 -72 37 27.28 Cargo floor panel
from close
to rear pressure bulkhead 40 39 47.24 -72 37 27.28 4' piece of
cargo bin
support frame CARGO BAY 40 39 47.24 -72 37 27.28 FS skin
rear belly keel
beam 8/22/96-5 40 39 47.24 -72 37 27.28 cargo container
AKN7501 CARGO BAY
40 39 47.24 -72 37 27.28 galley container CABIN HGR 40 39
47.24 -72 37
27.28 cargo flooring CARGO HGR 40 39 47.24 -72 37 27.28
arm rest seat 37
(2) 40 39 47.24 -72 37 27.28 small section wing interior skin
with nozzle
fitting 40 39 47.24 -72 37 27.28 food carrier CABIN HGR 40 39
47.24 -72 37
27.28 lower section of galley 8/20/96-12 40 39 47.24 -72 37
27.28 personal
effects (suitcase) 8/21/96-6 40 39 47.24 -72 37 27.28 mag of blue
jeans
and misc. personal effects 8/21/96-6 40 39 47.24 -72 37 27.28
misc.
personal effects 8/21/96-6 40 39 47.24 -72 37 27.28 part of cargo
hold #4
CARGO BAY 8/22/96-5 40 39 47.24 -72 37 27.28 upper part of
galley
8/22/96-5 40 39 47.24 -72 37 27.28 aircraft frame 8/22/96-5 40
39 47.24
-72 37 27.28 misc personal effects 8/21/96-6 40 39 47.24 -72 37
27.28
galley top 8/22/96-5 40 39 47.24 -72 37 27.28 Galley Drawer
8/22/96-5 40
39 47.24 -72 37 27.28 cargo handling wheel CARGO BAY

8/22/96-5 40 39 47.24
-72 37 27.28 gasper duct DUCTING BAY 8/22/96-5 40 39 47.24
-72 37 27.28
misc part of galley 8/22/96-5 40 39 47.24 -72 37 27.28 part of
galley
8/22/96-5 40 39 47.24 -72 37 27.28 Movie Projector 8/22/96-5
40 39 47.24
-72 37 27.28 US mail 8/21/96-6 40 39 47.24 -72 37 27.28 cargo
lock CARGO
BAY 8/22/96-5
C2090 40 39 47.24 -72 37 27.28 wiring bundle 40 39 47.24 -72
37 27.28 misc
personal items; clothing, watches 8/21/96-6 40 39 47.24 -72 37
27.28
personal effects: purse, jewelry, coinage, credit card belonging
to:
8/21/96-6 40 39 47.24 -72 37 27.28 misc. body parts and bones
8/21/96-6 40
39 47.24 -72 37 27.28 cabin floor support PARTS BAY 8/22/96-5
40 39 47.24
-72 37 27.28 piece of frame PARTS BAY 8/22/96-5 40 39 47.24
-72 37 27.28
misc. personal effects 8/21/96-6 40 39 47.24 -72 37 27.28 US
mail
8/21/96-6 40 39 47.24 -72 37 27.28 part of cabin chair 37 (3),
CABIN HGR
8/22/96-5 40 39 47.24 -72 37 27.28 FS 2180-2240; stringers
36R-44R
8/22/96-5 40 39 47.24 -72 37 27.28 DHL Mail Bag 8/21/96-6 40
39 47.24 -72
37 27.28 Part of Galley and Galley Bulkhead (D section)
8/22/96-5 40 39
47.24 -72 37 27.28 service galley CABIN HGR 40 39 47.24 -72

37 27.28 cargo
container CARGO BAY 8/22/96-5 40 39 47.24 -72 37 27.28 seat
34 (4), CABIN
HGR 40 39 47.24 -72 37 27.28 seat 35 (4), armrest with partial
frame,
CABIN HGR 40 39 47.24 -72 37 27.28 seat 38 (5) armrest,
CABIN HGR 40 39
47.24 -72 37 27.28 seat 47 (7), CABIN HGR 40 39 47.24 -72 37
27.28 seat 34
(5), CABIN HGR 40 39 47.24 -72 37 27.28 seat 44 (4), CABIN
HGR 40 39 47.24
-72 37 27.28 seat 36 (8), CABIN HGR 8/20/96-12 40 39 50.14
-72 37 27.24
generator cable lead 40 39 50.14 -72 37 27.24 flap mechanism
8/09/96-37 40
39 50.14 -72 37 27.24 fuel tank bulkhead; ?? CW MOCKUP
8/09/96-37 40 39
50.14 -72 37 27.24 fuel tank bulkhead; right inboard fuel tank
8/09/96-37
40 39 50.14 -72 37 27.24 # 4 reserve fueling valve 8/09/96-37 40
39 50.14
-72 37 27.24 flap carriage assembly 8/09/96-37 40 39 50.14 -72
37 27.24
engine pylon firewall and harness 8/09/96-37 40 39 50.14 -72 37
27.24
right lower wing skin; SOB rib, stringer 3-rear spar 8/09/96-37
40 39
50.14 -72 37 27.24 flap carriage assembly 8/09/96-37 40 39
50.14 -72 37
27.24 fuel tank slice 8/09/96-37 40 39 50.14 -72 37 27.24 flap
carriage
section 8/09/96-37 40 39 50.14 -72 37 27.24 flap drive assembly
8/09/96-37

CW215, CW 40 39 50.14 -72 37 27.24 front spar RH terminal fitting/jack point #2; right hand lower panel; contains jack point #2; this part i CW

MOCKUP 8/08/96-30 40 39 50.14 -72 37 27.24 spoiler section 8/08/96-30 40 39 50.14 -72 37 27.24 engine wiring harness CW30?? 40 39 50.14 -72 37 27.24 R14 #5 CW Body Rib. SWB #2 to mid spar CW

MOCKUP 8/09/96-37 40 39 50.14 -72 37 27.24 FS 2285-2360; stringer 8L-24L 8/09/96-37 40 39 50.14 -72 37 27.24 right wing stringer 8/08/96-30 40 39 50.14 -72 37 27.24 spar section FSSI 920.00-ILES 922.25 8/09/96-37 40 39 50.14 -72 37 27.24 variable cambor scissors 8/09/96-37 LF15A, RF09 40 39 50.14 -72 37 27.24 FS 2100-2160; stringers 22L-30L 8/09/96-37 40 39 50.14 -72 37 27.24 flap section 8/09/96-37 40 39 50.14 -72 37 27.24 fuselage section including 8 window apertures 8/09/96-37 40 39 50.14 -72 37 27.24 wing center box bulkhead fragment 8/08/96-30 40 39 50.14 -72 37 27.24 fuel capacitance probe 8/09/96-37 40 39 50.14 -72 37 27.24 ?? center fuel tank assembly 8/09/96-37 40 39 50.14 -72 37 27.24 R3 main entry door 8/08/96-30 40 39 50.14 -72 37 27.24 lower CW skin; S-4 to S-10; left SOB to RBL 80 CW

MOCKUP 8/08/96-30 40 39 50.14 -72 37 27.24 FS 2530 -2618

stringer 23R -
49L 8/08/96-30 40 39 50.14 -72 37 27.24 flaptrack 8/08/96-30 40
39 50.14
-72 37 27.24 top aft right cw tank skin S-1A to S-9 CW
MOCKUP 8/08/96-30
40 39 50.14 -72 37 27.24 right wing lower skin; RWS 1196-1424
8/09/96-37
CW801, CW 40 39 50.14 -72 37 27.24 mid spar web RBL 85 to
LBL 49 (CW801);
SWB #2 RH web RBL 30,80 (CW702). Top right portion CW
MOCKUP 8/08/96-30 40
39 50.14 -72 37 27.24 lower center and left CW skin 5-10 to
5-15; LBL 97
to RBL 104 CW MOCKUP 8/09/96-37 40 39 50.14 -72 37 27.24
horizontal
stabilizer skin section 8/08/96-30 40 39 50.14 -72 37 27.24 FS
1540-1820
left side fuselage 8/08/96-30 40 39 50.14 -72 37 27.24 right wing
stringer
8/08/96-30 40 39 50.14 -72 37 27.24 left wing #1 flap carriage
((See
C2029) 8/08/96-30 40 39 50.14 -72 37 27.24 CABIN HGR
8/08/96-30 40 39
50.14 -72 37 27.24 trailing edge flap 8/09/96-37 40 39 50.14 -72
37 27.24
trailing edge flap 8/09/96-37 40 39 50.14 -72 37 27.24 trailing
edge flap
8/09/96-37 40 39 50.14 -72 37 27.24 upper fwd inboard section
wheel well
wall; FS 1360-1380 8/09/96-37 40 39 50.14 -72 37 27.24 wing to
fuselage
angle 8/09/96-37 40 39 50.14 -72 37 27.24 right trailing edge
flap section

8/08/96-30 CW1010 40 39 50.14 -72 37 27.24 rear spar RBL
11-80, web @
lower chord CW MOCKUP 40 39 50.14 -72 37 27.24 cw tank
stringer 40 39
50.14 -72 37 27.24 cw stringer CW MOCKUP 40 39 50.14 -72
37 27.24 spanwise
beam #1-lower RBL 53 to 66 CW MOCKUP 40 39 50.14 -72 37
27.24 cw spanwise
beam #2-LH web door perimeter CW MOCKUP 40 39 50.14 -72
37 27.24 lower CW
skin; STR 14-15; RBL 30-80 CW MOCKUP
C2160 40 39 50.14 -72 37 27.24 cw lower skin-left side mid spar
to S13;
left SOB to LBL 104 CW MOCKUP 40 39 50.14 -72 37 27.24
cw lower skin
stringer CW MOCKUP 40 39 50.14 -72 37 27.24 lower wing
skin; right hand
wing; WS 1214-1243; FS 6 to rear spar 8/09/96-37 40 39 50.14
-72 37 27.24
lower cw skin-fwd left corner CW MOCKUP 40 39 50.14 -72 37
27.24 skin
panel FS 2020-2040; stringer 36L-41L 8/09/96-37 40 39 50.14
-72 37 27.24
FS 2160-2220; stringer 23L-30L 8/09/96-37 40 39 50.14 -72 37
27.24 seats
51 (1 2 3), CABIN HGR 40 39 50.14 -72 37 27.24 rear spar CW
tank @ RBL
127, was cut from lower right wing CW MOCKUP 40 39 50.14
-72 37 27.24 FS
2270-2300 stringer 10L-13L 8/09/96-37 40 39 50.14 -72 37
27.24 FS
1920-1940 stringer 32L-36L 40 39 50.14 -72 37 27.24 right wing
outboard

fore flap 40 39 50.14 -72 37 27.24 FS 1760-1810 stringer
25L-30L
8/09/96-37 40 39 50.14 -72 37 27.24 FS 1740-1800 stringer
30L-34L
8/08/96-30 40 39 49.40 -72 37 27.20 misc metal debris
9/20/96-33 40 39
49.40 -72 37 27.20 miscellaneous metal debris 40 39 48.90 -72
37 27.20
grey metal rivet 40 39 47.62 -72 37 27.15 seat 36 (4) 8/12/96-3
40 39
47.62 -72 37 27.15 cargo bin w/ bone fragment in side CARGO
BAY 8/12/96-3
40 39 47.62 -72 37 27.15 fuselage frame approx 5', no FS #
8/12/96-3 40 39
47.62 -72 37 27.15 toilet paper holder 8/12/96-3 40 39 47.62 -72
37 27.15
metal strip 6"(1; cargo liner PARTS BAY 8/12/96-3 40 39 47.62
-72 37 27.15
cargo container fragment, approx 2'(2' 8/12/96-3 40 39 47.62 -72
37 27.15
olive drab green panel, 4'(2' w/link to 4' structure 8/12/96-3 40
39 47.62
-72 37 27.15 door section 3'(1/2' 8/12/96-3 40 39 47.62 -72 37
27.15 cargo
container w/letters AK CARGO BAY 8/12/96-3 40 39 47.62 -72
37 27.15 cargo
container 5'(2' w/letters KN7488 CARGO BAY 8/12/96-3 40 39
47.62 -72 37
27.15 cargo container #AAP7309 1'(2' CARGO BAY 8/12/96-3
40 39 47.62 -72
37 27.15 bundle of blue jeans 8/12/96-3 40 39 47.62 -72 37
27.15 seat 41
(4 5) armrest only CABIN HGR 8/12/96-3 40 39 47.62 -72 37

27.15 row 43
seat 7 armrest CABIN HGR 8/12/96-3 40 39 47.62 -72 37 27.15
wing leading
edge air foil rib 8/12/96-3 40 39 47.62 -72 37 27.15 wing box
beam w/fuel
vent port approx 3' long 8/12/96-3 40 39 47.62 -72 37 27.15
white carry-on
cloth bag 8/12/96-3 40 39 47.62 -72 37 27.15 FS 1900 fuselage
approx 3'
long p/n 65B04600 separated 8/12/96-3 40 39 47.62 -72 37 27.15
section of
floor w/ball decking 2'(2' 8/12/96-3 40 39 47.62 -72 37 27.15
suitcase w/
tag located in galley structure 8/12/96-3 40 39 47.62 -72 37
27.15 galley
storage locker 8/12/96-3 40 39 47.62 -72 37 27.15 black carry-on
bag
w/name tag (8/12/96-3 40 39 47.62 -72 37 27.15 US mail bag
8/12/96-3 40
39 47.62 -72 37 27.15 red crushed fuselage skin 1'(1' 8/12/96-3
40 39
47.62 -72 37 27.15 bulkhead fragment w/circular fairing area
(unpainted)
approx 4'(4'(3/16" 8/12/96-3 40 39 47.62 -72 37 27.15 electric
pump -
non-aircraft 8/12/96-3 40 39 47.62 -72 37 27.15 5' section of
leading edge
8/12/96-3 40 39 47.62 -72 37 27.15 5' length of fuselage frame
w/handwritten "1960" 8/12/96-3 40 39 47.62 -72 37 27.15
fuselage frame, FS
1520 approx 8' long 8/12/96-3 40 39 47.62 -72 37 27.15 FS 1220
frame from
stringer 5R-11R 40 39 47.62 -72 37 27.15 FS 1620 frame section

from
stringer STR 5R-9R 40 39 47.60 -72 37 27.11 black handbag
8/12/96-3 40 39
47.60 -72 37 27.10 fuselage frame # 1900 8/12/96-3 40 39 47.60
-72 37
27.10 bulkhead fragment, approx 3'(4' 8/12/96-3 40 39 46.80 -72
37 27.10
1.5' long metal with hinge red on one side 9/10/96-4 40 39 47.60
-72 37
27.10 seat 36 (1) armrest. CABIN HGR 40 39 52.50 -72 37
27.10 misc metal
9/28/96-1 40 39 47.35 -72 37 27.06 wing rib w/#WS 1454.0
8/14/96-9 40 39
47.35 -72 37 27.06 seat frame, unknown # 8/14/96-9 40 39 47.35
-72 37
27.06 luggage; olive green flower print; 1'(2' 8/14/96-9 40 39
47.35 -72
37 27.06 wallet and pants, 8/26/96-30 40 39 47.35 -72 37 27.06
cargo
container fragment; 2'(4' CARGO BAY 8/14/96-9 40 39 47.35
-72 37 27.06
misc mail packet, DHL unopened 8/14/96-9 40 39 47.35 -72 37
27.06 cargo
retention mechanism, 3' long 8/14/96-9 40 39 47.35 -72 37 27.06
fuel tank
bulkhead fragment, 1'(2' 8/14/96-9 40 39 47.35 -72 37 27.06
light duty
structural frame, 5' long 8/14/96-9 40 39 47.35 -72 37 27.06 tire
fragment
8/14/96-9 40 39 47.35 -72 37 27.06 pneumatic actuator MOTOR
BAY 8/14/96-9
40 39 47.35 -72 37 27.06 movie projector housing CABIN HGR
8/14/96-9 40 39

47.35 -72 37 27.06 bathroom toilet paper dispenser CABIN HGR
8/14/96-9 40
39 47.35 -72 37 27.06 FS 1680 frame segment; stringers 4L-12L
8/14/96-9 40
39 47.35 -72 37 27.06 misc luggage 8/14/96-9 40 39 47.35 -72
37 27.06 FS
1860 frame segment; stringers 7L-16L; light structural frame, 7'
PARTS BAY
8/14/96-9 40 39 47.35 -72 37 27.06 misc mail packets in bags,
USPS\
8/14/96-9 40 39 47.35 -72 37 27.06 fuselage bulkhead fragment
1' 8/14/96-9
40 39 47.35 -72 37 27.06 FS 1800-1848 stringer 22R with two
windows
(fuselage bulkhead, w/window fragment) 8/14/96-9 40 39 47.35
-72 37 27.06
row 43, seat 4 armrest CABIN HGR 8/14/96-9 40 39 47.35 -72
37 27.06 row 42
seat 4-5 CABIN HGR 8/14/96-9 40 39 47.35 -72 37 27.06 light
structural
frame 3' PARTS BAY 8/14/96-9 40 39 47.35 -72 37 27.06
fuselage bulkhead
fragment 8'(3' PARTS BAY 8/14/96-9 40 39 47.35 -72 37 27.06
fuselage FS
1560 8/14/96-9 40 39 47.35 -72 37 27.06 fuselage bulkhead
fragment 6'(1'
8/14/96-9 40 39 47.35 -72 37 27.06 passports and wallets,
8/14/96-9 40 39
47.35 -72 37 27.06 red fuselage skin 1'(1' 8/14/96-9 40 39 47.35
-72 37
27.06 a/c duct filter 8/14/96-9 40 39 47.35 -72 37 27.06 cargo
container
fragment CARGO BAY 8/14/96-9 40 39 47.35 -72 37 27.06

interior bulkhead
section 8/14/96-9 40 39 47.35 -72 37 27.06 interior bulkhead
fragment
1'(2' 8/14/96-9 40 39 47.35 -72 37 27.06 cargo container wall
and edge
CARGO BAY 8/14/96-9 40 39 47.35 -72 37 27.06 cargo
container motorized
wheel CARGO BAY 8/14/96-9 40 39 47.35 -72 37 27.06 olive
drab box, 5'(3'
8/14/96-9 40 39 47.35 -72 37 27.06 main landing gear tire
8/14/96-9 40 39
47.35 -72 37 27.06 non-structural interior, red, 5' long PARTS
BAY
8/14/96-9 40 39 47.35 -72 37 27.06 R4 jumpseat, F/A CABIN
HGR 8/14/96-9 40
39 47.35 -72 37 27.06 door, corner, exterior 8/14/96-9 40 39
47.35 -72 37
27.06 cargo container 2'(1' CARGO BAY 8/14/96-9 40 39 47.35
-72 37 27.06
5'(5' alum pallet CARGO BAY 8/14/96-9 40 39 47.35 -72 37
27.06 cargo
conatiner edge (10') CARGO BAY 8/14/96-9 40 39 47.35 -72 37
27.06 door
section fragment 8/14/96-9 40 39 47.35 -72 37 27.06 interior
non-structural box 2'(2' 8/14/96-9 40 39 47.35 -72 37 27.06
luggage
8/14/96-9 40 39 47.35 -72 37 27.06 fuselage bulkhead fragment
8/14/96-9 40
39 47.35 -72 37 27.06 cargo container fragment 4'(6' CARGO
BAY 8/14/96-9
40 39 47.35 -72 37 27.06 40 39 47.35 -72 37 27.06 FS
2484-2598; stringer
23L-42L 8/14/96-9 40 39 48.01 -72 37 27.06 armrest 25 (0)

CABIN HGR 40 39

47.35 -72 37 27.06 seat 52 (8), partial seat/armrest no back,

CABIN HGR 40

39 48.01 -72 37 27.06 portion of spanwise beam CW tank CW

MOCKUP 40 39

47.35 -72 37 27.06 seat 35 (6 7), CABIN HGR 40 39 48.01 -72
37 27.06

portion of spanwise beam CW tank CW MOCKUP 40 39 48.01
-72 37 27.06 debris

9/22/96-1 40 39 48.01 -72 37 27.06 CW lower skin, RBL 9-50,
STGR 10-13 CW

MOCKUP 9/22/96-1

Z3375 40 39 48.01 -72 37 27.06 debris 9/22/96-1 40 39 48.01
-72 37 27.06

debris 9/22/96-1 40 39 48.01 -72 37 27.06 debris 9/22/96-1 40 39
48.01 -72

37 27.06 debris 9/22/96-1 40 39 48.01 -72 37 27.06 debris
9/22/96-1 40 39

48.01 -72 37 27.06 debris 9/22/96-1 40 39 45.03 -72 37 27.01 FS
910-940;

stringer 13L-14L 9/02/96-11 CW1016 40 39 49.03 -72 37 27.01
inboard leg CW

tank left hand pickle fork rear CW MOCKUP 9/21/96-1 40 39
45.03 -72 37

27.01 CW front spar lower chord, LBL98.48 CW MOCKUP
9/21/96-1 40 39 49.03

-72 37 27.01 metal debris 9/21/96-1 40 39 45.03 -72 37 27.01
metal debris

and wire (1 cargo net) 9/21/96-1 40 39 45.03 -72 37 27.01 #2
eng, left

under wing fitting outbd 9/21/96-1 40 39 47.00 -72 37 27.00 #3
engine

diagonal brace pylon ENG HGR 8/08/96-30 40 39 45.00 -72 37

27.00 lower
left wing skin; WBL 448-1098; mid to rear spar 40 39 47.00 -72
37 27.00
right wing trailing edge flap; upper airfoil section 8/08/96-30 40
39
47.00 -72 37 27.00 internal components to right wing 8/08/96-30
40 39
47.00 -72 37 27.00 R3 cabin door; internal components to right
wing
8/08/96-30 40 39 47.00 -72 37 27.00 left wing - outboard section
of the
inboard aileron 8/08/96-30 40 39 47.00 -72 37 27.00 internal
components to
right wing 8/08/96-30 40 39 45.00 -72 37 27.00 L/W inside brace
40 39
47.00 -72 37 27.00 internal components to right wing 8/08/96-30
40 39
47.00 -72 37 27.00 internal components to right wing 8/08/96-30
40 39
47.00 -72 37 27.00 internal components to right wing 8/08/96-30
40 39
45.00 -72 37 27.00 lower left wing skin; WBL 584-910; lower
panel skin
splice to aft spar 40 39 45.00 -72 37 27.00 left wing #4 flap track
assembly 40 39 48.50 -72 37 27.00 misc. airplane shell parts
with
snake-skin belt 9/11/96-4 40 39 48.50 -72 37 27.00 CW spar CW
MOCKUP 40 39
48.50 -72 37 27.00 side of body center wing tank CW MOCKUP
40 39 49.00 -72
37 27.00 6 ft curved piece of metal 9/20/96-33 40 39 48.50 -72
37 27.00
right hand inboard aileron actuator and support assembly

9/12/96-2 40 39
49.50 -72 37 27.00 debris 9/22/96-1 40 39 48.50 -72 37 27.00 FS
923-960;
stringer 29L-35L with FS 940 frame segment 40 39 47.12 -72 37
26.99 misc.
metal & plastic fragments 10/17/96-1< 40 39 47.12 -72 37 26.99
misc. metal
debris 10/13/96-3 40 39 47.12 -72 37 26.99 misc. metal debris
10/13/96-3
40 39 47.04 -72 37 26.90 spanwise H4, LE1A 40 39 47.04 -72 37
26.90 piece
of horizontal stabilizer station 106.9-131.9; part of H4 and LE1A
8/23/96-15 40 39 47.04 -72 37 26.90 seat armrest marked Row
48 Seat 6
CABIN HGR 8/23/96-15 40 39 47.04 -72 37 26.90 human
remains 8/23/96-13 40
39 47.04 -72 37 26.90 wreckage labeled actuator rotary motor
part
#544646-1 8/23/96-15 40 39 47.04 -72 37 26.90 portion of
galley-per ALPA
representative CABIN HGR 8/23/96-15 40 39 47.04 -72 37
26.90 fuselage side
of body; FS 1393; LBL 98.58 to 110.5 8/23/96-15 40 39 47.04
-72 37 26.90
portion of galley container- CABIN HGR 8/23/96-15 40 39
47.04 -72 37 26.90
unidentified aircraft part PARTS BAY 8/23/96-15 40 39 47.04
-72 37 26.90
partial seat assembly marked row 43 seat 2 (armrest row 43 seat
1 and 2)
8/23/96-15 40 39 47.04 -72 37 26.90 portion of fuselage skin
PARTS BAY
8/23/96-15 40 39 47.04 -72 37 26.90 FS 1540-1600; stringer

35R-43R

8/23/96-15 40 39 47.04 -72 37 26.90 unidentified aircraft part

8/23/96-15

40 39 47.04 -72 37 26.90 unidentified aircraft part 8/23/96-15 40

39 47.04

-72 37 26.90 fuselage skin FS 1680-1700; stringer 42R-44R

8/23/96-15 40 39

47.04 -72 37 26.90 portion of galley- CABIN HGR 8/23/96-15

40 39 47.04 -72

37 26.90 seat 51 (6); armrest and partial frame CABIN HGR 40

39 47.04 -72

37 26.90 misc clothing and personal effects 8/23/96-1 40 39

47.04 -72 37

26.90 DHL package and misc papers 8/23/96-1 40 39 47.04 -72

37 26.90 misc

clothing and personal effects 8/23/96-1 40 39 47.04 -72 37 26.90

possible

human bone 8/23/96-13 40 39 47.04 -72 37 26.90 misc clothing

and personal

effects 8/23/96-1 40 39 47.04 -72 37 26.90 one small photograph

album

8/23/96-1 40 39 47.04 -72 37 26.90 possible human bone

8/23/96-13 40 39

47.04 -72 37 26.90 misc clothing and personal effects 8/23/96-13

40 39

46.81 -72 37 26.86 body part 8/21/96-6 40 39 46.81 -72 37 26.86

suitcase

with misc. personal effects 8/21/96-6 40 39 46.81 -72 37 26.86

chair part

row 35 seat 3 CABIN HGR 8/22/96-5 40 39 46.81 -72 37 26.86

chair part;

armrest 54-6,7 8/22/96-5 40 39 46.81 -72 37 26.86 partial head

skull 40 39

46.81 -72 37 26.86 FS 2020-2160 stringer 41L - 45R 8/22/96-5
40 39 46.81
-72 37 26.86 suitcase and misc. personal effects 8/22/96-4 40 39
46.81 -72
37 26.86 personal effects 8/22/96-4 40 39 46.81 -72 37 26.86
misc.
personal effects 8/22/96-4 40 39 46.81 -72 37 26.86 bone part 40
39 46.81
-72 37 26.86 stringer 8/22/96-5 40 39 54.24 -72 37 26.84 debris
10/07/96-1
C2110 40 39 48.32 -72 37 26.81 fuel line tubing: seat 53-7
CABIN HGR 40 39
46.40 -72 37 26.80 scavenge pump 40 39 51.30 -72 37 26.80
oxygen cylinder
9/24/96-16 40 39 46.40 -72 37 26.80 misc. debris 9/23/96-5 40
39 46.40 -72
37 26.80 CW SOB rib CW MOCKUP 40 39 46.40 -72 37 26.80
SWB #1 web right
hand closure panel CW MOCKUP 40 39 46.40 -72 37 26.80
SWB #1 web right
hand closure panel CW MOCKUP 40 39 46.40 -72 37 26.80
SWB #1 web right
hand closure panel CW MOCKUP 40 39 46.50 -72 37 26.80 2
pieces gray metal
40 39 46.40 -72 37 26.80 right SOB rib lower chord segment at
SWB #1 CW
MOCKUP 40 39 49.56 -72 37 26.73 row 30, seat 9-10 CABIN
HGR 40 39 45.60
-72 37 26.70 FS 2100-2280 stringer 23R-2R 40 39 46.60 -72 37
26.70 FS
1720-2018, stringer 27L-3R 40 39 51.33 -72 37 26.66 seats 23 (2
3) armrest
for 23 (1) CABIN HGR 8/23/96-1 40 39 55.63 -72 37 26.64

debris, wing
9/16/96-2 40 39 55.63 -72 37 26.64 right hand inboard flap
assembly
trailing edge with carriages (20'(10') 9/16/96-2 40 39 55.63 -72
37 26.64
piece of debris 9/20/96-33 40 39 46.89 -72 37 26.59 center fuel
tank gauge
40 39 46.89 -72 37 26.59 skin with stringer 40 39 46.89 -72 37
26.59
spanwise beam #1 - lower web at LBL 98 intercostal (wing
center section
intercostal) CW MOCKUP 40 39 46.89 -72 37 26.59 Wing Skin
1'(2' CW MOCKUP
40 39 46.89 -72 37 26.59 mid spar wing section 65B01036-17 40
39 46.89 -72
37 26.59 fuel tank probe CW504A 40 39 46.89 -72 37 26.59
front spar LH web
above access hole approx 8"(8" section CW MOCKUP 40 39
46.89 -72 37 26.59
seat 47 (6) armrest; seat 47 (7) seat CABIN HGR 40 39 46.89
-72 37 26.59
FS 1840-1920, stringer 47R-50R 8/22/96-5 40 39 46.89 -72 37
26.59 center
wing tank span 40 39 46.89 -72 37 26.59 misc. personal clothing
and
effects 8/25/96-1 40 39 46.89 -72 37 26.59 tail cone / APU
exhaust; FS
2742-2775 8/24/96-7 40 39 46.89 -72 37 26.59 Item of jewelry
and photo
8/25/96-7 40 39 46.89 -72 37 26.59 one human foot 8/25/96-1 40
39 46.89
-72 37 26.59 aft cargo door fragment 8/23/96-15 40 39 46.89 -72
37 26.59

cargo bin structure CARGO BAY 8/22/96-5 40 39 46.89 -72 37
26.59 cargo
container CARGO BAY 8/22/96-5 40 39 46.89 -72 37 26.59
landing gear
actuator 8/22/96-5 40 39 46.89 -72 37 26.59 piece of cargo door
8/22/96-5
40 39 46.89 -72 37 26.59 FS 940-1000; stringer 35L-39L with
piece of
bulkhead under wing front spar 8/22/96-5 40 39 46.89 -72 37
26.59 inner
sleeve for hydraulic actuator 8/22/96-5 40 39 46.89 -72 37 26.59
seat 29
(1) armrest, seat 29 (2) seat CABIN HGR 8/22/96-5 40 39 46.89
-72 37 26.59
left wing, rear spar, inboard end 8/22/96-5 40 39 46.89 -72 37
26.59 TWA
flight attendant jacket 8/22/96-4 40 39 46.89 -72 37 26.59 misc
personal
clothing and effects 8/22/96-4 40 39 46.89 -72 37 26.59 cargo
bin ball
matt - CARGO BAY 8/22/96-5 40 39 46.89 -72 37 26.59 portion
of cargo bin
flooring CARGO BAY 8/22/96-5 40 39 46.89 -72 37 26.59 seat -
Row 50 seat 3
CABIN HGR 8/22/96-5 40 39 46.89 -72 37 26.59 armrest 51(7)
and partial
seat assembly CBN INT 8/24/96-7 40 39 46.89 -72 37 26.59 seat
41 (8)
armrest cap 8/24/96-7 40 39 46.89 -72 37 26.59 armrest, Row 47
Seat 9 40
39 46.89 -72 37 26.59 landing gear actuator 8/22/96-5 40 39
46.89 -72 37
26.59 library card 8/22/96-4 40 39 46.89 -72 37 26.59 one piece

of luggage

8/22/96-4 40 39 46.89 -72 37 26.59 one piece of luggage

8/22/96-4 40 39

46.89 -72 37 26.59 misc clothing 8/22/96-4 40 39 46.89 -72 37

26.59 2 US

mail bags 8/22/96-4 40 39 46.89 -72 37 26.59 2 pieces of

luggage + misc

personal effects 8/22/96-4 40 39 46.89 -72 37 26.59 lower belly

skin

8/22/96-5 40 39 46.89 -72 37 26.59 misc. personal clothing + ID

credit

card 8/22/96-4 40 39 46.89 -72 37 26.59 one lap top computer

8/22/96-4 40

39 46.89 -72 37 26.59 piece of skull 40 39 46.89 -72 37 26.59

small blue

pack containing French passport + US currency 8/22/96-4 40 39

46.89 -72 37

26.59 check book 8/22/96-4 40 39 46.89 -72 37 26.59 one piece

of luggage

8/22/96-4 40 39 46.89 -72 37 26.59 misc clothing 8/22/96-4 40

39 46.89 -72

37 26.59 2 US mail bags 8/22/96-4 40 39 46.89 -72 37 26.59 one

piece of

Luggage w/"TWA" cap visible 8/22/96-4 40 39 46.89 -72 37

26.59 body parts

40 39 46.89 -72 37 26.59 unidentified aircraft wreckage

8/22/96-5 40 39

46.89 -72 37 26.59 rib FS 1620 8/24/96-7 40 39 46.89 -72 37

26.59 waist

garment chain (charred) 8/22/96-4 40 39 46.89 -72 37 26.59 right

hand side

aft bulk cargo door lower section 8/23/96-15 RF109D 40 39

46.89 -72 37

26.59 FS1620-1660 stringer 30R-33R 8/24/96-7 40 39 46.89 -72
37 26.59
piece of aircraft fuselage 8/22/96-5
C2126 40 39 46.89 -72 37 26.59 Row 53 Seat 8 40 39 46.89 -72
37 26.59
aircraft wreckage labeled rotary actuator TUBING BAY
8/22/96-5 40 39 46.89
-72 37 26.59 shutoff bleed valve 40 39 46.89 -72 37 26.59
aircraft
wreckage labeled "water separator" 8/22/96-5 40 39 46.89 -72 37
26.59
unidentified aircraft wreckage 8/22/96-5 40 39 46.89 -72 37
26.59
unidentified aircraft wreckage 8/22/96-5 40 39 46.89 -72 37
26.59 a/c 1/2"
tubing TUBING BAY 8/22/96-5 40 39 46.89 -72 37 26.59
aircraft tire/wheel
8/22/96-5 40 39 46.89 -72 37 26.59 unidentified aircraft
wreckage
8/22/96-5 40 39 46.89 -72 37 26.59 unidentified aircraft
wreckage
8/22/96-5 40 39 46.89 -72 37 26.59 aircraft wreckage TUBING
BAY 8/25/96-1
40 39 46.89 -72 37 26.59 one (1) dollar bill US currency
8/25/96-1 40 39
46.89 -72 37 26.59 flap drive tube PARTS BAY 8/22/96-5 40 39
46.89 -72 37
26.59 8/22/96-5 40 39 46.89 -72 37 26.59 8/22/96-5 40 39 46.89
-72 37
26.59 wheel well structure 8/22/96-5 40 39 46.89 -72 37 26.59
piece of
fuselage 8/22/96-5 40 39 46.89 -72 37 26.59 seat 49 (4) armrest
8/24/96-7

40 39 46.89 -72 37 26.59 possible seat part CABIN HGR
8/22/96-5 40 39
46.89 -72 37 26.59 unidentified wreckage 8/22/96-5 40 39 46.89
-72 37
26.59 piece of clear plastic to which foot was attached 8/25/96-1
40 39
46.89 -72 37 26.59 partial seat assembly; seat 34 (2) 8/24/96-7
40 39
46.89 -72 37 26.59 left main landing gear air ducting for air start
(with
small hinged door marked "pneumatic ground se 8/24/96-7 40 39
46.89 -72 37
26.59 FS 1620 rib 8/24/96-7 40 39 46.89 -72 37 26.59 seat 32 (1)
armrest
CBN INT 8/24/96-7 40 39 46.89 -72 37 26.59 seats 33 (4 5 6 7)
CABIN HGR
8/24/96-7 40 39 46.89 -72 37 26.59 FS 2140-2160; stringer 23R -
35R
8/24/96-7 40 39 46.89 -72 37 26.59 rib for wing 8/24/96-7 40 39
46.89 -72
37 26.59 8/22/96-5 40 39 46.89 -72 37 26.59 Aircraft Wreckage
8/23/96-15
40 39 46.89 -72 37 26.59 misc. personal effects and clothing
8/25/96-1 40
39 46.89 -72 37 26.59 misc. paper, magazines and other debris
8/25/96-5 40
39 46.89 -72 37 26.59 Portion of Meal cart 8/23/96-15 40 39
46.89 -72 37
26.59 Aircraft Wreckage 40 39 46.89 -72 37 26.59 Aircraft
Wreckage
8/23/96-15 40 39 46.89 -72 37 26.59 FS 1725-1820, stringer
44R-50R
8/23/96-15

C1008 40 39 46.89 -72 37 26.59 aircraft part with wires attached
8/23/96-15 40 39 46.89 -72 37 26.59 fuselage skin (per ALPA
representative) PARTS BAY 8/23/96-15 40 39 46.89 -72 37
26.59 seat 32 (8 9
10) seat backs CABIN HGR 8/23/96-15 40 39 46.89 -72 37
26.59 Apparent
partial speaker assembly (aircraft wreckage) 8/23/96-15 40 39
46.89 -72 37
26.59 two (2) bone fragments with some tissue attached
8/25/96-1 40 39
46.89 -72 37 26.59 Aircraft Wreckage 40 39 46.89 -72 37 26.59
partial seat
assembly marked row 51 seat 9 CABIN HGR 8/23/96-15 40 39
46.89 -72 37
26.59 FS 1760-1780, stringer 43R-45R 8/23/96-15 40 39 46.89
-72 37 26.59
right main wheel well; FS 1460; (body steering harness included)
8/24/96-7
40 39 46.89 -72 37 26.59 seat assembly marked row 53 seat 10
CABIN HGR
8/23/96-15 40 39 46.89 -72 37 26.59 portion of cargo container
CARGO BAY
8/23/96-15 40 39 46.89 -72 37 26.59 piece of horizontal
stabilizer
8/23/96-15 40 39 46.89 -72 37 26.59 aircraft part marked FS
1660
8/23/96-15 40 39 46.89 -72 37 26.59 partial seat assembly
marked row 38
seat 3 8/23/96-15 40 39 46.89 -72 37 26.59 apparent container
portion
marked "TWA" bearing number 7501 CARGO BAY 8/23/96-15
40 39 46.89 -72 37
26.59 armrest marked Row 50 Seat 7 8/23/96-15 40 39 46.89 -72

37 26.59

aircraft wreckage 8/23/96-15 40 39 46.89 -72 37 26.59 misc.
personal

clothing and effects 8/25/96-1 40 39 46.89 -72 37 26.59 misc
clothing and

personal effects 40 39 46.89 -72 37 26.59 unidentified piece of
aircraft

wreckage 8/23/96-15 40 39 46.89 -72 37 26.59 six bones - all
found in same

proximity 8/25/96-1 40 39 46.89 -72 37 26.59 2 bags marked
"US Postal

Service" 8/25/96-1 40 39 46.89 -72 37 26.59 1 Bundle of Blue
Jeans

8/25/96-1 40 39 46.89 -72 37 26.59 Mail Bag, Misc. Personal
Effects

8/25/96-1 40 39 46.89 -72 37 26.59 Blue Jean Pants From
Bundle 8/25/96-1

40 39 46.89 -72 37 26.59 FS 1540-1620; stringer 24R-31R

8/23/96-15 40 39

46.89 -72 37 26.59 one (1) one-hundred dollar bill; one (1) fifty
dollar

bill; One (1) twenty dollar bill (all US Currency) 8/25/96-1 40 39
46.89

-72 37 26.59 one bone approx. 8" long with black discoloration
about 1/2

of bones length 8/25/96-1 40 39 46.89 -72 37 26.59 one possible
bone

fragment 8/25/96-1 40 39 46.89 -72 37 26.59 Personal effects
including

various forms of identification and photographs 8/25/96-1 40 39
46.89 -72

37 26.59 aircraft wreckage 8/23/96-15 40 39 46.89 -72 37 26.59
misc.

personal clothing and effects 8/25/96-1 40 39 46.89 -72 37 26.59
possible
human bones and tissue 8/25/96-1 40 39 46.89 -72 37 26.59 FS
1680-1800;
stringer 46L - 50R 8/23/96-15 40 39 46.89 -72 37 26.59 misc
personal
effects and clothing 8/25/96-1 40 39 46.89 -72 37 26.59 1 photo
ID), 1
photo album, 1 broken JVC tape cassette 8/25/96-1
C1048 40 39 46.89 -72 37 26.59 portion of fore support joist
marked "STA
1980" PARTS BAY 8/24/96-7 40 39 46.89 -72 37 26.59 1 Bundle
of Blue Jeans
8/25/96-1 40 39 46.89 -72 37 26.59 one possible human tooth
(located on
cargo net during loading of M boat) 8/25/96-1 40 39 46.89 -72
37 26.59
Misc. Personal effects and clothing 8/25/96-1 40 39 46.89 -72 37
26.59
possible piece of luggage with apparent charring 8/25/96-6 40 39
46.89 -72
37 26.59 Blue Jean Pants From Bundle 8/25/96-1 40 39 46.89
-72 37 26.59
Blue Jean Pants From Bundle 8/25/96-1 40 39 46.89 -72 37
26.59 aircraft
wreckage 8/23/96-15 40 39 46.89 -72 37 26.59 seat 51 (5)
armrest, CABIN
HGR 40 39 46.89 -72 37 26.59 unidentified piece of wreckage
8/26/96-36 40
39 46.89 -72 37 26.59 seat 46 (4) armrest, CABIN HGR 40 39
46.89 -72 37
26.59 fuselage skin under body fairing, stringer 34 40 39 46.89
-72 37

26.59 LE2B is portion of LHS outboard elevator from ES FS
335-385
8/26/96-36 40 39 46.89 -72 37 26.59 unidentified piece of
wreckage marked
"STA 1820" 8/26/96-36 40 39 46.89 -72 37 26.59 seat 48 (5)
armrest, CABIN
HGR 40 39 46.89 -72 37 26.59 partial seat assembly 8/24/96-7
40 39 46.89
-72 37 26.59 FS 1800 frame segment; stringer 6L-14L 8/22/96-5
40 39 46.89
-72 37 26.59 seat 53 (4) arm rest, CABIN HGR 40 39 46.89 -72
37 26.59 seat
53 (6) arm rest, CABIN HGR 40 39 46.89 -72 37 26.59
unidentified aircraft
wreckage 8/24/96-7 40 39 46.89 -72 37 26.59 apparent top of
cargo bay -
8/24/96-7 40 39 46.89 -72 37 26.59 partial seat assembly marked
"ROW 36
SEAT 7" 8/24/96-7 40 39 46.89 -72 37 26.59 seat 36 (5) armrest,
CABIN HGR
8/8/96-31 40 39 46.89 -72 37 26.59 partial cargo container
8/24/96-7 40 39
46.89 -72 37 26.59 seat 47 (8) armrest, CABIN HGR 40 39
46.89 -72 37 26.59
FS 2725-2742, part of RH APU access door hinge 40 39 46.89
-72 37 26.59 FS
1438-1460 stringer 28L-29L 8/23/96-15 40 39 46.89 -72 37
26.59 human
remains 8/23/96-13 40 39 46.89 -72 37 26.59 insulation material
containing
possible human bones 8/23/96-13 40 39 46.89 -72 37 26.59 misc
clothing
8/23/96-13 40 39 46.89 -72 37 26.59 misc clothing and personal

effects

8/23/96-1 40 39 46.89 -72 37 26.59 bag marked US mail

8/23/96-13 40 39

52.85 -72 37 26.54 1 large piece of twisted metal; 1 window and seal; 1

small piece of twisted metal 9/11/96-5 40 39 52.85 -72 37 26.54

CW tank

midspar web LBL 52-78 CW MOCKUP 40 39 52.85 -72 37

26.54 4.5-5' (2-3'

piece of skin (red/white & green metal) 10/02/96-1 40 39 52.85 -72 37

26.54 camera, black notebook, various sizes of green, gray, yellow metal

pieces, woven belt 10/02/96-1

Z3227 40 39 52.85 -72 37 26.54 thin metal (meshed) interior

(seat arm

rest), 1 tube colgate toothpaste, approx. 1'(6" gray metal pie

10/02/96-1

40 39 52.85 -72 37 26.54 debris- airplane/metal debris w/plastic bag

attached w/debris in it also 10/02/96-1 40 39 46.70 -72 37 26.50

small

body parts 8/30/96-23 40 39 46.70 -72 37 26.50 misc. debris

from aircraft

PARTS BAY 8/30/96-23 40 39 46.70 -72 37 26.50 personal items

including a

black Casio watch 8/30/96-23 40 39 46.70 -72 37 26.50 FS

2018-2040, with

partial window 40 39 46.70 -72 37 26.50 misc debris from

aircraft PARTS

BAY 40 39 46.70 -72 37 26.50 wire bundle 8/30/96-23 40 39

46.70 -72 37

26.50 personal effects - black reading glasses 40 39 46.70 -72 37

26.50

misc metal from aircraft 8/31/96-4 40 39 46.70 -72 37 26.50

Triple A Card

40 39 46.70 -72 37 26.50 black cover of the Holy Bible 40 39

46.70 -72 37

26.50 FS 920-1000, stringer 29R-34R CW MOCKUP 8/30/96-23

40 39 46.70 -72

37 26.50 seat 47 (4) armrest CABIN HGR 40 39 50.20 -72 37

26.50 debris

9/22/96-1 40 39 46.70 -72 37 26.50 seat 46 (9) armrest only

CABIN HGR 40

39 46.15 -72 37 26.49 #4 engine pylon section ENG HGR

8/19/96-22 40 39

46.15 -72 37 26.49 left wing lower skin LWS 1030-1230; front spar aft to

S1 8/17/96-7 40 39 46.15 -72 37 26.49 aft spar WS 400 No. 2

tank outboard

jettison 40 39 46.15 -72 37 26.49 leading edge left wing with leading edge

flap; part of edge flap 8/19/96-22 40 39 46.15 -72 37 26.49 Main Landing

Gear Strut with tires 1F, 1R, 2R 8/17/96-7 40 39 46.15 -72 37

26.49

miscellaneous cabin interior parts CABIN HGR 8/19/96-22 40

39 46.15 -72 37

26.49 seat 36 (3) CABIN HGR 8/19/96-22 40 39 46.15 -72 37

26.49 window

reveal 8/19/96-22 40 39 46.15 -72 37 26.49 hydraulic lines

TUBING BAY

8/19/96-22 40 39 46.15 -72 37 26.49 wing structure part of

hydraulic area

8/17/96-7 40 39 46.15 -72 37 26.49 miscellaneous Payne Webber

paper

reports 8/19/96-16 40 39 46.15 -72 37 26.49 clothing, life vest,
suitcase
8/19/96-20 40 39 46.15 -72 37 26.49 personal effects, 8/19/96-16
40 39
46.15 -72 37 26.49 2 bags of US Mail 8/19/96-16 40 39 46.15
-72 37 26.49
wing ribs 8/19/96-22 40 39 46.15 -72 37 26.49 FS 1920 crown
frame (C891)
40 39 46.15 -72 37 26.49 fuselage station 1319 8/16/96-5 40 39
46.15 -72
37 26.49 left wing up skin; LWS 771-808 with front span cap
(skin segment
(C891)) 40 39 46.15 -72 37 26.49 Lot - Misc Pieces Interior
CABIN HGR 40
39 46.15 -72 37 26.49 Piece of door with handle - L5 door
C2012 40 39 46.15 -72 37 26.49 seat 51 (8) armrest and tray
table CABIN
HGR 8/06/96-46 40 39 46.15 -72 37 26.49 duct 8" dia. (C891)
40 39 46.15
-72 37 26.49 personal effects; wallet 8/19/96-22 40 39 46.15 -72
37 26.49
row 49 seat 8 armrest CBN HGR 8/18/96-6 40 39 46.15 -72 37
26.49 wing
stringer (C891) 40 39 46.15 -72 37 26.49 miscellaneous parts
8/19/96-22 40
39 46.15 -72 37 26.49 wing skin piece 2' (1' (C891) 40 39 46.15
-72 37
26.49 rib (C891) 40 39 46.15 -72 37 26.49 rear spar segment WS
450.00
(C891) 40 39 46.15 -72 37 26.49 FS 920-1000; stringer S 24-28
(C891)
8/18/96-6 40 39 46.15 -72 37 26.49 FS 1235 WL 168 RBL 87
(C891) 40 39

46.15 -72 37 26.49 upper skin @ side body (C891) 40 39 46.15
-72 37 26.49
left wing #1 flap carriage (C891) (See C229) 40 39 46.15 -72 37
26.49 wing
spar segment (C891) CW108, CW 40 39 46.15 -72 37 26.49
upper CW LH splice
S14 (M.S.) (CW108); mid spar - 3' portion of LBL 127.5 fitting;
this part
is part CW MOCKUP 8/18/96-6 40 39 46.15 -72 37 26.49 wing
front spar left
lower center section CW MOCKUP 40 39 46.15 -72 37 26.49
wing rib (C891)
PARTS BAY 40 39 46.15 -72 37 26.49 rear spar WS 522.00
(C891) 40 39 46.15
-72 37 26.49 stringer 7-13; upper left hand splice body to center
wing LBL
127.5(C891) CW MOCKUP 40 39 46.15 -72 37 26.49 hydraulic
return filter
wheel well area (C891) 40 39 46.15 -72 37 26.49 vent line
18" (C891) 40 39
46.15 -72 37 26.49 cargo container (C891) CARGO BAY 40 39
46.15 -72 37
26.49 12" (3" wing skin (C891) 40 39 46.15 -72 37 26.49
miscellaneous
clothing 8/19/96-22 40 39 46.15 -72 37 26.49 miscellaneous
human rib bones
40 39 46.15 -72 37 26.49 APU firewall segment 8/18/96-6 40 39
46.15 -72 37
26.49 personal effects 8/18/96-4 40 39 46.15 -72 37 26.49 left
wing
outboard aileron section and wing bulkhead WS 1325-1390
8/18/96-4 40 39
46.15 -72 37 26.49 left lower wing skin WS 520-660 8/18/96-6

40 39 46.15
-72 37 26.49 lower left wing skin; WS 525-690 8/18/96-6 40 39
46.15 -72 37
26.49 #3 left flap track and carriage assembly 8/18/96-6 40 39
46.15 -72
37 26.49 FS 2484-2638, stringer 1R-17R 8/18/96-6 40 39 46.15
-72 37 26.49
left wing lower skin; (WS 650-1035; midspar to front spar)
8/18/96-6 40 39
46.15 -72 37 26.49 air cycle machine 8/18/96-6 40 39 46.15 72
37 26.49
8/18/96-6 40 39 46.15 -72 37 26.49 left wing up skin; LWS
586-688; from
STR 10 to midspar 8/18/96-6 40 39 46.15 -72 37 26.49 fuel
pump 8/18/96-6
40 39 46.15 -72 37 26.49 personal effects, 8/18/96-6 40 39 46.15
-72 37
26.49 wing ribs 8/19/96-22 40 39 46.15 -72 37 26.49 section of
wing flap
8/19/96-22 40 39 46.15 -72 37 26.49 miscellaneous wing parts
PARTS BAY
8/19/96-22 40 39 46.15 -72 37 26.49 fuel boost pump 8/19/96-22
40 39 46.15
-72 37 26.49 left wing #1 flap track 8/19/96-22 40 39 46.15 -72
37 26.49
long piece - misc parts 8/19/96-22 40 39 46.15 -72 37 26.49
spoiler
actuator, flap, gear box & misc wing structure & tubing;
MOTOR BAY
8/19/96-22 40 39 46.15 -72 37 26.49 lot- pieces of wing and fuel
tank WING
AREA 8/19/96-22 40 39 46.15 -72 37 26.49 left wing flap track
support LWBL

353 5-7 8/19/96-22 40 39 46.15 -72 37 26.49 miscellaneous parts
8/19/96-22
40 39 46.15 -72 37 26.49 miscellaneous wing parts 8/19/96-22
40 39 46.15
-72 37 26.49 wing stringer -lower panel 40 39 46.15 -72 37 26.49
fore flap
track Assy - outboard 40 39 46.15 -72 37 26.49 CW side body
chord - upper;
fits with C2176 CW MOCKUP LW15, CW 40 40 39 46.15 -72
37 26.49 left upper
wing skin at SOB S25-S33 CW MOCKUP 40 39 46.15 -72 37
26.49 Front spar
center section Web CW MOCKUP 40 39 46.15 -72 37 26.49
lower front spar
Side of Body outboard wing left CW MOCKUP 40 39 46.15 -72
37 26.49 left
lower wing skin panel segment; WS 860-902 8/19/96-22 40 39
46.15 -72 37
26.49 Row 37 Seat 4 armrest CABIN HGR 40 39 46.15 -72 37
26.49 front spar
web piece; center fuel tank CW MOCKUP 40 39 46.15 -72 37
26.49 spanwise
beam #3LBL 127.5 paddle fitting and web CW MOCKUP 40 39
46.15 -72 37 26.49
left lower wing skin; WS 650-760; STR 10-13 CW407A 40 39
46.15 -72 37
26.49 LH BL127.5 (SOB) rib stiff at mid spar (lower half) o/b
wing side
65B11557-3 CW MOCKUP 40 39 46.15 -72 37 26.49 SOB rib at
upper FS LH side
CW MOCKUP 40 39 46.15 -72 37 26.49 SOB rib at upper FS
LH side CW MOCKUP
CW407B 40 39 46.15 -72 37 26.49 LH BL127.5 (SOB) rib, stiff

at MS (upper
half) o/b wing side 65B11557-3 CW MOCKUP 40 39 46.15 -72
37 26.49 left
upper wing skin; LWS 499-528 from STR 4-7 8/19/96-22 40 39
46.15 -72 37
26.49 left upper wing up skin; WBL 470 to WS 791 from
midspar to STR 17
8/19/96-22 40 39 46.15 -72 37 26.49 FS 1319 WL 305 RBL 65
frame 40 39
46.15 -72 37 26.49 spar segment approximately 2' 40 39 46.15
-72 37 26.49
upper center wing skin piece; LH side at stringer 5-1; LBL
104-115 at
upper STR 5-1 CW MOCKUP 8/18/96-6 40 39 46.15 -72 37
26.49 upper CW left
hand splice stringer 17-28 CW MOCKUP 40 39 46.15 -72 37
26.49 ducting
SYSTEMS ARE 40 39 46.15 -72 37 26.49 lot - cargo area pieces
CARGO BAY
C2037 40 39 46.15 -72 37 26.49 Pylon Fairing - Right Wing
ENG HGR 40 39
46.15 -72 37 26.49 FS 1500 RBL 120 WL264 Framing 40 39
46.15 -72 37 26.49
FS 2000 Framing 40 39 46.15 -72 37 26.49 rear spar segment
WS 1007 to WS
1040 CW113, CW 40 39 46.15 -72 37 26.49 upper CW skin;
LBL 72-93; stringer
12-13; this part is part of CW113 & CW817 CW MOCKUP 40
39 46.15 -72 37
26.49 upper CW skin piece; LBL 6-29 stringer 20-21 CW
MOCKUP 40 39 46.15
-72 37 26.49 wing front spar fragment, possibly LHS WS 686
(Rear Spar

Segment approximately 2') 40 39 46.15 -72 37 26.49 front spar
LHS corner
fitting CW MOCKUP 40 39 46.15 -72 37 26.49 cw lower skin-
matches w/C2160.
LBL 104 STR 11.5-13.5 CW MOCKUP 40 39 46.15 -72 37
26.49 lot - fuel vent +
fuel feeds - several pieces FUEL ROOM 40 39 46.15 -72 37
26.49 left lower
wing skin; WS 660-734; stringer S5-S8 8/19/96-22 40 39 46.15
-72 37 26.49
wing and tank parts small debris 40 39 46.15 -72 37 26.49 front
spar LH
terminal fitting piece CW MOCKUP 40 39 46.15 -72 37 26.49
left upper wing
skin LWS 670-725 with front spar to S23 8/19/96-22 40 39 46.15
-72 37
26.49 upper CW skin; LBL 107.5-118.5; upper STR 3; center
fuel tank CW
MOCKUP 8/18/96-6 40 39 46.15 -72 37 26.49 front spar, lower
dry bay access
hole CW MOCKUP 40 39 46.15 -72 37 26.49 front spar- LH
web SOB above
access hole CW MOCKUP 40 39 46.15 -72 37 26.49 cw lower
skin-fwd left
corner CW MOCKUP 40 39 46.15 -72 37 26.49 front spar lower
dry bay access
hole CW MOCKUP 40 39 46.15 -72 37 26.49 center fuel tank
stiffener, side
of body, left hand S3 upper S2 lower CW MOCKUP 40 39 46.15
-72 37 26.49
left upper wing skin WS 780-804 from stringer 22 to forward
edge of panel
8/18/96-6 CW1013 40 39 46.15 -72 37 26.49 upper rear spar web

40 39 46.15
-72 37 26.49 left wing #3 trailing edge flap drive gear box
8/19/96-22 40
39 46.15 -72 37 26.49 center wing tank lower 40 39 46.15 -72 37
26.49
center fuel tank left hand near rear spar 40 39 46.15 -72 37 26.49
FS
1260-1280 stringer 28L-31L 8/18/96-6 40 39 46.15 -72 37 26.49
center wing
tank spanwise beam 40 39 46.15 -72 37 26.49 cw mid spar
stiffener BL 11L
CW MOCKUP 40 39 46.15 -72 37 26.49 center wing tank LH
side of body, upper
span wise beam 1 40 39 46.15 -72 37 26.49 seat 43 (8) armrest
and partial
frame CABIN HGR 40 39 46.15 -72 37 26.49 SOB rib segment
CW MOCKUP 40 39
46.15 -72 37 26.49 seat 41 (3) CABIN HGR 40 39 46.15 -72 37
26.49 SOB rib
segment @ SWB #1 CW MOCKUP 40 39 46.15 -72 37 26.49
left wing front spar
ILES 280-440 40 39 46.15 -72 37 26.49 SOB rib segment, in line
w/ S-7 LWR
CW MOCKUP 40 39 46.15 -72 37 26.49 SOB rib segment CW
MOCKUP
C2368 40 39 46.15 -72 37 26.49 seat 41 (6 7) CABIN HGR 40
39 46.15 -72 37
26.49 right side CW upper skin CW MOCKUP 40 39 46.15 -72
37 26.49 left SOB
web CW MOCKUP 40 39 46.15 -72 37 26.49 TWA blue
passenger blanket and misc
personal clothing 8/19/96-22 40 39 46.15 -72 37 26.49 TWA blue
passenger

blanket with clear plastic material that was attached to it
8/19/96-22 40
39 46.15 -72 37 26.49 one Nikon one touch 100 camera
8/19/96-22 40 39
46.15 -72 37 26.49 center wing tank upper skin stringers 3-6 CW
MOCKUP 40
39 46.15 -72 37 26.49 left sob web BBL 127.5 CW MOCKUP 40
39 46.15 -72 37
26.49 left SOB rib stiffener free FLG + web - 14" long CW
MOCKUP 40 39
46.15 -72 37 26.49 CW upper skin LBL 98 @ S-16 CW
MOCKUP 8/19/96-22 40 39
46.15 -72 37 26.49 wing gear door rt side 8/19/96-22 40 39 46.15
-72 37
26.49 left upper wing skin WS 766-780; stringer 24-25
8/19/96-22 40 40
03.70 -72 37 26.40 stainless steel tubing 10/17/96-1 40 40 01.53
-72 37
26.34 skin yellow (4'(1') 10/17/96-1 40 39 44.90 -72 37 26.30
misc.
wreckage balance of cargo net 9/12/96-2 40 39 44.75 -72 37
26.20 landing
gear strut 10' long 9/11/96-4 40 39 44.75 -72 37 26.20 CW upper
skin M.S.
to SWB #1, LBL 45 - LBL 98 CW MOCKUP 9/11/96-4 40 39
44.75 -72 37 26.20
left wing flap track actuator #2 9/11/96-4 40 39 44.75 -72 37
26.20 CW
stringer 40 39 44.75 -72 37 26.20 CW spar 40 39 44.75 -72 37
26.20 center
section stringer 40 39 50.60 -72 37 26.20 misc. debris 9/22/96-1
40 39
58.97 -72 37 26.18 aircraft skin with red paint 10/17/96-1 40 39

46.40 -72
37 26.10 15' ft curved metal piece 9/20/96-33 40 39 46.40 -72 37
26.10
misc. debris in cargo net 9/20/96-33 40 39 46.40 -72 37 26.10
miscellaneous metal debris 9/20/96-33 40 39 48.70 -72 37 26.10
1 arm rest
and misc. debris 9/22/96-1 40 39 46.40 -72 37 26.10 1 cargo net
full of
miscellaneous debris 9/20/96-33 40 39 46.40 -72 37 26.10 3
pieces of fuel
probes 9/20/96-33 40 39 46.40 -72 37 26.10 cargo net full of
misc. debris
9/20/96-33 CW1017 40 39 46.40 -72 37 26.10 CW rear spar
stiffener and web
-LBL 98 (9-20-96-33) CW MOCKUP 40 39 46.40 -72 37 26.10
3 sections of
probable fuel probes 9/20/96-33 40 39 46.40 -72 37 26.10 SOB
rib lower
cord (9-20-96-33) CW MOCKUP 40 39 46.40 -72 37 26.10 SOB
rib segment CW
MOCKUP 40 39 46.40 -72 37 26.10 SOB rib segment CW
MOCKUP 40 39 46.40 -72
37 26.10 SOB rib segment CW MOCKUP
Z2801 40 39 46.40 -72 37 26.10 left SOB top edge of rib CW
MOCKUP 40 39
46.40 -72 37 26.10 CW upper skin tension fittings @ SWB #1,
3" (6" LBL 98
CW MOCKUP 40 39 46.40 -72 37 26.10 left SOB top edge of
rib CW MOCKUP 40
39 46.40 -72 37 26.10 mid spar web, LBL 97-105, 9'(12' CW
MOCKUP 40 39
46.40 -72 37 26.10 right SOB web, just below CW310 CW
MOCKUP 40 39 46.40

-72 37 26.10 left SOB top edge of rib CW MOCKUP 40 39
46.08 -72 37 26.07
lower center wing skin panel; LBL 127; stringer 2-5; Lot #
9-21-96-1 CW
MOCKUP 40 39 46.08 -72 37 26.07 FS 1700-1760; stringer
26R-28R 9/21/96-1
40 39 46.06 -72 37 26.07 debris (1 cargo net) 9/21/96-1 40 39
46.08 -72 37
26.07 fuselage skin under body fairing; stringer 37L; Lot #
9-21-96-1
9/21/96-1 40 39 48.10 -72 37 26.00 misc metal debris 9/20/96-33
40 39
56.15 -72 37 25.96 two 5' long pieces of debris, plastic bag of
debris
10/07/96-1 40 39 45.25 -72 37 25.86 misc. metal & plastic pieces
10/17/96-1 40 39 48.50 -72 37 25.70 debris 9/21/96-1 40 39
46.06 -72 37
25.62 green & gray metal piece 10/17/96-1 40 39 51.70 -72 37
25.50 misc.
debris; wire 9/23/96-5 40 39 45.20 -72 37 25.50 gray green piece
of
wreckage 9/12/96-2 40 39 45.20 -72 37 25.50 stringer 34; Lot #
9-12-96-2
9/12/96-2 40 39 51.70 -72 37 25.50 long metal debris 9/23/96-5
40 39 51.70
-72 37 25.50 SOB rib web CW MOCKUP 40 39 48.70 -72 37
25.50 left lower
wing skin (6'(8')); WS 1335-1450; stringer s4 to mid spar
9/22/96-1 40 39
45.20 -72 37 25.50 center wing tank LH side of body lower
spanwise beam 1
40 39 51.70 -72 37 25.50 misc. debris 9/23/96-5 CW1014 40 39
45.20 -72 37

25.50 Left butt line 98 rear spar stiffener CW1015 40 39 45.20
-72 37
25.50 Aft left rear spar pickle fork, upper rear spar kik fitting CW
MOCKUP 40 39 45.20 -72 37 25.50 upper CW tank wing skin
@ side of body 4"
(6" CW MOCKUP 40 39 45.20 -72 37 25.50 left SOB web CW
MOCKUP 40 39 46.50
-72 37 25.50 gray metal "T" bar 40 39 51.70 -72 37 25.50 mid
spar web RBL
112-116, 7'(6' CW MOCKUP 40 39 45.20 -72 37 25.50 left SOB
rib upper
stiffener between SWB #2 & mid spar CW MOCKUP 40 39
46.50 -72 37 25.50
fuel probe 40 39 31.66 -72 37 25.49 misc. green metal.
10/17/96-1 40 39
31.66 -72 37 25.49 marked "M LAV DOOR" 10/17/96-1 40 39
48.71 -72 37 25.32
gray metal panel 10/17/96-1 40 39 53.78 -72 37 25.31 debris
10/07/96-1 40
39 46.50 -72 37 25.30 misc metal debris 9/20/96-33
Z2664 40 39 47.72 -72 37 25.28 seat 34 (7) armrest CABIN
HGR 40 39 46.45
-72 37 25.21 1) "L" shaped green metal piece 2) 4' long gray
metal
9/09/96-49 40 39 48.60 -72 37 25.20 misc metal debris
9/20/96-33 40 39
46.50 -72 37 25.20 metal pump 8"(8"; pump/gear box with
brackets 9/12/96-2
40 39 46.50 -72 37 25.20 green metal strip beam 10/17/96-1 40
39 47.00 -72
37 25.10 small motor and/or pump, "27 - 1061" 9/09/96-49 40 39
49.02 -72
37 25.09 left hand SOB stiffener CW MOCKUP 40 39 49.02 -72

37 25.09 right
hand SOB stiffener CW MOCKUP 40 39 49.02 -72 37 25.09 CW
stringer 22 RH
end CW MOCKUP 40 39 49.02 -72 37 25.09 upper center
section stringer, LBL
11.3 - RBL 76 CW MOCKUP 40 39 49.02 -72 37 25.09 debris
9/21/96-1 40 39
49.02 -72 37 25.09 1 cargo net of debris (fuel probe, personal
effects)
9/21/96-1 40 39 49.02 -72 37 25.09 debris 9/21/96-1 40 39 49.02
-72 37
25.09 debris 9/21/96-1 Z3351a 40 39 49.01 -72 37 25.07
personal effects
(camera and wallet) 40 39 49.01 -72 37 25.07 human remains -
skull
fragment 9/21/96-1 40 39 49.00 -72 37 25.05 long piping debris
9/22/96-1
40 39 49.00 -72 37 25.05 debris (1 cargo net); camera, mini
cassette
9/22/96-1 40 39 49.00 -72 37 25.05 RH SOB rib 24" portion of
lwr chord FS
1058 - 1082 CW MOCKUP 9/22/96-1 40 39 49.00 -72 37 25.05
RH SOB rib 13"
portion of lwr chord FS 1039 - 1052 CW MOCKUP 9/22/96-1
40 39 49.00 -72 37
25.05 RH SOB rib 26" of inbd & outbd mipspar stiffener CW
MOCKUP 9/22/96-1
40 39 47.50 -72 37 25.00 misc metal debris 9/20/96-33 40 39
49.70 -72 37
25.00 sink; green oxygen bottle; debris 9/21/96-1 40 39 45.90
-72 37 24.90
actuator w/ motor; 4'-5' long piece of wreckage; 2'-3' long piece
of metal

9/12/96-2 40 40 02.70 -72 37 24.90 airvent 10/17/96-1 40 39
46.30 -72 37
24.80 lower panel out board wing (6' (2' section of wing)
9/09/96-49 40
39 42.60 -72 37 24.80 rectangular piece of metal approx. 5' (2.5'
9/11/96-4 40 39 42.60 -72 37 24.80 left wing WS 523 9/11/96-4
40 39 45.40
-72 37 24.80 MED 3L cutout skin, lower part FS 1250-1241
stringer
24.5L-28.5L 9/12/96-2 40 39 42.60 -72 37 24.80 squared 3-D
green piece of
metal 9/11/96-4 40 39 42.60 -72 37 24.80 metal with rivet holes
and
stripes 9/11/96-4 40 39 45.40 -72 37 24.80 hydraulic shaft w/
metal body
9/12/96-2 40 39 45.40 -72 37 24.80 circular metal piece w/ arm
9/12/96-2
40 39 45.40 -72 37 24.80 gray/green tube w/ gears on end 2' long
9/12/96-2
40 39 45.40 -72 37 24.80 left mid-spar fitting at double plus
chord CW
MOCKUP 40 39 45.40 -72 37 24.80 gray/green piece of
wreckage 1.5'(4.5'
9/12/96-2
Z3066 40 39 42.60 -72 37 24.80 9/11/96-4 40 39 45.40 -72 37
24.80 misc.
items contained in cargo net 9/12/96-2 40 39 55.75 -72 37 24.76
7' (5'
piece of debris, plastic bag of debris 10/07/96-1 40 39 44.70 -72
37 24.70
pump w/ hoses and large section of wing 9/12/96-2 40 39 47.40
-72 37 24.60
small debris which fell from larger pieces on deck 8/15/96-8 40

39 47,40
-72 37 24.60 top fwd, right and center; stringer 22 to front spar,
LBL 33
to RBL 127.5 CW MOCKUP 8/15/96-8 40 39 47.40 -72 37 24.60
bag US Mail
foreign - unopened 8/15/96-8 40 39 47.40 -72 37 24.60 wing
front spar at
station 778 - fragment 8/15/96-8 40 39 47.40 -72 37 24.60 right
hand upper
wing segment, front spar to mid spar WS 1186-1280 8/15/96-8
40 39 47.40
-72 37 24.60 FS 2638-2709, stringer 7R-4L 8/15/96-8 40 39
47.40 -72 37
24.60 BLO web body gear wheel well 8/15/96-8 RF37, CW51 40
39 47.40 -72 37
24.60 FS 930-1065; stringer 10R-27R; CW front spar - RH web
and stiffener
with window frame (upper R CW MOCKUP 8/15/96-8 40 39
45.60 -72 37 24.60 5'
pointy green metal piece 9/09/96-49 40 39 45.00 -72 37 24.60 5'
long gold
colored tubing, bent 9/09/96-49 40 39 45.10 -72 37 24.60 40 39
49.35 -72
37 24.60 housing w/attached tubing 10/07/96-1 40 39 45.01 -72
37 24.60
metal strip 40 39 45.01 -72 37 24.60 aircraft door panel 40 39
45.01 -72
37 24.60 engine fan blade 40 39 50.90 -72 37 24.60 honey comb
aluminum, 2
pieces of skin, laptop computer, framing w/ holes, twisted
framing
10/07/96-1 40 39 45.01 -72 37 24.60 metal skin 40 39 45.01 -72
37 24.60

metal fragment 40 39 45.01 -72 37 24.60 screened metal 40 39
45.01 -72 37
24.60 metal fragment 40 39 45.01 -72 37 24.60 wire bundle 40
39 43.10 -72
37 24.54 perforated metal 10/17/96-2 40 39 43.10 -72 37 24.54 2
pieces of
metal 10/17/96-2 40 39 56.22 -72 37 24.53 possible wing skin,
also
possible hydraulic line broken off 10/10/96-1 40 39 45.20 -72 37
24.50 1)
2' long structure 2) 3' long tubing 3) egg crate type rectangular
4"(12"
4) small metal piece 9/09/96-49 40 39 48.40 -72 37 24.50 many
misc items,
details on hard copy 40 39 51.30 -72 37 24.50 seat foot rest 40
39 48.40
-72 37 24.50 gear box 40 39 56.10 -72 37 24.39 #6 flap track
10/10/96-1 40
39 48.43 -72 37 24.33 seat 32 (4 5) armrest and frame CABIN
HGR 40 39
47.30 -72 37 24.30 misc metal debris 9/20/96-33 40 39 47.50 -72
37 24.30
skin section 10/17/96-1
Z3233 40 39 52.37 -72 37 24.21 possible section of structural
ribbing
(plastic) 10/07/96-1 40 39 49.00 -72 37 24.20 7' (2' metal
9/09/96-49 40
39 46.10 -72 37 24.20 misc metal debris 9/20/96-33 40 39 41.30
-72 37
24.20 misc metal debris 9/20/96-33 40 39 50.66 -72 37 24.14
possible
section of structural ribbing 10/07/96-1 40 39 48.00 -72 37 24.00
trim air

valve 40 39 49.90 -72 37 24.00 passenger seat + wire, debris
9/22/96-1 40
39 55.62 -72 37 23.91 bag with small metal part 9/09/96-49 40
39 48.90 -72
37 23.90 hinged bracket 10/17/96-1 40 39 47.60 -72 37 23.80
wing CW
stringer 40 39 47.40 -72 37 23.80 FS 940-960 (2' long); stringer
31L-32L
9/09/96-49 40 39 47.60 -72 37 23.80 keel beam chord FS 1480
40 39 47.60
-72 37 23.80 3' long metal structure type assembly 9/09/96-49 40
39 47.60
-72 37 23.80 heavy metal structure 9/09/96-49 40 39 47.40 -72
37 23.80
sealed buttrib; WBL 140 40 39 47.40 -72 37 23.80 skin segment;
FS
990-1000; stringer 32L-34L 9/09/96-49 40 39 47.12 -72 37 23.76
beam with
skin 10/17/96-1 40 39 57.98 -72 37 23.73 upper CW skin FS to
stringer 27;
LBL 17-117 (4' (5' section of interior structure) CW MOCKUP
9/08/96-2 40
39 57.98 -72 37 23.73 small piece of crumpled metal 9/09/96-49
40 39 57.98
-72 37 23.73 misc. metal 9/28/96-1 40 39 47.90 -72 37 23.70 #4
engine
stator Ring ENG HGR 8/15/96-5 40 39 47.90 -72 37 23.70 wallet
8/15/96-5 40
39 47.90 -72 37 23.70 portion of engine #4 cowling ENG HGR
8/15/96-5 40 39
47.90 -72 37 23.70 #4 engine accessory gear box ENG HGR
8/15/96-5 40 39
47.90 -72 37 23.70 cowling ENG HGR 8/15/96-5 40 39 47.90

-72 37 23.70 #4
engine thrust reverser actuator ENG HGR 8/15/96-5 40 39 47.90
-72 37 23.70
#4 engine worm gear ENG HGR 8/15/96-5 40 39 47.90 -72 37
23.70 cowling ENG
HGR 8/15/96-5 40 39 47.90 -72 37 23.70 cowling ENG HGR
8/15/96-5 40 39
47.90 -72 37 23.70 cowling ENG HGR 8/15/96-5 40 39 47.90
-72 37 23.70 #4
engine cowling ENG HGR 8/15/96-5 40 39 47.90 -72 37 23.70
#4 engine thrust
reverser actuator ENG HGR 8/15/96-5 40 39 45.30 -72 37 23.70
5' long white
tubular piece 9/09/96-49 40 39 45.30 -72 37 23.70 15' long
structural
member CW MOCKUP 40 39 47.60 -72 37 23.70 FS 2517-2598
(6'(2')); stringer
8L-11L 9/09/96-49 40 39 45.30 -72 37 23.70 15' long structural
member CW
MOCKUP 9/08/96-2
Z3319 40 39 46.30 -72 37 23.70 misc metal fragments 9/16/96-2
40 39 45.20
-72 37 23.70 propeller blade 9/12/96-2 40 39 49.50 -72 37 23.70
seat 28
(8) armrest CABIN HGR 9/22/96-1 40 39 43.20 -72 37 23.70
hydraulic fuel
pump 9/12/96-2 40 39 45.30 -72 37 23.70 left lower wing skin;
WS
1140-1210; rear spar stringer S5 9/09/96-49 40 39 45.30 -72 37
23.70 skin
segment FS 960-1000 stringer 27.5L -31.5L 40 39 46.40 -72 37
23.70 metal
fragments 9/16/96-2 40 39 45.20 -72 37 23.70 L shaped piece of

metal light
green, white and a bit blue 9/12/96-2 40 39 45.30 -72 37 23.70
FS 1080
stub beam at side of body LHS 9/09/96-49 40 39 47.50 -72 37
23.60 pieces
of wheel assembly 9/09/96-49 Z3108B 40 39 47.60 -72 37 23.60
flight
attendant's personal luggage 40 39 43.50 -72 37 23.60 round
metal item;
misc. wreckage 9/12/96-2 Z3108A 40 39 47.60 -72 37 23.60 5'
high, 1' (1'
square green and white metal structure 40 39 43.50 -72 37 23.60
CW
stiffener 40 39 47.80 -72 37 23.50 left lower wing skin (10'(2');
WS
557-670; mid-spar to stringer 8 9/09/96-49 40 39 47.80 -72 37
23.50 black
Jansport knapsack with contents in small pouch 9/09/96-49 40 39
47.80 -72
37 23.50 assorted small pieces of debris 9/10/96-4 40 39 47.80
-72 37
23.50 1 3" (5" photograph 9/09/96-49 40 39 46.30 -72 37 23.50
CW
stabilization braces CW MOCKUP 40 39 46.30 -72 37 23.50
outboard wing rib
FS 1280 40 39 46.30 -72 37 23.50 edge of wing 7' section
9/09/96-49 40 39
47.40 -72 37 23.50 seat 34-6 and other assorted pieces CABIN
HGR
9/09/96-49 40 39 47.80 -72 37 23.50 plastic bag with clothes and
misc.
wire 9/10/96-3 40 39 47.80 -72 37 23.50 suitcase luggage
9/10/96-3 40 39

47.40 -72 37 23.50 portion of spanwise beam CW tank CW
MOCKUP 40 39 47.80
-72 37 23.50 9/10/96-4 40 39 47.80 -72 37 23.50 9/10/96-3 40 39
50.80 -72
37 23.47 seat part 40 39 50.80 -72 37 23.47 fuselage section,
green, 4' (
3', charred 40 39 50.80 -72 37 23.47 fuselage bulkhead parts
8' (2' 40 39
50.80 -72 37 23.47 spanwise beam #2 - RH web; SOB rib to
RBL 90 CW MOCKUP
8/16/96-5 40 39 50.80 -72 37 23.47 seat part 8/16/96-5 40 39
43.25 -72 37
23.45 round piece (like a gear) 9/11/96-4 40 39 43.25 -72 37
23.45 FS
1350; stringer 23L-30L; fuselage skin w/ red paint 9/11/96-4 40
39 43.25
-72 37 23.45 outboard wing spar chord 40 39 43.25 -72 37 23.45
beam
section with metal plate attached (green) 9/11/96-4
Z3103 40 39 00.00 -72 37 23.40 5' metal beam 9/09/96-49 40 39
50.94 -72 37
23.39 left lower wing & skin WS 1214-1420 8/17/96-7 40 39
50.94 -72 37
23.39 HF coupler; "180R-17" 8/17/96-7 40 39 50.94 -72 37
23.39 part of
fuel tank 3'(6' section CARGO BAY 8/17/96-7 40 39 50.94 -72
37 23.39
systems hydraulic reservoir & 3 pumps (all connected) 8/17/96-7
40 39
50.94 -72 37 23.39 spanwise beam #3 RBL 78-127.5 CW
MOCKUP 8/17/96-7 40 39
50.94 -72 37 23.39 right LW outboard 8/17/96-7 40 39 50.94 -72
37 23.39

small pieces - human skull 40 39 50.94 -72 37 23.39 LWS
1309-1423; left
upper wing skin 8/17/96-7 40 39 50.94 -72 37 23.89 FS
1319-1434; stringer
5L-23-L 8/17/96-7 40 39 50.94 -72 37 23.39 leading edge
8/17/96-7 40 39
50.94 -72 37 23.39 SWB #3 chord with small segment right SOB
web attached
CW MOCKUP 40 39 46.75 -72 37 23.33 large metal piece w/
holes 10/17/96-1
40 39 43.05 -72 37 23.32 metal plate gray on one side, bright
blue on the
other 9/11/96-4 40 39 43.20 -72 37 23.30 FS 920-1000; stringer
35R-40R
9/11/96-4 40 39 43.20 -72 37 23.30 fuselage skin w/ red paint
9/11/96-4 40
39 43.20 -72 37 23.30 small piece with hydraulics lines attached
9/11/96-4
40 39 43.30 -72 37 23.30 gear box assembly 9/11/96-4 40 39
43.20 -72 37
23.30 possible CW spar 40 39 51.31 -72 37 23.22 stringer
section
10/07/96-1 40 39 43.65 -72 37 23.20 stainless steel tube
9/11/96-4 40 39
43.65 -72 37 23.20 round engine part 9/11/96-4 40 39 43.65 -72
37 23.20
"shovel-like" pieces of metal, green and red colors 9/11/96-4 40
39 43.65
-72 37 23.20 flap panel with support arm 40 39 43.05 -72 37
23.20 frame
piece (semi-circle) burnt looking 9/11/96-4 40 39 43.65 -72 37
23.20
framing piece 9/11/96-4 40 39 43.65 -72 37 23.20 metal plate;

gray on one
side, green and red (screws) on the other side 9/11/96-4 40 39
47.10 -72
37 23.17 10/17/96-1 40 39 50.50 -72 37 23.10 seats; seat 25 (1 2
3), seat
backs and frame CABIN HGR 9/08/96-2 40 39 50.90 -72 37
23.10 wing section,
9/23/96-5 40 39 44.20 -72 37 23.10 stainless duct 9/12/96-2 40
39 44.20
-72 37 23.10 metal tubing with torque hanging off 9/12/96-2 40
39 44.20
-72 37 23.10 MED 3L cutout skin, LWR part FS 1265-1350,
stringer 23L-31L
9/12/96-2 40 39 49.05 -72 37 23.07 1 long strand 9/22/96-1 40
39 49.05 -72
37 23.07 1 long strand 9/22/96-1 40 39 49.05 -72 37 23.07 debris
9/22/96-1
Z3381 40 39 49.05 -72 37 23.07 1 long strand 9/22/96-1 40 39
47.68 -72 37
23.06 row 31, seats 9-10 CABIN HGR 8/15/96-8 40 39 46.65
-72 37 23.04
section of stringer 10/17/96-1 40 39 48.30 -72 37 22.95 metal
debris
10/17/96-1 40 39 45.85 -72 37 22.82 actuator part round metal
item with
rivets 18" round 9/12/96-2 40 39 49.50 -72 37 22.80 body
landing gear drag
strut 8' 8/15/96-8 40 39 49.50 -72 37 22.80 fuselage right side;
FS
1350-1480, stringer 23R-32R with FS 1350 bulkhead frame and
RHS landing
8/15/96-8 40 39 43.72 -72 37 22.80 motorblade (#23 written on
it)

9/11/96-4 40 39 43.72 -72 37 22.80 flat plate 9/11/96-4 40 39
43.72 -72 37
22.80 white metal w/ rivet holes 40 39 55.92 -72 37 22.75 4
small pieces
of debris 10/10/96-1 40 39 45.20 -72 37 22.70 left lower wing
skin; WS
1120-1180; stringer 5-7 9/11/96-4 40 39 45.20 -72 37 22.70 2
seats (row 27
seat 8 and seat 0) a third seat came off but we attached with
plastic
strap; seats 27 CABIN HGR 9/11/96-4 40 39 48.50 -72 37 22.70
debris
9/22/96-1 40 39 45.20 -72 37 22.70 outboard wing spar 40 39
48.50 -72 37
22.70 possible CW lower skin CW MOCKUP 40 39 45.20 -72 37
22.70 left wing
spoiler #5 with actuator 9/11/96-4 40 39 50.78 -72 37 22.68
metal ducting.
10/17/96-1 40 39 46.60 -72 37 22.60 2' long green metal with
jagged ends
9/10/96-4 40 39 51.19 -72 37 22.50 FS 1170-1500; stringer
7R-24R with
window belt and door frame 8/16/96-5 40 39 51.19 -72 37 22.50
spanwise
beam #1- LBL 60-100 web segment CW MOCKUP 8/16/96-5 40
39 51.19 -72 37
22.50 span wise beam #1 - upper LBL SOB connection CW
MOCKUP 40 39 50.50
-72 37 22.50 seat belt w/ buckle 9/24/96-16 40 39 45.80 -72 37
22.40 piece
of bulkhead with frame section, hole in side of outer skin
9/08/96-2 40 39
50.90 -72 37 22.40 small section of metal & housing 10/07/96-1

40 39 46.10
-72 37 22.20 5' long twisted metal 9/09/96-49 40 39 46.10 -72 37
22.20
portion of top wing 40 39 46.10 -72 37 22.20 15' long twisted
beam
9/09/96-49 40 39 46.10 -72 37 22.20 seat 44 (9), CABIN HGR
40 39 43.66 -72
37 22.19 #3 engine LP compressor ENG HGR 8/09/96-37 40 39
48.42 -72 37
22.19 I-beam w/attached skin 10/09/96-1 40 39 43.66 -72 37
22.17 #3 engine
inlet cowl 6'(2'; TWA tag s/n 2019; RR# 22028 ENG HGR
8/09/96-37 40 39
43.66 -72 37 22.17 #3 engine exhaust (s/n 64) case & piece of
tailpipe ENG
HGR 8/09/96-37 40 39 43.66 -72 37 22.17 lg piece of engine
core cowling;
hng end 6'(4.5' ENG HGR 8/09/96-37 40 39 43.66 -72 37 22.17
21/2'(3' irreg
shape, heat exchanger "precooler air bleed" s/n 50-679
8/09/96-37 40 39
46.60 -72 37 22.15 piece of metal with pipe 10/17/96-1
Z3724 40 39 46.60 -72 37 22.15 10/17/96-1 CW1104 40 39
48.04 -72 37 22.06
spanwise beam web CW MOCKUP 40 39 48.04 -72 37 22.06
debris (camera)
9/22/96-1 40 39 48.04 -72 37 22.06 black metal box 9/22/96-1 40
39 48.04
-72 37 22.06 CW stiffener CW MOCKUP 40 39 48.04 -72 37
22.06 debris
9/22/96-1 40 39 42.00 -72 37 22.00 left wing up fragment mates
in LWS
554-580 behind mid-spar small fragment 8/11/96-2 40 39 43.50

-72 37 22.00
formerly round-brown metal container 9/11/96-4 8/11/96-2 40 39
42.00 -72
37 22.00 #3 engine ENG HGR 8/11/96-2 8/11/96-2 40 39 42.00
-72 37 22.00 #3
engine fan rub ring ENG HGR 40 39 43.50 -72 37 22.00 wing
support strut
9/11/96-4 40 39 43.50 -72 37 22.00 mangled metal 2.5' long with
blue on it
9/11/96-4 40 39 43.50 -72 37 22.00 mangled green metal 3.5'
long with arm
9/11/96-4 40 39 43.50 -72 37 22.00 misc engine parts 40 39
42.00 -72 37
22.00 aircraft pneumatic duct and panel 8/11/96-2 40 39 42.00
-72 37 22.00
aircraft pneumatic duct and panel 8/11/96-2 40 39 42.00 -72 37
22.00 #3
engine ENGINE HGR 8/10/96-16 40 39 43.50 -72 37 22.00 3'
piece of metal w/
rubber molding 40 39 43.50 -72 37 22.00 misc airline fragments
in a black
body bag and cardboard box; also loose turbine blades (engine bl
40 39
47.25 -72 37 21.90 seat frame row 33; seats 33 (8 9 10) armrests
and
frames CABIN HGR 9/08/96-2 40 39 47.25 -72 37 21.90
photograph 3" (5"
color, partially destroyed 9/09/96-49 40 39 47.25 -72 37 21.90
fuel probe
40 39 47.25 -72 37 21.90 CW tank piece CW MOCKUP 40 39
47.25 -72 37 21.90
assorted plane parts 9/09/96-49 40 39 47.25 -72 37 21.90 1 black
leather

type bag with contents 9/08/96-2 40 39 47.25 -72 37 21.90
structural piece
approximately 3' long 9/08/96-2 40 39 47.25 -72 37 21.90 FS
1120-1140,
stringer 23R-27R 40 39 47.25 -72 37 21.90 portion CW tank 40
39 47.25 -72
37 21.90 personal luggage 9/08/96-2 40 39 47.25 -72 37 21.90
portion of
flap assembly 40 39 47.25 -72 37 21.90 anti-skid valve module
MOTOR BAY 40
39 47.25 -72 37 21.90 portion of outboard fore flap 40 39 47.25
-72 37
21.90 metal frame with wheels from luggage 9/08/96-2 40 39
47.25 -72 37
21.90 CW wing center section floor beam 40 39 47.25 -72 37
21.90 piece of
seat, seat 31(7) armrest frame CABIN HGR 9/08/96-2 40 39
47.25 -72 37
21.90 left wing aileron segment (o/b) 3'(4' 9/08/96-2
Z3017 40 39 47.25 -72 37 21.90 passenger seats; seats 25 (4 5 6
7), seat 4
- frame, seat 5 - armrest/frame, seat 6 - frame, seat 7 - CABIN
HGR
9/08/96-2 40 39 47.25 -72 37 21.90 metal tubing, 1
approximately 25' long,
1 approximately 6' long 9/08/96-2 40 39 47.25 -72 37 21.90 9'
long metal
with rivets 9/08/96-2 40 39 47.25 -72 37 21.90 seats 25 (8 9 10)
seat 25
(10) frame; seat 25(8) -armrest, back, frame; seat 25(9) - armrest,
frame
CABIN HGR 9/08/96-2 40 39 47.25 -72 37 21.90 3' long cone
shaped metal

9/08/96-2 40 39 47.25 -72 37 21.90 section 40 39 47.25 -72 37
21.90 cargo
net full of debris; portion of rudder 9/08/96-2 40 39 47.25 -72 37
21.90
5' long metal strut hinged 9/08/96-2 40 39 47.25 -72 37 21.90
structural
piece with pump type assembly 9/08/96-2 40 39 47.25 -72 37
21.90 4' piece
of airplane flap 9/08/96-2 40 39 47.25 -72 37 21.90 2' length of
large
tubing 9/09/96-49 40 39 47.25 -72 37 21.90 assorted pieces of
metal
9/09/96-49 40 39 47.25 -72 37 21.90 approximately 8' section of
wing
9/08/96-2 40 39 47.25 -72 37 21.90 right hand HF antenna
assembly
approximately 8' long 9/08/96-2 40 39 47.25 -72 37 21.90 bleed
air #3
manifold station 1240 ACM BAY 9/09/96-49 40 39 47.25 -72 37
21.90 human
remains, spine, rib, small bones, lumbar vertebrae 1-5, sacrum, 1
rib, 2
metatarsals 9/09/96-49 40 39 47.25 -72 37 21.90 heavy tubular
strut
9/08/96-2 40 39 47.25 -72 37 21.90 5' long frame section
9/08/96-2 40 39
44.90 -72 37 21.90 misc metal pieces 9/16/96-2 40 39 47.25 -72
37 21.90 CW
tank upper center stringer 40 39 47.25 -72 37 21.90 portion of
spanwise
beam CW tank CW MOCKUP 40 39 47.25 -72 37 21.90 3' long
piece of metal 40
39 47.20 -72 37 21.70 6" (2' section of aluminum with rivets

9/08/96-2 40
39 44.25 -72 37 21.70 various airplane parts and debris 9/16/96-2
40 39
45.13 -72 37 21.52 6' (4' edge of wing target # GRS992
9/08/96-2 CW211,
CW 40 39 50.46 -72 37 21.45 lower CW skin; R.S. to STR 1;
LBL 15 to RBL 15
CW MOCKUP 8/23/96-15 40 39 46.00 -72 37 21.20 horizontal
stabilizer upper
skin between aux. spar and rear spar. stabilizer STA
143.60-180.50
9/10/96-4 40 39 50.47 -72 37 21.03 seats 22 (8 and 9) plus
armrest for
22(10) CABIN HGR 8/23/96-15 40 39 46.10 -72 37 21.00 2
small pieces 1)
2.5' long 2) approximately 1' long and bent over 9/10/96-4 40 39
48.10 -72
37 21.00 toilet assembly 10/17/96-1 40 39 54.00 -72 37 20.98
piece of
debris 9/20/96-33 40 40 02.82 -72 37 20.84 debris 9/22/96-1 40
39 51.41
-72 37 20.65 2'(2' skin 10/07/96-1 40 39 41.30 -72 37 20.50
landing gear
door 9/11/96-4 40 39 44.90 -72 37 20.40 large metal debris
9/16/96-2 40 39
44.90 -72 37 20.40 bone fragments
Z3128 40 39 45.00 -72 37 20.40 4' metal, triangular section,
wing edge?
9/10/96-4 40 39 46.00 -72 37 20.30 1) 6' ribbed metal piece 2)
2' (1'
piece of outside skin of plane 9/10/96-4 40 39 45.60 -72 37 20.30
human
remains skull, scalp, eye socket, jaw bone, teeth, part of spinal

column

9/10/96-4 40 39 50.72 -72 37 20.15 3' (4' section 9/08/96-2 40 39 50.72

-72 37 20.15 outer part of plane 9/08/96-2 40 39 48.46 -72 37 20.08

structural section 10/17/96-1 40 39 46.70 -72 37 20.00 2' (2' section

with 3 pieces of tubular coming off 9/10/96-4 40 39 47.53 -72 37 19.98 O2

compressore, wire, masks 40 39 47.53 -72 37 19.98 ss 1/2 tubing, 2 pieces

40 39 47.20 -72 37 19.80 4 pieces 1) 3' long piece of rubber 2) 5' piece

of ribbed metal 3) 5' long, 6" wide green metal with "S 9/10/96-4 40 40

00.66 -72 37 19.80 AR1054; big cylindrical object 9/20/96-33 40 39 46.30

-72 37 19.70 5' long green metal with bolts and clips on edge 9/10/96-4 40

39 53.55 -72 37 19.60 vhf antenna poss. 10/07/96-6 40 39 50.57 -72 37

19.49 misc. metal; battery charger 9/28/96-1 40 39 50.57 -72 37 19.49 misc

metal 9/28/96-1 40 39 48.77 -72 37 19.47 armrest 32??2 40 39 48.77 -72 37

19.47 seat 36 (10) armrest CABIN HGR 8/24/96-7 40 39 48.77 -72 37 19.47

seat 36 (6) 40 39 48.77 -72 37 19.47 main landing gear assembly 8/24/96-7

40 40 02.30 -72 37 19.40 metal structure 10/17/96-1 40 39 43.28 -72 37

19.15 left upper wing skin, WS 503-584 from STR 16-22 8/09/96-37 40 39

48.60 -72 37 19.10 1 small leather wallet 9/30/96-1 40 39 46.90
-72 37
19.00 left upper wing skin (3'(10')); WS 1200-1330; stringer 5-12
9/10/96-4
40 39 46.90 -72 37 19.00 wing portion 10/13/96-4 40 39 46.90
-72 37 19.00
aft wheel well bulkhead 40 39 53.02 -72 37 18.91 31 (5) partial
frame,
31(6) armrest/frame CABIN HGR 9/09/96-49 40 39 46.30 -72 37
18.90 2' (3'
green metal with electrical connections plus assorted metal
pieces and
small items 9/10/96-4 40 39 46.30 -72 37 18.90 passenger head
phone tubing
9/10/96-3 40 39 46.30 -72 37 18.90 door port (interior) 9/10/96-3
40 39
46.30 -72 37 18.90 9/10/96-3 40 39 46.50 -72 37 18.80 1' (2'
metal
structure, green on one side, gray on the other 9/10/96-4 40 39
49.48 -72
37 18.78 tire hub 10/07/96-11 40 39 59.40 -72 37 18.70 metal
skin section
10/17/96-1 40 39 52.08 -72 37 18.66 #5 flap track "TWA 17729"
mfg
5B81129-6; flap track with jack screw 8/09/96-37 40 39 46.60
-72 37 18.60
CW upper stringer 10/13/96-4 40 39 46.60 -72 37 18.60 removed
tag from
part tagged Z3125 10/13/96-4
Z2531 40 39 46.60 -72 37 18.60 upper wing skin - left side
10/13/96-4 40
39 46.60 -72 37 18.60 upper wing section left side 40 39 46.60
-72 37

18.60 flight attendant jump seat 40 39 46.60 -72 37 18.60
9/10/96-4 40 39
50.10 -72 37 18.60 5 pieces of small metal; 2 small metal pipes
intertwined; wire; life vest in package 9/30/96-1 40 39 46.60 -72
37 18.60
wing tank web 10/13/96-4 CW1021 40 39 46.60 -72 37 18.60
CW tank rear spar
LBL 85 stiffener CW MOCKUP 9/30/96-1 40 39 46.60 -72 37
18.60 outboard
wing stringer 10/13/96-4 40 39 46.60 -72 37 18.60 humerus bone
40 39 46.60
-72 37 18.60 ulna and radius with metacarpal and distal/middle
phalanges
with skin intact 40 39 46.60 -72 37 18.60 spinal column
(complete) with
humerus 40 39 46.60 -72 37 18.60 10' (1' long/wide green metal,
plus
assorted smaller pieces of wreckage 9/10/96-4 40 39 46.60 -72
37 18.60 8'
long (1' wide curved, green metal with rivets 9/10/96-4 40 39
46.60 -72
37 18.60 11' long, narrow angular piece with rivets - green color
9/10/96-4 40 39 46.60 -72 37 18.60 portion of fuselage longeron
40 39
45.90 -72 37 18.40 CW tank upper skin segment CW MOCKUP
10/03/96-4 40 39
50.70 -72 37 18.40 misc metal box 9/28/96-2 40 39 45.90 -72 37
18.40
green, yellow, and gray pieces of metal and piping; some interior
pieces
and personal items 9/30/96-1 40 39 45.90 -72 37 18.40 8' to 9'
piece of
metal w/yellow exterior paint CW MOCKUP 9/30/96-1 40 39

45.90 -72 37 18.40
8' to 9' metal piece; white on one side/green on opposite side
9/30/96-1
40 39 45.90 -72 37 18.40 1 multi-colored rugby shirt; one piece
of white
notebook 9/30/96-1 40 39 45.90 -72 37 18.40 blown-out tire
including metal
rim on tire 9/30/96-1 40 39 45.90 -72 37 18.40 CW tank
spanwise beam #3
LBL 82-98.6 CW MOCKUP 10/03/96-4 40 39 50.00 -72 37
18.30 #4 engine with
wing strut ENG HGR 8/15/96-8 40 39 51.20 -72 37 18.10
Goodyear tire and
rim (large) 10/07/96-1 40 39 51.20 -72 37 18.10 Goodyear tire &
rim
10/07/96-1 40 39 43.86 -72 37 18.00 left upper wing skin; LWS
554-580 from
STR 7-10 40 40 08.00 -72 37 17.97 brown date book w/
calculator 10/07/96-1
40 39 54.72 -72 37 17.92 misc. metal; life vest; pipe 9/28/96-1
40 39
47.61 -72 37 17.80 black + green metal, wire 40 39 52.10 -72 37
17.50
small stringer section 10/07/96-10 40 39 50.40 -72 37 17.50 misc
metal
9/28/96-2 40 39 45.80 -72 37 17.40 center wing fuel tank
spanwise beam CW
MOCKUP 40 39 45.80 -72 37 17.40 right upper wing skin
96"(33" adjoins mid
spar FS1250 9/19/96-1 40 39 45.80 -72 37 17.40 misc. small
debris (1 cargo
net full) 9/19/96-1 40 39 45.80 -72 37 17.40 (1) shoe and
personal

property 9/19/96-1
Z2261 40 39 45.80 -72 37 17.40 skin surface horizontal stab 40
39 45.80
-72 37 17.40 horizontal stabilizer, part of 40 39 45.80 -72 37
17.40 left
upper wing skin; WS 1336-1423; stringer 5-14 40 39 45.80 -72
37 17.40 SWB
#3 upper web RBL 99-112 CW MOCKUP 40 39 45.92 -72 37
17.38 metal beam
9/16/96-2 40 39 39.57 -72 37 17.34 fuselage fragment with
attached burned
insulation 3'(3'(1' 9/27/96-2 40 39 50.68 -72 37 17.26 motor or
valve
10/07/96-7 40 39 48.40 -72 37 17.00 approx. 3' green metal
spring w/
partial white metal casing 9/30/96-1 40 39 48.40 -72 37 17.00 8'
to 9'
metal piping 9/30/96-1 40 39 48.40 -72 37 17.00 CW tank
spanwise beam 3
LBL 98.6 side of body CW MOCKUP 10/03/96-4 40 39 48.40
-72 37 17.00
approx. 6'(6" green metal trim 9/30/96-1 40 39 48.40 -72 37
17.00 one
interior light; headphone switch; 4 pieces of metal debris; one
plastic
debris piece 9/30/96-1 RF114C 40 39 48.40 -72 37 17.00 3.5' to
4' square
plane skin 9/30/96-1 40 39 48.40 -72 37 17.00 approx. 1.5'
diameter mech.
part, one cylinder w/2 rows of 1" diameter holed, variety of
interior/exte
10/06/96-1 40 39 48.40 -72 37 17.00 approx. 4' pipe possible
shock

attached to 1' square piece of metal and smaller metal pieces at a
jo

9/30/96-1 40 39 48.40 -72 37 17.00 approx. 1.5'(3.5' gray metal
piece w/

appendatures 9/30/96-1 40 39 48.40 -72 37 17.00 approx. 4'
piece green

metal w/ slight curvature 9/30/96-1 40 39 06.44 -72 37 16.68 life
raft,

debris 10/06/96-1 40 40 12.10 -72 37 16.67 debris 10/07/96-1
Z3201a 40 39

50.80 -72 37 16.60 misc metal, first aid kit, wires near wheel
well door

40 39 54.23 -72 37 16.49 misc. metal 9/28/96-1 40 39 50.33 -72
37 16.46

misc engine component ENG HGR 8/16/96-5 40 39 50.33 -72 37
16.46 #4 engine

cowl, thrust reverser ENG HGR 8/16/96-5 40 39 50.33 -72 37
16.46 engine

component 8/16/96-5 40 39 50.33 -72 37 16.46 misc actuator
8/16/96-5 40 39

50.33 -72 37 16.46 misc actuator 8/16/96-5 40 39 50.33 -72 37
16.46 misc

engine component ENG HGR 8/16/96-5 40 39 50.33 -72 37
16.46 metal, misc

engine part ENG HGR 8/16/96-5 40 39 50.33 -72 37 16.46

engine part ENG HGR

8/16/96-5 40 39 50.33 -72 37 16.46 gear pump, fuel 8/16/96-5 40
39 50.33

-72 37 16.46 #4 engine accessory, pump? ENG HGR 8/16/96-5
40 39 50.33 -72

37 16.46 #4 engine accessory, generator ENG HGR 8/16/96-5 40
39 50.33 -72

37 16.46 engine fan stage ENG HGR 8/16/96-5 40 39 50.33 -72

37 16.46
engine block part ENG HGR 8/16/96-5 40 39 50.33 -72 37 16.46
engine cowl
frame ENG HGR 8/16/96-5 40 39 50.33 -72 37 16.46 #4 engine
intake section
ENG HGR 8/16/96-5 40 39 50.33 -72 37 16.46 row 20 passenger
vent CABIN HGR
8/16/96-5 40 39 50.33 -72 37 16.46 engine component 8/16/96-5
40 39 50.33
-72 37 16.46 misc engine component ENG HGR 8/16/96-5 40 38
52.84 -72 37
16.32 plastic debris & a piece of american flyer luggage - piece
of black
gasket 10/02/96-1 40 39 43.17 -72 37 16.07 cowling 10/13/96-3
40 39 46.90
-72 37 16.00 center wing tank spanwise 40 39 46.90 -72 37 16.00
misc.
metal pieces CW MOCKUP 9/19/96-1 40 39 46.90 -72 37 16.00
airplane part
9/19/96-1 40 39 46.90 -72 37 16.00 main entry door L3
9/19/96-1 40 39
46.90 -72 37 16.00 misc. parts 9/19/96-1 40 39 46.90 -72 37
16.00 upper
wing skin 9/19/96-1 40 39 48.40 -72 37 16.00 multiple pieces of
gray metal
piping, yellow & green metal, shredded plastic/cloth; piece of
burnt bl
9/30/96-1 40 39 48.40 -72 37 16.00 multiple green and yellow
pieces of
metal; interior seat pieces; piping; approx. 1.5' diameter gray m
9/30/96-1 40 39 47.50 -72 37 15.90 misc. metal pieces 9/19/96-1
40 39
47.50 -72 37 15.90 fuselage skin aft 40 39 47.50 -72 37 15.90

misc. metal
pieces 9/19/96-1 40 39 46.00 -72 37 15.80 metal piece 9/19/96-1
40 39
46.00 -72 37 15.80 misc. metal debris 9/19/96-1 40 39 46.00 -72
37 15.80
various metal fragments 9/19/96-1 40 39 46.00 -72 37 15.80
misc. metal
fragments 9/19/96-1 40 39 46.05 -72 37 15.76 alum siding,
figerglass vent
and framing 8/14/96-10 40 39 45.80 -72 37 15.60 (1) cargo net
full of
misc. debris 9/19/96-1 40 39 45.80 -72 37 15.60 personal effects
9/19/96-1
40 39 45.80 -72 37 15.60 3'(3' metal panel 9/19/96-1 40 39 45.80
-72 37
15.60 part of landing gear door 9/19/96-1 40 39 45.80 -72 37
15.60 APU
fire wall Z3202a 40 39 48.20 -72 37 15.40 metal U-shaped wing
piece 40 39
07.96 -72 37 15.24 black bag 10/96/96-1 40 39 47.20 -72 37
15.16 misc
metal, life vest with seat belt 9/28/96-2 40 39 47.20 -72 37 15.16
upper
center wing left hand SOB-LBL30; STR22-27 CW MOCKUP
CW1103 40 39 47.20 -72
37 15.16 center wing rear spar to SWB #1; BL0 rib; Lot #
9-28-96-2 CW
MOCKUP 40 39 40.59 -72 37 15.15 7'(2.5' aircraft skin 40 39
40.59 -72 37
15.15 yellow plastic with aircraft skin 10/17/96-2 40 39 44.57
-72 37
15.01 piece of skin and channel 10/13/96-3 40 39 08.21 -72 37
14.88 life

raft 10/06/96-1 40 39 49.51 -72 37 14.83 9 pieces (largest
3'(15"(3");
B2B1 has chair rail attached p/n 65B817-2 PARTS BAY
8/11/96-1 40 39 49.51
-72 37 14.83 #65-41916-21 7 pieces with part of back seat parts
are
charred CABIN HGR 8/09/96-37 40 39 49.51 -72 37 14.83 4
pieces including a
shoe and melted life vest 8/09/96-37 40 39 49.51 -72 37 14.83 #4
engine
portion of cowling ENG HGR 8/11/96-1 40 39 49.51 -72 37
14.83 5 small
pieces; p/n 65B1029817; 65B0275-15; 65B0275-16;
65B0275-17 PARTS BAY
8/11/96-1 40 39 49.51 -72 37 14.83 2 pieces 6' long p/n
65B04600-9 FS
1394; p/n 65B38600-170; s/n 001047 8/11/96-1 40 39 49.51 -72
37 14.83 p/n
69B02355; 1'(1' green metal; 3-1/2'(2' tube p/n 10234 on clamp
PARTS BAY
8/11/96-1 40 39 49.51 -72 37 14.83 white metal skin 3'(2'(.25";
green mesh
3'(1.5'(1/8" 8/11/96-1 40 39 49.51 -72 37 14.83 1(1 electronic
piece BAC
60B40037-25 8/09/96-37 40 39 49.51 -72 37 14.83 #3 engine
portion of
cowling ENG HGR 8/09/96-37 40 39 49.51 -72 37 14.83
15'(4.5'(1.5' green
metal; right wing with skin 8/11/96-1 40 39 49.51 -72 37 14.83
intercostal
between beam #2 to #3 CW MOCKUP 40 39 49.51 -72 37 14.83
mid spar-lower
web piece LBL 66-87 CW MOCKUP CW1022 40 39 49.51 -72

37 14.83 rear spar
stiffener at RBL 21, complete CW MOCKUP 40 40 06.31 -72 37
14.64 3' piece
of metal (yellow) 10/17/96-2 40 39 46.50 -72 37 14.50 center
wing tank
spanwise 2 CW MOCKUP 9/19/96-1 40 39 46.34 -72 37 14.42
burnt suitcase and
aircraft skin 10/17/96-2 40 39 47.00 -72 37 14.10 9/19/96-1 40
39 47.00
-72 37 14.10 ducting 9/19/96-1 40 39 47.00 -72 37 14.10 metal
frame work
9/19/96-1 40 39 47.00 -72 37 14.10 sheet of metal 9/19/96-1 40
39 47.00
-72 37 14.10 oxygen bottle 9/19/96-1 40 39 47.00 -72 37 14.10
misc parts
9/19/96-1 40 39 46.76 -72 37 14.05 CW tank upper skin
segment@ LBL 106,
stringer 2 CW MOCKUP 10/03/96-4 40 39 46.76 -72 37 14.05
right hand SWB #1
web RBL 106.2 CW MOCKUP 40 39 46.76 -72 37 14.05
9/20/96-33 40 39 46.76
-72 37 14.05 LH SOB rib RS CW MOCKUP 40 39 46.76 -72 37
14.05 left hand
rib near right side (fits between CW411 and CW412) CW
MOCKUP 40 39 46.76
-72 37 14.05 portion of spanwise beam CW tank CW MOCKUP
40 39 46.76 -72 37
14.05 left hand SOB rib section CW MOCKUP 40 39 46.76 -72
37 14.05 portion
of spanwise beam CW tank CW MOCKUP 40 39 46.76 -72 37
14.05 misc debris
9/19/96-1 40 39 46.76 -72 37 14.05 left hand upper center
section stringer

end CW MOCKUP CW1018 40 39 46.76 -72 37 14.05 LBL 70;
rear spar web
segment at upper chord with 8" piece of stiffener CW MOCKUP
10/03/96-4
CW1019 40 39 46.76 -72 37 14.05 LBL 66; rear spar web skin
segment with 2'
of stiffener CW MOCKUP 10/03/96-4 40 39 46.76 -72 37 14.05
fuselage skin
under body fairing; Lot # 9-20-96-33 9/20/96-33 40 39 46.76 -72
37 14.05
CW tank upper skin segment with piece of spanwise beam and
chord CW MOCKUP
10/03/96-4
Z2785 40 39 46.76 -72 37 14.05 CW upper skin, 10 pieces CW
MOCKUP 40 39
46.76 -72 37 14.05 CW upper skin LBL 127, S-2 to R.S. CW
MOCKUP 9/20/96-33
40 39 46.76 -72 37 14.05 CW upper skin LBL 127; S-2 to R.S.
CW MOCKUP
9/20/96-33 40 39 46.76 -72 37 14.05 vertical stabilizer station,
fin
station 230.412-410.045 40 39 46.76 -72 37 14.05 FS 1000 ring
chord segment
with stringer 37L end fitting 9/20/96-33 CW518, LF3 40 39
52.48 -72 37
14.03 FS 900-1350 stringer 4R-29L; 15'(40'); 14 windows CW
MOCKUP 8/16/96-5
40 39 47.11 -72 37 13.88 lower center wing skin panel; LBL
100; stringer
2; Lot # 9-27-96-1 CW MOCKUP CW1106 40 39 47.11 -72 37
13.88 portion of
span wise beam CW tank CW MOCKUP 40 39 47.11 -72 37
13.88 large metal

piece CW MOCKUP 9/27/96-1 40 39 47.11 -72 37 13.88 metal
snap; plastic;
wiring; seatbelt; mirror base; picture; misc. metal 9/27/96-1 40
39 49.04
-72 37 13.76 5'(1' reinforced metal and insulation 8/09/96-37 40
39 49.04
-72 37 13.76 amex travel checks 8/09/96-37 40 39 49.04 -72 37
13.76
portion center wing fuel tank. butts up with C2132 8/09/96-87 40
39 49.04
-72 37 13.76 various small pieces 8/09/96-37 40 39 23.76 -72 37
13.74 6"
piece metal frame # 5B38600-361 10/12/96-2 40 39 44.50 -72 37
13.70 piece
of skin 10/13/96-3 40 39 43.70 -72 37 13.60 aluminum skin w/
red paint
10/13/96-3 40 39 34.91 -72 37 13.56 6(18"(3 1/2 piece of rudder;
FS 357.4
and 382.4 8/09/96-37 40 39 50.72 -72 37 13.33 fuselage
fragment; FS
1135-1280; stringer 11R-6L 8/16/96-5 40 39 50.72 -72 37 13.33
center wing
tank spar 3' (3' 8/16/96-5 40 39 50.72 -72 37 13.33 PARTS BAY
8/16/96-5
40 39 50.72 -72 37 13.33 row 23 seat 9-10 CABIN HGR
8/16/96-5 40 39 50.72
-72 37 13.33 head rest F/A jumpseat CABIN HGR 8/16/96-5 40
39 50.72 -72 37
13.33 fuselage frame FS 1200 (fuselage part green, 6' (6')
8/16/96-5 40 39
50.72 -72 37 13.33 fuselage part, 2.5' (6", "65B38600-170"
PARTS BAY
8/16/96-5 40 39 50.72 -72 37 13.33 control surface,

6' (1' (ribbed metal
skin) 8/16/96-5 40 39 50.72 -72 37 13.33 engine part, exhaust
cone ENG HGR
8/16/96-5 40 39 44.50 -72 37 13.30 oblong metal frame
9/19/96-1 40 39
44.50 -72 37 13.30 SWB #1 stiffener free flange CW MOCKUP
40 39 44.50 -72
37 13.30 3' (5' metal 9/19/96-1 40 39 44.50 -72 37 13.30
women's purse
9/19/96-1 40 39 44.50 -72 37 13.30 misc metal 9/19/96-1 40 39
44.50 -72 37
13.30 misc metal 9/19/96-1 40 39 44.50 -72 37 13.30 misc metal
9/19/96-1
40 39 44.50 -72 37 13.30 misc metal 9/19/96-1 40 39 44.50 -72
37 13.30 CW
upper skin M.S. to SWB #2, LBL 41 - LBL 96 CW MOCKUP
9/19/96-1
Z3342 40 39 44.50 -72 37 13.30 metal frame 9/19/96-1 40 39
44.50 -72 37
13.30 hatch door 9/19/96-1 40 39 44.50 -72 37 13.30 right SWB
#1 above
door CW MOCKUP 40 39 44.50 -72 37 13.30 LBL 57.5 floor
beam CW MOCKUP 40
39 44.50 -72 37 13.30 misc metal 9/21/96-1 40 39 44.50 -72 37
13.30 long
metal beam 9/19/96-1 40 39 44.50 -72 37 13.30 large wing
section with
window 9/19/96-1 40 39 47.11 -72 37 13.18 misc. metal
9/27/96-1 40 39
31.88 -72 37 13.13 misc. plastic 40 39 44.63 -72 37 13.11 pieces
of skin
10/13/96-3 40 39 45.70 -72 37 13.10 metal pieces 9/19/96-1 40
39 45.70 -72

37 13.10 metal fragment 9/19/96-1 40 39 45.70 -72 37 13.10
metal sheet
approximately 3'(4' 9/19/96-1 40 39 45.70 -72 37 13.10 various
metal
fragments 9/19/96-1 40 39 45.70 -72 37 13.10 small door
9/19/96-1 40 39
53.43 -72 37 12.66 7'(1/2" hydro landing gear tubing TUBING
BAY 8/11/96-1
40 39 48.10 -72 37 12.50 several small pieces of metal green/
silver/white;
1 battery to a cellular phone 9/30/96-1 40 39 48.10 -72 37 12.50
small
green piece of metal 2'(2' 9/30/96-1 40 39 48.10 -72 37 12.50
large oval
cone shaped metal piece - black/silver 9/30/96-1 40 39 43.30 -72
37 12.40
miscellaneous skin 10/13/96-3 40 39 53.10 -72 37 12.30 misc
metal, life
vest 9/28/96-2 40 40 03.58 -72 37 12.25 metal ribbing w/ partial
honey
comb attached 10/17/96-2 40 39 44.13 -72 37 12.15 flat
aluminum, aluminum
channel 10/13/96-3 40 39 44.13 -72 37 12.15 wing piece and
wiring conduit;
piece of seat 10/13/96-3 40 40 08.63 -72 37 12.14 stainless steel
debris
10/07/96-1 40 39 45.81 -72 37 12.12 9/19/96-1 40 39 42.00 -72
37 12.00
rusty gray metal pieces (2)approx. 6"(1'(2"; approx. 8'(3" green/
gray
metal piece (twisted); approx. 10/02/96-1 Z3324a 40 39 45.40
-72 37 11.90
misc. metal 40 39 47.56 -72 37 11.84 honeycomb piping and

channel

10/13/96-3 40 39 47.56 -72 37 11.84 misc. metal 9/28/96-1 40 39
39.42 -72

37 11.77 piece of metal 10/17/96-2 40 39 44.91 -72 37 11.70 4
pieces

longest 3'(2'(2" 8/09/96-37 40 39 44.91 -72 37 11.70 14 pieces;
p/n

65B10295-27 MAR 17; FS 2180 8/09/96-37 40 39 46.99 -72 37
11.57 misc.

metal; hoses; TWA p/n #291-4304 s/n 1799 9/28/96-1 40 39
49.20 -72 37

11.20 10-12' gray, crushed pipe approx 6-8" diameter 10/02/96-1
40 39

43.30 -72 37 11.20 aluminum strip 10/13/96-3

Z2670 40 39 43.60 -72 37 11.10 center section floor beam 40 39
43.60 -72

37 11.10 misc metal pieces 9/19/96-1 40 39 43.60 -72 37 11.10
part of CW

fuel tank CW MOCKUP 40 39 43.60 -72 37 11.10 part of center
wing tank 40

39 43.60 -72 37 11.10 part of center wing tank 40 39 45.89 -72
37 11.10

aluminum angle (2), piece of skin, bracket, metal strap with holes
10/13/96-3 40 39 33.13 -72 37 11.06 piece of metal and

fiberglass

10/17/96-2 40 40 07.85 -72 37 10.95 window frame 10/11/96-9
40 39 45.40

-72 37 10.90 5'(8' piece of airplane structure 9/08/96-2 40 39
44.30 -72

37 10.90 green metal structure 10/13/96-3 40 39 43.60 -72 37
10.60 toilet

seat 10/13/96-3 40 39 46.80 -72 37 10.50 8(8 section 9/19/96-1
40 39 46.80

-72 37 10.50 3'(3' section 9/19/96-1 40 39 46.40 -72 37 10.20
assorted
small structural pieces 9/09/96-49 40 39 42.66 -72 37 10.07 misc
debris
9/11/96-5 40 39 42.66 -72 37 10.07 6" hose + 7' aluminum
9/27/96-2 40 39
42.66 -72 37 10.07 human leg bone 9/27/96-2 40 39 42.66 -72 37
10.07 misc
fuselage fragments, ribbing, wiring 9/27/96-2 40 39 42.66 -72 37
10.07
seat and misc fragments 9/27/96-2 40 39 42.66 -72 37 10.07 3'
aluminum
flanged pipe 9/27/96-2 40 39 42.66 -72 37 10.07 cargo door,
7'(3'(1'
9/27/96-2 40 39 45.61 -72 37 10.01 bag of small metal parts
9/09/96-49 40
39 45.61 -72 37 10.01 white toilet seat 9/09/96-49 40 39 45.61
-72 37
10.01 RT stub frame FS 1060, RBL 98.58 - RBL 127.50 CW
MOCKUP 40 39 54.20
-72 37 09.86 bag of debris 10/07/96-1 40 39 54.20 -72 37 09.86
debris
10/07/96-1 40 39 54.20 -72 37 09.86 debris, poss. speaker assy.
10/08/96-1
40 39 46.59 -72 37 09.60 seat belt and small piece of structure
10/13/96-3
40 39 48.15 -72 37 09.58 5' light framing/ various piping & light
edging;
waterline 100 RBL 55 Support 8/16/96-10 40 39 36.37 -72 37
09.58
8/09/96-37 40 39 48.15 -72 37 09.58 aircraft struts, frame 6'
length
8/15/96-12 40 39 43.30 -72 37 09.30 one 8' & one 2' of "z"

channel

10/13/96-3 40 39 46.97 -72 37 09.21 panel structure 10/11/96-10
40 39

46.90 -72 37 09.20 9/19/96-1 40 39 46.90 -72 37 09.20 9/19/96-1
40 39

43.20 -72 37 09.20 aluminum channeling 10/13/96-3 40 39 52.57
-72 37 09.14

4'(1.5'(3" red/white exterior skin p/n 65B03318376 8/11/96-1 40
39 52.57

-72 37 09.14 3 small pieces largest 3'(3"(1" #65B12201-8
8/09/96-37 40 39

45.46 -72 37 09.10 one canvas bag; one knap sack 9/09/96-49 40
39 45.46

-72 37 09.10 2'(2'(1' section of structure 9/09/96-49 40 39 45.46
-72 37

09.10 3' length of tubing 9/09/96-49 40 39 49.49 -72 37 09.00
fuselage

6'(2' 8/14/96-9 40 39 49.49 -72 37 09.00 fuselage (yellow)
2.5'(18" CW

MOCKUP 8/14/96-9 40 39 43.40 -72 37 09.00 structural metal
w/wire

10/13/96-3 40 39 50.46 -72 37 08.96 5'(3',2'(3' oblong metal sect
honeycomb insulation; fire damage part-metal 8/14/96-11 40 39
45.83 -72 37

08.61 8" tubing & pieces 8/15/96-12 40 39 45.13 -72 37 08.61
paper

products 8/15/96-12 40 39 45.83 -72 37 08.61 US mail;
magazine 8/14/96-10

40 39 45.83 -72 37 08.61 food container unit 8/15/96-12 40 39
45.83 -72 37

08.61 exterior part PARTS BAY 8/15/96-12 40 39 45.83 -72 37
08.61 metal

part PARTS BAY 8/15/96-12 40 39 45.83 -72 37 08.61

denimjacket 8/15/96-12
40 39 45.83 -72 37 08.61 fiberglass part 8/15/96-12 40 39 45.83
-72 37
08.61 metal part 8/15/96-12 40 39 45.83 -72 37 08.61 metal part
8/15/96-12
40 39 45.83 -72 37 08.61 sandal & metal parts 8/15/96-12 40 39
45.83 -72
37 08.61 metal frame parts 8/15/96-12 40 39 45.83 -72 37 08.61
5' metal
piece 8/15/96-12 40 39 45.83 -72 37 08.61 seat back and rounded
fwd wing
sect 5'(4'(2' 8/14/96-10 40 39 45.83 -72 37 08.61 photo's, suitcase
parts
- burn damage 8/15/96-12 40 39 45.83 -72 37 08.61 horizontal
stabilizer
right side inboard nose section 40 39 34.02 -72 37 08.58 piece of
metal
10/17/96-2 40 39 43.10 -72 37 08.30 honeycomb skin 10/13/96-3
40 39 47.30
-72 37 07.90 right SOB web-lower segment CW MOCKUP 40
39 47.30 -72 37
07.90 2 small pieces of skin 10/13/96-3 40 39 47.95 -72 37 07.80
forward
lower cargo bay structure FS 920 right hand side 8/15/96-11 40
39 47.95
-72 37 07.80 aircraft - exterior & frame 40 39 47.95 -72 37 07.80
plastic
& metal parts PARTS BAY 8/16/96-9 40 39 47.95 -72 37 07.80
aircraft
exterior with access panel 8/16/96-9 40 39 47.95 -72 37 07.80
skin & frame
8/14/96-10 40 39 47.95 -72 37 07.80 A/C exterior, overhead
panel, metal

carts fire damage 8/15/96-12 40 39 05.11 -72 37 07.68 tan
curtain or sheet
10/06/96-1
Z3640 40 39 44.60 -72 37 07.50 gasket and metal parts
10/13/96-3 40 38
05.10 -72 37 07.40 12"(18" thin alum sheet 8/10/96-9 40 39
44.70 -72 37
07.40 aluminum skin, 2'(3' 10/13/96-3 40 39 43.35 -72 37 07.38
misc debris
9/11/96-5 40 39 48.38 -72 37 07.13 section of aluminum angle
10/11/96-10
40 39 48.38 -72 37 07.13 white plastic strip with black screws
and nuts
10/11/96-10 40 39 44.15 -72 37 07.08 honeycomb fragment
10/13/96-3 40 39
44.15 -72 37 07.08 panel structure 10/13/96-3 40 39 44.15 -72 37
07.08
skin section 10/13/96-3 40 39 51.18 -72 37 06.75 assorted small
pieces
9/09/96-49 40 39 45.00 -72 37 06.50 tubing & channel parts
10/13/96-3 40
39 43.70 -72 37 06.50 rubber hose and structure 10/13/96-3 40
39 46.85 -72
37 06.22 6 pcs alum framing, 2 inner walls, largest 3'(1'
8/14/96-9 40 39
46.30 -72 37 06.20 plastic skin and metal fragment 10/13/96-3
40 39 46.40
-72 37 06.20 section of metal structure 10/13/96-3 40 39 46.30
-72 37
06.20 miss rubber, small stainless part 10/13/96-3 40 39 46.30
-72 37
06.20 honeycomb 40 39 47.47 -72 37 06.01 aluminum structural
GD 205.2A -

serial #; plane skin 10/11/96-10 40 39 44.30 -72 37 06.00 wiring
bundle
10/13/96-3 40 39 44.30 -72 37 06.00 one piece of aluminum
skin, red, white
& green, 6' 10/13/96-3 40 39 47.37 -72 37 05.80 beam CW rear
spar CW
MOCKUP 40 39 47.37 -72 37 05.80 SWB #1 web; 1'(2' green
sheet metal with
rivets CW MOCKUP 9/09/96-49 40 39 47.37 -72 37 05.80 mid
spar CW stiffener
CW MOCKUP 40 39 32.77 -72 37 05.57 10'(1'(3" 8/09/96-37 40
39 48.13 -72 37
05.51 overhead bin / various light framing / speaker frame
8/16/96-10 40
39 48.13 -72 37 05.51 speaker frame, 4' metal frame, overhead
compartment
8/15/96-12 40 39 51.71 -72 37 05.34 bag of debris 10/07/96-1 40
39 51.71
-72 37 05.34 4'(2' piece of debris 10/07/96-1 40 39 43.30 -72 37
04.95
outboard wing rib segment, upper and lower 40 39 43.30 -72 37
04.95
debris, purse 9/16/96-2 40 39 43.30 -72 37 04.95 FS 1100 frame
segment 40
39 43.30 -72 37 04.95 wing rib segment lower chord 40 39 43.30
-72 37
04.95 # 1 engine pylon access panel inboard 40 39 43.30 -72 37
04.95 gap
cover engine 40 39 47.28 -72 37 04.89 5 small pcs alum framing,
metal pc
4'(2' jagged edges 8/14/96-9 40 39 47.28 -72 37 04.89 seat belt,
wire
harness p/n 8131913; 5 small pieces aluminum framing

8/14/96-9 40 39 45.05
-72 37 04.78 metal parts and tubing 8/14/96-11 40 39 44.36 -72
37 04.63 CW
upper skin (9-21-96-1) CW MOCKUP 40 39 44.36 -72 37 04.63
9/22/96-1 40 39
44.36 -72 37 04.63 CW upper skin CW MOCKUP 40 39 44.36
-72 37 04.63 SWB #1
(9-21-96-1 CW MOCKUP 40 39 44.36 -72 37 04.63 name tag
and debris plus
some kind of pipe 9/20/96-33 40 39 44.36 -72 37 04.63 large
pieces of
debris 9/20/96-33 40 39 44.36 -72 37 04.63 debris 9/21/96-1 40
40 04.43
-72 37 04.48 metal bucket like object 10/17/96-2 40 39 47.98 -72
37 04.08
metal seat back 10/11/96-10 40 39 45.00 -72 37 03.76 20'(10'
fuselage
sect, also metal part # 501 8/14/96-9 40 39 45.00 -72 37 03.76
4'(2'
curled metal framing & siding; 20'(10' piece of fuselage 40 39
51.38 -72
37 03.58 debris 9/22/96-1 40 39 46.31 -72 37 03.51 1'(2" metal
piece PARTS
BAY 8/15/96-12 40 39 46.31 -72 37 03.51 metal parts, tubing,
smoke
detector 8/16/96-9 40 39 46.31 -72 37 03.51 light metal framing
8/15/96-12
40 39 46.31 -72 37 03.51 framing & clamp 8/15/96-12 40 39
46.31 -72 37
03.51 A/C exterior 10'(10" 8/15/96-12 40 39 46.31 -72 37 03.51
A/C
exterior & light framing 40 39 46.31 -72 37 03.51 metal parts
8/16/96-9 40

39 46.31 -72 37 03.51 5'(2' siding (alum) 8/15/96-12 40 39 46.31
-72 37
03.51 fan inlet diffuser housing for air cycle machine 8/15/96-12
40 39
50.17 -72 37 03.35 metal plastic parts, headsets and spring
8/14/96-11 40
39 50.17 -72 37 03.35 2.5' framing 8/15/96-11 40 39 46.62 -72
37 03.35
7'(2'(1' square framing p/n 65B50570-119 8/14/96-9 40 39 46.62
-72 37
03.35 light framing at hole built in #1621011 21 8/14/96-9 40 39
46.62 -72
37 03.35 mail label; book 8/14/96-9 40 39 57.66 -72 37 03.06
debris
10/08/96-1 40 39 47.34 -72 37 02.89 strut marked 814491, alum
framing w/
burn marking 8/14/96-9 40 39 59.07 -72 37 02.75 aircraft
ribbing, 1.5'
long, 'Z'shaped 10/17/96-2 40 38 19.30 -72 37 02.70 plastic
window framing
(whole) 8/10/96-9 40 39 36.47 -72 37 02.70 2'(1"(1"angle iron,
small
bundle of wires W1295-2CC48 8/14/96-9 40 39 45.72 -72 37
02.67 metal frame
structure p/n 69B518H9-6, 4370, A3191; black luggage
8/14/96-9 40 39 45.72
-72 37 02.67 metal frame structure "69B518H9-6 4370 A3191"
40 38 52.33 -72
37 02.64 some kind of gray tray 10/02/96-1 40 39 48.47 -72 37
02.59 white
+ yellow curved piece of plastic 10/11/96-10
Z3426 40 39 48.47 -72 37 02.59 debris and a piece of carpet
9/22/96-1 40

39 48.47 -72 37 02.59 lower center wing skin panel mid spar at BL0; Lot #
9-22-96-1 CW MOCKUP 40 39 48.47 -72 37 02.59 lower center wing skin panel;
front spar at BL110; Lot # 9-22-96-1 CW MOCKUP 40 39 48.47 -72 37 02.59
misc. metal debris 10/02/96-1 40 39 48.47 -72 37 02.59 lower center wing
skin panel; RBL 98; stringer 13-14, Lot # 9-22-96-1 CW MOCKUP 40 39 48.47
-72 37 02.59 lower center wing skin panel; RBL 98; stringer 9; Lot #
9-22-96-1 CW MOCKUP 40 39 48.47 -72 37 02.59 debris
9/16/96-2 40 39 48.47 -72 37 02.59 SOB rib segment CW MOCKUP 40 39 30.20 -72
37 02.30 rudder section 10/17/96-1 40 39 36.06 -72 37 02.28 tail rudder 6'(8'(1'
"65B25056-1" 8/09/96-37 40 39 53.91 -72 37 02.26 plastic bag of debris
10/07/96-1 40 39 53.91 -72 37 02.26 debris 10/07/96-1 40 39 46.35 -72 37
02.14 speaker frame, 6" exhaust tubing 4' long, side panels; lighting
panel PARTS BAY 8/14/96-10 40 39 46.75 -72 37 02.14 metal parts, tubing
test switch for fire ext. 8/16/96-9 40 39 46.75 -72 37 02.14 rubber tubing
8/16/96-9 40 39 32.16 -72 37 01.61 aircraft skin 10/17/96-1 40 39 30.50
-72 37 01.30 skin, 1' (6" 10/17/96-1 40 39 46.40 -72 37 01.20 1 gray
plastic bag and misc metal 9/11/96-5 40 39 46.40 -72 37 01.20 debris

9/21/96-1 40 39 46.40 -72 37 01.20 piece of jewelry on a piece
of clothes;
eye or sunglass case; debris 9/21/96-1 40 39 49.50 -72 37 00.60
green
metal, 3'(2"(3" 10/11/96-10 40 39 46.36 -72 37 00.45 inner
framing and
wiring 8/14/96-10 40 39 46.36 -72 37 00.45 6'(4' siding various
piping and
siding 8/14/96-10 40 39 47.41 -72 37 00.06 green metal with
rivets twisted
10/11/96-10 40 39 26.46 -72 37 00.06 aircraft skin 10/17/96-1 40
39 47.41
-72 37 00.06 frame member/station 1438 40 39 00.00 -72 37
00.00 misc metal
debris from plane 40 39 45.04 -72 36 59.81 bag of debris
10/02/96-1 40 39
45.04 -72 36 59.81 toilet seat lid; life vest; debris 9/11/96-5 40
39
52.50 -72 36 59.80 debris - some kind of paper 9/22/96-1 40 39
45.23 -72
36 59.71 green skin 10/11/96-10 40 39 47.70 -72 36 59.60 green
skin
10/11/96-10 40 39 48.08 -72 36 59.49 green skin 10/11/96-10 40
39 46.08
-72 36 58.60 2 plastic bags; hatch; misc metal pieces 9/11/96-5
40 39
28.40 -72 36 58.50 structural part 10/17/96-1 40 39 43.52 -72 36
58.38
debris 9/16/96-2
Z2568 40 39 43.52 -72 36 58.38 bags, gray 9/11/96-5 40 39
43.52 -72 36
58.38 misc. debris; hoses 9/27/96-1 40 39 43.00 -72 36 58.20
skin + 1 beam

10/11/96-10 40 39 46.07 -72 36 58.02 green skin; framing
10/11/96-10 40 39
46.07 -72 36 58.02 green metal with rivets with four circular
holes
10/11/96-10 40 39 46.07 -72 36 58.02 green metal 40 39 46.94
-72 36 58.00
gasket 9/20/96-33 40 39 42.80 -72 36 57.50 10/11/96-10 40 39
31.08 -72 36
57.32 LHS vertical stabilizer upper fin station 370-520
8/09/96-37 40 39
44.92 -72 36 57.32 DOD flight info sheets/ 12 pieces bagged
with flight
info and 3'(2'(4' piece PARTS BAY 8/09/96-37 40 39 45.74 -72
36 57.27
1'(1' outer hatch bolted shut; wallet 8/14/96-9 40 39 45.74 -72 36
57.27
exhaust tubing?, 1'(1' small alum pcs, wallet 8/14/96-9 40 39
45.74 -72 36
57.27 metal framing ?? damage PARTS BAY 8/14/96-9 40 39
45.03 -72 36 56.89
3'(4" inner wall attached to framing 8/15/96-12 40 39 31.10 -72
36 56.80
small structural part 10/17/96-1 40 39 45.13 -72 36 56.61 inner
framing,
largest 18"(12", oxygen mask, alum rail 1' long CABIN HGR
8/14/96-9 40 39
42.10 -72 36 55.94 brown zip bag; piece of small debris; bag
containing
newspaper 10/02/96-1 40 39 42.10 -72 36 55.94 pipes & debris
9/16/96-2 40
39 44.77 -72 36 55.72 possible wing framing 3'(1'(1'; 3'(1'(3"
framing;
misc. pieces 8/14/96-9 40 39 44.77 -72 36 55.72 1'(6" insulation

and small

aluminum inner siding 8/14/96-9 40 39 44.42 -72 36 55.17

crown skin FS

1241-1438 stringer 5L-8R 9/16/96-2 40 39 44.42 -72 36 55.17

debris -

clothes 9/20/96-33 40 39 32.00 -72 36 54.60 small structural part
w/

fabric 10/17/96-1 40 39 46.30 -72 36 54.18 misc. small framing
aluminum

DUCTING BAY 8/14/96-9 40 39 46.60 -72 36 54.18 7' long

curved ducting p/n

65B38600-153-256 8/14/96-9 40 39 30.50 -72 36 54.00 black

boot w/ possible

human remains 40 39 45.72 -72 36 53.73 p/n 65B0 3862 20;

4'(2.5' inner

wall; various hoses (melted) 8/14/96-9 40 39 45.72 -72 36 53.73

various

hoses melted PARTS BAY 8/14/96-9 40 39 28.40 -72 36 52.70

ribbing with

access hole 10/17/96-1 40 39 44.79 -72 36 52.47 debris

9/16/96-2 40 39

44.79 -72 36 52.47 debris 9/20/96-33 40 39 44.31 -72 36 51.63 2

pieces of

skin, aluminum on one side, green on the other side 40 39 42.39

-72 36

50.64 2 pieces plastic & magazines 10/12/96-2 40 39 45.10 -72

36 50.19 2

pieces of metal 10/12/96-2 40 39 34.36 -72 36 49.37 1' light

framing PARTS

BAY 8/26/96-33 40 39 44.69 -72 36 49.13 bent piece of metal 1'

long

Z1756 40 39 34.96 -72 36 49.06 small piece of debris 10/02/96-1

40 39

29.65 -72 36 48.92 several small pieces of metal framing (5) the largest is 1'(6" 8/20/96-15 40 39 46.11 -72 36 48.90 debris 10/08/96-1 40 39 28.22 -72 36 48.71 2 pieces 1) 2'(1/8"(1' p/n 65B40501 M206; 2) 1'(2" shard 8/20/96-15 40 39 43.93 -72 36 48.43 plastic window shade, fabric with insulation 8/26/96-33 40 39 43.93 -72 36 48.43 baggage & wreckage; 1 large aluminum piece marked: INTER COS. 65B01113-?; 4' curved fram in 8/26/96-17 40 39 43.93 -72 36 48.43 large bundle of debris 8/26/96-28 40 39 43.93 -72 36 48.43 white bag with plane pieces 8/26/96-33 40 39 43.93 -72 36 48.43 metal tubing. burnt metal frame PARTS BAY 8/26/96-33 40 39 43.93 -72 36 48.43 blue bag, foreign air mail 8/26/96-33 40 39 43.93 -72 36 48.43 2'(1.5' metal skin; 3'(20" metal 8/26/96-33 40 39 43.93 -72 36 48.43 misc debris 8/26/96-1 40 39 53.91 -72 36 48.31 debris 10/08/96-1 40 39 43.76 -72 36 48.16 1. 3' long with "DOOR MUST BE LATCHED" tag 2. 2' long with ripped out rivet holes 3. 3" piec 10/12/96-2 40 39 31.33 -72 36 47.97 part of aircraft skin 40 39 43.90 -72 36 47.67 various pieces of scrap metal; 18"(10"; 18"(36"; 15"(3.5" 8/24/96-10 40 39 25.97 -72 36 47.25 3 pieces of green metal framing, longest 2.5'(2"(2" 8/20/96-15 40 39 27.20

-72 36

47.00 aluminum strip 10/17/96-1 40 39 43.90 -72 36 46.43 US
airmail

envelope 8/26/96-14 40 39 43.04 -72 36 46.32 10/07/96-9 40 39
37.98 -72 36

45.94 large piece of debris 10/02/96-1 40 39 37.97 -72 36 45.93
seat frame

with blanket; 1.5'(2' metal with 10' carpet; FWD unit #320

CABIN HGR

8/26/96-33 40 39 41.83 -72 36 45.87 skin 1'(2' 10/07/96-12 40 39
48.09 -72

36 45.78 debris 10/08/96-1 40 39 42.44 -72 36 44.43 piece of
metal - 1 ft.

long with "WL/310" stenciling 10/12/96-2 40 38 26.13 -72 36
43.93 seat 5

(1 2) first class CBN INT 10/29/96-2 40 39 24.05 -72 36 43.38
3'(1'

exterior skin, 2'(1' exterior skin 8/26/96-33 40 39 23.45 -72 36
43.20

1'(8" exterior skin 8/26/96-33 40 39 53.68 -72 36 42.65 debris
10/07/96-1

40 39 41.79 -72 36 42.48 debris 9/21/96-1 40 39 41.7 -72 36
42.48 book;

debris 9/21/96-1 40 39 26.40 -72 36 42.30 black blanket
10/17/96-1 40 39

44.22 -72 36 42.19 misc. debris 9/27/96-1 40 39 44.22 -72 36
42.19 debris

9/21/96-1 40 39 49.22 -72 36 42.09 carpet 10/07/96-1 40 38
50.27 -72 36

41.71 passport photo 10/02/96-1

Z1703 40 39 18.20 -72 36 41.38 4' piece of debris 10/07/96-1 40
39 49.50

-72 36 41.13 2.5" piece of plastic / fiberglass 10/17/96-2 40 39

49.50 -72
36 41.13 1.5" green metal piece 10/17/96-2 40 39 28.82 -72 36
40.73 1
piece plastic w/ metal strap 10/17/96-2 40 39 49.27 -72 36 40.24
debris
10/08/96-1 40 39 26.70 -72 36 40.00 black rubber 10/17/96-1 40
39 40.22
-72 36 39.99 debris 9/22/96-1 40 39 55.29 -72 36 39.48 3' long
frame
section 8/24/96-10 40 39 44.16 -72 36 39.23 financial papers
8/26/96-11 40
39 44.16 -72 36 39.23 2'(2' siding; t shirt; j&b whiskey bottle;
siding
p/n M442 B03287 1 8/26/96-2 40 39 45.10 -72 36 39.17 metal
pieces, hair
dryer, rubber pieces 8/26/96-16 40 39 42.95 -72 36 39.04 small
plastic
siding; small aluminum piece; 6"(6" fiberglass 8/26/96-21 40 39
41.48 -72
36 38.76 window shade 3' (4' aluminum 8/26/96-3 40 39 43.36
-72 36 37.93
2'(1.5' piece of aluminum; 8"(14" aluminum; magazines;
fiberglass pieces
8/26/96-23 40 39 40.05 -72 36 37.90 metal debris, toothbrush,
and
photographs 9/23/96-5 40 39 40.15 -72 36 37.80 debris 9/21/96-1
40 39
40.15 -72 36 37.80 piece of pipe or hose 9/21/96-1 40 39 46.52
-72 36
36.92 unidentified clothing 8/24/96-7 40 39 46.52 -72 36 36.92
metal part
w/frame (56B0551511), 4' (4" metal ?? toilet seat cover, misc
debris

(details on ha 8/24/96-7 40 39 41.24 -72 36 36.62 debris; tube
9/21/96-1
40 39 38.86 -72 36 36.33 piece of wire and a book 9/22/96-1 40
39 42.41
-72 36 36.19 10/08/96-1 40 39 40.14 -72 36 36.02 portion of
spartwise beam
CW tank CW MOCKUP 40 39 37.86 -72 36 34.77 piece of
carpet and debris
9/22/96-1 40 39 37.86 -72 36 34.77 4' long beam 10/17/96-2 40
39 37.86 -72
36 34.77 blackened metal debris 9/25/96-2 40 39 37.86 -72 36
34.77 misc.
metal debris; towel; quilt; photographs; US mail 9/25/96-2 40 39
37.86 -72
36 34.77 newspaper and letter with address 10/17/96-2 40 39
37.86 -72 36
34.77 flight bag; flashlight 9/27/96-1 40 39 37.86 -72 36 34.77
several
pieces of metal (&1 wire bundle) from wreckage log 10/17/96-2
40 39 37.86
-72 36 34.77 1 piece of metal with oil tank written on it
10/17/96-2 40 39
37.86 -72 36 34.77 seat pan 10/17/96-2 40 39 37.86 -72 36 34.77
support
beam metal 9/27/96-1 40 39 37.86 -72 36 34.77 misc. metal
debris 9/27/96-1
40 39 37.86 -72 36 34.77 misc. debris 9/27/96-1 40 39 37.86 -72
36 34.77
hose; misc. debris; flotation device 9/27/96-1
Z3544 40 39 37.86 -72 36 34.77 west clock timer; seat cover
9/27/96-1 40
39 37.86 -72 36 34.77 misc. metal debris 9/27/96-1 40 39 37.86
-72 36

34.77 misc metal 9/28/96-1 40 39 37.86 -72 36 34.77 misc metal
9/28/96-1
40 39 37.86 -72 36 34.77 carpet; misc. metal debris; floor trim
9/27/96-1
40 39 37.86 -72 36 34.77 rubber gasket 10/17/96-2 40 39 37.86
-72 36 34.77
misc metal 9/28/96-1 40 39 37.86 -72 36 34.77 personel effects,
calculator
10/18/96-3 40 39 37.86 -72 36 34.77 pieces of metal 10/17/96-2
40 39 37.86
-72 36 34.77 small pieces of metal 10/17/96-2 40 39 37.86 -72
36 34.77
several pieces of metal 10/17/96-2 40 39 37.86 -72 36 34.77
piece of
plastic 10/17/96-2 40 39 37.86 -72 36 34.77 2.5' length of pipe
w/ metal
10/17/96-2 40 39 37.86 -72 36 34.77 honeycomb insulation
10/17/96-2 40 39
37.86 -72 36 34.77 green metal piece 10/17/96-2 40 39 37.86 -72
36 34.77
1' long piece of plastic 10/17/96-2 40 39 37.86 -72 36 34.77
plastic
ventilation 10/17/96-2 40 39 37.86 -72 36 34.77 fiberglass w/
warning
label 10/17/96-2 40 39 37.86 -72 36 34.77 1' (2' piece of metal
10/17/96-2 40 39 37.86 -72 36 34.77 misc metal 9/28/96-1 40 39
37.86 -72
36 34.77 piece rubber coated wire 10/17/96-2 40 39 37.86 -72 36
34.77
wiring harness 10/17/96-2 40 39 37.86 -72 36 34.77 framework
40 39 37.86
-72 36 34.77 framework 40 39 37.86 -72 36 34.77 framework
10/18/96-3 40 39

37.86 -72 36 34.77 3' (4' metal piece 10/17/96-2 40 39 37.86 -72
36 34.77

5' piece of black metal 10/17/96-2 40 39 37.86 -72 36 34.77 6'
metal piece

10/17/96-2 40 39 37.86 -72 36 34.77 metal tube & wiring

10/17/96-2 40 39

37.86 -72 36 34.77 6" green metal(qty 2); 7" triangular orange
metal; 5"

flat metal 1/2 wrapped in black plastic 40 39 37.86 -72 36 34.77
brown

denim shorts, size small 40 39 46.96 -72 36 34.73 1'(1.5" metal
p/n

65B03153 32; 6" wire cover; 1'(3" fiberglass 8/24/96-7 40 39

23.84 -72 36

34.44 debris, head phone cords black; red exterior piece of plane

10/02/96-1 40 39 23.98 -72 36 34.16 misc. metal 9/28/96-1 40 39

40.09 -72

36 34.11 debris - carpet - P1 to 50 9/22/96-1 40 39 45.81 -72 36

34.11

misc. metal 9/28/96-1

Z3448 40 39 26.24 -72 36 34.01 debris 9/22/96-1 40 39 40.21

-72 36 33.92

debris 9/22/96-1 40 39 44.99 -72 36 33.78 white plastic bag and
metal

debris 9/23/96-5 40 39 44.10 -72 36 33.64 debris 9/22/96-1 40 39

43.26 -72

36 33.16 debris 9/22/96-1 40 39 33.57 -72 36 33.04 vent 5'(5" p/

n

1471075-34 8/20/96-15 40 39 45.38 -72 36 32.96 6"(6" alum.;

metal

fragments PARTS BAY 8/24/96-7 40 39 43.76 -72 36 32.55 mail

envelope

(white); piece of hose 9/22/96-1 40 39 40.29 -72 36 32.45 2

pieces of
debris 10/07/96-1 40 39 46.40 -72 36 32.44 umbrella, 6'(4'
carpet; piece
of burnt plastic, Carpet 7' long 8/24/96-7 40 39 39.49 -72 36
32.23
portion of aft pressure bulkhead; 9'(6' tapering mass w/insl
attached p/n
65B0263458 on clip 8/11/96-1 40 39 39.49 -72 36 32.23
8/11/96-1 40 39
39.49 -72 36 32.23 bag full of insulation 8/11/96-1 40 39 23.26
-72 36
31.96 misc. metal 9/28/96-1 40 39 42.67 -72 36 31.94 debris
9/22/96-1 40
39 43.10 -72 36 31.49 debris 9/22/96-1 40 39 43.10 -72 36 31.49
strut 7'
long 65B067617 9/22/96-1 40 39 43.10 -72 36 31.49 2 women's
cosmetic bags,
striped with misc materials in it - no ID 8/26/96-12 40 39 46.98
-72 36
31.42 1'(6" alum PARTS BAY 8/24/96-7 40 39 44.95 -72 36
31.34 FS 920
frame; stringer 33L-35L; (rib assy #65001736-401) 40 39 44.95
-72 36 31.34
carpet & alum. pcs / panties / headphone 8/24/96-7 40 39 45.37
-72 36
31.08 debris- honey comb/ plastic 10/02/96-1 40 39 45.70 -72 36
30.46
debris 9/20/96-33 40 39 43.24 -72 36 30.45 small pieces of
debris
9/23/96-5 40 39 43.93 -72 36 29.83 green cloth 9/23/96-5 40 39
03.03 -72
36 29.57 burnt rubber tubing DUCTING BAY 8/24/96-7 40 39
39.68 -72 36

29.54 personal effects photo (no picture) 40 39 44.55 -72 36
29.11 debris
10/02/96-1 40 39 44.94 -72 36 28.85 debris 9/22/96-1 40 39
45.10 -72 36
28.75 luggage rack cart 8/22/96-7 40 39 38.37 -72 36 28.75 2
small pieces
of debris 10/07/96-1 40 39 45.82 -72 36 28.59 2"(4" plastic
#68-5330;
armrest piece 8/24/96-7 40 39 19.58 -72 36 28.58 new levi's
jeans, tags
still attached; rubber weather strip 8/26/96-33 40 39 19.43 -72 36
28.58
debris 9/22/96-1 40 39 42.04 -72 36 28.57 gasket; debris; picture
9/21/96-1 40 39 37.42 -72 36 28.42 debris 9/20/96-33 40 39
41.63 -72 36
28.41 fiberglass pieces, metal pieces, world business report
8/26/96-33 40
39 41.63 -72 36 28.41 6'(4" curved framing p/n 65B38600-170
257 PARTS BAY
8/26/96-33 40 39 41.63 -72 36 28.41 p/n 69B501101:1 on frame
6'(2'
8/26/96-33 40 39 42.01 -72 36 27.99 piece of backbone
9/21/96-1 40 39
42.01 -72 36 27.99 debris 9/21/96-1 40 39 42.83 -72 36 27.99
debris
9/21/96-1 40 39 20.35 -72 36 27.82 piece of metal with paint on
one side
10/17/96-2 40 39 40.42 -72 36 27.56 debris 9/11/96-5 40 39
46.28 -72 36
27.56 debris 9/20/96-33 40 39 34.23 -72 36 27.55 strapped gray
mass
unknown (mail?) 9/22/96-1 40 39 37.76 -72 36 27.41 debris
9/20/96-33 40 39

40.66 -72 36 27.34 bag of debris 9/22/96-1 40 39 44.43 -72 36
27.20
various small metal pieces (6) & 1 picture; small alum and
plastic pieces
8/24/96-7 40 39 37.60 -72 36 27.00 insulation panel, 6"(6"
10/12/96-3 40
39 37.60 -72 36 27.00 coded steel cable 10/12/96-3 40 39 42.87
-72 36
26.64 windows shade; debris 9/21/96-1 40 39 43.53 -72 36 26.17
window
molding 9/21/96-1 40 39 44.72 -72 36 25.97 debris 9/22/96-1 40
39 37.78
-72 36 25.65 two pieces of debris 9/22/96-1 40 39 38.81 -72 36
25.39
debris 9/22/96-1 40 39 43.10 -72 36 24.97 debris 9/21/96-1 40 39
42.93 -72
36 24.91 1'(4" piece of plastic; a photo; 3 small pieces of
fiberglass; 5
bags 8/24/96-7 40 39 15.55 -72 36 24.87 white rain jacket &
small burlap
bag 8/24/96-10 40 39 43.32 -72 36 24.87 debris 9/22/96-1 40 39
38.88 -72
36 24.77 debris 9/22/96-1 40 39 38.88 -72 36 24.77 row 31 (1 2
3) seats
CABIN HGR 40 39 38.88 -72 36 24.77 paper and debris
9/20/96-33 40 39 35.62
-72 36 24.73 various framing 40 39 35.62 -72 36 24.73 misc
debris with the
following p/n 65B09123-23 919 FS 1301; p/n 69B42019-1
8/26/96-33 40 39
43.65 -72 36 24.67 debris 9/22/96-1 40 39 41.38 -72 36 24.55
debris
9/11/96-5 40 39 32.58 -72 36 24.49 9/22/96-1 40 39 41.41 -72 36

24.15

piece of black hose 10/12/96-3 40 39 41.41 -72 36 24.15 one side of

honeycomb insulation panel 10/12/96-3 40 39 37.82 -72 36 23.96 debris

9/20/96-33 40 39 37.25 -72 36 23.43 debris 9/20/96-33

Z3413 40 39 37.25 -72 36 23.43 some kind of book and computer disk

9/21/96-1 40 39 41.28 -72 36 23.13 debris 9/11/96-5 40 39 38.34 -72 36

22.87 US mail envelope; hose; debris 9/21/96-1 40 39 38.34 -72 36 22.87

see tag 9/21/96-1 40 39 00.03 -72 36 22.79 microfiche, red bag, orange bag

8/24/96-10 40 39 38.99 -72 36 22.67 right SOB stiffener, 4th aft of SWB

#3; 65B11554-16 CW MOCKUP 40 39 38.99 -72 36 22.67 right SOB web at first

stiff forward of M.S., FS 1120, below CW303 CW MOCKUP 40 39 38.99 -72 36

22.67 SWB #1 web right hand closure panel CW MOCKUP 40 39 38.99 -72 36

22.67 right SOB web at SWB #1 CW MOCKUP 40 39 38.99 -72 36 22.67 right

wing upper surface, stringer 9-mid spar, WS 1250 40 39 38.99 -72 36 22.67

SWB #1 web right hand closure panel CW MOCKUP 40 39 38.99 -72 36 22.67

rubber strip and debris 9/22/96-1 40 39 38.99 -72 36 22.67 SWB #1 web

right hand closure panel CW MOCKUP 40 39 40.05 -72 36 22.00 debris in bag

9/22/96-1 40 39 36.15 -72 36 21.94 misc. debris 9/23/96-5 40 39

38.43 -72

36 21.78 personal effects and debris 9/21/96-1 40 39 39.29 -72

36 21.75

various small metal & plastic pieces, one measures 18"(8"(8"

8/24/96-10 40

39 39.62 -72 36 21.74 debris 9/22/96-1 40 39 33.43 -72 36 21.38

fuel pipe

9/22/96-1 40 39 37.20 -72 36 21.35 debris 9/22/96-1 40 39 36.96

-72 36

20.93 9/22/96-1 40 39 41.20 -72 36 20.82 debris and miniature

bottle

9/22/96-1 40 39 39.69 -72 36 20.69 debris 9/21/96-1 40 39 39.69

-72 36

20.69 SWB #2, LBL 93.48 web, 9'(14'H inc?? fuel hole CW

MOCKUP 40 39 39.69

-72 36 20.69 CW upper skin 5 pieces CW MOCKUP 40 39 39.69

-72 36 20.69

large piece of debris 9/22/96-1 40 39 35.92 -72 36 20.24 misc.

debris

9/23/96-5 40 39 22.52 -72 36 19.81 misc. plastic 10/17/96-1 40

39 43.02

-72 36 19.42 debris 9/16/96-2 40 39 29.60 -72 36 19.40

structural piece

10/17/96-1 40 39 43.42 -72 36 19.06 debris 9/16/96-2 40 39

42.44 -72 36

19.01 clothes (bumt); burnt lifevest 8/24/96-7 CW1008 40 39

42.44 -72 36

19.01 rear spar, left corner section CW MOCKUP 8/24/96-7 40

39 41.28 -72

36 18.99 picture - bundle - piece of debris 9/22/96-1 40 39 39.55

-72 36

18.31 book; debris 9/21/96-1 40 39 39.55 -72 36 18.31 metal &

fiberglass

insulation 10/17/96-2
Z3457 40 39 35.01 -72 36 18.25 misc. debris 9/23/96-5 40 39
39.72 -72 36
18.22 piece of debris - piece of cloth - instruction book- picture
9/22/96-1 40 39 36.65 -72 36 18.17 misc. debris 9/23/96-5 40 39
31.73 -72
36 17.67 2'(2" framing 8/26/96-33 40 39 34.15 -72 36 17.55 p/n
69B01906-1
7/24/70; a/c headphones; rain jacket 8/26/96-33 40 39 35.02 -72
36 17.52
mail box; plastic tubing; metal piece of fuselage 8/26/96-33 40
39 32.82
-72 36 17.52 men's slipper, US Mail 8/26/96-33 40 39 35.02 -72
36 17.52
4'(2' framing and wall PARTS BAY 8/26/96-33 40 39 44.02 -72
36 17.37
debris 9/16/96-2 40 39 33.92 -72 36 16.54 1'(4" metal piece and
8"(4"
insulation 8/26/96-33 40 39 42.28 -72 36 14.50 1 piece rubber,
piece skin
4' long (1' wide 40 39 42.45 -72 36 13.92 10"(10" piece of
siding
8/24/96-7 40 38 58.84 -72 36 13.53 inner wall siding CABIN
HGR 8/24/96-7
40 39 36.67 -72 36 12.89 misc. debris, strap 9/23/96-5 40 39
38.31 -72 36
11.20 plastic gasket 9/16/96-2 40 39 41.91 -72 36 10.87 p/n
69B41076-
piece of pipe - seatbelt 9/22/96-1 40 39 42.73 -72 36 10.77 debris
9/22/96-1 40 39 42.31 -72 36 10.57 CW stiffener (9-22-96-1)
CW MOCKUP 40
39 42.31 -72 36 10.57 CW mid spar RBL 87.26-98.59
(9-22-96-1) CW MOCKUP 40

39 42.31 -72 36 10.57 CW mid spar CW MOCKUP 40 39 42.31
-72 36 10.57
debris 9/22/96-1 40 39 42.31 -72 36 10.57 SWB #1 (9-22-96-1)
CW MOCKUP 40
39 42.31 -72 36 10.57 right SOB web CW MOCKUP 40 39
42.31 -72 36 10.57
right SOB web (9-22-96-1) CW MOCKUP 40 39 42.31 -72 36
10.57 CW stiffener
CW MOCKUP 40 39 42.31 -72 36 10.57 CW stiffener
(9-22-96-1) CW MOCKUP 40
39 42.31 -72 36 10.57 CW upper skin (9-22-96-1) CW
MOCKUP 40 39 42.31 -72
36 10.57 CW upper skin CW MOCKUP 40 39 42.31 -72 36
10.57 portion of
spanwise beam #1 upper chord CW MOCKUP 40 39 42.31 -72
36 10.57 SWB web
(9-22-96-1) CW MOCKUP 40 39 43.85 -72 36 09.48 misc.
debris 9/23/96-5 40
39 40.98 -72 36 08.72 magazine bundle, photograph 10/07/96-1
40 38 55.45
-72 36 08.34 metal debris 10/02/96-1 40 39 46.00 -72 36 08.18
debris
9/16/96-2 40 39 34.44 -72 36 06.17 misc metal debris 9/24/96-16
40 39
31.49 -72 36 05.17 misc. metal 10/17/96-1
Z2577 40 39 44.66 -72 36 05.01 rudder sta. 57.8 9/16/96-2 40 39
33.70 -72
36 04.98 L shaped metal with honeycomb fiberglass p/n
65B54890-1 4 3071;
small 20" wire p/n W9412107 8/26/96-10 40 39 39.34 -72 36
04.53 assy p/n
65B0350392 (M151), 10"(1' siding 8/24/96-7 40 39 37.63 -72 36
03.90 2'(2'

fiberglass, possible wing section / photograph 8/24/96-7 40 39
45.88 -72
36 03.74 3" triangular fiberglass piece & photos 8/23/96-6 40 39
05.64 -72
36 03.45 left wing outboard aileron section and wing bulkhead
8/24/96-7 40
39 36.46 -72 36 01.00 1'(7" fiberglass debris 8/24/96-7 40 39
33.63 -72 35
58.95 2'(2' aluminum interior skin & framing - m1 2 65B?3864
PARTS BAY
8/26/96-18 40 39 21.88 -72 35 57.87 various pieces of laptop
computer
largest is 12"(8"(2" 8/24/96-10 40 39 26.78 -72 35 56.81
aluminum with
honeycomb 10/18/96-3 40 39 29.04 -72 35 56.09 plastic 1.5'(6",
Eddie Bauer
shirt 8/26/96-7 40 39 30.43 -72 35 55.18 2' framing p/n
65B52313-192
8/26/96-19 40 39 36.60 -72 35 54.71 plastic parts #1621028-2;
US mail
envelope and sheet music 8/23/96-6 40 39 38.20 -72 35 54.66
wreckage log
says 2'(6" aluminum piece 8/26/96-29 40 39 38.29 -72 35 54.66
plastic sink
basin CABIN HGR 40 39 38.29 -72 35 54.66 plastic sink basin
8/26/96-33 40
39 21.78 -72 35 54.39 various pieces of cloth 8/24/96-10 40 39
30.70 -72
35 53.80 plastic window framing 8/26/96-33 40 39 34.97 -72 35
53.57 metal
parts, p/n 65B0386314 M207; 2 fiberglass parts; black clothing
8/23/96-6
40 39 27.80 -72 35 53.48 misc. plastic 10/17/96-1 40 39 09.86

-72 35 53.16

outer metal skin - 2 pieces 40 39 41.43 -72 35 52.61 debris

9/16/96-2 40

39 29.20 -72 35 52.56 suit case tag #A21131; clothing; cargo
overhead bin

8/26/96-27 40 39 31.17 -72 35 51.34 2'(3" metal structure

PARTS BAY

8/26/96-33 40 39 39.00 -72 35 51.25 4 photos 8/26/96-13 40 39

39.00 -72 35

51.25 8"(12" fiberglass/ 18" (12" twisted metal 8/26/96-22 40 39
35.05

-72 35 49.33 2.5'(20" insulation 8/26/96-29 40 39 29.69 -72 35
48.54

partial jordache suitcase (frame) 10/17/96-1 40 39 32.44 -72 35
47.62

small metal piece; small fiberglass piece marked with p/n

65B16805-004 42;

horizontal stabilizer w plcd w/horz stab 40 39 32.44 -72 35 47.62
1.5'(1"

fiberglass 1"(2' metal (assy M3255 p/n 65B16805-04) 8/26/96-20
40 39 23.59

-72 35 45.51 luggage/personal items (glasses, belt, pants) in
white

plastic bag 40 39 33.45 -72 35 43.89 magazine 8/26/96-15 40 39
33.40 -72

35 43.89 1) fiberglass piece; 2) picture; 3) burnt life preserver

CABIN

HGR 8/26/96-9 40 39 37.20 -72 35 41.76 1) torn fiberglass with
honeycomb;

2) faded kodak paper; 3) torn fiberglass with honeycomb, mild

8/26/96-8 40

39 31.50 -72 35 39.93 bent window shade; seat cover 8/26/96-29

40 38 57.83

-72 35 37.23 parachute & metal cylinder 10/03/96-4
Z3791 40 39 30.32 -72 35 33.05 rib framing 6"(7' long arc, STA
2080, lime
green 40 39 31.71 -72 35 32.43 aluminum structure, circular with
3
protusions 40 39 31.26 -72 35 32.36 metal structure with many
wires, 15'
long (2' wide, #'s available STA 280, STA 2200 40 39 24.43 -72
35 31.60
life jacket 10/17/96-2 40 39 21.92 -72 35 26.16 debris
10/07/96-1 40 39
21.97 -72 35 25.42 plastic with insulation on opposite side
10/17/96-2 40
39 04.07 -72 32 23.90 various (7 bags and various piping) all in
metal box
8/26/96-24 40 37 52.79 -72 30 06.79 black and white plastic
10/02/96-1
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tao

LF22-01 40 39 04.70 -72 38 26.80 Skin panel section 42, FS
660-680,

stringer 41L-47L 8/08/96-31 40 39 04.70 -72 38 26.80 FS
520-560 stringer
27R-35R cargo bin #7430 8/08/96-31 40 39 04.70 -72 38 26.80
Wheel well
frame, torque box ñ nose wheel FS 340 LH Side 8/08/96-31 40
39 01 60 -72
38 26.80 General aircraft debris 8/08/96-31 40 39 01 60 -72 38
26.80
General aircraft debris 8/08/96-31 40 39 01 60 -72 38 26.80
Personal
effects 8/08/96-31 40 39 01 60 -72 38 26.80 Personal effects
8/08/96-31 40
39 04.10 -72 38 26.30 Carpet 8/08/96-37 40 39 04.10 -72 38
26.30 1 suit
case, small bag 8/08/96-37 40 38 20 00 -72 38 26.30 Metal &
Plastic
interior piece #147107B 1, 147 1114 26; galley piece? 40 38 27
70 -72 38
26.20 Metal piece with electronics 8/24/96-8 40 39 00 40 -72 38
26.10
Bone, possibly human 40 38 21 45 -72 38 26.09 Alum angle w/
wires 1.5x3
(#65B52112-76) 8/08/96-31 40 38 21 82 -72 38 25.96 FS
940-1000; stringer
9R-15R 8/06/96-46 40 39 18.23 -72 38 25.62 Vent 5x6
diameter 40 39 04.75
-72 38 25.51 Window frame, cushion, honeycomb insulation;
shorts
8/14/96-11 40 39 00.30 -72 38 25.50 Plastic box w/handle
8/26/96-31 40 39
05.50 -72 38 25.40 Luggage tag 8/26/96-31 40 39 00.00 -72 38
25.40 Misc
pieces 8/19/96-10 40 39 06.41 -72 38 25.26 passport 8/08/96-31

40 38 40.92
-72 38 25.24 FS 800-860, RBL 33 to RBL 53.5, portion of life
raft beam
8/04/96-66 40 38 26.67 -72 38 25.04 1) 3 oxygen masks 2) metal
shard 1
foot long 3) 2 small pieces of framing 8/19/96-23 40 39 06.00
-72 38 25.00
Plastic pc. Approx 4î, gray 8/26/96-31 40 38 22.81 -72 38 24.99
Interior
metal sheet with rivets & strut 65B01741; rib and stringer 40 38
31.64 -72
38 24.90 Assy part 65B54209-5, 2îx5î green alum folded w/holes
8/08/96-31
40 38 23.70 -72 38 24.90 Alum angle 6îx 1îx 1î (assy
#65B09314-950) 7-8-70
R373 8/10/96-9 40 39 04.90 -72 38 24.80 Personal luggage.
8/07/96-15 40 39
04.90 -72 38 24.80 Personal luggage/makeup case 8/08/96-31 40
39 04.90 -72
38 24.80 Small pieces from deck sweepings 8/08/96-31 40 39
04.90 -72 38
24.80 FWD Pressure Bulkhead Portion FS180 40 39 04.90 -72
38 24.80 FWD
Pressure Bulkhead Portion FS180 40 39 04.90 -72 38 24.80
Personal luggage
8/07/96-15 40 39 04.90 -72 38 24.80 FS 140-220; stringer 0-31A
with window
belt 8/07/96-15 40 39 04.90 -72 38 24.80 Front end passenger
floor &
radome bulkhead FS 140-180 8/07/96-15 40 39 04.90 -72 38
24.80 Left side
upper fuselage, FS 380-520, stringer 18L-19R 8/07/96-15 40 39
04.90 -72 38

24.80 Part of LF19A; saw cut separated part into two pieces
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Paragraph Font Body Text Body Text 2 Footnote Reference
Footnote Text Times New Roman Symbol 8/08/96-31 40 39 01
60 -72 38 26
B304 } 8/08/96-31 40 39 01 60 al effects 8/08/96-31 40 39 0
8/08/96-31 40
39 04.10 -72 38 26.3 40 39 04 -72 38 26.30 Metal & P(piece
#147107B 1, 14
Microsoft Word Document MSWordDoc Word.Document.6
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for Windows 95 Microsoft Word Document MSWordDoc
Word.Document.8

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From: John Barry Smith <barry@corazon.com>
Date: May 10, 2002 9:48:08 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Pictures

Dear Bill, 9 May 02

Got your long email, thanks for taking time to write. I think I understand. Best wishes on your retirement. It is well earned, I'm sure. My retirement has been very pleasant.

In the remaining month on board could you please acquire and send four photographs of the forward cargo door area of Air India Flight 182, as you did for Pan Am Flight 103? Sgt Blachford referred me to you for that type of thing.

They would be most helpful and very appreciated.

Cheers,
Barry

From: John Barry Smith <barry@corazon.com>
Date: May 22, 2002 4:28:28 AM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Pix of Air India Flight 182**

Dear Bill, 22 May 02

Air India Flight 182 was said by the CASB and the Kirpal Commission to have suffered an explosion on the right side forward of the wing in flight. Therefore, photographs of the right side forward of the wing are relevant and very important. It is to be expected that photographs of that area be available for inspection as they are the fatal wound of the victim. Much time and expense was used to procure those photographs. They exist and held by the Crown authorities.

If the Director General, Investigation Operations, Transportation Safety Board of Canada asks to view those photographs and is rebuffed with excuses and delay, there is something fishy going on.

Why would Ron Schleede call you out of the blue? What did Ken Smart say that led to your decision to retire a few days later?

Bill, the whole sequence is fishy.

I believe you see the plausible and more likely explanation for Air India Flight 182 is mechanical rather than conspiracy.

In your bailing out email, as I call it, to me on 9 May 02, you refer to persons and titles and their opinions as to the cause of the accidents but never refer to facts, data, or evidence. You also never refer to United Airlines Flight 811 as if it never existed which is absolutely not fair since that is the model for the other three.

Well, that is how I know I'm right; never rebutted with facts, only the opinions of titles of persons who have been involved since 1985 and have much interest in maintaining the status quo, even in the face of conclusive contradictory evidence which abounds in the metal, cams, latches, engines, and recorders of United Airlines Flight 811.

For Ken Smart to imply that the forward cargo door area of Pan Am Flight 103 opened in flight but that it happened after the 'bomb' explosion' is contrary to the AAIB wreckage distribution fuselage reconstruction which shows it happened at initial event time. The photographs show it happened in flight. The evidence is there.

But ignored and that's why it's fishy.

Bill, please do not retire until you get a look at the forward cargo door area of Air India Flight 182. Satisfy your own curiosity to see if the twisted metal matches the other three door areas of twisted metal.

Cheers,
Barry

From: John Barry Smith <barry@corazon.com>

Date: May 22, 2002 4:28:28 AM PDT
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Barry

From: John Barry Smith <barry@corazon.com>

Date: May 30, 2002 9:22:20 AM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Written before and after Trans World Airlines Flight 800 and way before China Airlines Flight 611

Mr. John Brennan, Esq.
US Aviation
199 Water Street,
New York, New York 10038

Dear Mr. Brennan,

16 August 1995

This is John Barry Smith from Carmel Valley, California. We spoke on the phone today, 16 August 1995. Thank you again for the conversation.

The essential point is that I think it was an inadvertent opening of the cargo door which resulted in explosive decompression and not a bomb leading to the crash of Pan Am 103. You believe opposite.

In response to my statement that if there were a picture of the skin peeling back I would be persuaded that it was a bomb, you told me about a picture in Flight International. I immediately went down to the Monterey library which did not carry the magazine but, to my luck, the Naval Postgraduate School did, from 1962 to 1992. As a retired officer, I had access and reviewed the entire bound and unbound back issues. The enclosed copies are some of what I found.

The only visual reference I could find is this drawing. It is a drawing made by someone in a publishing group on assignment to read the report and make a picture. It has several inconsistencies and has very little credibility.

Mr. Brennan, will you consider an alternate cause for the crash of 103? A quality of an intelligent mind is the ability to hold two completely opposite trains of thought at the same time. One would be the bomb theory and the other the door.

The copilot of United Flight 811 reported, "A bomb went off," when the cargo door let loose. He was wrong but based upon what he felt and heard he could have been right. Only later did he change his mind.

Will you follow the hypothetical line that it was an inadvertent opening of the cargo door which resulted in explosive decompression?

Accident investigations must rule out certain possible causes as well as rule in the probable. May we assume that the cause of the explosive decompression was not a mid-air with some foreign object? Yes, because the object should have shown up on radar, and didn't. May we assume human error was not the cause such as a pilot induced sudden pitchup? Yes, because the flight recorder information would have revealed such deviation.

Can we rule out mechanical malfunction? No, although many types of malfunction can be ruled out such as aft bulkhead breaking and shearing of the vertical stab and rudder, or other known 747 problems. If those mechanical malfunctions had occurred, the disintegration would have taken a few seconds longer and shown up on the flight recorder.

Is there a mechanical malfunction which could cause the sudden explosive decompression and explain the subsequent actions of the crash? Yes. A large hatch opening at high altitude would do it. The plane would pop like an inflated balloon. That possibility then needs to be conclusively ruled out if a different cause is to be believed.

In my opinion, the cargo door mechanical malfunction possibility has not been conclusively ruled out. It doesn't matter how much belief there is that it was something else, this possibility needs to be ruled out for the alternate bomb theory to be believed without doubt.

Mr. Brennan, please persuade me that it could not have been a cargo door.

I will always say it could have been a bomb. In my opinion, however, the scale of reasonable probability tips towards the mundane explanation of a mechanical event that happened before and happened afterward-inadvertent cargo door opening; as opposed to the tortuous, twisted, shadowy, flimsy explanation of Libyan agents, Maltese tailor shops, German bomb factories, botched British security, transferred luggage, traces of explosive on fragments, concealed warnings, and fake cassette recorders.

Let me get back to our conversation by telephone today. Thank you again for your time. I fully realize the possible futile effort of talking about a subject so close to you with a stranger on the telephone. You were gracious and patient. I recall your statement of it's not an economic thing but more important thing to find out the truth. I agree.

Of note in the Flight International article is the the investigating board declared, within a week, the cause of the crash to be a bomb found on traces on a metal pallet and no evidence of structural failure. That was fine for a quick guess but carries little weight for an accident scene miles wide. In September of 1990, the accident report was released, (which I assume you have access to, where can I get one?,) but did not address the possibility of a cargo door opening, a very curious omission for such an obvious cause, a cause you immediately speculated upon, an aging aircraft with mechanical problems.

Let us examine the drawing and then the picture of the large piece of cockpit.

It doesn't make sense. Why is the cargo door closed? Logic says that when the bomb went off and the fuselage started to disintegrate the tear would have been at a point where the fuselage was already cut, the cargo door.

The size of the bomb hole is much larger that the report stated, 50cm.

The photo picture shows a straight line cut near the cockpit,

exactly what the forward fuselage of Flight 811 looked like after it limped home from its 20000 feet, lower altitude, inadvertent door opening. That 747 was also an aging aircraft. The picture shows a line consistent with a shearing action of a door torn off, not an explosive disintegration of jagged edges.

To rule out the cargo door the accident board should have done the following:

1. Where did the door land? Was it near the frame of the door as it would be if it were a bomb and the whole front of the aircraft disintegrated together? Or was it far away indicating it separated first and drifted further away?

2. Was the door found with any of the latches still intact and clasping indicating it was bomb? Or was the door found with all latches unlatched indicating the door was opened in flight?

3. Was the door compared with the door from Flight 811 which was conclusively proven to be an inadvertent door opening? Dissimilar markings would indicate a bomb. Similar markings would indicate inadvertent door opening.

4. Was the tape from 103 compared to the tape of 811 during the critical second after the event? Dissimilar would indicate bomb; similar would indicate cargo door opening.

5. Explain debris in starboard engines and not port engines. Port engine FOD indicates bomb, starboard engines indicate door.

Did the board do these steps to rule out an obvious crash cause? If they didn't, they were negligent.

To rule in the bomb I ask;

1. Where is the picture of the peeled back skin in the reconstruction of the aircraft? The omission of the important picture is alarming. As Sherlock Holmes said, "The hound should have barked, but didn't."

2. Where are the pictures of the fragments on which traces of explosive were found? They may be too small to photograph or

damaged during testing. Fragments imply very small pieces and traces imply very small amounts. To find a very small amount of something on a very small piece of something among millions of very small pieces of something spread out over many square miles in a few days is not probable, is not likely, and is not believable. I believe it also rained following the crash so that may have washed off any residue.

3. Where is conclusive evidence from the terrorists. Many terrorists want credit for their cause and have code numbers or leave notes. None for Flight 103 because there is none.

4. Explain how the sequence and coincidences and lapses and bad luck could have resulted in the bomb going off when and where it did and remain plausible to a reasonable person.

If the opening of such a small hole that the bomb caused could cause an explosive decompression, why was the possibility not considered of inadvertent opening of other hatches, such as the passenger doors which can be opened from inside?

I can explain why the bomb theory holds such weight but I get into controversial opinion which might be better discussed later. Let us stick to objective facts as much as possible.

Bomb scenario...Too confusing for me but many people can explain the path as well as disagree as to the exact route.

Door scenario...several documented accidental openings on ground, documented accidental opening at 20000 feet, accidental opening at 31000 feet. Boring, sad, and completely plausible.

Which sequence is more probable, more likely, more believable? If the door can not be ruled out, then the conclusion must be that it could be the cause just as if the bomb can not be ruled out, it must be considered to be the cause.

If the door is the cause, then your company has just saved a billion dollars. I have never written a billion dollars before and in this case, it is a real number. The damage awards are from two to twenty million. If a conservative number is five million and

the number is 200 passenger sue out of the 260 killed, then a billion dollars changes hands.

If not a bomb then a cargo door, still misconduct but not wilful and therefore limited to 75000\$.

Why is money important? It should act as an inducement for closed minds to consider other options, even if embarrassing or surprising. The cause of the crash should be reexamined. There are many historical precedents for catastrophes to be blamed on bombs and then later reassessed to be natural phenomena.

Changing a person's mind is the most difficult thing in the world to do. I'm open, sir, persuade me it was not a cargo door and it was a bomb. I will say it could have been a bomb. Will you say it could have been a cargo door inadvertently opening at high altitude causing explosive decompression of Flight 103?

Should you choose to reply by telephone, Mr. Brennan, I'm at 408 659 3552. By email, I'm at meadow@redshift.com. By snail mail, I'm at 551 Country Club Drive, Carmel Valley, California, 93924. To help put an image for your reply I've enclosed a graphic of me. I'm a commercial pilot, instrument rated, formerly owned a FAR Part 135 charter company, Navy P2V aircrewman, RA5C navigator, squadron legal officer, and now a retired officer with wife and daughter.

Please continue our dialogue.

Sincerely,

John Barry Smith

Mr. John V. Brennan, Esq.
US Aviation Underwriters

One Seaport Plaza
199 Water Street,
New York, New York 10038

Dear Mr. Brennan,

6 September 1995

Well, sir, a polite brush off is better than no brush off. Thank you for reading my letter of 16 August and replying; it could have been ignored. I will followup on your lead of the picture of the bomb caused petalled hole in the side of Pan Am 103 which is said to appear in a later issue of Flight International. I shall drive to San Francisco from Carmel Valley to find a library with the back issues. A 50cm bomb hole is six inches; I hope it's a closeup.

While waiting for your reply I wrote a shorter letter to Mr. Harold Clark reviewing the essential points supporting my belief that the inadvertent opening of the cargo door caused the explosive decompression of the airframe of the older Boeing 747 leading to its destruction.

Your letter does not rebut any of those suppositions. Nor does it answer my question of how I can get hold of the official accident board investigation report.

The question I have that should be answered in that report is where did the door land? Assuming a bomb, the door falls nearby with the rest of the nose. Assuming the door unlatched, opened up, was torn way, and then drifted down to land, that certain spot can be calculated. Start at 31000 feet, velocity 450 knots, factor in the wind, use a drift angle determined by the United Flight 811 door falling, and the area of probability can be approximated. If the door was found in that far location, then it must be assumed it came off and did not come down with the rest of the forward fuselage.

Easy problem with easy answer with big consequences.

I will seek the book you recommend, "Sky Gods: the Fall of Pan Am," by Robert Gandt. I will keep an open mind although it appears that the book will rule in a bomb, something that has been done, and done poorly, for the last six years.

I'm asking to rule out the accidental opening of a cargo door; something that has happened before, could have happened then, and happened after. This is not a weird request like saying it could have been a midair with a flying saucer, man, check out the autopsy photos. I'm the rational one here with a boring, ordinary, mechanical event. An old airplane gets worn, twisted and its door snaps open. Not very interesting unless you have a billion dollars on the line. And you do.

Much more interesting with shadowy spies with secret weapons concealed duping security, switching airplanes and whatever, the bomb theory just gets too strange for me. I'm very down to earth when it comes to reality. I also know who killed John F. Kennedy...Lee Harvey Oswald.

The American people do not want to believe that a single twisted person with a gun could kill a beloved symbol or a few simple latches unsnapped and killed hundreds. They want to believe it was a conspiracy of dozens of shadowy secret agents in cahoots doing terrible things. They even tried to blame the Oklahoma bombing on Mideast terrorists until the real culprits showed up.

There is a way for me to stop writing to you....tell me it is in your best interest that the cause of the crash be a bomb. If your company is better off with a bomb cause than a cargo door, I'll go elsewhere. Your mind will not be changed.

If a cargo door, the US government loses 30% of two billion for taxes. They have already issued tax claims against the family members. It wants a bomb.

If a cargo door, the family members don't get their 10 million

each from you, just a lousy \$75000 to assuage their grief. They want a bomb.

If a cargo door, Boeing has some questions to answer and may have to pay a lot money to somebody. They want a bomb.

Pan Am is dead and said, as it was dying, "It was a bomb but it wasn't my fault, it got on the plane because of faulty airport security, blame Heathrow, and the government knew about it and should have told me and should share the blame." Blah, blah, blah.

Now it comes down to paying the piper, the insurance company: you. The insurance company is to pay for other's screwups. Is that the way it works?

Mr. Brennan, let us be philosophical. You are the good guys. You correctly judged the risk to loss and assigned a correct premium to insure Pan AM. It was not wilful misconduct. Your company should not pay.

In one sense you are the victim of an enormous insurance fraud by well meaning institutions who are blind to boring truth because they believe it is in their best interest to believe the exciting lie of a bomb. And for hundreds of millions of dollars, in cold cash, I would have trouble believing otherwise myself.

I see your letterhead reads-Chairman of the Executive Committee. What does that mean? What does the Executive Committee do? When I called to find out the correct spelling of your name, the secretary said you were retired but still employed. What does that mean? Do you have a staff? a budget?

Did I detect a New York Irish accent in our conversation? I was born in England and emigrated at age two and a half. My parents have given me a bias against the Irish. I fight against that bias and try to be objective in matters of Ireland and the IRA, etc. (If the Boeing had been British Airways, the cause would have been an IRA bomb. Still wrong.)

Mr. Brennan, put yourself in my position for a few moments.,

You are a fifty one year old retired military officer who built model airplanes as a kid, then flew model airplanes as a teenager, then soled a real plane at eighteen. Went on to get commercial license and becomes a charter pilot. Went to war as a navigator on Navy carrier jet. Survived an ejection and crash which killed his pilot. And believes that the cause of a world famous crash is not the common belief. The common belief has nations fighting with each other. It has nations refusing to fly into other nations airports, has stopped commerce into another country, has caused barbaric bounties for the capture of foreign citizens. It has caused delayed compensation to grieving family members. It has glossed over a defective apparatus in an aircraft that we may fly in and crash. The common belief is wrong; it happens all the time. What would you do, Mr. Brennan if you believed as I do? Who should I talk to? Where should I write?

Back to objective. Can you assign a lowly staff member a morning of work to work out the landing spot of the door if it were to come loose at 31000 feet over Lockerbie? I would do it if I had access to the accident reports of Flights 811 and 103. I don't have the data. You do.

Does the Flight 103 door look like the Flight 811 door? I don't have access to the pictures. You do.

Do the flight recorder sounds of Flight 811 match the sounds of Flight 103? I don't have access to the sound tapes. You do.

Please explain the starboard engines FOD. It should be the port engines if a bomb.

Where may I obtain copies of the accident reports of Flight 811 and Flight 103?

Sincerely,

John

Barry Smith

email

meadow@redshift.com

(408)

659-3552

551

Country Club Drive,

Carmel Valley, CA 93924

Mr. John V. Brennan, Esq.
US Aviation Underwriters
One Seaport Plaza
199 Water Street,
New York, New York 10038

Dear Mr. Brennan,

16 September 1995

Well, sir, I went to the local bookstore, (the Thunderbird, at the mouth of Carmel Valley, you may know it if you have visited the Monterey Peninsula,) and excitedly picked up the book you recommended about Pan Am by Robert Gandt. It has three pages about the crash. Two of the pages are about the cause being structural failure. One page is about a bomb. The rest of the book is tabloid heart-pulling pseudo-dramatic crap.

I shall have to add wild goose chase to polite brush off. But then, a wild goose chase is better than no goose chase.

As you also recommended, I went back to the library and found another visual representation in Flight International of the Pan

Am Boeing 747 being blown apart by a bomb. It was the same non-official drawing I sent you; they just repeated it in another later issue. There was no picture.

If you have a picture, please send it. I would think that a company that is about to pay a billion or so dollars because of an event would have a picture of that event displayed prominently in the files with a note, "Here is the bomb! Read it and weep!"

(To quote from a report, "General Re's US Aviation subsidiary was the leader of a 15-member syndicate that carried 30% of the insurance on the plane involved in the 1988 Pan Am 103 crash, about which there has been considerable litigation that may still affect this unit.")

To have no picture in your files is curious. To have no picture at all, even in the British official files, is damning.

I sent a picture to you; it was the 747 lying on its side with a straight line cut on its starboard side, exactly as it would appear if the cargo door ripped off in flight.

Why the resistance to accept a contrary theory until ruled out, Mr. Brennan?

Our difference in opinion is the cause of the crash; you bomb, me cargo door.

What do we have in common? We are men. We are aviation experienced. We are retired. We are over fifty. We speak English. We are Americans. We respect the truth. Our names are both John. (Check out my web page, <http://www.redshift.com/~coyote>, it includes a story of ejection and a link to my John Smith club.)

Since we are men we know that terrible crimes such as mass murder do exist so it could have been a bomb. Since we are aviation experienced we know that there are an infinite number of causes of crashes so it could have been a bomb or a cargo door. Since we are retired we don't have to kiss ass for money or approval, we can think for ourselves. Since we are over fifty we

can look back and see that many events are misunderstood for years and some are never correctly explained. Since we speak English we can talk about all this stuff. Since we are Americans we know that many other cultures hate us for whatever reasons and could kill us with a bomb. We also know we Americans make things that don't often work the way they should and occasionally break, like space shuttles. Since we respect the truth we never give up trying to find out what happened about important events until 100% sure.

Mr. Brennan, are you 100% sure the cause of the crash was a bomb? If so, crush this letter up, hold it over the wastebasket and let it float down to destruction.

If not 100% sure, then read further. What else could it be if not a bomb?

Let's skip the bomb or door theory for now. Let's agree it was a sudden decompression and then go to what happened next. Do you agree it was a sudden decompression? Is the analogy of a pricked fully inflated balloon satisfactory?

The prick came from inside. Do we agree so far? Then what happened?

How far can we agree before we disagree?

Tomorrow I'm going on a few days motorcycle trip around California. I want to see the high Sierra passes before the snows hit. Then down to the deserts, flat and fast and alone. It's good to get away and just think with no distractions and outside pressures.

Sincerely,

Barry Smith

John

email

meadow@redshift.com,

web

page <http://www.redshift.com/~coyote/>

(408)

659-3552

551

Country Club Drive,

Carmel Valley, CA 93924

Mr. John Brennan, Esq.

US Aviation

199 Water Street,

New York, New York 10038

Dear Mr. Brennan,

Wednesday, 04

December, 1996

Mr. Brennan, John Barry Smith here. We spoke on the phone and exchanged a few letters last summer.

The cause of the crash of Pan Am 103, the inadvertent opening of the forward cargo door in flight, which we spoke about, has happened again, this time to TWA Flight 800.

As the insurer of both, I assume you have a responsibility to investigate a reasonable report of hazard to the things you insure.

I wish again to make a reasonable report of a hazard to the airplane you insure and which has crashed at least two of them, Pan Am 103, and TWA 800.

The reasonable mechanical cause is the inadvertent opening of the forward cargo door in flight.

Full documentation and support for the report of hazard is on web site, www.corazon.com The web site has ADs, NTSB reports, other government reports such as UK AAIB, and news

reports.

I wish to thank you for steering me on to the path of documentation by referring me to the Flight International article on Pan Am 103 which was supposed to have a picture of the petalling of the fuselage skin from the bomb but actually had an artist's impression. Once started on documentation, I went to the NTSB and other governments and literature for information on the crashes. The research only made me more firmly believe in the cargo door theory.

By the way, if the proof of bomb on 103 was the same evidence as used for bomb on TWA 800 but later shown to be benign such as heart medicine or planted explosives for dog sniffing tests, why not PA 103 also be benign? It can be and the cause of the crash can be shown by evidence to be that forward cargo door. The weight of evidence for bomb on 103 is lessened by the discovery of innocent evidence on 800. The investigation of 103 should be reopened.

Regardless, the cargo door theory must be investigated for the current crash and for the fact that the hazard still exists and can cause another Boeing 747 crash.

I invite you to turn this over to your investigators by referring them to the web site or calling me at 408 659 3552.

Sincerely,

John Barry Smith

Mr. Harold Clark
Chief Executive Officer
US Aviation Insurance Group
1 Seaport Plaza,

199 Water Street,
New York, New York 10038

Dear Mr. Clark,

30 August 1995

I am John Barry Smith from Carmel Valley, California. The cause of the crash of Pan Am 103 was the inadvertent opening of the starboard cargo door resulting in explosive decompression to the airframe. The cause of the crash of Pan Am 103 was not a bomb.

Why is that important to you? Because that truth will mean that your company does not spend a billion dollars in claims because the company you insured was not guilty of wilful misconduct by allowing a bomb through security checkpoints. The company you insured did its best to make sure the door was locked but, as documented, many inadvertent openings happened before and happened after December 21, 1988. Your judgment about risk to loss to insure the airline was correct.

For the past six years all interested parties have believed it was in their best interests to believe it was a bomb and spent their time ruling in a bomb and not ruling out the cargo door. Until now.

It is in your interest to try to rule out a cargo door, Mr. Clark. And sir, that can't be done. I've tried to in my hobby/interest of six years and the deeper I go, the more I am persuaded that it was the door. It could have been a bomb but the more reasonable, mundane, tragic cause is the cargo door.

I ask you, Mr. Clark, to use science and open mindedness to try to rule out the cause of the crash being the opening of the cargo door. Ruling in a bomb has been done, and done poorly, but still

holds as the consensus opinion. It is a wrong opinion.

A letter to your employee, Mr. John Brennan, is enclosed. As a retired military officer I followed the chain of command. Time is getting short. He has not replied yet so I have come directly to you.

As a commercial licensed, instrument rated pilot I want the causes of crashes to be accurately appraised to prevent a reoccurrence. Truth hurts. We must realize our planes have defects but we are not totally hated with mysterious foreigners trying to bomb us. Let Boeing pay for their design errors which led to death of passengers and crew.

Important questions not answered yet to rule out door:

1. Where did the door land? Close to cockpit means bomb; far away means failure of door.

2. Was the door found with any of the latches still intact? Or all latches unlatched?

3. Was the door compared with the door from United Flight 811 which was conclusively proven to be an inadvertent cargo door opening? Dissimilar markings would indicate a bomb. Similar markings would indicate inadvertent door opening.

4. Explain FOD in starboard engines and not port engines. Port engine FOD indicates bomb, in starboard engines indicates door.

I welcome discussion; please reply.

Sincerely,

John Barry Smith
Email meadow@redshift.com
551 Country Club Drive,
Carmel Valley CA 93924
408 6593552

Ronald Ferguson
Chairman, President, and CEO,
General Reinsurance
HQ: 695 E. Main St.,
PO Box 10351,
Stamford, CT 06904-2351

Dear Mr. Ferguson

12 October

1995

I'm at the top corresponding with you. Please consider this a billion dollar letter.

Your company should not pay the claims against you for the crash of Pan Am 103 because you are not fairly liable. The cause was not a bomb which was judged wilful misconduct but an inadvertent opening of a cargo door which is not wilful misconduct.

The accident board ruled in a bomb. They should have ruled out the door. If unable, the accident board investigation must be reopened. Current facts prove the door theory possible. Further investigation will prove it correct.

Current facts show foreign object damage (FOD) in the starboard engines, consistent with the cargo door opening. There was no FOD to the port engines, consistent with a bomb theory.

Documentation shows seven previous inadvertent cargo door openings on the ground in early boeing 747s with no damage. A few months after Flight 103, records show one door opening in flight, United Flight 811, with loss of life and heavily fodded starboard engines.

Further investigation will match similarities to the known door opening of Flight 811 to Flight 103 such as sounds on tape,

markings on door, number of latches attached, and landing distance from cockpit.

Why you and your company, sir? Because only now is the piper due his payment and you are asked to pay for someone else's tune. You should not pay the billion dollars and should listen to clear reasons why not.

The tune of conspiracy of spy Libyans in Malta buying stuff and going to Germany and hiding bombs etc is not your tune. There is no conspiracy. A stupid boring thing happened. A door opened when it should not have. It's happened before and will happen again. You insured against that door opening and should pay the 75000\$ maximum. You should not pay the 20 million dollars per victim for a phantom bomb. When multiplied by 260 victims and divided by the other companies shares, you still will pay out a billion of real dollars unnecessarily.

Here's how to avoid that injustice. Attempt to rule out the door opening. When unable, petition to reopen the accident board investigation. The new cause will be the faulty cargo door. Then ask the courts to moot the wilful misconduct decision. There will be no new trial against you because the victims will seek damages against Boeing, the true culprit.

How to reopen the accident investigation? Show it was a cargo door.

Will you go through the thinking with me?

A real event happens and consistent, reasonable events follow. An imagined event occurs and inconsistent unreasonable events are proposed.

The real event is the cargo door and the imagined event is the bomb.

The imagined event is much more interesting and much more profitable for many people who believe it is in their best interest to believe it. So they do.

The real event is ordinary, boring, and deprives sad people a lot

of money who therefore disbelieve it.

Will you agree with me that a 747 cargo door opening at 31000 feet would cause an explosive decompression such as a pricked balloon? We know from Flight 811 that the fuselage is torn apart when the door opens. Flight 811 was at 21000 feet and therefore the door opening had less explosive force which did not destroy the craft, but did tear a large piece of skin off, blew debris into number 3 and 4 engines, and allowed the solo door to float down a far distance away into the water where it was retrieved. In addition, the co-pilot of United Flight 811 said a bomb had gone off. Only upon landing was it discovered that the door had opened and torn off. (If that United 747 had not limped back to Honolulu but crashed into the ocean, there would have been two bomb thought US 747 crashes within three months with terrible international repercussions.)

If the Pan Am 103 crash could have been the cargo door opening, a competent accident investigation would rule that cause out. That was not done. The board concentrated on ruling a cause in, a bomb.

In the real event of the door coming open and then off, the door would drift to a certain spot on the ground that can be calculated using the United Flight 811 data. Did the Pan Am 103 door land near that spot? That must be determined.

In the imagined bomb explosion, the door would land someplace else. Where? The landing location of the door must be determined.

I can't do that. I don't have access to the board investigation. I have asked your employees, Mr. John Brennan and Mr. Harold Clark of US Aviation Underwriters, for help, but so far, no joy. (Letters attached.)

The door needs to be examined in close detail to determine if it is similar or dissimilar to the United Flight 811 door. The real event of the door opening at altitude would leave similar

scratches, snapped latches, twisted hinges, etc. If a bomb, the markings would be dissimilar.

The audio tape needs to be examined closely for similar sounds. A half a second is an eternity to an audio expert. The tape of Flight 811 and Flight 103 may be similar in the critical one half second after the door opened. Or they would be dissimilar if a bomb. If both flights of early 747's suffered inadvertent door openings, there would be a discernible pattern in the half million microseconds before the tape ended for Flight 103 when compared to Flight 811.

If the door theory is to be discounted, a reasonable explanation needs to be provided for the pounds of debris found in the engines on the cargo door side of the plane and no debris found in the engines on the bomb side of the fuselage.

The bomb theory is the flimsiest set of coincidences with improbable discoveries and is easily discarded when a strong, verifiable explanation is presented.

(Just one wildly impossible occurrence which is required for the bomb theory...Within two days of the crash, with twisted, shattered debris scattered over dozens of miles, fragments of a storage pallet were discovered which had traces of explosive on them. Something invisible, traces of explosive, was quickly found on something very small, fragments, in an area of millions of very small pieces, debris, in a very large area, pastures. Possible but improbable, just as are all the other bomb linking clues.)

A competent, non-political, unbiased aircraft accident investigation has to rule out probable causes. The Pan Am 103 investigation was inadequate and only ruled in a cause.

The early conjecture of the cause of the crash was structural failure on an airframe with over 70000 flight hours. That cause was not ruled out. It can't be because that was the cause.

(Other interesting coincidental facts about early 747s: They had

the cargo door area worked on as part of a civilian retrofit for military purposes in event of war. That was an opportunity for defective workmanship. After the crash of 103, early 747s were recalled and more structural work was done on the cargo door area. This was an opportunity to fix door problems.)

To review:

1. You should pay for what you agreed to pay...75000\$. You should not pay for what you did not agree to pay...20 million per victim for wilful misconduct of your client.
2. Determine if there is reasonable belief that the cargo door opening could be a cause of the crash by calculating landing spot.
3. Request that investigation be reopened upon further evaluation of facts.
4. When confirmed that door could have and probably did cause the crash, ask the wilful misconduct judgment be set aside.

You will have potent opposition. Everybody except the insurance company loves the bomb theory, especially Boeing. The US government wants the half billion or so in taxes it will collect from the families after you pay them off. (It has already sent tax due notices to families how have yet to be paid off.) The families want the 20 million dollars instead of the 75000\$. The US government and Boeing will be concerned at the sales export drop at the decreased reputation of the 747. Everyone will be upset at the door explanation except you, who saves a billion dollars.

Conspiracy theories abound and are false. Lee Harvey Oswald killed President Kennedy, not a group of ex-CIA agents. A cargo door opened and caused the crash of a 747, not a group of Libyan secret agents working in several countries smuggling a bomb on board a plane. A jealous ex-husband slashed his wife to death, not a group of racist police who planted evidence to frame OJ Simpson.

You may think, who is presenting this idea of cargo door crash cause, which goes against the popular belief? The crash cause should stand on its merits but the messenger is always judged.

I may be a tramp pushing a shopping cart full of carefully selected items picked up from trash cans while talking on a broken cellular telephone to people on another planet. But, even a blind squirrel finds an acorn once in a while. The acorn is the cargo door.

But I am not the person described above although I did see someone just like that. Again, that homeless tramp is more interesting than the reality which is a retired military officer living in own home with wife and daughter.

Here I am. Call me anytime, Mr. Ferguson. I have a phone, 408 659 3552, a snail mail address, 551 Country Club Drive, Carmel Valley, CA, 93924, an email address, meadow@redshift.com, a web site, <http://www.redshift.com/~coyote/>, and an insurance company I have had for thirty years, USAA, account number 0071 03 10. Check me out.

Regarding the crash of Pan Am 103, I have been in a plane crash, ejected and lived to tell about it. The story is on my web page under FCLP. I am a commercial licensed pilot, instrument rated. I have flight time as enlisted crewmember, jet carrier navigator, civilian owner and pilot, and Boeing 747 passenger. On the legal side, I was a Navy squadron legal officer, not an Article 27b lawyer, but a Navy trained legal officer handling summary courts-martial and non-judicial punishments. I've had a few articles published in aviation newspapers, worked on a local newspaper, and finished a novel which can be read at my web page under Valiant Dust. I became an audiologist which examines sound very closely and assists the hard of hearing.

Do you disregard free advice but respect information you pay for? Then send me a dollar.

I can see clearly how a person's perceived best interests rule

their beliefs. This individual delusional response applies to aircraft accident boards, corporations, and governments. Truth does not shape administrative reality.

The accident board, Boeing, and the US government all believe a bomb was smuggled on board Pan Am 103 because they believe it is in their best interests to believe in the bomb theory. It's just not true.

A jury in a courtroom ruled Pan Am showed wilful misconduct in allowing the bomb on board. Pan Am paid you premiums to pay off any claims against them. You must now pay a billion or so dollars to fulfill your contract.

But you don't have to, sir. Before payout, take that last gasp and check out the landing spot of the cargo door. Find out if the latches and markings on the door match the documented defective cargo door of Flight 811. Clutch that last straw and demand to know why the starboard engines of Flight 103 were foddred and the port engines were not. Look under the final stone and examine that audio tape for a frequency pattern similar to Flight 811.

You have that right. You can examine the aircraft pieces for which you are about to pay a billion dollars. Give the case to your fraud squad. Tell them to look at the claim as bogus from claimants who stand to gain much from the flimsy bomb theory and little from the solid cargo door theory.

When the door theory is shown to be correct, your actuarial judgment in assessing premiums against risk will be vindicated.

You did not gamble and lose a lot. You gambled and lost a little. General Reinsurance will have re-established the integrity of the insurance risk/premium/claim/payment/ model. It's worth the effort.

Sincerely,

John Barry Smith

551 Country Club Drive,
meadow@redshift.com
Carmel Valley CA 93924
(408) 659-3552

From: John Barry Smith <barry@corazon.com>
Date: May 30, 2002 9:22:27 AM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Written before and after Trans World Airlines Flight 800 and way before China Airlines Flight 611**

Mr. John Brennan, Esq.
US Aviation
199 Water Street,
New York, New York 10038

Dear Mr. Brennan,

16 August 1995

This is John Barry Smith from Carmel Valley, California. We spoke on the phone today, 16 August 1995. Thank you again for the conversation.

The essential point is that I think it was an inadvertent opening of the cargo door which resulted in explosive decompression and not a bomb leading to the crash of Pan Am 103. You believe opposite.

In response to my statement that if there were a picture of the skin peeling back I would be persuaded that it was a bomb, you told me about a picture in Flight International. I immediately

went down to the Monterey library which did not carry the magazine but, to my luck, the Naval Postgraduate School did, from 1962 to 1992. As a retired officer, I had access and reviewed the entire bound and unbound back issues. The enclosed copies are some of what I found.

The only visual reference I could find is this drawing. It is a drawing made by someone in a publishing group on assignment to read the report and make a picture. It has several inconsistencies and has very little credibility.

Mr. Brennan, will you consider an alternate cause for the crash of 103? A quality of an intelligent mind is the ability to hold two completely opposite trains of thought at the same time. One would be the bomb theory and the other the door.

The copilot of United Flight 811 reported, "A bomb went off," when the cargo door let loose. He was wrong but based upon what he felt and heard he could have been right. Only later did he change his mind.

Will you follow the hypothetical line that it was an inadvertent opening of the cargo door which resulted in explosive decompression?

Accident investigations must rule out certain possible causes as well as rule in the probable. May we assume that the cause of the explosive decompression was not a mid-air with some foreign object? Yes, because the object should have shown up on radar, and didn't. May we assume human error was not the cause such as a pilot induced sudden pitchup? Yes, because the flight recorder information would have revealed such deviation.

Can we rule out mechanical malfunction? No, although many types of malfunction can be ruled out such as aft bulkhead breaking and shearing of the vertical stab and rudder, or other known 747 problems. If those mechanical malfunctions had occurred, the disintegration would have taken a few seconds longer and shown up on the flight recorder.

Is there a mechanical malfunction which could cause the sudden explosive decompression and explain the subsequent actions of the crash? Yes. A large hatch opening at high altitude would do it. The plane would pop like an inflated balloon. That possibility then needs to be conclusively ruled out if a different cause is to be believed.

In my opinion, the cargo door mechanical malfunction possibility has not been conclusively ruled out. It doesn't matter how much belief there is that it was something else, this possibility needs to be ruled out for the alternate bomb theory to be believed without doubt.

Mr. Brennan, please persuade me that it could not have been a cargo door.

I will always say it could have been a bomb. In my opinion, however, the scale of reasonable probability tips towards the mundane explanation of a mechanical event that happened before and happened afterward-inadvertent cargo door opening; as opposed to the tortuous, twisted, shadowy, flimsy explanation of Libyan agents, Maltese tailor shops, German bomb factories, botched British security, transferred luggage, traces of explosive on fragments, concealed warnings, and fake cassette recorders.

Let me get back to our conversation by telephone today. Thank you again for your time. I fully realize the possible futile effort of talking about a subject so close to you with a stranger on the telephone. You were gracious and patient. I recall your statement of it's not an economic thing but more important thing to find out the truth. I agree.

Of note in the Flight International article is the the investigating board declared, within a week, the cause of the crash to be a bomb found on traces on a metal pallet and no evidence of structural failure. That was fine for a quick guess but carries little weight for an accident scene miles wide. In September of 1990, the accident report was released, (which I assume you have

access to, where can I get one?.) but did not address the possibility of a cargo door opening, a very curious omission for such an obvious cause, a cause you immediately speculated upon, an aging aircraft with mechanical problems.

Let us examine the drawing and then the picture of the large piece of cockpit.

It doesn't make sense. Why is the cargo door closed? Logic says that when the bomb went off and the fuselage started to disintegrate the tear would have been at a point where the fuselage was already cut, the cargo door.

The size of the bomb hole is much larger than the report stated, 50cm.

The photo picture shows a straight line cut near the cockpit, exactly what the forward fuselage of Flight 811 looked like after it limped home from its 20000 feet, lower altitude, inadvertent door opening. That 747 was also an aging aircraft. The picture shows a line consistent with a shearing action of a door torn off, not an explosive disintegration of jagged edges.

To rule out the cargo door the accident board should have done the following:

1. Where did the door land? Was it near the frame of the door as it would be if it were a bomb and the whole front of the aircraft disintegrated together? Or was it far away indicating it separated first and drifted further away?

2. Was the door found with any of the latches still intact and clasping indicating it was a bomb? Or was the door found with all latches unlatched indicating the door was opened in flight?

3. Was the door compared with the door from Flight 811 which was conclusively proven to be an inadvertent door opening? Dissimilar markings would indicate a bomb. Similar markings would indicate inadvertent door opening.

4. Was the tape from 103 compared to the tape of 811 during the critical second after the event? Dissimilar would indicate bomb;

similar would indicate cargo door opening.

5. Explain debris in starboard engines and not port engines. Port engine FOD indicates bomb, starboard engines indicate door.

Did the board do these steps to rule out an obvious crash cause? If they didn't, they were negligent.

To rule in the bomb I ask;

1. Where is the picture of the peeled back skin in the reconstruction of the aircraft? The omission of the important picture is alarming. As Sherlock Holmes said, "The hound should have barked, but didn't."

2. Where are the pictures of the fragments on which traces of explosive were found? They may be too small to photograph or damaged during testing. Fragments imply very small pieces and traces imply very small amounts. To find a very small amount of something on a very small piece of something among millions of very small pieces of something spread out over many square miles in a few days is not probable, is not likely, and is not believable. I believe it also rained following the crash so that may have washed off any residue.

3. Where is conclusive evidence from the terrorists. Many terrorists want credit for their cause and have code numbers or leave notes. None for Flight 103 because there is none.

4. Explain how the sequence and coincidences and lapses and bad luck could have resulted in the bomb going off when and where it did and remain plausible to a reasonable person.

If the opening of such a small hole that the bomb caused could cause an explosive decompression, why was the possibility not considered of inadvertent opening of other hatches, such as the passenger doors which can be opened from inside?

I can explain why the bomb theory holds such weight but I get into controversial opinion which might be better discussed later. Let us stick to objective facts as much as possible.

Bomb scenario...Too confusing for me but many people can explain the path as well as disagree as to the exact route.

Door scenario...several documented accidental openings on ground, documented accidental opening at 20000 feet, accidental opening at 31000 feet. Boring, sad, and completely plausible.

Which sequence is more probable, more likely, more believable?

If the door can not be ruled out, then the conclusion must be that it could be the cause just as if the bomb can not be ruled out, it must be considered to be the cause.

If the door is the cause, then your company has just saved a billion dollars. I have never written a billion dollars before and in this case, it is a real number. The damage awards are from two to twenty million. If a conservative number is five million and the number is 200 passenger sue out of the 260 killed, then a billion dollars changes hands.

If not a bomb then a cargo door, still misconduct but not wilful and therefore limited to 75000\$.

Why is money important? It should act as an inducement for closed minds to consider other options, even if embarrassing or surprising. The cause of the crash should be reexamined. There are many historical precedents for catastrophes to be blamed on bombs and then later reassessed to be natural phenomena.

Changing a person's mind is the most difficult thing in the world to do. I'm open, sir, persuade me it was not a cargo door and it was a bomb. I will say it could have been a bomb. Will you say it could have been a cargo door inadvertently opening at high altitude causing explosive decompression of Flight 103?

Should you choose to reply by telephone, Mr. Brennan, I'm at 408 659 3552. By email, I'm at meadow@redshift.com. By snail mail, I'm at 551 Country Club Drive, Carmel Valley, California, 93924. To help put an image for your reply I've enclosed a graphic of me. I'm a commercial pilot, instrument rated, formerly owned a FAR Part 135 charter company, Navy P2V aircrewman,

RA5C navigator, squadron legal officer, and now a retired officer with wife and daughter.

Please continue our dialogue.

Sincerely,

John Barry Smith

Mr. John V. Brennan, Esq.
US Aviation Underwriters
One Seaport Plaza
199 Water Street,
New York, New York 10038

Dear Mr. Brennan,

6 September 1995

Well, sir, a polite brush off is better than no brush off. Thank you for reading my letter of 16 August and replying; it could have been ignored. I will followup on your lead of the picture of the bomb caused petalled hole in the side of Pan Am 103 which is said to appear in a later issue of Flight International. I shall drive to San Francisco from Carmel Valley to find a library with the back issues. A 50cm bomb hole is six inches; I hope it's a closeup.

While waiting for your reply I wrote a shorter letter to Mr. Harold Clark reviewing the essential points supporting my belief that the inadvertent opening of the cargo door caused the explosive decompression of the airframe of the older Boeing 747 leading to its destruction.

Your letter does not rebut any of those suppositions. Nor does it answer my question of how I can get hold of the official accident board investigation report.

The question I have that should be answered in that report is where did the door land? Assuming a bomb, the door falls nearby with the rest of the nose. Assuming the door unlatched, opened up, was torn way, and then drifted down to land, that certain spot can be calculated. Start at 31000 feet, velocity 450 knots, factor in the wind, use a drift angle determined by the United Flight 811 door falling, and the area of probability can be approximated. If the door was found in that far location, then it must be assumed it came off and did not come down with the rest of the forward fuselage.

Easy problem with easy answer with big consequences.

I will seek the book you recommend, "Sky Gods: the Fall of Pan Am," by Robert Gandt. I will keep an open mind although it appears that the book will rule in a bomb, something that has been done, and done poorly, for the last six years.

I'm asking to rule out the accidental opening of a cargo door; something that has happened before, could have happened then, and happened after. This is not a weird request like saying it could have been a midair with a flying saucer, man, check out the autopsy photos. I'm the rational one here with a boring, ordinary, mechanical event. An old airplane gets worn, twisted and its door snaps open. Not very interesting unless you have a billion dollars on the line. And you do.

Much more interesting with shadowy spies with secret weapons concealed duping security, switching airplanes and whatever, the bomb theory just gets too strange for me. I'm very down to earth when it comes to reality. I also know who killed John F. Kennedy...Lee Harvey Oswald.

The American people do not want to believe that a single twisted person with a gun could kill a beloved symbol or a few

simple latches unsnapped and killed hundreds. They want to believe it was a conspiracy of dozens of shadowy secret agents in cahoots doing terrible things. They even tried to blame the Oklahoma bombing on Mideast terrorists until the real culprits showed up.

There is a way for me to stop writing to you....tell me it is in your best interest that the cause of the crash be a bomb. If your company is better off with a bomb cause than a cargo door, I'll go elsewhere. Your mind will not be changed.

If a cargo door, the US government loses 30% of two billion for taxes. They have already issued tax claims against the family members. It wants a bomb.

If a cargo door, the family members don't get their 10 million each from you, just a lousy \$75000 to assuage their grief. They want a bomb.

If a cargo door, Boeing has some questions to answer and may have to pay a lot money to somebody. They want a bomb.

Pan Am is dead and said, as it was dying, "It was a bomb but it wasn't my fault, it got on the plane because of faulty airport security, blame Heathrow, and the government knew about it and should have told me and should share the blame." Blah, blah, blah.

Now it comes down to paying the piper, the insurance company: you. The insurance company is to pay for other's screwups. Is that the way it works?

Mr. Brennan, let us be philosophical. You are the good guys. You correctly judged the risk to loss and assigned a correct premium to insure Pan AM. It was not wilful misconduct. Your company should not pay.

In one sense you are the victim of an enormous insurance fraud by well meaning institutions who are blind to boring truth because they believe it is in their best interest to believe the exciting lie of a bomb. And for hundreds of millions of dollars, in

cold cash, I would have trouble believing otherwise myself.

I see your letterhead reads-Chairman of the Executive Committee. What does that mean? What does the Executive Committee do? When I called to find out the correct spelling of your name, the secretary said you were retired but still employed. What does that mean? Do you have a staff? a budget?

Did I detect a New York Irish accent in our conversation? I was born in England and emigrated at age two and a half. My parents have given me a bias against the Irish. I fight against that bias and try to be objective in matters of Ireland and the IRA, etc. (If the Boeing had been British Airways, the cause would have been an IRA bomb. Still wrong.)

Mr. Brennan, put yourself in my position for a few moments., You are a fifty one year old retired military officer who built model airplanes as a kid, then flew model airplanes as a teenager, then soled a real plane at eighteen. Went on to get commercial license and becomes a charter pilot. Went to war as a navigator on Navy carrier jet. Survived an ejection and crash which killed his pilot. And believes that the cause of a world famous crash is not the common belief. The common belief has nations fighting with each other. It has nations refusing to fly into other nations airports, has stopped commerce into another country, has caused barbaric bounties for the capture of foreign citizens. It has caused delayed compensation to grieving family members. It has glossed over a defective apparatus in an aircraft that we may fly in and crash. The common belief is wrong; it happens all the time. What would you do, Mr. Brennan if you believed as I do? Who should I talk to? Where should I write?

Back to objective. Can you assign a lowly staff member a morning of work to work out the landing spot of the door if it were to come loose at 31000 feet over Lockerbie? I would do it if I had access to the accident reports of Flights 811 and 103. I don't have the data. You do.

Does the Flight 103 door look like the Flight 811 door? I don't have access to the pictures. You do.

Do the flight recorder sounds of Flight 811 match the sounds of Flight 103? I don't have access to the sound tapes. You do.

Please explain the starboard engines FOD. It should be the port engines if a bomb.

Where may I obtain copies of the accident reports of Flight 811 and Flight 103?

Sincerely,

Barry Smith

meadow@redshift.com

659-3552

Country Club Drive,

Carmel Valley, CA 93924

Mr. John V. Brennan, Esq.
US Aviation Underwriters
One Seaport Plaza
199 Water Street,
New York, New York 10038

Dear Mr. Brennan,

16 September 1995

John

email

(408)

551

Well, sir, I went to the local bookstore, (the Thunderbird, at the mouth of Carmel Valley, you may know it if you have visited the Monterey Peninsula,) and excitedly picked up the book you recommended about Pan Am by Robert Gandt. It has three pages about the crash. Two of the pages are about the cause being structural failure. One page is about a bomb. The rest of the book is tabloid heart-pulling pseudo-dramatic crap.

I shall have to add wild goose chase to polite brush off. But then, a wild goose chase is better than no goose chase.

As you also recommended, I went back to the library and found another visual representation in Flight International of the Pan Am Boeing 747 being blown apart by a bomb. It was the same non-official drawing I sent you; they just repeated it in another later issue. There was no picture.

If you have a picture, please send it. I would think that a company that is about to pay a billion or so dollars because of an event would have a picture of that event displayed prominently in the files with a note, "Here is the bomb! Read it and weep!"

(To quote from a report, "General Re's US Aviation subsidiary was the leader of a 15-member syndicate that carried 30% of the insurance on the plane involved in the 1988 Pan Am 103 crash, about which there has been considerable litigation that may still affect this unit.")

To have no picture in your files is curious. To have no picture at all, even in the British official files, is damning.

I sent a picture to you; it was the 747 lying on its side with a straight line cut on its starboard side, exactly as it would appear if the cargo door ripped off in flight.

Why the resistance to accept a contrary theory until ruled out, Mr. Brennan?

Our difference in opinion is the cause of the crash; you bomb,

me cargo door.

What do we have in common? We are men. We are aviation experienced. We are retired. We are over fifty. We speak English. We are Americans. We respect the truth. Our names are both John. (Check out my web page, <http://www.redshift.com/~coyote>, it includes a story of ejection and a link to my John Smith club.)

Since we are men we know that terrible crimes such as mass murder do exist so it could have been a bomb. Since we are aviation experienced we know that there are an infinite number of causes of crashes so it could have been a bomb or a cargo door. Since we are retired we don't have to kiss ass for money or approval, we can think for ourselves. Since we are over fifty we can look back and see that many events are misunderstood for years and some are never correctly explained. Since we speak English we can talk about all this stuff. Since we are Americans we know that many other cultures hate us for whatever reasons and could kill us with a bomb. We also know we Americans make things that don't often work the way they should and occasionally break, like space shuttles. Since we respect the truth we never give up trying to find out what happened about important events until 100% sure.

Mr. Brennan, are you 100% sure the cause of the crash was a bomb? If so, crush this letter up, hold it over the wastebasket and let it float down to destruction.

If not 100% sure, then read further. What else could it be if not a bomb?

Let's skip the bomb or door theory for now. Let's agree it was a sudden decompression and then go to what happened next. Do you agree it was a sudden decompression? Is the analogy of a pricked fully inflated balloon satisfactory?

The prick came from inside. Do we agree so far? Then what happened?

How far can we agree before we disagree?

Tomorrow I'm going on a few days motorcycle trip around California. I want to see the high Sierra passes before the snows hit. Then down to the deserts, flat and fast and alone. It's good to get away and just think with no distractions and outside pressures.

Sincerely,

Barry Smith

meadow@redshift.com,

page <http://www.redshift.com/~coyote/>

659-3552

Country Club Drive,

Carmel Valley, CA 93924

Mr. John Brennan, Esq.

US Aviation

199 Water Street,

New York, New York 10038

Dear Mr. Brennan,
December, 1996

Wednesday, 04

Mr. Brennan, John Barry Smith here. We spoke on the phone and exchanged a few letters last summer.

John

email

web

(408)

551

The cause of the crash of Pan Am 103, the inadvertent opening of the forward cargo door in flight, which we spoke about, has happened again, this time to TWA Flight 800.

As the insurer of both, I assume you have a responsibility to investigate a reasonable report of hazard to the things you insure.

I wish again to make a reasonable report of a hazard to the airplane you insure and which has crashed at least two of them, Pan Am 103, and TWA 800.

The reasonable mechanical cause is the inadvertent opening of the forward cargo door in flight.

Full documentation and support for the report of hazard is on web site, www.corazon.com The web site has ADs, NTSB reports, other government reports such as UK AAIB, and news reports.

I wish to thank you for steering me on to the path of documentation by referring me to the Flight International article on Pan Am 103 which was supposed to have a picture of the petalling of the fuselage skin from the bomb but actually had an artist's impression. Once started on documentation, I went to the NTSB and other governments and literature for information on the crashes. The research only made me more firmly believe in the cargo door theory.

By the way, if the proof of bomb on 103 was the same evidence as used for bomb on TWA 800 but later shown to be benign such as heart medicine or planted explosives for dog sniffing tests, why not PA 103 also be benign? It can be and the cause of the crash can be shown by evidence to be that forward cargo door. The weight of evidence for bomb on 103 is lessened by the discovery of innocent evidence on 800. The investigation of 103 should be reopened.

Regardless, the cargo door theory must be investigated for the current crash and for the fact that the hazard still exists and can cause another Boeing 747 crash.

I invite you to turn this over to your investigators by referring them to the web site or calling me at 408 659 3552.

Sincerely,

John Barry Smith

Mr. Harold Clark
Chief Executive Officer
US Aviation Insurance Group
1 Seaport Plaza,
199 Water Street,
New York, New York 10038

Dear Mr. Clark,

30 August 1995

I am John Barry Smith from Carmel Valley, California. The cause of the crash of Pan Am 103 was the inadvertent opening of the starboard cargo door resulting in explosive decompression to the airframe. The cause of the crash of Pan Am 103 was not a bomb.

Why is that important to you? Because that truth will mean that your company does not spend a billion dollars in claims because the company you insured was not guilty of wilful misconduct by allowing a bomb through security checkpoints. The company you insured did its best to make sure the door was locked but, as documented, many inadvertent openings happened before and happened after December 21, 1988. Your judgment about risk to

loss to insure the airline was correct.

For the past six years all interested parties have believed it was in their best interests to believe it was a bomb and spent their time ruling in a bomb and not ruling out the cargo door. Until now.

It is in your interest to try to rule out a cargo door, Mr. Clark. And sir, that can't be done. I've tried to in my hobby/interest of six years and the deeper I go, the more I am persuaded that it was the door. It could have been a bomb but the more reasonable, mundane, tragic cause is the cargo door.

I ask you, Mr. Clark, to use science and open mindedness to try to rule out the cause of the crash being the opening of the cargo door. Ruling in a bomb has been done, and done poorly, but still holds as the consensus opinion. It is a wrong opinion.

A letter to your employee, Mr. John Brennan, is enclosed. As a retired military officer I followed the chain of command. Time is getting short. He has not replied yet so I have come directly to you.

As a commercial licensed, instrument rated pilot I want the causes of crashes to be accurately appraised to prevent a reoccurrence. Truth hurts. We must realize our planes have defects but we are not totally hated with mysterious foreigners trying to bomb us. Let Boeing pay for their design errors which led to death of passengers and crew.

Important questions not answered yet to rule out door:

1. Where did the door land? Close to cockpit means bomb; far away means failure of door.
2. Was the door found with any of the latches still intact? Or all latches unlatched?
3. Was the door compared with the door from United Flight 811 which was conclusively proven to be an inadvertent cargo door opening? Dissimilar markings would indicate a bomb. Similar markings would indicate inadvertent door opening.

4. Explain FOD in starboard engines and not port engines.
Port engine FOD indicates bomb, in starboard engines indicates door.

I welcome discussion; please reply.

Sincerely,

John Barry Smith
Email meadow@redshift.com
551 Country Club Drive,
Carmel Valley CA 93924
408 6593552

Ronald Ferguson
Chairman, President, and CEO,
General Reinsurance
HQ: 695 E. Main St.,
PO Box 10351,
Stamford, CT 06904-2351

Dear Mr. Ferguson

12 October

1995

I'm at the top corresponding with you. Please consider this a billion dollar letter.

Your company should not pay the claims against you for the crash of Pan Am 103 because you are not fairly liable. The cause was not a bomb which was judged wilful misconduct but an inadvertent opening of a cargo door which is not wilful misconduct.

The accident board ruled in a bomb. They should have ruled out

the door. If unable, the accident board investigation must be reopened. Current facts prove the door theory possible. Further investigation will prove it correct.

Current facts show foreign object damage (FOD) in the starboard engines, consistent with the cargo door opening. There was no FOD to the port engines, consistent with a bomb theory.

Documentation shows seven previous inadvertent cargo door openings on the ground in early boeing 747s with no damage. A few months after Flight 103, records show one door opening in flight, United Flight 811, with loss of life and heavily foddod starboard engines.

Further investigation will match similarities to the known door opening of Flight 811 to Flight 103 such as sounds on tape, markings on door, number of latches attached, and landing distance from cockpit.

Why you and your company, sir? Because only now is the piper due his payment and you are asked to pay for someone else's tune. You should not pay the billion dollars and should listen to clear reasons why not.

The tune of conspiracy of spy Libyans in Malta buying stuff and going to Germany and hiding bombs etc is not your tune. There is no conspiracy. A stupid boring thing happened. A door opened when it should not have. It's happened before and will happen again. You insured against that door opening and should pay the 75000\$ maximum. You should not pay the 20 million dollars per victim for a phantom bomb. When multiplied by 260 victims and divided by the other companies shares, you still will pay out a billion of real dollars unnecessarily.

Here's how to avoid that injustice. Attempt to rule out the door opening. When unable, petition to reopen the accident board investigation. The new cause will be the faulty cargo door. Then ask the courts to moot the wilful misconduct decision. There will be no new trial against you because the victims will seek

damages against Boeing, the true culprit.

How to reopen the accident investigation? Show it was a cargo door.

Will you go through the thinking with me?

A real event happens and consistent, reasonable events follow.

An imagined event occurs and inconsistent unreasonable events are proposed.

The real event is the cargo door and the imagined event is the bomb.

The imagined event is much more interesting and much more profitable for many people who believe it is in their best interest to believe it. So they do.

The real event is ordinary, boring, and deprives sad people a lot of money who therefore disbelieve it.

Will you agree with me that a 747 cargo door opening at 31000 feet would cause an explosive decompression such as a pricked balloon? We know from Flight 811 that the fuselage is torn apart when the door opens. Flight 811 was at 21000 feet and therefore the door opening had less explosive force which did not destroy the craft, but did tear a large piece of skin off, blew debris into number 3 and 4 engines, and allowed the solo door to float down a far distance away into the water where it was retrieved. In addition, the co-pilot of United Flight 811 said a bomb had gone off. Only upon landing was it discovered that the door had opened and torn off. (If that United 747 had not limped back to Honolulu but crashed into the ocean, there would have been two bomb thought US 747 crashes within three months with terrible international repercussions.)

If the Pan Am 103 crash could have been the cargo door opening, a competent accident investigation would rule that cause out. That was not done. The board concentrated on ruling a cause in, a bomb.

In the real event of the door coming open and then off, the door

would drift to a certain spot on the ground that can be calculated using the United Flight 811 data. Did the Pan Am 103 door land near that spot? That must be determined.

In the imagined bomb explosion, the door would land someplace else. Where? The landing location of the door must be determined.

I can't do that. I don't have access to the board investigation. I have asked your employees, Mr. John Brennan and Mr. Harold Clark of US Aviation Underwriters, for help, but so far, no joy. (Letters attached.)

The door needs to be examined in close detail to determine if it is similar or dissimilar to the United Flight 811 door. The real event of the door opening at altitude would leave similar scratches, snapped latches, twisted hinges, etc. If a bomb, the markings would be dissimilar.

The audio tape needs to be examined closely for similar sounds. A half a second is an eternity to an audio expert. The tape of Flight 811 and Flight 103 may be similar in the critical one half second after the door opened. Or they would be dissimilar if a bomb. If both flights of early 747's suffered inadvertent door openings, there would be a discernible pattern in the half million microseconds before the tape ended for Flight 103 when compared to Flight 811.

If the door theory is to be discounted, a reasonable explanation needs to be provided for the pounds of debris found in the engines on the cargo door side of the plane and no debris found in the engines on the bomb side of the fuselage.

The bomb theory is the flimsiest set of coincidences with improbable discoveries and is easily discarded when a strong, verifiable explanation is presented.

(Just one wildly impossible occurrence which is required for the bomb theory...Within two days of the crash, with twisted, shattered debris scattered over dozens of miles, fragments of a

storage pallet were discovered which had traces of explosive on them. Something invisible, traces of explosive, was quickly found on something very small, fragments, in an area of millions of very small pieces, debris, in a very large area, pastures. Possible but improbable, just as are all the other bomb linking clues.)

A competent, non-political, unbiased aircraft accident investigation has to rule out probable causes. The Pan Am 103 investigation was inadequate and only ruled in a cause.

The early conjecture of the cause of the crash was structural failure on an airframe with over 70000 flight hours. That cause was not ruled out. It can't be because that was the cause.

(Other interesting coincidental facts about early 747s: They had the cargo door area worked on as part of a civilian retrofit for military purposes in event of war. That was an opportunity for defective workmanship. After the crash of 103, early 747s were recalled and more structural work was done on the cargo door area. This was an opportunity to fix door problems.)

To review:

1. You should pay for what you agreed to pay...75000\$. You should not pay for what you did not agree to pay...20 million per victim for wilful misconduct of your client.
2. Determine if there is reasonable belief that the cargo door opening could be a cause of the crash by calculating landing spot.
3. Request that investigation be reopened upon further evaluation of facts.
4. When confirmed that door could have and probably did cause the crash, ask the wilful misconduct judgment be set aside.

You will have potent opposition. Everybody except the insurance company loves the bomb theory, especially Boeing. The US government wants the half billion or so in taxes it will collect from the families after you pay them off. (It has already

sent tax due notices to families how have yet to be paid off.) The families want the 20 million dollars instead of the 75000\$. The US government and Boeing will be concerned at the sales export drop at the decreased reputation of the 747. Everyone will be upset at the door explanation except you, who saves a billion dollars.

Conspiracy theories abound and are false. Lee Harvey Oswald killed President Kennedy, not a group of ex-CIA agents. A cargo door opened and caused the crash of a 747, not a group of Libyan secret agents working in several countries smuggling a bomb on board a plane. A jealous ex-husband slashed his wife to death, not a group of racist police who planted evidence to frame OJ Simpson.

You may think, who is presenting this idea of cargo door crash cause, which goes against the popular belief? The crash cause should stand on its merits but the messenger is always judged.

I may be a tramp pushing a shopping cart full of carefully selected items picked up from trash cans while talking on a broken cellular telephone to people on another planet. But, even a blind squirrel finds an acorn once in a while. The acorn is the cargo door.

But I am not the person described above although I did see someone just like that. Again, that homeless tramp is more interesting than the reality which is a retired military officer living in own home with wife and daughter.

Here I am. Call me anytime, Mr. Furguson. I have a phone, 408 659 3552, a snail mail address, 551 Country Club Drive, Carmel Valley, CA, 93924, an email address, meadow@redshift.com, a web site, <http://www.redshift.com/~coyote/>, and an insurance company I have had for thirty years, USAA, account number 0071 03 10. Check me out.

Regarding the crash of Pan Am 103, I have been in a plane crash, ejected and lived to tell about it. The story is on my web

page under FCLP. I am a commercial licensed pilot, instrument rated. I have flight time as enlisted crewmember, jet carrier navigator, civilian owner and pilot, and Boeing 747 passenger. On the legal side, I was a Navy squadron legal officer, not an Article 27b lawyer, but a Navy trained legal officer handling summary courts-martial and non-judicial punishments. I've had a few articles published in aviation newspapers, worked on a local newspaper, and finished a novel which can be read at my web page under Valiant Dust. I became an audiologist which examines sound very closely and assists the hard of hearing.

Do you disregard free advice but respect information you pay for? Then send me a dollar.

I can see clearly how a person's perceived best interests rule their beliefs. This individual delusional response applies to aircraft accident boards, corporations, and governments. Truth does not shape administrative reality.

The accident board, Boeing, and the US government all believe a bomb was smuggled on board Pan Am 103 because they believe it is in their best interests to believe in the bomb theory. It's just not true.

A jury in a courtroom ruled Pan Am showed wilful misconduct in allowing the bomb on board. Pan Am paid you premiums to pay off any claims against them. You must now pay a billion or so dollars to fulfill your contract.

But you don't have to, sir. Before payout, take that last gasp and check out the landing spot of the cargo door. Find out if the latches and markings on the door match the documented defective cargo door of Flight 811. Clutch that last straw and demand to know why the starboard engines of Flight 103 were foddred and the port engines were not. Look under the final stone and examine that audio tape for a frequency pattern similar to Flight 811.

You have that right. You can examine the aircraft pieces for

which you are about to pay a billion dollars. Give the case to your fraud squad. Tell them to look at the claim as bogus from claimants who stand to gain much from the flimsy bomb theory and little from the solid cargo door theory.

When the door theory is shown to be correct, your actuarial judgment in assessing premiums against risk will be vindicated.

You did not gamble and lose a lot. You gambled and lost a little. General Reinsurance will have re-established the integrity of the insurance risk/premium/claim/payment/ model. It's worth the effort.

Sincerely,

John Barry Smith
551 Country Club Drive,
meadow@redshift.com
Carmel Valley CA 93924
(408) 659-3552

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: May 30, 2002 10:22:17 AM PDT
To: "'John Barry Smith'" <barry@corazon.com>
Subject: RE: Stay and fight, Bill, you are needed and most important.

Hi Barry,

You are getting way ahead of me again with e-mail msgs. I have several replies to write to you, especially about the AI 182 photos. I hope I can do so today or tomorrow. and I shall certainly try to because, if not, it will not likely be until the week of 17 June.

This one is easy.

As a public servant, referring to comments by a politician, my reaction is

"No comment".

As for my pending retirement, I don't think there is anything that could

dissuade me. I am really looking forward to having a better balance to my

life - and especially, more time with my wife (who is also going to retire

in late June).

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Thursday, May 30, 2002 12:41 PM

To: Tucker, Bill

Subject: Stay and fight, Bill, you are needed and most important.

POSTED AT 7:17 PM EDT Wednesday, May 29

Canada nation of defeatists, Harper says

Canadian Press

Ottawa - Alliance Leader Stephen Harper called Canada a nation

of
defeatists on Wednesday as he defended his remark that the woes
of
Atlantic Canada are linked to a pervasive "can't-do" attitude.

Mr. Harper said there is a "culture of defeat" not just in the
eastern
provinces, but on the Canadian prairies and among some
Quebeckers.

"In parts of the prairies we're increasingly seeing similar views -
there
is no hope, there is no way forward, and all we can do is kind of
negotiate with the party in power," he said.

"I think any region where you have sustained underdevelopment
or lack of
growth for a long period of time, this starts to develop."

Mr. Harper then went one step further, calling defeatism a
"general
problem" among Canadians.

"Generally the kind of can't-do attitude is a problem in this
country," he
said.

"I think this whole country ... should be leapfrogging the United
States
and there's too many people in this country think that we can't do
it.

"This should be the wealthiest country in the world, not a country

with a living standard that's 25 per cent lower. So obviously the growth and the attitudes that go with that are different in some parts of the country than others, but it's a general problem."

Mr. Harper said he comes from an "eighth-generation Canadian family that's left the Maritimes because there's no growth."

He argued Tuesday in a newspaper interview that his party's biggest stumbling block to a breakthrough in Atlantic Canada was the "can't-do attitude," fostered by years of federal transfer payments and industry handouts.

Rather than toning down his argument Wednesday by expanding it, Mr. Harper appeared to ratchet up the rhetoric, saying Atlantic politicians outraged by his remarks don't understand their own constituents.

"Frankly, they're out of touch with their own people if they don't think that there isn't a lot more that could be done to get people more optimistic in that part of the country," he said.

"Atlantic Canada can be as wealthy as any other region but that needs to be pursued aggressively and we don't sit around waiting for

favours from
government"

He said the Alliance would put an end to federal handouts, and that - combined with low taxation and less regulation - would help "have-not" regions flourish.

Other federal leaders also jumped on the remarks Wednesday, saying Mr. Harper was being irresponsible by perpetuating stereotypes.

"You know, the more things change, the more they stay the same with the Alliance party," said NDP Leader Alexa McDonough.

"This is the real Stephen Mr. Harper, who wanted to put up firewalls around Alberta to keep those nasty eastern Canadians out because we're ne'er-do-wells and we're lazy bums.... They've just got it dead wrong.

Tory Leader Joe Clark said the comments were uncalled for.

"It's just an irresponsible thing for a national political leader to say," he said.

"Atlantic Canadians are not defeatist and certainly the people of Saskatchewan are not. Mr. Harper, all of us, should be very careful not to

apply false caricatures to people or parts of the country."

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: May 30, 2002 3:48:28 PM PDT
To: "John Barry Smith" <Barry@corazon.com>
Subject: **FW: My email to Mr. Chou for China Airlines Flight 611**

Dear Barry,

Based on what little I know about the China Airlines 611 accident, I would say: "You may well be right". Of course, to be complete one should also add that "You may be wrong". I am quite sure that you would agree with both of those statements; however, those who don't know you may not realize that.

It may seem to them that you have a focus only on cargo doors.

A wise old investigator taught me, almost 20 years ago, that there is a good reason why accident investigators have two eyes and two ears, but only one mouth.

Your hypothesis about China Airlines 611 seems quite plausible, and I would be surprised if K F Chou and his team do not have it under active consideration. However, I would also be surprised if that is the only

hypothesis under consideration. I have met K F, his boss (Kay Yong) and several others from the ASC - Taiwan; and I have also seen the results of some of their work. They are a really good group.

If you are correct, that will be impressive and, more importantly, you will no doubt see safety improvements result in the area that is so close to your heart. However, please keep in mind that it would be quite inappropriate for the ASC to jump to a premature conclusion. They must be cautious and thorough. As for me, I have lots of my own TSB work to do without intervening in the ASC's, - but I will keep an eye on their progress. I'm sure Ken Smart would say the same.

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Wednesday, May 29, 2002 8:33 PM

To: Tucker, Bill

Subject: To Mr. Chou: China Airlines Flight 611 Black Box results

<< Message: Untitled Attachment >> << File:
AI182pagecan23matchesDC10aw.JPG >> << File:
Chart12Report.jpg >>

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Wednesday, May 29, 2002 1:02 PM
To: Bill.Tucker@tsb.gc.ca; ksmart@aaib.gov.uk
Subject: My email to Mr. Chou for China Airlines Flight 611

<< Message: Untitled Attachment >> << File:
811holephotocropped.jpg >>

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Sunday, May 26, 2002 1:13 PM
To: Bill.Tucker@tsb.gc.ca; ksmart@aaib.gov.uk
Subject: China Airlines 611

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Bill Tucker and Mr. Ken Smart, 25 May 2002

It probably happened again. Based upon what is released to

the
public, the pattern is the same as TWA 800, Air India Flight 182,
and Pan
Am Flight 103 and of course, United Airlines Flight 811.

The chart below will be filled in slowly with 'yes' for most of
the
pattern for China Airlines Flight 611. It already fits eight
categories. The
CVR with the sudden loud sound followed by an abrupt power
cut will be the
clincher at this stage.....
.....etc.

From: Ken Smart <ksmart@aaib.gov.uk>
Date: June 7, 2002 2:33:14 AM PDT
To: John Barry Smith <barry@corazon.com>
Subject: **Re: Conscience/Comet/Wiring/Doors**

Dear Mr Smith

Your recent e-mail trails presents me with the difficulty of
responding to your hypothesising in what I hope is a reasonable
way.

I can only reiterate that accident investigation, along with all
other forms of investigation, is an evidence based process. I
cannot afford the luxury of taking a stance that is in effect one
that says " don't confuse me with the facts".

I can see that there is nothing that I can do to convince you that

Panam 103 was brought down by an improvised explosive device. I can only refer you to the AAIB report and the very extensive technical evidence presented at the trial by specialists from around the world.

Ken Smart
Chief Inspector of Air Accidents

WARNING: The remainder of this 154K message has not been transferred. Turn on the "Fetch" button in the icon bar and check mail again to get the whole thing.

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Chief Inspector of Air Accidents

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HTML//EN">
<html><head><style type="text/css"><!--
blockquote, dl, ul, ol, li { margin-top: 0 ; margin-bottom: 0 }
--></style><title>Conscience/Comet/Wiring/Doors</title></
head><body>
<div>Ken Smart<br>
Chief Inspector of Accidents,<br>
Air Accidents Investigations Branch<br>
AAIB<br>
DRA Farnborough<br>
Hants GU14 6TD<br>
United Kingdom<br>
</div>
<div>Dear Mr. Smart,&nbsp; 3 June 2002</div>
<div><br>
Conscience: It's what safety is all about:&nbsp; Doing the right
thing although many would try to dissuade.<br>
```

</div>

<div>By your silence to my Smith AAR for Pan Am Flight 103 and your lack of response to my personal replies to your email regarding the photographs of the torn and twisted forward cargo door, I know you know that there is a very real possibility that the probable cause of the inflight breakup was not a bomb but the shorted wiring/forward cargo door rupture/explosive decompression explanation and that the finding of 'bomb' was probably based on the red herring of a rather large shotgun blast in the compartment after the tremendous explosion of the sudden decompression.</div>

<div>
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<div>I know you know this because the evidence, the facts, and the data support those conclusions and have been presented to you. You have implied that vertical torn skin above a cargo door proves it opened in flight and indeed, the forward cargo door of Pan Am Flight 103 has those telltale vertical tears. The wreckage distribution shows that ruptured open door occurred at the initial event time which is the sudden loud sound which matches the United Airlines Flight 811 sudden loud sound. You may be stunned by the enormity of the discovery.</div>

<div></div>

<div>Above picture of Pan Am Flight 103 shattered forward cargo door with peeled back skin from aft midspan latch and vertical tear lines above door.</div>

<div>
</div>

<div>I also know you know the complex political implications of this more accurate mechanical probable cause becoming accepted by aviation professionals and the public. There must be strong pressure to maintain the reputations of the New Scotland Yard, the AAIB, the NTSB, the FBI, and the stature of at least three foreign governments, India, UK, and USA. Literally billions of dollars have and will change hands thereby shifting the fortunes of millions. Based on the non-conspiracy theory for Pan Am Flight 103, apologies may be made to a foreign government. The viability of the largest airliner manufacturer in the world may be in question.</div>

<div>
</div>

<div>I want you to know that I know of all these political implications and probably ignorant of many more such as promotions and assignments of those involved.</div>

<div>
</div>

<div>Yet, my purpose is clear: Aviation safety for crew and passengers is paramount and comes before financial or emotional considerations. I feel this way probably because I am a survivor

of a sudden night fiery fatal jet airplane crash myself. I've been there. I'm trying to stop others from going there.</div>

<div>

The one caught in the middle is you, sir, the Chief Inspector of the

branch which investigates Air Accidents.

What to do?

</div>

<div>Remain silent? Well, that silence of authorities over the years

has apparently resulted in the recent deaths of 225 more passengers

and crew in China Airlines Flight 611.</div>

<div>

Speak up? What good would that do? What's the use? Why try?

And that's where conscience comes in. Just because the political forces are aligned against safety and just because the will of the people you represent wants very badly for Pan Am Flight 103 to be a

terrorist event and really, really don't want it to be mechanical, are those good enough reasons to ignore the evidence that shows a

mechanical cause? Just because the cause to reopen the investigation

based on subsequent similar accidents appears to be daunting, is that

reason not to try?</div>

<div>
</div>

<div>Please don't turn a blind eye to the photographs of the

shattered door; please don't use a deaf ear to the sudden loud sound

on the CVR; and please look and listen to the purest and best evidence of what happened; the CVR and photographs.</div>

<div>
</div>

<div></div>

<div>Above: Chart 12 from NTSB showing four Boeing 747 sudden loud

sounds on the CVR and the abrupt power cut. The sound for Air India

Flight 182 has been matched to a DC-10 explosive decompression cargo

door event.</div>

<div>
</div>

<div>Several men are accused or convicted of causing a Boeing 747 to

suddenly come apart inflight within an hour of takeoff and yet the

similar inflight breakup has happened again...in 1989, and again in

1996...and again in 2002. The serial killer called faulty Poly X wiring is striking again and again and again while others or symptoms

such as a fuel tank explosion or shotgun discharge are blamed.</div>

<div>
</div>

<div>The evidence of similar matching evidence is overwhelming as

shown by the SmithTable below with more matches coming for China

Airlines Flight 611 as the wreckage is retrieved.</div>

<div>

The political pressure and popular will to keep the situation status

quo of terrorist bombing is overwhelming also.</div>

<div>
</div>

<div>I realize I am pleading my case. Not my personal cause because I

have little to gain. Pleading as in a legal sense, not for myself but for others such as passengers and for things such as wiring and doors.</div>

<div>
</div>

<div>Wiring pleads innocent in the sense it was light, strong, good

insulation, and designed for fifteen years. It apparently fulfilled its design requirements at the time. Only later did the problems appear: Quote from TWA 800 Public Docket 516A, Exhibit 9A Systems

Group Chairman's Factual report of Investigation, Page 47, "A

Boeing telefax of June 25, 1997, stated that: The Poly-X wire was

used as general purpose wire on the RA164 (TWA 800) aircraft.

Wire

insulation known as Poly-X had three in-service problems:</div>

<div>-Abrasion of the insulation in bundles installed in high vibration areas.

(This problem was corrected by Boeing Service Bulletin No. 747-71-7105, Dated July 19, 1974)

-Random flaking of the topcoat.

-Insulation radial cracks in tight bend radii.

Radial cracking phenomenon of the Poly-X wire was mainly associated

with mechanical stress. Bend radius is the largest contributor to mechanical stress in installed wire or cable. Presence of moisture

in

conjunction with mechanical stress is also a contributor."</div>

<div>
</div>

<div>The Cargo Door pleads innocent in the sense that outward opening

nonplug doors to baggage compartments have been the tradition for

transportation vehicles for centuries. Stagecoaches, trains, buses, cars, and airplanes have always had baggage doors that opened outward; it's a tradition. The reason is to save internal space, of course. The advent of highly pressurized cabins which mandated plug

type doors were not enough to overcome the tradition of outward opening doors. Ten latches but only eight locking sectors were thought sufficient to overcome any unwanted unlocking signal.</div>

<div>
</div>

<div>Passengers plead innocent in the sense of wishing to spend the

least amount of money to go where they want to go and if that means

flying in a plane with cheap tickets with a dangerous door, then they

will. The tickets are cheaper because more income can be derived from

a larger cargo compartment than one which is taken up by a door that

opens inward.</div>

<div>
</div>

<div>Manufacturers plead innocent in the sense they are in a competitive business that must make a profit to continue to make aircraft and the wiring and doors were deemed to be adequate at

the
time. Only decades later did the problems appear.</div>

<div>
</div>

<div>And that's why safety agencies exist; to identify these
difficult to prove problems and urge repair. These are plane
crashes,
not bank robberies. Plane crashes are usually mechanical or pilot
error; bank robberies are usually conspiracies.</div>

<div>
</div>

<div>Mr. Smart, what gives me the assumed right to lecture a
senior
government aviation safety official on his duty? What allows me
to

tell you things you already know? It's because I have the
arrogance

based on experience, the experience of actually being in one
sudden

night fiery fatal jet airplane crash and specifically talking to you
about another sudden night fiery fatal jet airplane crash. I have
the

right to suggest what you should do because I have earned that
right

by surviving even though my pilot died during his ejection.</
div>

<div>
</div>

<div>Please reconsider the probable cause of Pan Am Flight 103
to be

mechanical and not sabotage. It's never too late to correct an
error

of judgment by those who did not have the benefit of hindsight.</
div>

<div>
</div>

<div>The Comet investigation is a good example of history

repeating
itself. Bombs were suspected for the inflight breakups and the
planes
grounded. After a while the political pressure exerted itself and
the
planes flew again only to come apart again with more deaths.
Then an
objective, comprehensive investigation was conducted and the
true
culprit of hull rupture by mechanical reason was discovered,
metal
fatigue in a corner of a squarish ADF window. Bomb cause was
ruled
out. The Boeing 707 surged into the lead of commercial aviation.
Safety improvements were made with round smaller windows
and
stiffeners and belts installed to prevent the spread of a crack or
hole. (The 20 inch 'bomb' hole in Pan Am Flight 103 port side
would
have stopped at a small manageable size and did.)</div>
<div>
</div>
<div>I've included the Comet AAR to show that my conclusions
on Pan
Am Flight 103 are based on solid research and to show that
similarities among each Comet accident led to the answers. The
Comet
probable cause was determined by comparing the similar
evidence in
similar crashes. I did the same for the Boeing 747. The Comet
comparisons were made by safety officials because of the short
time
(one year and four months) between inflight breakups while the
Boeing

747 intervals for inflight breakups have been 1985 to 2002 or seventeen years.</div>

<div>
</div>

<div>Comments made almost fifty years ago about the Comets are

relevant today for Boeing 747s: "Some considerable attention was

paid in the Press last weekend to Sir Miles Thomas' statement that

the possibility of sabotage in the case of the Elba accident

"cannot be overlooked." This statement was natural enough

in the circumstances, since such a cause is always a possibility in any such disaster, and efforts must obviously be made to follow up

likely clues.

</div>

<div>But the weight of the investigation will, no doubt, continue to

be directed towards what I believe to more practical possible causes.

Among these could be the explosion of a kerosene-air mixture, or of

hydraulic fluid vapour, and the medical evidence may go a long way

towards confirming the likelihood of one or other similar possibility.</div>

<div>

Nevertheless, no one imagined it probable that signs of incipient structural failure would actually be found in the Comets under examination. B.O.A.C.'s maintenance and inspection is among the most

thorough in the World, and if such signs were to be seen in any

of
the Comets in service it is likely that they would have been found
during previous maintenance checks completed during the past
few
months.

</div>

<div>But a full and careful inspection of all the Corporation's
Comets was vital, both as a means of assuring the public and as
an
essential link in the series of checks which must be made towards
a
narrowing-down of the possible cause of the accident.

</div>

<div>Finally, let us remember, that the Comet is far from being
the
first or only civil aircraft to have suffered serious trouble, the
cause of which could not be immediately diagnosed, in the
earlier
stages of its service life.</div>

<div>
</div>

<div>There have been other similar cases of trouble with civil
transports which have afterwards continued, during their long
lives,
to be popular and successful aircraft."</div>

<div>
</div>

<div>Mr. Smart, meet the new boss of 1988, 1989, 1996, and
2002, same
as the old boss of 1954: Explosive decompression caused by
pressurized hull rupture inflight; several aircraft destroyed; errors
of judgment by politicians to keep flying; and the Airbus surges
into
the lead of commercial aviation. China Airlines Flight 611 is the
fifth controversial, strange, mysterious inflight breakup of a

Boeing

747 and the people who buy airplanes are mindful of this.</div>

<div>
</div>

<div>Regarding China Airlines Flight 611: A recent news article reports:

"Aviation

experts have offered several theories on the cause of crash, including metal fatigue, an internal explosion, sudden loss of cabin

pressure, a mid-air collision or a military accident. U.S. crash experts who investigated the mid-air explosion of a Trans World Airlines jumbo jet in 1996 are in Taiwan to try to determine why the

China Airlines aircraft broke into four pieces at an altitude of 30,000 feet and plunged into the Taiwan Strait. "</div>

div>

<div>
</div>

<div>History has repeated history.</div>

<div>

What to do?

</div>

<div>From my point of view, the choice is clear: Investigate fully

and let the chips fall where they may. Let the politicians handle the

red faces and the attorneys handle the money exchanges. Let the Air

Accidents Investigation Branch investigate an air accident which now

appears to possibly have been caused by a mechanical cause which has

happened before December, 1988, happened in February, 1989, and is

still happening again and again.</div>

<div>
</div>

<div>Based on the preliminary findings for China Airlines Flight 611

and the retrospective of United Airlines Flight 811, there is full justification to reopen/continue the investigation into a probable cause of a disintegration of an airliner which continues to fly thousands of passengers a day in hundreds of planes still in service

which crash cause is now open to question.</div>

<div>
</div>

<div>Hindsight is valuable and a luxury. To do nothing after United

Airlines Flight 811 was wrong. To do nothing after Trans World Airlines Flight 800 was wrong. To do nothing after China Airlines

Flight 611 is wrong. To not reconsider the probable cause for

Pan Am Flight 103, even at this late date, is to betray the trust of the passengers and crew; to ignore the visual and aural evidence is

to betray the aviation safety profession; and to pretend UAL 811 is

irrelevant to PA 103 is to make a lie of your career.</div>

<div>
</div>

<div>Do you need more evidence presented to you, Mr. Smart? I have it

and can assist your staff of investigators. There is much to check out in the wreckage at Farnborough. Motivated, informed citizens can

have much to offer the experts. I am available at any time to answer

any questions you may have. You have access to the answers in

your
files and in a hangar. I can direct you where to look. You can
satisfy your curiosity and the skepticism of the senior
government
politicians within a few hours of examination of the wreckage
which
has been saved for exactly this purpose.</div>

<div>
</div>

<div>Do you need advice on how to proceed politically? I can't
help

you there and good luck facing the press and the politicians.</
div>

<div>
</div>

<div>All I can do is to go to the authority that have the
responsibility and present my evidence and conclusions. They
are in
my Smith AAR for Pan Am Flight 103 and sent to you earlier as
well as

other documentation. There is much more if required and is
available

upon request. There is no dearth of factual support for the
shorted

wiring/forward cargo door rupture/explosive decompression/
inflight

breakup explanation for Pan Am Flight 103.</div>

<div>
</div>

<div>Please, Mr. Smart, let the weight of the investigation
continue

to be directed towards more practical possible causes. It may be a
difficult decision but the right one when it comes to life and
death.</div>

<div>

Cheers,

R.A.E." means
the Royal Aircraft Establishment controlled by the Minister of
Supply.

*<x-tab> </x-tab>" B.O.A.C." means British
Overseas Airways
Corporation.

(b) The Air Registration Board

2. The primary object of A.R.B. is to carry out such
administrative
and advisory functions with regard to the design, construction
and
maintenance of aircraft and matters connected therewith as may
from
time to time be delegated to A.R.B. by the Minister of Transport
and
Civil Aviation. Under its Articles of Association A.R.B. is to
consist of two members appointed by the Minister and sixteen
other
members. Of these sixteen four must represent operators of
aircraft,
four must represent constructors of aircraft, four must represent
insurers engaged in aircraft insurance business and the remaining
four are co-opted. It is provided that of the two members to be
nominated by the Minister one is to be an independent person
and the
other a person who has had not less than five years' professional
experience as a pilot of civil aircraft. It is further provided that
the co-opted members are to be persons representative of some
interest connected with civil aviation.

3. By section 7 of the Civil Aviation Act, 1949, which reproduces

installation of the same) for the purposes of the issue and renewal of certificates of airworthiness or of validations of such certificates and for the purposes of the variation of particulars and

conditions specified in such certificates of any flight manual or performance schedule issued therewith;

*<x-tab> </x-tab>(c) the making of

recommendations to the Minister as to the issue of certificates of airworthiness and of validations of such certificates and as to the variation of particulars and conditions specified in such certificates or any flight manual or performance schedule issued therewith;

*<x-tab></x-tab>(d) the renewal of certificates of airworthiness and

of validations of such certificates and to such extent as may be determined by the Minister in writing the variation of particulars and conditions specified in such certificates or any flight manual or

performance schedule issued therewith;

*<x-tab> </x-tab>(e) the making of any investigation required

in connection with an application for a special permission for an aircraft to fly without a certificate of airworthiness being in force in respect thereof and the making of recommendations to the Minister

as to the giving of such a special permission;

*<x-tab> </x-tab>(f) the approval

of engines for aircraft;

*<x-tab> </x-tab>(g) the making of

inspections of organisations of persons or firms desiring to

furnish reports or certificates as to compliance by aircraft and engines, components, accessories, instruments, equipment and apparatus of aircraft with airworthiness requirements, the approval of any such firm or persons as qualified to furnish such reports of certificates, and the acceptance of such reports or certificates;

5. The chairman of A.R.B. is the Rt. Hon. Lord Brabazon of Tara.

The

members of the Council are identical with the members of the Board.

The Council are advised by a technical staff of about 125 of whom

about 84 are employed on inspectional duties. The Chief Executive

Officer is Mr. R. E. Hardingham and the Chief Technical Officer of

the Board is Mr. W Tye.

6. To enable A.R.B. to discharge its functions it prepares and from

time to time publishes detailed requirements which inform manufacturers of the minimum conditions with which, prima facie, they

have to conform if they are to obtain a Certificate of Airworthiness.

To assist A.R.B. in the preparation of these requirements they have

appointed an " Airworthiness Requirements Co-ordinating Committee" which includes representatives of the Ministry

of
Supply, R.A.E., manufacturers of aircraft, operators of aircraft
and
A.R.B. itself.

7. Requirements are not, however, treated by A. R. B. as being as
immutable as the laws of the Medes and Persians. On the one
hand,

during the development of a new type, requirements more
exacting than

those prescribed in the published regulations are often imposed
or

adopted by the manufacturer concerned. On the other hand, on
occasions certain deviations from the prescribed conditions are
accepted by A.R.B. provided that they are satisfied that the safety
of the aircraft is not thereby jeopardised.

(c) The Air Safety Board

8. A.S.B. is a purely advisory body and has no statutory authority
behind it. It was appointed in November, 1946, with the
following

terms of reference: " To keep under continuous review the
needs

of safety in British civil aviation and to recommend measures
calculated to promote safety in respect of both (a) the operation
of

British civil aircraft throughout the world, and (b) the efficiency
of the system of ground facilities provided for civil aircraft of all
nations operating over the United Kingdom." Its members
are

appointed by the Minister and at the material date consisted of
Air

Chief Marshal Sir Frederick Bowhill, Lord Brabazon, Sir Leonard

Bairstow Air Commodore Banks and Mr. (now Sir) Arnold Hall.

<div>

(d) The Royal Aircraft Establishment

9. R.A.E. is controlled by the Minister of Supply. The main establishment is at Farnborough but there are branch establishments

in other parts of the country. In this Report I am mainly concerned

with the work done at Farnborough. The Director of R.A.E. is Sir Arnold Hall. The Head of the Structures Department is Dr. P. B. Walker. The only other member of the staff who need be mentioned by

name is Mr. E L. Ripley who was responsible for the work in connection with the reconstruction and investigation of the wreckage

recovered after the accident. I should, however, add that R.A.E. has

its own flight testing facilities which were fully used in the investigations which took place after the accident.

(e) The de Havilland Aircraft Company Limited

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<div>10. de Havillands were the manufacturers

of the Cornet aircraft and the engines were made by a subsidiary company. the de Havilland Engine Company Limited. Mr. R. E. Bishop is

the Chief Designer of de Havillands and his Chief Assistant is Mr. C.

Wilkins. Mr. R. H. T. Harper is the Chief Structural Engineer and Mr.

H. Povey is the Director in charge of Production. de Havillands have

an Inspection Department entirely separate from their Production Department and the independence of the Inspection Department is

secured by the provision that it reports direct to the Managing Director and is not in any way under the control of the Production

Department. de Havillands have been approved under paragraph 1(g) of

the Civil Aviation (Air Registration Board) Order of 1951 as qualified to furnish reports and certificates as to compliance with airworthiness requirements.

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PART II

HISTORY OF THE COMET PROJECT

11. Mr. Bishop stated that at the end of the war de Havillands were

faced with the problem of recommencing the manufacture of civil

aircraft. During the war they had been building only military aircraft. They decided that it would be inadvisable merely to build

another version of the conventional aircraft; they had had some years' experience with jet fighters and concluded that with the help

of their engine company they should be able to produce a useful civil

aircraft which would be a step ahead of the current type. With

this
end in view they commenced design by the end of September,
1946. Some
idea, however, of the amount of work involved is indicated by
the
fact that it was not until the 27th July 1949, that the first
prototype Comet made its first flight. de Havillands were,
however,
fortunate that B.O.A.C. and the Minister of Supply were willing
to
enter into a contract for the purchase of Comet aircraft without
waiting for the prototype to be available. This enabled de
Havillands
at once to do preliminary work in the Production Department.
The
contract was entered into on the 21st January, 1947 and under it
B.O.A.C. started their proving, flights in April, 1951.

12. At some date in 1951 it was arranged that the first two
prototypes should be delivered to the Ministry of Supply but that
the
remaining aircraft to be supplied under the contract should be
delivered to B.O.A.C. and that the approval of the Ministry of
Supply
to them should no longer be required.

13. A.R.B. issued a number of special category certificates of
airworthiness to enable the requisite tests, both in this country
and
overseas, to be carried out, but it was not until early in 1952 that
a full Certificate of Airworthiness was issued. This enabled the
passenger service to be started and it was actually commenced on
the

2nd May, 1952. The personnel for the service had received intensive training. B.O.A.C. had established a school for the training of pilots and crews and made full use of a special school which had been established by de Havillands for the training not only of pilots and crews, but also of station engineers. By the 8th April, 1954, when the Comet fleet of B.O.A.C. was grounded after the disaster near Naples, Comet aircraft had flown almost 25,000 hours, representing, on the basis of 400 miles per hour, a mileage of 10,000,000 miles.

14. Dealing more specifically with the technical aspect of the development of the project between September, 1946, and the 2nd May 1952, de Havillands' outlook and practice underwent virtually no change. In order to provide an economically satisfactory payload and range at the high cruising speed which the turbo-jet engines offered, it was essential that the cruising height should be upwards of 35,000 ft. double that of the then current airliners and that the weight of the structure and equipment should be as low as possible.</div>

<div>

15. Throughout the design they relied upon well established methods, essentially the same as those in general use by aircraft designers. But they were going, outside the range of previous experience and

they decided to make thorough tests of every part of the cabin structure. They had not only to prove to their own satisfaction that their design was basically sound, but also to investigate the effect, on the large variety of materials involved, of the extreme conditions which would be met. They gave special attention to the structural integrity of the pressure cabin. The difference -- This difference is sometimes referred to hereafter as ' P ' -- between the internal and external pressure (8.25 lb./sq. in) was about 50 per cent. greater than that in general use and there was in addition a larger difference between the internal and external temperatures.

16. Their policy of testing in the laboratory was not a novel one, nor indeed were they alone in their belief in it. They recognised, however, that testing alone is not sufficient. Every test is to some extent a compromise, since the conditions to be met in service can seldom be represented completely in the laboratory and in many cases are not accurately known. The result must therefore, be reviewed in the light of calculations based on fundamental knowledge, and on general experience and practice.

17. For the design of the basic structure of the cabin they adopted a multiple of the Working pressure difference, P. in excess of current requirements in any country. The British Civil Airworthiness

Requirements (B.C.A.R.) called for a "proof" pressure of 1.33 P (under which the cabin must show no signs of permanent deformation), together with a "design" pressure of 2 P (at which the material may reach its ultimate strength). These requirements were the same as those of the International Civil Aviation Organisation (I.C.A.O.) and also those of this country for military transport aircraft. de Havillands used a design pressure of 2.5 P and tested the cabin to 2 P. Two test sections of the cabin were built. The front part, 26 ft. in length, extended from the nose nearly to the front spar of the wing, and included typical windows, hatches and door. The centre part, 24 ft. in length, extended from a few feet in front of the front spar to a few feet aft of the rear spar, covering the large cut-out containing the wing structure .

18. Their reasons for adopting these substantially higher figures were two. They believed, and this belief was shared by A.R.B. and other expert opinion, that a cabin which would survive undamaged a test to double its working pressure, 2 P. should not fail in service under the action of fatigues -- There is attached hereto as Appendix IV a note on the subject of fatigue in metals and its bearing on the design of engineering structures which has been prepared for my

assistance by my Assessors. -- due to the pressurisation to working pressure, P, on each flight, and to other fluctuating loads to which it is subjected in operations.

Secondly, they considered that it would ensure a larger margin of safety against the possible failure of windows, doors, and hatches.

These are contingencies which had been shown by experience to be a

serious risk, for even if nothing worse happens, the resulting loss of pressure may be rapid.

19. So much importance did they attach to this latter consideration

that they made many tests of window panes to very high pressures in

addition, they applied pressures of between P and 2P some 30 times to

the test section of the front part of the cabin together with a series of 2,000 pressurisations to rather over P. These tests were not intended as a test of the fatigue resisting properties of the structure, but rather as providing an assurance that the cabin would

be satisfactory as a pressure vessel. But they undoubtedly contributed to de Havillands' confidence in the soundness of the cabin.

20. Simultaneously With the design and testing of the pressure cabin,

all other parts of the structure were receiving treatment based on the same outlook -- design to at least the current requirements, coupled with exhaustive tests. The wing is of special interest,

since

it is here that requirements specifically directed to resistance to fatigue first became important. During the period 1949 to 1951 there

had been growing among all aircraft designers and users a realisation

that the life of the essential structure of an aircraft is not unlimited. The effects of atmospheric turbulence had produced unexpected and relatively early failure of the wings of certain transport aircraft. Gusts are most severe near the ground and in the

tropics. Methods had been devised, and have since been improved and

extended, for determining their frequency and intensity. In the light

of this knowledge, repeated loading tests -- In which the appropriate

load is applied and removed many times, simulating the effects of

gusts, or any other cause of variation of load -- of the wings of transport aircraft became accepted as necessary. Tests of the Comet's

wing were made in close co-operation with R.A.E.

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21. Until about the middle of 1952 the likelihood that the fatigue resistance properties of a pressure cabin demanded further precautions, either in design or by test, than were provided by the current static strength requirements had not been realised. The matter first came to de Havillands' notice through Sir. Harper's association with the problem on Service (R.A.F.) transport aircraft,

as a member of the Joint Airworthiness Committee (J.A.C.) of the

Ministry of Supply. Draft Requirements (Paper 579, Oct., 1952) called

for a static test to 2 P, a proof test to 1.33 P, together with repeated loading tests of 1.25 P applied 10,000 times.

22. At about the same time A.R.B. were reviewing the civil position.

In due course they issued proposals in Paper No. 230 (19th June 1953)

which called for the same static test to 2 P and proof test to 1.33 P

but raised the number of applications of 1.25 P to 15,000. At the same time the paper suggested that certain structural parts such as

riveted joints, door and window frames etc., might have to be designed to 3 P (on the ultimate strength of the material), in order to meet these requirements. It also stated that the figure of 15,000 was intended to cover the number of applications of P during the life

of an aircraft, and that the test pressure of 1.25 P was intended to cover the phenomenon of "scatter" -- see Appendix IV -- in

the fatigue strength of different cabins built to the same design.

23. The result of these developments was that in July, 1953 de Havillands reconsidered the position of the Comet's cabin. Up to that

time no Comet had exceeded 2,500 hours flying say 800 pressurised

flights. In order to satisfy themselves of its safety, and also to discover its probable safe working life, they carried out repeated loading tests of the test section of the fore part of the cabin,

applying the working pressure P about 16,000 times. By September, 1953, this specimen had withstood 18,000 applications of P in addition to some 30 earlier applications of pressures between P and 2P.

24. These tests were ended by a failure of the skin in fatigue at the corner of a window, originating at a small defect in the skin. But the number of pressurisations sustained was so large that, in conjunction with the numerous other tests, it was regarded as establishing the safety of the Comet's cabin with an ample margin.

25. Meanwhile, on the 2nd May, 1953, Comet G-ALYV had crashed in a tropical storm of exceptional severity near Calcutta. An inquiry was directed by the Central Government of India and was held under Rule 75 of the Indian Aircraft Rules 1937. The Court reported on the 26th May, 1953, that the accident was caused by structural failure of the airframe during flight through a thundersquall. In the opinion of the Court the structural failure was due to overstressing which resulted from either :

(i) Severe

gusts encountered in the thundersquall, or
*
(ii) Overcontrolling or loss of control
by the

pilot when flying through the thunderstorm.

Fatigue failure of the cabin was
not then

suspected as a cause and in my opinion the evidence adduced in
the

course of the present Inquiry affords no sufficient reason for
doubting the conclusion of the Indian Court.

PART III

THE ACCIDENT

26. Comet G-ALYP (sometimes hereinafter called Yoke Peter)
left

Ciampino Airport, Rome, at 09:31 hours on the 10th January,
1954, on

a flight to London. After taking off the aircraft was in touch with
Ciampino control tower by radio telephone and from time to time
reported its position. These reports indicated that the flight was
proceeding according to the B.O.A.C. flight plan and the last of
them, which was received at 09:50 hours, said that the aircraft
was

over the Orbetello Beacon. The Captain of another B.O.A.C.
aircraft,

Argonaut G-ALHJ. gave evidence of communications which
passed between

him and Yoke Peter. The last such message received by the
Argonaut

began "George How Jig frown George Yoke Peter did you
get

my" and then broke off. The Captain of the Argonaut gave it as

his opinion that the message was not merely interrupted by another

aircraft but that transmission ceased after the word "my"

and he estimated that the message was received by him at approximately 09:51 hours. Shortly after 10:00 hours the Ciampino

Traffic Control Clerk heard a sound which he suggested might have

been an unmodulated transmission from Yoke Peter.</div>

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27. The evidence of four witnesses from Elba as to things seen and

heard by them on the 10th January suggests that Yoke Peter must have

crashed into the sea at about 10:00 hours and it therefore appears that something happened to the aircraft with catastrophic suddenness

which may have accounted for the interruption of the transmission of

the last message to the Argonaut. It is also clear from the evidence

of the Elba witnesses that part of Yoke Peter fell into the sea in flames.

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<div>28. The chart, which is Figure 1 of this

Report, was prepared from all the information available and produced

by a Navigating Officer from B.O.A.C. The estimated flight track

of
the aircraft and the position in which bodies and wreckage were
found
can be seen on the chart and the witness gave it as his opinion
that
at 09:51 hours the aircraft was probably approaching a height of
27
000 feet.

PART IV

THE AIRCRAFT

29. Yoke Peter was designed and constructed by de Havillands
and was
of the type properly described as DH106 series 1, commonly
known as
the Comet 1. It was designed for high speed long distance,
passenger
and freight transport at high altitude and was propelled by four
de
Havilland Ghost 50 turbo-jet engines mounted within the wings,
each
engine developing a static thrust of 5,000 lb. The crew and
passenger
compartments were pressurised, so that when flying at 40,000 ft.
a
cabin pressure equivalent to atmospheric pressure at an altitude
of
8,000 ft. was maintained. The cabin pressure was regulated to a
maximum pressure difference between cabin and outside
atmosphere of
8.25 lb/sq. in. and a safety valve was set to open at a pressure
difference of 8.5 lb/sq. in. The dual flying control were power

operated by hydraulic servo control units. The fuel for the engines was kerosene carried in a centre section tank made up of four inter-connected bag tanks and in four integral wing tanks. The authorised maximum all-up weight was 107,000 lb. Yoke Peter first flew on the 9th January, 1951, and was granted a Certificate of Registration No. R.3162/1 on the 18th September, 1951, in the name of B.O.A.C. as owner. A Certificate of Airworthiness No. A.3162, valid until the 12th March, 1953, was granted on the 22nd March, 1952. The aircraft was delivered to B.O.A.C. on the 13th March, 1952, and from that date was operated by B.O.A.C. On the 2nd May, 1952, having by then flown a total of 339 flying hours in experimental, test and training flights on behalf of de Havillands and B.O.A.C. it entered scheduled passenger service and was the first jet-propelled passenger aircraft carrying aircraft in the world to do so.

30. On the 11th March, 1953. the Certificate of Airworthiness was renewed for one year and was therefore, valid at the time of the accident. On the 11th November 1953, after the aircraft had flown 3,207 hours and following a repair to the passenger entrance door the fuselage was subjected to a proving test to 11 lb/sq. in. The airframe and engine log books show that the airframe and

engines had
been regularly inspected and maintained in accordance with the
Approved Maintenance Schedules and that the number of flying
hours of
each engine since its last complete overhaul was well within the
approved life.

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<div>31. In accordance with the
Approved
Maintenance Schedules a Check I inspection was completed on
the 6th

January, 1954, at London Airport and a Certificate of
Maintenance,

signed by properly licensed airframe and engine maintenance
engineers

and valid for 75 flying hours, was issued on the 7th January
1954. At

the time of the accident the aircraft had flown only 40 hours
since

the issue of the Certificate of Maintenance and its total flying life
was 3,681 hours. An Aircraft Radio Station Certificate of
Serviceability was issued in respect of Yoke Peter on the 7th
January, 1954, with the remark "no items
unserviceable."

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PART V

THE CREW

32. Captain Alan Gibson, D.F.C., who was in command of Yoke
Peter at

the time of the accident was aged 31 years and 3 months. He held
Airline Transport Pilot's Licence No. 22713, valid until the 24th

February 1954, which entitled him to fly in command of Comet aircraft

and he had a valid Instrument Rating.

<div>

Captain Gibson also held Flight Navigator' s Licence No. 1442 which

was valid until the 19th February, 1954. He entered the employment of

B.O.A.C. under contract in 1946 having previously been employed by

B.O.A.C. on secondment from the Royal Air Force. While in the Royal

Air Force Captain Gibson had a total flying experience of 1,348 hours

of which 1,175 were flown in command. He had flown a total of 4,062

hours by day and 1,165 hours by night with B.O.A.C. and most of these

were flown as first pilot. He had flown Comets for 84 hours by day

and 48 hours by night as second pilot and for 79 hours by day and 80

hours by night as first pilot. During the six months preceding the accident he had flown 79 hours by day and 80 hours by night as first

pilot of Comets and 47 hours by day and 31 hours by night under supervision.

33. While with B.O.A.C. Captain Gibson was concerned in an accident

involving the forced landing of a Hermes aircraft in 1951 and was

complimented by the Operations Manager for his conduct on that

occasion. He was successful in both his flying checks during the period when he was flying Comets and I am satisfied that he was fully equipped to carry out his normal duties as a pilot and as a captain and to deal with emergencies.

34. The second pilot of Yoke Peter was First Officer William John

Bury whose age was 33 years and 10 months. He held Airline Transport

Pilot's Licence No. 27251 valid until the 8th April, 1954, and a valid Instrument Rating. In addition he held Flight Navigator's Licence No. 2583 valid until the 9th October, 1954. He had

flown a

total of 1,917 hours in the Royal Air Force of which 1,735 were as

first pilot, all in piston engined aircraft. With B.O.A.C. he had flown 2,355 hours by day and 643 by night as second pilot and 11

hours by day and 1 hour by night as first pilot and altogether had flown 153 hours by day and 109 by night in Comets, all as second

pilot. I am satisfied that First Officer Bury was fully equipped to carry out his normal duties and to support his captain in emergencies.

35. The Engineer Officer was Mr. Francis Charles Macdonald who was

aged 27 years and 11 months. Since joining B.O.A.C. on the 21st January, 1952, he had 439 hours flying as Engineer Officer in Hermes

aircraft and 281 hours in Comets of which 225 hours were flown during

the six months preceding the accident Mr. Macdonald's Flight Engineer's Licence was No. 428 and had expired on the 11th December, 1953. During its validity this licence included Comet aircraft. Had he applied to renew his licence he would have been required to give Log Book evidence of six hours flying as engineer-in-charge including six flights during the 12 months preceding the date of application and would have been required to pass a medical examination.

36. On joining B.O.A.C. Comet Fleet Mr. Macdonald obtained an endorsement to his licence which made it valid in respect of Comet aircraft and he completed a form giving details of his licence. In completing this form he stated, wrongly, though no doubt in good faith, that his licence was valid until the 24th April, 1954. He himself made no application to renew the licence before its expiry nor was he given any reminder to do so by B.O.A.C. This matter is further referred to in paragraph 147 of this Report.

37. I am satisfied that Mr. Macdonald's flying experience was sufficient to support an application for renewal of his licence but I have no evidence as to his medical fitness. However, I have no reason to suppose that he was in fact unfit at the time of the

accident.

38. The Radio Officer was Mr. Luke Patrick Mc Mahon who was aged 32

years and 2 months. He held a First Class Flight Radio Telegraphy

Operator's Licence No. 1235 which was valid until the 16th October,

1954, and had done 2,946 flying hours with B.O.A.C. in various aircraft before the 3rd October, 1952, and 629 hours in Comets thereafter. During the six months preceding the accident he had flown

207 hours in Comets. I am satisfied that he was a capable officer.

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<div>39. The other members of the crew were

Steward Frank Leonard Saunders and Stewardess Jean Evelyn Clarke,

both of whose services had at all times been entirely satisfactory.</div>

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PART VI

THE PASSENGERS AND CARGO

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<div>40. Yoke Peter carried a total of 29 passengers, all of whom were killed in the accident. The cargo carried did not include any items which could have been relevant to

the cause of the accident. The comparison between the amount of cargo

known to have been carried and that shown in the Load Distribution

and Trim Sheet showed a discrepancy of 27 kilograms in hold 2A.

Moreover, no load was shown on the Load Distribution and Trim Sheet

for hold 3, whereas there was evidence that 15 kilograms of baggage

were placed in that hold. I am satisfied, however by the evidence of

Mr. B. J. Folliard that these errors in the Load Distribution and Trim Sheet would have left the loading and trim of the aircraft well

within the prescribed safe limits.

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<div>PART VII</div>

<div>PRE FLIGHT INCIDENTS

41. The last three flights made by Yoke Peter prior to that which ended in disaster were from Karachi to Bahrein, Bahrein to Beirut and

Beirut to Rome. During refuelling at Karachi a defect developed in

the port wing tanks the Engineer Officer of Yoke Peter adopted a procedure known as "off-load" refuelling which is authorised for use in such an emergency. It involves holding the refuelling switch in the "off-load" position -- The normal

purpose of this position is to enable the tanks to be emptied -- and

releasing it when refuelling is complete. In fact the Engineer Officer did not release the switch in time and about five gallons of

fuel escaped from the airvent on the under surface of the mainplane.

There was no repetition of this incident at Bahrein but at Beirut, after the Engineer Officer had explained to the ground engineer, who was assisting him with the refuelling what had happened at Karachi, a further incident occurred. When the Engineer Officer returned to the port wing after inspecting the starboard tanks he noticed fuel emerging from the port air vent. The refuelling switch was in the neutral position from which fact, and from the fact that fuel was obviously entering the tank, he deduced that somebody, intending to put the switch to the "off-load" position, from which it should automatically have returned to neutral when released must have failed to do so and that the switch, instead of returning to neutral had remained half open. He attempted to close the switch by moving it to the full "off-load" position and releasing it but this had no effect and the flow of fuel was eventually stopped by shutting down the bowser.

42. As a result of this incident the actuator was removed and as no replacement was available it was tested, found satisfactory and refitted. These incidents were reported by the Engineer Officer to Mr. Macdonald when the aircraft was handed over at Rome. The practice of "off-load" refuelling is further referred to in paragraph 111 of this Report.

<div>43. Two other items were also unserviceable during the flights from Karachi to Rome. These were the No. 1 engine hydraulic flow warning light and the automatic temperature control selector. The former device is designed to draw the attention of the pilot to a possible failure of the engine-operated hydraulic pump. On this occasion, when the flow warning light appeared faulty, the operation of the pump was tested by other means and found satisfactory. The automatic temperature control selector is intended to control automatically the temperature of the crew and passenger compartments. When it was found to be faulty the temperature was controlled manually. I am satisfied that neither of these faults, both of which were drawn to the attention of Mr. Macdonald, can have endangered the aircraft in any way.</div>

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PART VIII

WEATHER CONDITIONS AT THE TIME OF THE ACCIDENT

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<div>44. From take-off at Rome at 09:31 hours on the 10th January, 1954, to the time of the accident at approximately 27,000 ft. near Elba Comet G-ALYP experienced

essentially good weather conditions. The climb was made through only thin and broken layers of cloud with no rain and with negligible icing conditions. At the time and position of the accident it is probable that some turbulence in clear air may have existed due to the proximity of a narrow high velocity wind current called a "jet stream". Such turbulence, if encountered, would be less than aircraft frequently experience in turbulent cloud conditions. It can, therefore, be assumed that the state of the weather was not a contributory cause of the accident.

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PART IX

ACTION TAKEN AFTER THE ACCIDENT AND PRIOR

TO THE ACCIDENT TO COMET G-ALYY

(a) Local salvage and medical investigation

45. At 11:50 hours on the 10th January, 1954 the Harbour

Authority at

Portoferraio in the Isle of Elba was informed of the occurrence of the accident, being told that an aircraft had exploded in the air and

crashed in flames into the sea south of Cape Calamita roughly in the

direction of the island of Monte Cristo. With commendable promptness

Lieutenant-Colonel Lombardi, the Officer Commanding the Harbour

Authority of Portoferraio, despatched all available craft to the

scene of the accident with a doctor and nurse on board and he himself put to sea after he had made all the necessary arrangements. In these salvage operations 15 bodies, various mail bags and some aircraft wreckage and personal effects were recovered. The ships had been assisted in their search by the collaboration of aircraft. On the two following days the search was continued. No more bodies were found but various pieces of wreckage and articles were recovered.

46. Under Lieutenant-Colonel Lombardi's directions the bodies were taken to the local cemetery at Porto Azzurro and devoutly placed in the chapel there. At the request of the examining magistrate at Portoferraio an examination of the bodies recovered was carried out by Professor Antonio Fornari who was acting under the direction of Dr. Folco Domenici, Director of the Institute of Forensic Medicine in the University of Pisa. Professor Fornari gave evidence before me and he put in a report which had been prepared by him and Dr. Domenici. The substance of their report is to be found in the conclusions at p. 60 of the translation of the report and may be summarised as follows

:

(1) Death was caused by impact against parts of the aircraft.

(2) There was serious lesions resulting from explosive decompression

and deceleration.

(3) The probable point of impact between the bodies and the structure

of the aircraft was the forepart of the fuselage, perhaps in the vicinity of that part of the fuselage which lies above the engines.

(4) There were burns on the bodies of all the victims but they presented post-mortem characteristics from which the inference was

that the burns took place after death.

(b) Action taken by the Ministry of Transport and Civil Aviation

47. News of the accident was received by the Accidents Investigation

Branch of the Ministry of Transport and Civil Aviation at 12:00 hours

on the 10th January, 1954, and both the Senior Inspector of Accidents, Mr. Nelson, and the Senior Investigating Officer, Mr. Morris. left for Italy that evening.

48. On arrival Mr. Nelson got into touch with the Commission which

had been convened by the Italian aviation authorities and went with the Commission to Elba. Some days later it was agreed that the responsibility for the investigation of the accident should be handed over to the Accidents Investigation Branch of the British Ministry of Transport and Civil Aviation but Colonel Miniero and Signor Roveri, who have attended this Inquiry, were appointed accredited representatives to the British investigators and gave them every possible assistance. The Minister of Transport and Civil Aviation was also in touch with the Admiralty and it was arranged that the Commander-in-Chief Mediterranean, Admiral Earl Mountbatten, would cause an intensive search to be made for the wreckage. The Chief Inspector of Accidents, in accordance with normal practice, arranged for the wreckage recovered to be sent to and examined at R.A.E. Mr. Nelson and Mr. Morris remained in Elba, examined the Wreckage recovered and arranged for its transport back from Elba to the mainland and thence to Rome, whence it was flown direct to the United Kingdom, but certain very large pieces had to be sent by sea.

(c) Naval search for wreckage

49. Commander Forsberg was placed in charge of the operations. Special vessels, H.M.S. Barhill and H.M.S. Sea Salvor, were

fitted up
to carry 200 tons of heavy moving gear. An observation chamber,
television gear, all toothed grab and other equipment were
obtained
from England and the necessary modifications to the vessels
were made
in the dockyard at Malta. This was all done in under a fortnight
and
the two vessels and H.M.S. Wakeful, in which the television
equipment
was installed, arrived off Elba on the 25th January,
1954.

<div>

50. The search was prosecuted at depths varying between 70
fathoms
and 100 fathoms. It is noteworthy that this was the first occasion
on
which television equipment had been used for this purpose. The
first
date on which anything was located on the bottom by television
was
the 12th February, 1954. I need not recount in detail the history
of
the search. Suffice is to say that by the 23rd March, 1954, only
the
floating wreckage, the pressure dome, and parts of the rear
fuselage
and the engines and wing centre section had been recovered and
that
thereafter the search continued until by the end of August, 1954,
about 70 per cent. of the empty weight of the aircraft, made up of
about 70 per cent. of the structure, 80 per cent. of the power plant
and 50 per cent of the equipment, had been recovered. I have

included
as Appendix V a table, which was put in evidence, showing the
dates
of recovery of the main portions of the wreckage and the dates
on
which they reached Farnborough. Diagrams (Figures 2 and 3)
give a
striking impression of the amount of material which was
ultimately
recovered, though they relate only to the external structure.
Figure
4 is a photograph showing the reconstruction of the fuselage and
tail
unit from the wreckage and Figure 5 is a photograph showing the
reconstruction of the front fuselage.

51. The amount of wreckage recovered was greatly in excess of
the
expectations entertained in March, 1954, when the decision to
allow
the Comets to fly again was taken. A remarkable fact was the
small
amount of damage which had been caused to the structure either
by
immersion in sea water or in the process of salvage.

(d) The Abell Committee

52. Immediately on receiving news of the accident B.O.A.C. had
decided to suspend their normal Comet passenger services, for
the
purpose of carrying out a detailed examination of the aircraft of
the Comet operational fleet in collaboration with A.R.B. and de

Havillands and to this end the Chairman of B.O.A.C. had called a meeting at London Airport for the 11th January, 1954, which was attended by representatives of B.O.A.C., the Accidents Branch of the Ministry of Transport and Civil Aviation, de Havillands, the de Havilland Engine Company Limited and A.R.B. As a result of that meetings a committee under the chairmanship of Mr C. Abell, the Deputy Operations Director (Engineering) of B.O.A.C., and composed of representatives of A.R.B., B.O.A.C. and de Havillands, was appointed to consider what modifications were necessary before B.O.A.C. could properly seek the agreement of the Minister of Transport and Civil Aviation to the resumption of passenger services by Comet aircraft.

The Committee proceeded to consider what possible features or combination of features might have caused the accident.

According to the evidence of Mr. Abell. they came to the view that possible main causes of the accident were as follows :

(a) Flutter of control surfaces. This is a term used to describe a type of vibration of a surface, which may be dangerous and may arise from one or more of several causes such as the failure of some part of the mechanism connecting the control surface to the hydraulic

power unit which operates it in flight, or to the development of
play
or backlash in the mechanism. It was decided to make a special
inspection of the whole of the mechanism and of the control
surfaces
and mass-balance arms.

(b) Primary structural failure. They considered, in particular, the
possible effects of gusts, in causing abnormally high loads, and
surveyed all parts of the structure of which there was any
suspicion
in the light of previous experience.

(c) Flying controls. For each hydraulic power unit operating a
control surface there is an output circuit connected to the control
surface, and an input circuit connected to the pilot's control in the
cabin. Many possible sources of malfunctioning both of the
hydraulic
power units themselves and of these mechanical circuits were
examined
and special investigations initiated.

(d) Fatigue of the structure. They had in mind more particularly
fatigue of the wing, because about the time of the Elba accident
cracks had appeared near the edge of the wheel-wells, on the
under-surface of the wing of the first prototype which was under
test
at R.A.E., after the equivalent of about 6,700 flying hours. They
re-examined also one or two other parts of the structure at which
they felt fatigue effects might be appearing.</div>

<div>

(e) Explosive decompression of the pressure cabin. They had no
reason

to suspect the primary structure of the cabin itself. They reviewed the records of damage by, for example, the steps used to load the aircraft, and the methods of repairing such damage by schemes approved by de Havillands. Their main concern, however, was the window panels, where they thought it necessary to consider possible defects which might cause weakness not revealed in the tests made during design at de Havillands.

(f) Engine installation. Their main preoccupation here was with the possibility of fire and investigations were made at a number of points in order to remove every cause of possible fire risk which they could imagine.

53. As a result of the inspections and tests which followed the meetings of the Committee, a large number of modifications were made both to the power plants and to other parts mentioned above. At the conclusion of their work the Committee still regarded fire as the most likely cause of the accident. But one modification deserves special mention since it shows the care which was taken to avoid the possibly serious consequences of failure of a turbine blade. although there existed no evidence of such a failure in all previous experience. The only recommendation specifically directed to fatigue related to the wing as mentioned above. One modification and

two

special inspections were called for. Mr. Abell said that the possibility of fatigue in the wing structure due to gusts was believed to be much more likely than fatigue in the pressure cabin

since this is subject to much less frequent chances of load. At this stage neither Mr. Bishop nor Mr. Harper of de Havillands suspected

that the failure of the cabin structure by fatigue or otherwise was a

primary cause of the accident. They still regarded the 18,000 repeated loadings as removing any doubt about the fatigue life of the

cabin.

(e) Resumption of Comet services

54. On the 17th February, 1954, Mr Abell forwarded to the Operations

Director of B.O.A.C. a report and papers showing in detail all the inspections, investigations, modifications and other work which had

been carried out since the Comet aircraft had been temporarily removed from service by B.O.A.C. on 11th January, 1954. On the 19th

February the Chairman of B.O.A.C. forwarded the above-mentioned

report and papers to the Minister of Transport and Civil Aviation stating in the course of his letter that, on the assumption that no further indication of the cause of the accident emerged prior to the

completion of the inspection and modification work, B.O.A.C. considered that all such steps as were possible before putting the

aircraft back into passenger service should have been taken.

55. The position was also considered by A.R.B. On the 4th April
Lord

Brabazon wrote to the Minister saying :

"Although no definite reason for the accident has been
established, modifications are being embodied to cover every
possibility that imagination has suggested as a likely cause of the
disaster. When these modifications are completed and have been
satisfactorily flight tested, the Board sees no reason why
passenger

services should not be resumed.'"

56. In the meantime the Minister of Transport and Civil Aviation,
who

had not revoked the Certificate of Airworthiness of the Comet
fleet

had asked A.S.B. for advice on the resumption of the Comet
passenger

services. On the 5th March Air Chief Marshal Sir Frederick
Bowhill,

the Chairman of A.S.B., minuted the Minister as follows :

" 2. The Board has considered all the available information
resulting from recent investigations and has noted the nature and
extent of the modifications planned as a result. It realises that no
cause has yet been found that would satisfactorily account for the
Elba disaster, and whilst the Calcutta disaster is completely
accounted for if the aircraft is supposed to have encountered a
gust

of very great severity (which would have broken any other

aircraft)

we cannot eliminate that the accident might have been due to some

other cause which was possibly common to both disasters.

Nevertheless, the Board realises that everything humanly possible has

been done to ensure that the desired standard of safety shall be maintained. This being so, the Board sees no justification for imposing special restrictions on Comet aircraft.

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3. The Board therefore recommends that Comet aircraft should return

to normal operational use after all the current modifications have been incorporated and the aircraft have been flight tested."

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<div>57. Acting on this advice the Minister

gave permission for flights to be resumed and the first Comet aircraft to resume passenger service took the air on the 23rd March,

1954.

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PART X

THE ACCIDENT TO G-ALYY

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<div>58. On the 8th April, 1954, Comet aircraft

G-ALYY, which was on charter to South African Airways, crashed near

Naples while on a flight from Rome to Cairo. I am making a separate

Report on that accident. It is sufficient for the purpose of this

Report to record that the accident occurred at approximately the same height and after approximately the same lapse of time after departure from Rome as in the case of Yoke Peter. On receiving news of the accident B.O.A.C. decided immediately to suspend all Comet services until more was known and on the 12th April, 1954, the Parliamentary Secretary to the Ministry of Transport and Civil Aviation informed the House of Commons that the Minister, after consulting A.R.B. and A.S.B. and discussing the matter with the Chairman of A.R.B., had withdrawn the United Kingdom Certificate of Airworthiness from all Comet aircraft.

PART XI

INVESTIGATION OF THE ACCIDENT TO

G-ALYP AND G-ALYY

(a) Investigation by R.A.E.

59. The loss of Yoke Peter and Yoke Yoke presented a problem of unprecedented difficulty, the solution of which was clearly of the greatest importance to the future, not only of the Comet, but also of Civil Air Transport in this country and, indeed, throughout the world. Accordingly, shortly after the Naples accident, the Minister

of Supply instructed Sir Arnold Hall the Director of R.A.E. to undertake at R.A.E. a complete investigation of the whole problem

presented by the accidents and to use all the resources at the disposal of the Establishment. This provided an opportunity of showing what can be done by a close collaboration between a private

firm and R.A.E. with the unique facilities at its disposal. It will be seen hereafter that full use was made of that opportunity by R.A.E. and de Havillands.

60. R.A.E. made a complete review of the conclusions which had been

reached by the Abell Committee, and particularly of the implications

arising from the fact that there had been two accidents in what appeared to be similar conditions, each occurring at about the time

when the aircraft was nearing the top of its climb. They thought it

necessary to satisfy themselves about the structural integrity of the

aircraft, in particular of the cabin and the tail and to consider in more detail possible sources of explosion and loss of control.

They

also considered that flight tests would be required in order to investigate the possibility of flutter of control surfaces (see para. 52 (a)). It soon became evident that it was probable that more wreckage would be recovered than had at first been expected.

The wing

centre section was received on the 5th April (the engines had been

recovered and sent by air to de Havillands on the 21st March),

and
the front part of the cabin arrived on the 15th April. But at the
time when their attention became directed to fatigue of the
pressure
cabin they were influenced chiefly by the apparent similarity of
the
circumstances of the two accidents, and by the fact that the
modifications carried out after Elba seemed to rule out many of
the
other possible causes.

61. On the 18th April Sir Arnold Hall decided that a repeated
loading
test of the whole cabin ought to be made. He said that he
regarded
this as one of a number of lines of inquiry which had to be
pursued
and that he felt it to be necessary to study every possible cause in
detail.

62. The normal method of testing pressure cabins up to the point
when
they fail under pressure is similar to that used for vessels such as
boilers. They are filled with water, and more water is pumped in
until the desired difference between the internal and external
pressure is reached. This method has two advantages over the use
of
air. Water is relatively incompressible, so that failure when it
occurs produces only a mild form of explosion. The origin of the
failure can be determined and the structure can generally be
repaired
and tested again. If air were used instead of water, the failure
would be catastrophic (equivalent in the case of the Comet's

cabin to
the explosion of a 500 lb bomb). Such a test would be dangerous,
the
cabin would be destroyed, and the evidence of the origin of the
failure should almost certainly be lost. It is however necessary to
prevent unrepresentative loading of the cabin structure by the
weight
of the water. This is ensured in practice by immersing the whole
cabin in a tank, and filling the tank and the cabin simultaneously
with water. Pressure in the cabin is then raised by pumping in
water
from the space outside it. Cycles of loading, to the same or
different levels of pressure as desired are applied by a suitable
routine of pumping.

<div>

63. By a remarkable effort, to which de Havillands and the firms
who
built the tank (see Figure 6) contributed to the full and by the use
of all the resources of R.A.E., repeated loading tests began early
in
June on aircraft G-ALYU (Yoke Uncle). The object of the tests
was to
simulate the conditions of a series of pressurised flights. To this
end the cabin and wings were repeatedly subjected to a cycle of
loading as far as possible equivalent to that to which they would
be
subjected in the period between take-off and landings. In
addition to
one application of cabin pressure, fluctuating loads were applied
to
the wings in bending to reproduce the effect of such gusts as
might
be expected in normal conditions, although the contribution of

gust loads to the stresses in the cabin structure, compared with that made by the internal pressure, was in general small. Moreover, the programme of tests included, at intervals of approximately 1,000 "flights" a proving test in which the pressure was raised to 1.3 P (11 lb./sq. in.). It must be understood that there are other sources of fluctuation, load and, therefore, of fatigue to which no precise value can be attached. No attempt was made to represent these in the test. Examples are vibration due to irregular airflow, vibration due to the engines and the jet efflux and fluctuating loads occurring during take-off and landing.

64. Yoke Uncle had made 1,230 pressurised flights before the test and after the equivalent of a further 1,830 such flights, making a total of 3,060, the cabin structure failed, the starting point of the failure being the corner of one of the cabin windows (see Figures 7 and 8). The fact that the failure occurred during one of the proving tests to 11 lb/sq. in. is not thought significant since the crack would have spread in very much the same way after a few more applications of the working pressure. Examination of the failure provided evidence of fatigue at the point where the crack would be most likely to start, namely near the edge of the skin at the corner of the window (see Figures 9 and 10). This was revealed by the discoloration due to algae in the water which made it clear that the

crack had endured several pressurisations before it spread catastrophically. It is important to note here that the sources of fatigue mentioned above, which were not reproduced in the tank test,

all tend to increase the burden of fatigue and that, therefore, the life of a fuselage deduced from the test is longer than would be expected in service. It is not possible to do more than estimate the

magnitude of this effect but it was suggested by Dr. Walker that a "life" of 3,060 flights in the test might be equivalent to

about 2,500 in practice.

65. It is convenient to note here that Comet G-ANAV, which had been

sent to R.A.E. to undergo flight tests (unpressurised) on a number of

matters which could only be explored in flight, made its first flight

on the 23rd June. A large amount of miscellaneous wreckage was arriving at R.A.E. during the whole of this period and was being stored out and examined by the Accidents Investigation Section under

Mr. Ripley.

66. The failure of the cabin of Yoke Uncle marks the point at which

the character of the investigation changed to one in which the problem of fatigue in the structure of the cabin began to dominate

all others, although many possible sources of trouble were continually investigated during the whole of the summer. In the main

their results were negative so far as the accidents were concerned though they revealed points which needed and will receive attention.

The inference suggested by the tank test, that the primary failure of Yoke Peter was the bursting of the pressure cabin, was confirmed by a close examination of the wreckage and by the experiments referred to in the next following paragraphs of this Report.

67. The character of the damage caused to the structure was such that

it became possible to determine with a high degree of probability the

manner in which the various fragments struck the sea, mainly because

of the very high local pressures produced by the impact with the sea.

Moreover, it rapidly became clear that the intense fire which had existed was confined virtually to the centre part of the wing, leaving the outer parts of the wing and the front and rear parts of the cabin untouched. These considerations led to the conclusion that

it was probable that the main part of the aircraft fell into the sea in a small number of relatively large pieces, one of which was on fire (see Figure 11). Most of these pieces had fallen in a surprisingly small area. This conclusion was in agreement with the

evidence of the farmer at Elbas who saw fragments, one of which was

on fire, falling into the sea. This led to a line of experiment which produced remarkable results. Models were made of the Comet in

light
wood, suitably ballasted, and projected in the air at the
appropriate
speed. They were released from a kite balloon at a height above
the
ground corresponding to that at which it was believed the Comet
structure failed, reduced in proportion to the scale of the model.
The model was so constructed that it would break at the point
where
the failure of the cabin was suspected, namely in the
neighbourhood
of the wing. The outer parts of the wing (only one of which had
been
recovered), were also separated from the centre part. The descent
of
the fragments was photographed, and it was found that they fell
in a
manner which agreed faith the deductions which had been made
from the
evidence mentioned above.

<div>

68. Simultaneously with this work, further experiments in the
water
tank were made on the cabin of Yoke Uncle, after the first failure
had been repaired by de Havillands. Until then, owing to the
need to
discover whether the cabin had, against all previous belief, a
relatively short life under repeated loading, no attempt had been
made to measure the stress in the material of the skin at points
where it might be expected to be higher than the average. One
reason
for this omission was that the number of places coming within
this

description is large, and it would have taken a long time to install the necessary strain gauges and other associated equipment. But it now seemed highly probable that the stress near the corners of the windows was higher than had been believed by the designers, and the strain gauges were therefore fixed to the surface of the skin, at various positions near the corners of typical windows, including the windows corresponding to the one which had failed but on the other side of the cabin.

69. A discussion of the evidence bearing on the reliability of the estimates of the stress at the edge of the window will be found in paragraphs 118 to 129. It is sufficient here to say that I am satisfied that the highest stress in the skin, at the edge near the corner of the window of Yoke Uncle, was probably over 40,000 lb./sq.

in. when the pressure difference was 8.25 lb. / sq. in. and that the general level of the stress in the skin in these regions was significantly higher than had been previously believed. In the light

of known properties of the aluminium alloy D.T.D. 546 or 746 of which

the skin was made and in accordance with the advice I received from

my Assessors, I accept the conclusion of R.A.E. that this is a sufficient explanation of the failure of the cabin skin of Yoke Uncle

by fatigue after a small number, namely, 3.060 cycles of pressurisation.

70. In considering the possible bearing of this result on the accidents at Elba and Naples, it is necessary to recognise that there are inevitable differences between individual aircraft structures built to the same drawings. The nature and extent of these depend on a number of factors such as variations in the thickness of metal sheet of nominally the same gauge, and local regions of high stress due to the methods employed in joining the various parts, such as rivets, bolts, etc. If a number of such structures are tested under repeated loading, there will be appreciable differences between the number of cycles of application of given loading before failure occurs. Experience suggests that there will be a variation of at least 9 to 1 in the number of cycles necessary to produce failure when the general level of stress is high, and the number of cycles undergone before failure therefore low. If a large number of specimens could be tested, it would undoubtedly be found that the weak and the strong were relatively few in number, and that the majority would be more or less evenly distributed round a mean value.

But it is impossible from a single test to say where, in the total range to be expected from general experience, a particular specimen lies.

71. At the time of the Elba accident Yoke Peter had made 1,290 pressurised flights and at the time of the Naples accident Yoke Yoke had made 900 pressurised flights. Sir Arnold Hall said in

evidence

that in the light of the experiment on Yoke Uncle, and of the measurements and calculation of stress referred to above he considered that the cabin of Yoke Peter had reached a point in its life when it could be said to be in danger of failure from fatigue, and that the Cabin of Yoke Yoke would similarly be in danger.

Dr.

Walker said that he did not regard the picture presented by the three

failures (on the assumption that these were all due to the same fundamental cause) as surprising, since the three results taken together are consistent with general experience of the strength under

repeated loading of a number of nominally identical structures, in which the stress level is high. They lie within a range of just over 3 to 1, whereas experience suggests a total range of at least 9 to 1.

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72. At this stage in R.A.E. 's attack on the problem, it seemed unlikely that any more wreckage would be recovered which would throw

light on the problem which was now obviously the chief one. But after

a further review of the whole of the circumstances of the flight of the aircraft and the distribution of the wreckage on the sea bed, R.A.E. reached the conclusion that search in a wider area was justified. Whatever the cause of the bursting, it seemed probable that the disruption of the aircraft would have resulted in some relatively large pieces of the structure being blown clear. These might well have fallen some distance away from the main pieces of

wreckage, all of which, as mentioned above, were found within a remarkably small area. It was therefore decided to make a search

of

an area some miles long in the sea below the path of the aircraft working towards Rome from the area where the main items were recovered. As the depth of the sea increased rapidly in this direction, the only practicable method was trawling.

73. As a result of the new search R.A.E. received a piece of cabin skin, which had been found by an Italian fishing boat. It was identified as coming from the centre of the top of the cabin approximately over the front spar of the wing (see Figure 12). It contained the two windows in which lie the aerials which are part of

the A.D.F. (Automatic Direction Finding) equipment. At the same time

R.A.E. received a part of the aileron of the port wing (see Figures 13 and 16) and a part of the "boundary layer fence" fitted

to the leading edge of the port wing not far from the tip (see Figures 14 and 16).

74. The latter parts provided important evidence about the bursting

of the cabin. There were marks on them which were identified as made

by pieces from the cabin itself. Taken together with the paint mark

on the leading edge of the centre section not far from where the outer wing broke off, which was identified as caused by the piece of

the cabin wall containing the first window (escape hatch) (see Figures 15, 16 and 12), they established that the cabin burst catastrophically in the neighbourhood of the front spar of the wing

when the aircraft was flying substantially normally.

75. By examination of the piece containing the A.D.F. windows and the adjacent pieces (see Figure 12) it was established that it was here that the first fracture of the cabin structure of Yoke Peter occurred. In general terms, it took the form of a split along the top centre of the cabin along a line approximately fore and aft passing through corners of the windows as shown in Figure 17. The direction in which the fracture spread was determined by examination of the lines of separation of the material.

76. A development drawing of the wreckage recovered from the part of the cabin over the wing spar is shown in Figure 18. Apart from the area on top of the cabin around the A.D.F. windows, which is shown cross-hatched, the remainder was recovered with, and in many cases remained attached to, either the front fuselage, the wing centre section, or the rear fuselage. These three groups are distinguished by different hatchings, as indicated in the diagram. In the light of all this evidence, I accept R.A.E. 's conclusion that the first fracture of the cabin occurred near the rear A.D.F. window and spread fore and aft from it.

77. I do not consider it possible to establish with certainty the

point at which the disruption of the skin first began. But I consider that it is probable that it started near the starboard aft corner of the rear A.D.F. window, at a point where examination by experts showed that fatigue had existed, at the edge of the countersunk hole through which a bolt passed (see Figure 19)

78. The only alternative point suggested was the opposite (port forward) corner of the same window. Here the fracture passed through a small crack in the reinforcing plate, about 0.2 in. long, made accidentally during the build, of the aircraft. This had been dealt with by de Havillands in accordance with their procedure for dealing with any departure from the strict requirements of their drawings which might appear during the manufacture of their aircraft. All such matters were required to be reported to the Technical Office, and each was dealt with as a special case by a qualified expert. In this case approval was given to the use of the normal process of "locating" small cracks in the skin of an aircraft by drilling small holes at their ends. Advised by my Assessors I see no reason to doubt that this would have been a satisfactory method of dealing with the crack in question had it not been for the fact that the stress in this region was relatively high. It was suggested that such a crack might be a possible place of origin of fatigue but no witness was able to identify any evidence of fatigue at the material

point.</div>

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79. It is my opinion that the fundamental cause of the failure of the cabin structure was that there existed around the corners of the windows and other cut-outs a level of stress higher than is consistent with a long life of the cabin, bearing in mind the unavoidable existence of points, within the areas of generally high stress, at which it will be still further raised by relatively local influences, such as the countersunk hole near the starboard rear corner, and the small crack with its "locating" hole near the port forward corner. I find it impossible to say definitely, on any evidence before me, which of these operated first. But, since the existence of fatigue near the bolt hole is established, I think it the more probable.

(b) Investigation by the de Havilland Engine Company Limited

80. The R.A.E. investigation did not deal with the engines. The history of their recovery and investigation is as follows.

81. The centre section of the wing of Yoke Peter was recovered from the sea on the 15th March. It was severely damaged by fire and by impact with the water. It contained the four Ghost engines substantially intact with the exception that the turbine disc of No. 2 engine (port inner) was missing. The shaft on which it had been mounted had broken near the hub to which it was bolted and it had escaped through a large gash in the exhaust cone. The disc has

not
been recovered.

82. The engines were removed and examined superficially by an engineer from de Havillands Engine Company Limited. They were then

sent by air to that company's works where they arrived on the 21st

March and were dismantled and examined in detail.

83. Dr. Moulton, Chief Engineer of the de Havilland Engine Company

Limited, said in evidence that there were no signs consistent with seizure of any engine, or of any excessive internal heat, or of any failure having occurred before the break-up of the aircraft. The extensive fire damage was all external to the engines. The four compressor impellers were intact on their shafts.

84. The turbine discs from Nos. 1, 3 and 4 engines showed no signs of

failure. No blades were missing from them. In No. 2 engine, there was

no evidence of penetration of the shroud ring surrounding the turbine, either by a blade or by the complete disc. There was no evidence of failure of any blade in any of the engines.

85. Examination of the hubs to which the turbine discs of Nos. 1, 3

and 4 engines were bolted showed that all were on the point of failing. Cracks were found in the same regions as those which had

resulted in the fracture of No. 2 engine, which led to the loss of the disc.

86. The remarkable similarity of the damage to the turbine shafts of all four engines pointed to a common cause external to the engines, and further examination showed that the most probable cause was a sudden and very rapid rotation of the whole wing about a transverse axis, nose downwards, while the engines were still running normally.

Such a rotation, being about an axis at right angles to the engine shafts, would produce gyroscopic couples tending to bend the shafts in a sideways direction, that is, in the plane of the wing. Since the clearances between the discs and the stationary parts surrounding them are small, signs of rubbing would be expected in definite regions. Examination showed such signs in each engine.

87. From this evidence the conclusion was reached that the engines had run, though only for a short time, possibly a few hundred revolutions after a sudden nose-down rotation of the wing and had not stopped suddenly. Further examination showed other evidence consistent with this, namely the absence of any deformation in the splines on the turbine shafts. This also suggested that by the time the whole of the centre section, including the engines, hit the surface of the sea, the engines were no longer rotating.

88. The whole of the remaining extensive damage to the engines

was considered to be due to impact with the surface of the sea. It was in the main confined to the upper parts of the engines, and was therefore consistent with the deductions from the examination of the centre section of the wing itself, which showed everywhere evidence of the wing having hit the sea upside down.

<div>

89. In order to investigate the conditions which were now thought to have caused the failure of the turbine hubs, tests were made on a Ghost engine supported in a framework which was pivoted about a horizontal axis some distance above the engine, so that it could swing in a vertical plane, like a pendulum. The engine was run at normal speed, and was pulled sideways, thus raising it from its lowest position. When released, it accelerated under the combined influence of its weight and the thrust from the jet. The rate of rotation round the transverse axis could be varied by releasing it from different heights. It was found that when this reached a value of nearly 180° a second (corresponding to the centre section of the wing turning upside down in about one second) the turbine disc hub broke and the engine slowed down and stopped without any further substantial damage. Examination showed the same type of failure and symptoms, as were found on the four engines of Yoke Peter.

90. The examination of the engines, combined with the striking evidence of this experiment, confirmed de Havillands in the view that

no part of the engines was in any way the cause of the failure of the

aircraft. Dr Moulton said that in their previous experience of Ghost engines of the same type as those used in the Comet, they had had no

records of any blade failures. The modifications made to the aircraft

as a result of the Abell Committee's discussions, consisting of fitting high tensile steel plate round certain parts of the engines in the plane of the turbine discs, was regarded by him as possibly a

wise precaution, in view of the need to guard against every source of

trouble which could be imagined. At the time it was put into effect,

with the other modifications decided by the Abell Committee, the engines from Yoke Peter had not been examined.

91. In the light of all this evidence and these considerations, I accept Dr. Moulton's conclusion that there was no failure of any

part of any engine which could have been the cause of the failure of Yoke

Peter. The fire which damaged the engines externally was in my opinion subsequent to and not a cause of the disintegration of the aircraft.

(b) The alternative suggestion made by Mr. B. Jablonsky

96. The only rival Suggestion was made by Mr. Jablonsky. His experience of structural problems in aeronautics has been concerned

mainly with propellers having blades of highly compressed wood. He

is, therefore, familiar with adhesives, and with the problems which

have to be overcome in using them to make components.

97. In the construction of the Comet wide use is made of a metal-to-metal adhesive known as Redux, mainly for the purpose of

attaching members, generally known as "stringers", to the

skin both of the wing and of the cabin. In the cabin there are about

forty stringers more or less evenly spaced around the circumference

and running longitudinally. They are not structurally continuous from

end to end, the largest uninterrupted length being about 25 ft. de Havillands were pioneers in using Redux for such purposes in aircraft

structures, and have had long experience of it. It is in effect an alternative to the conventional riveting.

98. Mr. Jablonsky's argument proceeded on the following lines:

*<x-tab> </x-tab>(a) The skin of the cabin is exposed

the
skin and the stringers, contemplated by Mr. Jablonsky.

102. Finally, examination of the wreckage led Mr. Ripley to
conclusions contrary to those inferred by Mr. Jablonsky, for
reasons
which he explained in detail.

103. It has been established to my satisfaction that the rear part
of
the fuselage substantially intact, hit the surface of the sea at high
speed, open end downwards. This caused the equivalent of an
explosion
in it, whose effects were naturally most acute near the open end
(see
Figures 3 and 4). I am advised that the failure, under these
circumstances, of the adhesion between the skin and the stringers
cannot be regarded as evidence of the failure of the adhesive to
meet
the requirements of the normal use of the aircraft. There was in
this
neighbourhood abundant evidence of the failure of all the
methods of
attaching the various structural components to one another.
Moreover,
the numerous places where the skin had parted from the stringers
exposed the glue line to examination and Mr. Ripley said that he
had
been unable to find any sign of any unsatisfactory features in the
process employed by de Havillands, or of any weakness in the
adhesive.</div>

<div>

104. In the light of these considerations I have no hesitation in

rejecting Mr. Jablonsky's suggested alternative cause of the failure of the cabin.

(c) Mr. Tye's evidence

105. The only other witness who did not completely accept the suggestion advanced in the Report was Mr. Tye. He did not dispute

that the primary cause of the accident was the bursting of the cabin

structure, but he expressed himself as not entirely satisfied that fatigue was the cause of that disruption. He appears to have proceeded on the basis that the 9,000 hours (3,000 flights) at which

Yoke Uncle burst could be regarded as a fair average life for the fuselage and to have been impressed by the improbability, on this basis, of both Yoke Peter and Yoke Yoke failing from fatigue after

only about 3,000 hours (1,000 flights). He was unable, however to

suggest any other cause. He admitted that he could find no evidence

either (a) of excessive internal pressure in the cabin or (b) of excessive stresses in the cabin structure due to external action such

as gusts or failure of the control system. He agreed also that he could not name any alternative cause of the failure which R.A.E. had

failed to consider.

106. Bearing in mind that Mr. Tye is the Chief Technical Officer of

A.R.B. and as such will be responsible for advising A.R.B. when an application is made for a new Certificate of Airworthiness for Comet aircraft, his caution is understandable, but I have the duty of expressing my conclusion on the evidence. I rely in this connection on an answer given by Mr. Tye to Sir Lionel Heald which seems to me to represent the proper approach for me to adopt in the circumstances of the case. Mr. Tye said "I think in concluding on the likelihood of the cause one has to take the thing as a whole: one has to take the tank test evidence and say that that shows that fatigue is possible, although on my argument not necessarily probable, that is the tank test by itself; one then has to look at the other half of the matters namely, all the other possible causes, and if in the process of eliminating possible causes you become completely confident that you have eliminated every other possible cause, then you are driven to say that the possible fatigue rises to the most probable cause." Applying these observations to what was done in the course of the investigations by R.A.E. and by the de Havilland Engine Company Limited and to the evidence given in the Inquiry before this Court, I unhesitatingly come to the conclusion that R.A.E. were right in their conclusion that the accident at Elba was caused by structural failure of the pressure cabin in the region of

the A.D.F. window, brought about by fatigue. In reaching this conclusion I am fortified by the advice I have received from my Assessors.

(d) The possibility of over-pressurisation

107. I considered nevertheless that although the R.A.E. Report contained a full investigation of the equipment used for controlling

the pressure in the cabin, including both an examination of the possible causes of mal-functioning and of the condition of the equipment recovered from the wreckage, de Havillands should be asked

to produce further evidence directed towards establishing that the precautions taken in the Comet installation, to ensure that the pressure could not rise appreciably above the normal working pressure, were reliable. Mr. Wilkins, an Assistant Chief Designer of

de Havillands, who was responsible for this aspect of the designs gave evidence on the matter, and a statement was produced by de Havillands summarising the method of operation of the essential controlling and safety valves. Messrs. Normalair Limited, the firm

responsible for the pressurisation control equipment, also produced

full information about the essential parts. Taken together with the R.A.E. Report, this additional evidence satisfies me that the possibility of the development of excessive internal pressure in the

cabins of an amount sufficient to endanger its structure, was so remote that it can be excluded as a probable cause of the bursting of

the cabin.</div>

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(e) Certain defects referred to in the R.A.E. Report

108. I turn now to the other defects discovered by R.A.E. and already

referred to in paragraph 93 of this Report, I see no reason to differ

from the conclusion reached by R.A.E. that none of these defects was

in any way the cause of the accident.

109. It is clear that the separation of both port and starboard outer wings from the centre section (see Figure 11) was not the primary

cause of the accident, for there is ample evidence from the distribution of paint marks and scratches on both wings that they were made by parts of the cabin structures and form a pattern (see

Figure 16) which is consistent only with the whole wing having been

intact when they were made. For the same reason, the known point of

fatigue weakness in the wing skin near the edge of the wheel-wells is

not suspect. Moreover the fracture of the wings occurred some distance outside this region.

110. As regards escape of fuel from the fuel venting system, examination of the wreckage disclosed that fire did not start until after the disruption of the cabin. It is clear, therefore, that escape of fuel from the tank vents during take-off or climb had nothing to do with the accident.

111. Turning to refuelling, the danger apprehended could only occur by a concatenation of five events. The risk was, therefore, said to be a remote one and in any event in the present case R.A.E. state that examination of the Elba wreckage made it plain that even if the aircraft had sustained damage of the type indicated in Part 6 of the R.A.E. Report (which deals with this subject), such damage was not the cause of the accident to Yoke Peter. There had, however, been a recorded instance of trouble due to this cause and it is to be observed that de Havillands have indicated their intention of devising a method of removing the possibility of damage of this kind (see Appendix VIII).

(f) The possibility of damage by jet efflux

112. During the operation of B.O.A.C. services, there had been some experience of small damage to the cabin skin, due to the buffeting by the efflux from the jet engines. This damage was partly in front of and partly behind the pressure dome of the cabin. As soon as it was observed, a systematic inspection was made of all Comets, and where any signs of cracking were detected a repair was made according to a scheme specially devised by de Havillands. Internal inspection

showed

that the buffeting was also causing slight loosening of the joint between the stringers and the skin in this region, and rivets were therefore inserted in order to ensure that this would not give rise to danger.

113. This point of possible weakness was under continuous observation. The steps taken to deal with it may be considered to be

satisfactory, particularly since, where the repair had been carried out, no further trouble occurred.

</div>

<div>114. It is, however, recognised by de

Havillands that a situation in which it is known that such cracks are

likely to occur is unsatisfactory, and among the improvements they

intend to make on future Comets is one which they believe will reduce

the cause of this damage, namely, a slight change in the direction of

the jet pipes at their exits, with the object of diverting the jets away from the sides of the cabin.</div>

<div>

PART XIV

RESPONSIBILITY

(a) Introductory

115. No suggestion was made that any party wilfully disregarded any

point which ought to have been considered or wilfully took

unnecessary risks. But in the course of the evidence, questions were put which make it necessary for me to consider a number of points in the light of the conclusion I have already expressed as to the cause of the accident.

(b) Criticism of de Havillands' design work

116. Dealing first with the period prior to the commencement of the scheduled passenger service on the 2nd May, 1952, the calculations

made by de Havillands were criticised and it was suggested that the

tests they carried out were inadequate to guard against the risk of fatigue in the cabin structure. In support of this contention particular reference was made to certain calculations included in paragraph 4 of Part 3 of the R.A.E. Report and to other calculations

produced by Sir Arnold Hall in the course of his evidence. It is, however, to be observed that the primary object of de Havillands was

to lay the foundation for extensive tests which they regarded as the

soundest basis for the development of a project rather than to arrive

at a precise assessment of the stress distribution at the corners of the cabin windows.</div>

<div>

117. I do not think that they can justly be criticised for this approach to the problem. In arriving, at this conclusion I have

been
assisted by a Memorandum which has been prepared for me by
my
Assessors and which confirms the impression I formed from the
evidence of the witnesses that de Havillands were proceeding in
accordance with what was then regarded as good engineering
practice.

I am also satisfied that in the then state of knowledge de
Havillands
cannot be blamed for not making greater use of strain gauges
than
they actually did or for believing, that the static test that they
proposed to apply would, if successful, give the necessary
assurance
against the risk of fatigue during the working life of the aircraft.
The Memorandum to which I have referred is included as
paragraphs 118
to 129 of this Report.

(c) Memorandum by Assessors

118. During the design of the Comet de Havillands did not make
use of
calculations in an attempt to arrive at a close estimate of the
stress distribution near the corners of the cabin windows. We
have
examined such of their calculations as had a bearing on this
question; these led to the stress of 28,000 lb./sq. in. mentioned by
Mr. Harper. It is clear that this stress refers to an area of the
skin in the neighbourhood of the corners, and may fairly be said
to
be an average value over a width of 2 or 3 inches. de Havillands
believed that their method was satisfactory for the purpose they

had
in mind, namely, the design of a test specimen. They did not
consider
that a closer estimate of the highest value of the stress could be
made by any method which they would regard as reliable. They
preferred to rely on tests of specimens designed on the basis of
their calculations.

119. Since their estimate of the general level of stress in the
region investigated was less than half the ultimate strength of the
material (about 65,000 lb/sq. in.) they were confident that they
could demonstrate by static test that there would be no failure at
twice the working pressure, and that there would be a
considerable

reserve in hand. Their tests of panels about 3 ft. square,
including,

a window, substantiated this view.

120. We note, however, that in these tests the panel was
supported on
the face of a stiff steel "pressure box", and not in
conditions truly representative of those which existed near the
window in the pressure cabin itself. It is not possible to say what
the effect of this would be. de Havillands were reassured by the
results of the tests, in which the specimen withstood nearly 20
lb./sq. in. without failure.

121. de Havillands used the same approach to the design of the
whole
pressure cabin. The static tests which they made on the two parts
of
the pressure cabin, respectively 26 and 24 ft. long, gave them
confidence in the integrity of the whole cabin. Since they

believed,
with general support from then current practice and opinion,
including that of A.R.B., that this basis of design and static tests
would give ample assurance against risk of failure under repeated
applications of the working pressure, and other known causes of
fatigue, they felt that the cabin was good for the life of the
aircraft (say 10,000 pressurised flights, or 10 years).

122. Here again, however, we note that the test sections of the
cabin

differed from the cabin as fitted to the aircraft in several
respects. In the first place, each was incomplete, and incapable of
sustaining pressure if it had not been fitted with a stiff bulkhead
at the open end or ends. It is not possible to say whether the
constraint which these bulkheads imposed on the structure would
make

it stronger or weaker than when it formed part of a complete
cabin.

But it must be recognised that the stresses in the structure near
the

bulkheads would be appreciably affected by the constraint, and
the

reliability of deductions about the strength of the cabin would
thereby be reduced. Secondly neither section was fitted with the
complete number of windows, etc. Moreover, the windows of
special

interest in this Inquiry, which were in the front test section, were
rather near the bulkhead mentioned, so that the stresses in the
skin

round them might have been appreciably different from those in
similar places in the complete cabin.</div>

<div>

123. The increasing attention which de Havillands gave, during

the
period mid 1952 to end 1953, to the fatigue life of pressure
cabins
has been mentioned in paragraphs 21 to 24. In their repeated
loading
tests the front test section of the cabin survived 16,000
applications of just over the working pressure. They felt
confident
that the Comet's cabin would have a safe life well beyond their
target of 10 years in service.

124. The repeated loading test on Yoke Uncle at R.A.E. led to an
unexpected failure after some 3,000 applications of load. Though
this

was about three times the life of Yoke Peter at Elba or Yoke Yoke
at

Naples it was surprisingly short and led directly to the inference
that there were high local stresses. Steps were, therefore, taken at
R.A.E. to measure the stresses near the corner of the window,
using

strain gauges placed as near as possible to the edge of the skin
where the failure started. These measurements led to an
estimated

stress of 43,000 lb/sq. in. at the edge at the normal pressure
difference of 8.25 lb./sq. in.

125. This estimate of the stress was regarded by de Havillands as
unreliable, partly because the process of deriving it from the
experimental measurements involved some extrapolation, but
also

because it would imply that in their own test to twice the
working

pressure, there was a local stress of double this amount, namely

86,000 lb/sq. in., which is some 30 per cent. above the ultimate strength of the material. This apparent paradox can be explained by recognising that it neglects to take account of the effect of the ductility of the material in relieving "stress concentrations" (see on this subject paras. 148 to 153 below).

126. Calculations were made by Sir Arnold Hall to explore the problem in the light of such theoretical solutions as were known of the problem of stress distributions round a cut-out of the shape of the cabin windows, in a cylindrical shell of metal under pressure. These calculations were not put forward as exact, but, with due allowance for the fact that the window frame, and the cabin stringers and hoop frames, would influence the result they supported the reasonableness of the estimate made from measurements on Yoke Uncle.

127. It is our view that the two results taken together point strongly to the conclusion that the stress in the skin at the edge of the window near the corner was far higher than had been suspected by de Havillands, and was probably over 40,000 lb/sq. in. under the normal pressure difference.

128. In the course of the Inquiry much attention was paid to an estimate, given in Part 3, para. 6 of the R.A.E. Report on the tests on Yoke Uncle, of the stress which might be predicted on the basis of

their measurements by strain gauges, as probably existing in flight.

The figure "70 per cent. of the ultimate strength" was obtained by adding to the 43,000 lb/sq. in. (mentioned above)

due to

the working pressure, another 2,700 lb / sq. in. due to other known

loads, leading to a total of 45,700 lb/sq. in. This was contrasted with de Havillands' own estimate of 28,000 lb/sq. in. It has already

been pointed out that de Havillands' figure relates to an average over a considerable distance near the corner of the window, and due

only to the working pressure, whereas the estimate made by R.A.E.

relates to a particular point where the stress would be expected, on

general grounds, to reach a maximum. A direct comparison between them

is therefore misleading. Having regard to the different approach the

two figures cannot be said to be inconsistent.

129. It is natural that de Havillands and R.A.E. should have approached the problem of the "safe life" of the pressure

cabin of the Comet from different points of view. de Havillands were

the designers and looked at the problem as designers would, having

confidence in their methods based on their experience. R.A.E.

had had

virtually no previous knowledge of the design background of the

Comet, since it is a civil aircraft and their connection with it before the 8th April, 1954, was primarily advisory in character and was wholly concerned with fatigue of the wings. In the early stages of the Inquiry there was, therefore, a sharp disagreement between them on the interpretation of their calculations and tests. These differences of opinion diminished in the course of the Inquiry as greater mutual understanding developed. While there are still minor points on which they do not quite see eye to eye, a situation which is by no means unusual in technical problems of such difficulty, there is now no longer any substantial disagreement between them. Our own interpretation of the situation, so far as it can be determined by existing evidence, is set out above, and we believe that it would

be accepted by de Havillands and R.A.E.

<div>

(d) Criticism of de Havillands repeated loading tests in 1953

130. Another criticism of de Havillands was connected with the repeated loading tests carried out by them in 1953. When the R.A.E.

test revealed the short life of the cabin structure of Yoke Uncle the

question arose as to how to reconcile the result of that test with the result of these earlier repeated loading tests. Sir Arnold Hall suggested that the explanation might well be that the 1953 tests were

carried out on a nose section which had previously been subjected to

static tests up to a differential pressure of 16.5 lb/sq. in. and that the effect of such a test might be to prolong the life of the specimen subjected to it. Mr. Harper said that he was aware of this

possibility but he considered that if there was any increase in life of the nose section attributable to pre-loading the tests so amply covered the life of the aircraft both at the time of the tests and for the immediate future that de Havillands could safely accept the

test as satisfactory. In the then state of knowledge I think this conclusion was reasonable.

(e) de Havillands' method of dealing with cracks

131. There is one other question bearing on responsibility to which I

must refer. This concerns certain cracks, revealed by the examination

of the wreckage (see para. 78), which had occurred in the process of

manufacture and had been dealt with by location. Sir Arnold Hall said

that such manufacturing cracks might form foci for fatigue and thus

shorten the life of the structure. It was suggested in cross-examination that the fatigue which led to the disintegration of

Yoke Peter had originated in these cracks, that they ought not to have been dealt with as they were and that accordingly some responsibility ought to attach to de Havillands for allowing the aircraft which contained them to be put into service.

132. It will be convenient to deal with the subject of cracks

generally before giving my opinion on the specific question of responsibility mentioned above. This course may also enable the whole matter to be viewed in proper perspective. Public concern may have been aroused by what was said during the Inquiry and it is important that groundless fears should be allayed.

133. I am advised that it has been the general experience that certain parts of the structure of aircraft develop cracks as the result of fluctuation of load, vibration or casual damage and that the external skin, whether in the wings, tail or fuselage is particularly vulnerable. Cracks which occur during manufacture do not differ materially, in their significance, from those which may develop subsequently save, of course, that their presence may indicate an unsatisfactory manufacturing process.

134. It is the ordinary practice to make careful inspection of the structure, both during manufacture and subsequently, particularly in regions known to be specially susceptible and, if cracks are found, to deal with each case on its merits in the light of a now very wide experience of the problem. Where frequent inspection shows that a particular crack is likely to spread, it is dealt with by a carefully considered repair scheme, either prepared by the designers or by the operators in collaboration with the designers. However if after such

repair the crack continues to spread it is considered as a matter of major concern possibly requiring a radical modification to the design

to reduce the stress which gave rise to it.

135. For small cracks in regions not highly stressed the method of

location is generally found to prevent further spread, provided that

care is taken to ensure the inclusion of the end of the crack in the hole drilled. All witnesses who dealt with this matter in the Inquiry

were agreed that location was a reasonable method of dealing with

such cracks.

136. I am also advised that most aircraft experience cracks due to one or more of the causes mentioned above and that it would, indeed

be hardly practicable to insist on a standard of design and construction which would preclude completely the possibility of any

crack in the skin.</div>

<div>

137. The methods employed by de Havillands in dealing with manufacturing cracks were in no way different from those used to deal

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Ken Smart

Chief Inspector of Air Accidents

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: June 24, 2002 9:01:20 AM PDT
To: "John Barry Smith" <barry@corazon.com>
Subject: **RE: Please notify Chinese Authorities about the wiring/cargo door explanation**

Dear Barry,

I have forwarded your message to them. However, I must emphasize that I will not immerse myself in the ASC's investigation. I did say that I found you to be sincere and well motivated, and I suggested that they may find it worthwhile to look through what you have sent them and to use whatever they find to be useful.

A cargo door failure certainly seems like a plausible theory in the China Airlines 611 accident, but it would not be the only one at this stage of the investigation. You and I agree that it has certainly happened before; but, as you know, I do not share your view that it was a factor in Air India 182, Pan Am 103, or TWA 800.

I have a long half-finished e-mail reply to you which I will complete before

I "depart this fix" on Wednesday. As I had indicated, though I wanted to reply anyway, I felt I had to reply "for the record" when I read your comments about "something fishy going on".

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Sunday, June 23, 2002 10:14 PM
To: Bill.Tucker@tsb.gc.ca; ksmart@aaib.gov.uk
Subject: Please notify Chinese Authorities about the wiring/cargo door explanation

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Bill Tucker and Mr. Ken Smart, 22 June 2002

The last noise was a sharp "thud" before the power went off, he said.

Please Mr. Smart and Mr. Tucker, I suggest/ask/beg you to notify the Chinese aviation safety authorities, your counterparts, in Taipei about the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. Inform them there is a similar event of United Airlines Flight 811 from which to match China Airlines Flight 611 evidence.

The officials in Taiwan are mystified by the sudden loud sound/thud and the abrupt power cut. I am not and I believe you are not surprised either.

Please get them on the right track before another Boeing 747 suffers an inflight breakup.

Respectfully,
Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

China Airlines Crash Remains Mystery

Sun Jun 23,10:32 AM ET

By ANNIE HUANG, Associated Press Writer

TAIPEI, Taiwan (AP) - Initial analysis of a black box from a China

Airlines jet has yielded no clues in the crash last month that killed

225 people but has shown several unusual sounds, the chief investigator said Sunday.

Minutes before the Boeing 747-200 went down, the cockpit voice

recorder picked up a noise that

sounded like a human heart beat. But investigators have yet to identify the source of the noise, said Kay Yong, the chief investigator at Taiwan's Aviation Safety Council.

Shortly before the crash, the black box also recorded a noise that sounded like "ka ta, ka ta, ka ta," Yong said. The last noise was a sharp "thud" before the power went off, he said.

Several Boeing 747 pilots who listened to the tape said the sounds

were not normal in the cockpit, Yong said.

Each sound lasts a fraction of a second. Investigators could not say

if they were related to the crash, "but at this moment, we'd rather be more suspicious," Yong said.

A closer and more sophisticated analysis was needed to identify the noises, he said.

The second black box, the flight data recorder, was still being analyzed, and Yong would not comment on its contents.

Yong repeated on Sunday that the pilots' conversations did not indicate any problems.

He refused to speculate about why the plane crashed on May 25 about 20 minutes after taking off from Taiwan enroute for Hong Kong. But divers searching for the wreckage deep under the sea did not "find anything that did not belong to the airplane."

Search crews are still trying to recover large parts of the plane, which split into four pieces before plunging into the Taiwan Strait near the Penghu island chain off Taiwan's western coast. The wreckage might offer the best clues about why the plane crashed.

Some aviation experts have suggested that metal fatigue might have caused the 22-year-old plane to break up. Others have suggested that an explosion perhaps in the fuel tank was to blame. Security officials have said there were no signs of terrorism or a missile attack.

Rescue teams have so far recovered 160 bodies. Eight corpses including that of co-pilot Hsieh Ya-hsiung were found Saturday in wreckage about 200 feet under the sea.

The United Daily News quoted prosecutors as saying Hsieh's body was attached to the seat when it was found, indicating there had been no problem requiring him to get up immediately before the crash.

From: Ken Smart <ksmart@aaib.gov.uk>
Date: June 25, 2002 2:31:55 AM PDT
To: John Barry Smith <barry@corazon.com>
Subject: **Re: Please notify Chinese Authorities about the wiring/cargo door explanation**

Mr Smith

You can rest assured that the Aviation Safety Council in Taiwan, who are leading the investigation, will examine all possible causes for this tragic accident.

I understand that the cockpit voice recording contains some very interesting sounds in the seconds before the cessation of the record. These may give an important clue to the circumstances surrounding the loss of the aircraft, its passengers and crew.

Ken Smart

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
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Barry Smith

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Minutes before the Boeing 747-200 went down, the cockpit voice recorder picked up a noise that sounded like a human heart beat. But investigators have yet to identify the source of the noise, said Kay Yong, the chief investigator at Taiwan's Aviation Safety Council.

Shortly before the crash, the black box also recorded a noise that sounded like "ka ta, ka ta, ka ta," Yong said. The last noise was a

sharp "thud" before the power went off, he said.

Several Boeing 747 pilots who listened to the tape said the sounds were not normal in the cockpit, Yong said.

Each sound lasts a fraction of a second. Investigators could not say if they were related to the crash, "but at this moment, we'd rather be more suspicious," Yong said.

A closer and more sophisticated analysis was needed to identify the noises, he said.

The second black box, the flight data recorder, was still being analyzed, and Yong would not comment on its contents.

Yong repeated on Sunday that the pilots' conversations did not indicate any problems.

He refused to speculate about why the plane crashed on May 25 about 20 minutes after taking off from Taiwan enroute for Hong Kong. But divers searching for the wreckage deep under the sea did not "find anything that did not belong to the airplane."

Search crews are still trying to recover large parts of the plane, which split into four pieces before plunging into the Taiwan Strait near the Penghu island chain off Taiwan's western coast. The wreckage might offer the best clues about why the plane crashed.

Some aviation experts have suggested that metal fatigue might have caused the 22-year-old plane to break up. Others have suggested that an explosion perhaps in the fuel tank was to blame. Security officials have said there were no signs of

terrorism or a missile attack.

Rescue teams have so far recovered 160 bodies. Eight corpses including that of co-pilot Hsieh Ya-hsiung were found Saturday in wreckage about 200 feet under the sea.

The United Daily News quoted prosecutors as saying Hsieh's body was attached to the seat when it was found, indicating there had been no problem requiring him to get up immediately before the crash.

--

Ken Smart
Chief Inspector of Air Accidents

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Date: June 25, 2002 3:23:49 PM PDT
To: "'John Barry Smith'" <barry@corazon.com>
Subject: RE: Pix of Air India Flight 182

Dear Barry,

I felt that this message from you below, dated 22 May, needed specific responses to several of your points. I'll get to your request for photos later in this response, but first I want to clear the air on some of your concerns - or at least try to.

- 1) - I am not being "rebuffed with excuses and delay".
- 2) - There is nothing fishy going on.
- 3) - Ron Schleede contacts me because he is a colleague and a friend. He worked for me here as Director of Investigations-Air for six months on an international exchange (and he did a great job).
- 4) - Ken Smart said nothing to influence my retirement, and I am shocked that you would suspect a connection. The fact is that my decision was made and relayed to my boss in late March, at least a month before Ken's visit.
- 5) - I do not believe the "more likely explanation for Air India Flight 182 is mechanical rather than conspiracy". Based on my direct knowledge from the AI 182 investigation, I saw mechanical failure as one plausible explanation. Adding my indirect knowledge at the time (back in the late 1980s), from others who were more directly involved, I considered a bomb to be the more likely explanation and mechanical failure to be plausible, but unlikely. Adding in the additional knowledge I have acquired since then (which is almost all indirect in a pure accident investigation sense) I have

become more convinced that a bomb brought down AI 182.

6) - The only reason that my recent e-mail referred to AI 182, PanAm 103, and TWA 800, but not to UA 811, was that I had less familiarity with the UA 811 investigation than the other three. However, I have absolutely no reason to doubt the eventual conclusion that the cargo door failed in UA 811.

7) - As I advised you last summer, this agency has no mandate to re-conduct an investigation of AI 182. Moreover, my personal opinion is that it would not be an appropriate use of our resources to do so. Nevertheless, I did believe that the TSB should make John Garstang available to that investigation through periodic secondment to the RCMP, and I still feel that our doing so was an appropriate decision. I have high confidence in the integrity and the thoroughness of the RCMP investigation; and I sincerely hope that justice will be served by the pending trial - whatever its outcome.

Now to the matter of your request for photos of the forward right side of the AI 182 B747.

I spoke with John Garstang about your request. He advised that there are both photos and videos from the AI 182 investigation. However, with respect to the forward right side and the cargo door in particular, he is only certain about the video. They have pictures showing where the cargo door was in the debris field, and they also have a picture of the door at the ocean surface when it broke free during the recovery attempt; he is just not sure how much was video, or still frame from video, versus photographs..

To complicate matters, the video was deteriorating as time went by. Some years ago (estimate: around 1995), the RCMP took the magnetic tape video (which would be of even poorer quality by now) and made a digitized version.

The former is ours, the latter is theirs; however they need both for trial purposes (continuity of evidence, I assume). Moreover, they have advised that the matter is before the courts, that a publication ban is in effect, and that they do not want anything to be released that could be prejudicial to the court process. Both the TSB's General Counsel and I have been notified that the RCMP Legal Services group believes that release of Air

India wreckage photographs could be injurious to the RCMP's work and that, as such, release is exempted under Sec. 16(1) of Canada's Access to Information Act.

There may (far from certain) be some form of photo/video info that is still in the TSB's possession and that may (also far from certain) be releasable to you. To determine that will take considerable effort and, to be at all manageable, it will require the personal involvement of John Garstang. With his heavy workload, as we try to complete the report on the SWR111 investigation, we just can't give him any more tasks for the next few months. However, I have obtained a personal commitment from both the Director of Engineering and the Director of Air Investigations that they will follow-up on this at the end of the summer and see if there is anything that can be made available to you. To that end, I shall send both of them a copy of this message so that they can create a "bring forward" reminder to follow up. At the very worst, the TSB's photos/videos can certainly be made available after the trial.

Meanwhile, I can assure you that the cargo door failure

possibility was
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In closing, I can honestly say that I have enjoyed communicating
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what you have to say. I was, and still am, impressed with you.
You have a
good brain, a pleasant personality, good health, and a wonderful
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home; Don't miss out on enjoying all that in your retirement
years.

Very sincerely,

Bill T..

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Wednesday, May 22, 2002 7:28 AM
To: Tucker, Bill
Subject: Pix of Air India Flight 182

Dear Bill, 22 May 02

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Commission

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Why would Ron Schleede call you out of the blue? What did Ken Smart say that led to your decision to retire a few days later?

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In your bailing out email, as I call it, to me on 9 May 02, you refer to persons and titles and their opinions as to the cause of the accidents but never refer to facts, data, or evidence. You also never refer to United Airlines Flight 811 as if it never existed which is absolutely not fair since that is the model for the other three.

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Very sincerely,

Bill T..

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Sent: Wednesday, May 22, 2002 7:28 AM

To: Tucker, Bill

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Barry

From: System Administrator <postmaster@TSB.GC.CA>
Date: July 25, 2002 10:40:37 AM PDT
To: barry@corazon.com
Subject: Undeliverable: Three hull rupture causes for China Airlines Flight 611

Your message

To: ksmart@aaib.gov.uk; Bill.Tucker@tsb.gc.ca;
kfchou@asc.gov.tw;
Lyle.Streeter@faa.dot.gov; WILDEYJ@ntsb.gov
Subject: Three hull rupture causes for China Airlines Flight 611
Sent: Thu, 25 Jul 2002 13:39:19 -0400

did not reach the following recipient(s):

Bill.Tucker@TSB.GC.CA on Thu, 25 Jul 2002 13:40:27 -0400

The recipient name is not recognized

The MTS-ID of the original message is:

c=CA;a=govmt.canada;p=gc

+bst.tsb;l=TSBV2902072517403NHLV4F4

MSEXCH:IMS:Transportation Safety Board:HO:TSBV29 0
(000C05A6) Unknown

Recipient

Message-ID: <p04310103b965e19f1ac1@[216.228.25.38]>
From: John Barry Smith <barry@corazon.com>
To: ksmart@aaib.gov.uk, Bill.Tucker@tsb.gc.ca,
kfchou@asc.gov.tw,
Lyle.Streeter@faa.dot.gov, WILDEYJ@ntsb.gov
Subject: Three hull rupture causes for China Airlines Flight 611
Date: Thu, 25 Jul 2002 13:39:19 -0400
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2650.21)
X-MS-Embedded-Report:
Content-Type: text/plain;
charset="iso-8859-1"

K.F. Chou
Accident Investigation Division
Aviation Safety Council
16th Floor, 99 Fu-Hsing North Road, Taipei 105,
Taiwan, R.O.C.

Ken Smart
Chief Inspector of Accidents,
Air Accidents Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

W.T. (Bill) Tucker
Director General,
Investigation Operations

Transportation Safety Board
Canada

Lyle Streeter
FAA AAI
Aircraft Accident Investigator
FAA National Headquarters
800 Independence Avenue, S.W
Building FOB 10A, Room 838,
Washington D.C 20591

James F. Wildey II
National Resource Specialist
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Dear Mr. Chou, Mr. Smart, Mr. Tucker, Mr. Wildey, and Mr.
Streeter,
July 25, 2002,

Apparently China Airlines Flight 611 suffered a sudden inflight
breakup and that implies explosive decompression of the hull.
There
are three likely places for that rupture to occur: Aft pressure
bulkhead, forward cargo door, and aft cargo door.

The aft cargo door is huge and same size as forward, 99 inches
by 110
inches. (The aft bulk cargo door is one third that size. Aft bulk
cargo doors have never opened in flight on a 747 but have for DC
10.)
The aft main cargo door has never opened inflight for a Boeing

747

but has on the ground and a handle and seals have often leaked in the air.

1. For 747 251B: During climb, the aft cargo door illuminated and aircraft failed to pressurize. Flight returned to BKK after dumping 5000 lbs of fuel and landed without further incident. Maintenance found the aft cargo door handle out of position. Adjusted latch and lock. Operational check ok.

2. 1.17.6 Uncommanded Cargo Door Opening--UAL B-747, JFK Airport
On June 13, 1991, UAL maintenance personnel were unable to electrically open the aft cargo door on a Boeing 747-222B, N152UA, at JFK Airport, Jamaica, New York.

Aft pressure bulkhead has failed once in flight for Boeing 747, the infamous JAL 123, after poor repair. The actions of JAL 123 were not the same as the actions of China Airlines Flight 611 after the initial event.

The forward cargo door has opened officially twice in the air for a Boeing 747: United Airlines Flight 811 and the below event.

1.17.1 Previous Cargo Door Incident

On March 10, 1987, a Pan American Airways B-747-122, N740PA, operating as flight 125 from London to New York, experienced an incident involving the forward cargo door. According to Pan Am and Boeing officials who investigated this incident, the flightcrew experienced pressurization problems as the airplane was climbing through about 20,000 feet. The crew began a descent and the pressurization problem ceased about 15,000 feet. The crew began to climb again, but about 20,000 feet, the cabin altitude began to rise rapidly again. The flight returned to London. When the airplane was examined on the ground, the forward cargo door was found open about 1 1/2 inches along the bottom with the latch cams unlatched and the master latch lock handle closed. The cockpit cargo door warning light was off.

When the forward cargo door ruptures opens in flight, certain evidence is seen: Right wing leading edge has inflight damage, particularly in the right wing fillet. Midspan latches for both cargo doors will be absent. There will be outward petal shaped holes on right side of fuselage. Engine number three will be Fodded.

The forward cargo door is the most likely culprit pending evidence

confirmation.

However; the location of the tail first in the debris trail and the sudden sound at initial event time described as 'sharp' and not 'loud', indicates the hull rupture may have occurred in the aft part of the aircraft. If so, engine number three may not be foddred and there will be no inflight damage to the wing.

Midspan latch status for the two main cargo doors is most important.

If those are confirmed latched and attached to fuselage latch pins, then suspicion falls on aft pressure bulkhead failure.

Please release more factual information about this civilian airline accident during peacetime with no secrets involved.

Respectfully,

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>

Date: August 27, 2002 10:35:11 AM PDT

Date: 27 Feb 1997 15:18:35 +0400

From: Securitas <Securitas@bst-tsb.x400.gc.ca>

To: "P=gc+internet; DDA.TYPE=RFC-822;
DDA.VALUE=barry(a)corazon.com" <barry@corazon.com>
Subject: RE: Crash cause of Air India Flight 182
Importance: normal
Autoforwarded: FALSE
Priority: normal

Thank you for your report expressing concern about the opening of cargo doors on B-747 aircraft. During any aircraft crash, investigators examine every piece of evidence, in order to determine cause. In the case of the Air India flight, the cargo door was in fact retrieved from the bottom of the ocean by the investigators. The latches were still in place, and there was no evidence on the edges of the door to indicate in-flight opening of that door.

On the other hand, there was other solid evidence indicating a bomb blast had occurred. Aircraft accident investigators are trained people. Anybody can say anything they want on the Internet. Put your money on the experts; you will win more often.

From: P=gc+internet; DDA.TYPE=RFC-822;
DDA.VALUE=barry(a)corazon.com
To: Securitas

Subject: Crash cause of Air India Flight 182

Date: Saturday, August 31, 1996 9:50PM

<<File Attachment: BDY3.P00>>

DATE: Aug 31 17:50:40 1996 GMT

IPMessageID: 32287B6A.1295(a)corazon.com

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DDA.VALUE=barry(a)corazon.com]

TO: Securitas

SUBJECT: Crash cause of Air India Flight 182

IMPORTANCE: normal

AUTO FORWARDED: FALSE

PRIORITY:

ATTACHMENTS: c:\BDY3.P00

--

Dear Safety Person, The cause of the Air India flight 182 crash of a

Boeing 747-237B from Toronto to London in 1985 was an inadvertent opened

forward cargo door which then tore of skin which then tore of nose to

destruction of aircraft. Not a bomb. My safety concern to TSB Securitas

is that it can happen again. To properly assess the risk to Canadian air

passengers, visit the web site at <http://www.corazon.com> for a fully

documented presentation of the issue of inadvertently opening

cargo
doors. Open doors causing destruction in early model Boeing
747s has
happened before, it has happened now, and it may happen again.
Please
assess door opening claim by visiting web site and evaluating
documents
supporting hypothesis. John Barry Smith

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:10 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Supplemental TSB report for Air India Flight 182

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,

24 May 01

Well, sir, thank you very much for your polite and informative email to me regarding the administrative details of the Air India Flight 182 accident. I do call it an 'accident' and not a 'downing' as the RCMP AITF, specifically Sgt Blachford, calls it.

Sgt. Blachford has been in contact with me and requests a meeting and documents, a suggestion I have accepted with the requirement that a TSB aircraft accident investigator be present to interpret the technical details of an aircraft inflight breakup, an occurrence which a policeman would not be expected to understand. I've attached my most recent letter to the RCMP AITF in text and as a PDF file.

First, I must respond that the Transportation Safety Board of Canada (TSB-C) has no mandate to re-open the aviation safety investigation of the AI Flt.182 occurrence.

Well, not yet. Is it not judicious to be prepared for the trial in February when a TSB official will most certainly be called to the witness stand to present the current Canadian aviation accident experts' opinion about Air India Flight 182 for which two men are on trial for their life's freedoms?

Also, my research and conclusions indicate a present danger to the public safety in known faulty wiring again causing the forward cargo door of early model 747s to open in flight leading to fatalities, just like United Airlines Flight 811. Would it not be prudent to check out that startling claim by an experienced and educated aviation person?

When you say "Re-open" you imply the investigation was closed. My understanding is that the Air India Flight 182 investigation in the AITF has been open and ongoing for about 16 years. I would phrase the suggestion as providing a 'supplemental' report to the existing CASB report although later in this email I justify the suggestion for an entirely new AAR on Air India Flight 182 done by TSB alone.

As you may be aware, the TSB-C was not established until 1990, and the Aviation Occurrence Report you referred to was prepared by the Canadian Aviation Safety Board, the predecessor to the TSB-C. More

importantly, in accordance with ICAO Annex 13, the investigation of that accident was led by the Government of India; the CASB report was prepared as input to India's investigation.

As I read the CASB aviation occurrence report, it appears to be selected portions of the Kirpal inquiry with notable omissions, such as the assumptions of 'twinning' being proof positive of a bomb, and most importantly omitting the conclusion of a 'bomb' although the thought was there in everyone's minds.

The Canadians are to be complimented on resisting the intense political pressure at the time to call the cause of the agreed upon explosion in the forward cargo compartment as a bomb explosion. The UK AAIB representative, Mr. Davis, said the cause was not a bomb. The non aircraft investigator judge said it was a bomb, and the Canadian aircraft accident investigators declined to say one way or the other. Who was correct? Well, after 16 years and several similar accidents, it is now clear to me that the UK and the CASB air accident investigators were most correct.

The CASB were cautious, as all good investigators are, and only concluded that which was supported by real evidence of only an explosion in the forward cargo compartment. Period. That wise conclusion was confirmed years later by the event of United Airlines Flight 811 which refuted all of Judge Kirpal's reasons for grasping for a 'bomb' in the face of contradictory evidence such as the sudden loud sound on the CVR which matched a DC 10 explosive decompression sound and not a bomb sound.

Mr. Tucker, I read a lot of accident reports and the CASB

occurrence report of 1986 was meticulous, precise, and cautious. They acted as investigators, not prosecutors. Now is the time to supplement that cautious and later proven to be correct report with an update. The update can be used to rule in or rule out the match to the subsequent event of United Airlines Flight 811 which would indicate a present danger to the flying public and prepare some fellow for the cross examination by the defence of the accused in the February 2002 trial. After all, it was a plane crash, not a bank robbery, and current Canadian officials who know about plane crashes will be called to explain to the Court and jury just how and why a Boeing 747 came apart in the air so long ago.

Please do not wash your hands of Air India Flight 182. It's not done and gone. Accident investigations are based on precedent. We learn what happened now by what happened before. In one sense, a investigation is never complete because more and more is learned as similar accidents in similar circumstances leaving similar evidence occur allowing a refinement of the probable cause.

That said, we certainly have more than a passing interest in the circumstances of the AI Flt. 182 tragedy. We are interested because of the very nature of our chosen careers.

Too right.

We are interested because quite a few TSB staff were working for the CASB at the time (myself included), and many of that group were involved in the AI Flt.182 investigation. Above all, we

are interested because of the enormity of the tragedy, the links to Canada and the fact that there has not yet been closure on this matter - almost 16 years after the event.

Very frustrating, I agree. And the way to resolve that frustration is to confront the mystery again. There can be closure and satisfactory answers with a new supplemental report on the older one which can now examine the amazing significant similarities with United Airlines Flight 811, Trans World Airlines Flight 800, and Pan Am Flight 103. Of course you are interested. I'm miffed because most of the people I talk to don't even recall the tragic event even though it killed so many, many more than the other three.

United Airlines Flight 811 had an original AAR, 90/01, which was later superceded by an entirely new AAR on the same event, AAR 92/02. There is precedent for TSB to write an entirely new AAR with its own conclusions based upon actual examination of the evidence in videotapes and not rely on the Indian judiciary and their interpretations. The confirming proof exists in the videotapes and high quality 35 MM color photographs of the actual Air India Flight 182 wreckage that can now be matched to United Airlines Flight 811. TSB has access to those films via RCMP and specific expertise to properly evaluate that evidence.

TSB is entitled to conduct its own investigation for its own report and not have to refer to a dissolved agency or a foreign judicial official for opinions about a Canadian aviation accident which is still as potent as ever. AITF is after the 'bombers'; let the TSB go after a mechanical explanation based upon the matching event of United Airlines Flight 811, an event not available to CASB for

consideration in 1986 but available to you and TSB now.

The match to United Airlines Flight 811 and the other two make Air India Flight 182 even more of a significant aviation investigation other than a 747 that exploded in flight and was thought to be a bomb but was not, just like Trans World Airlines Flight 800 for 17 months. Other AARs can now be updated and a current safety problem of wiring can be identified and fixed.

May I digress a moment, Mr. Tucker. The Airbus A380 will hold 650 passengers and it has a fatal design flaw, that of outward opening non plug cargo doors. The small sized balloon of Comet burst at a window, the medium balloon of a DC 10 burst at a cargo door of AA 96, the large balloon of a 747 burst at a cargo door of United Airlines Flight 811, and now the huge balloon of the A380 may burst at the same place. The cargo doors must be designed like the passenger doors; plug type. Now is the time for authority to rule in or rule out my conclusion that forward cargo doors of 747s are rupturing open in flight at one or both of the midspan latches. If confirmed, then the A380 and subsequent airliners can correct this major design flaw which is acknowledged in NTSB AAR 92/02, that of outward opening non plug cargo doors.

And do we not agree that Pan Am Flight 103 does not have closure either? Is that event satisfactorily resolved in your mind? Can you really believe a 20 inch shatter zone on the port side of the nose caused by a 'bomb' can cause the nose of 747 to come off in flight even as we know that United Airlines Flight 811 had a ten foot by 15 foot hole in the nose and the plane stayed aloft?

As you are aware, the RCMP have been conducting a criminal investigation into the circumstances of the crash ever

since 1985.

In accordance with Canadian law, both the CASB and the TSB-C have provided the RCMP with copies of material from our file - excluding, of course, any information that is privileged under our Act. The information provided includes material that was produced by John Garstang.

Ahh, Mr. John Garstang.....He emailed me in 1997 with incorrect information. I replied and he called me on the phone later to correct his email report that the door was recovered intact as, in fact, neither cargo door was recovered. And there was not '...other solid evidence indicating a bomb blast had occurred.' Both his statements are misleading and incorrect. And now, 16 years later, he issues a report from the RCMP stating the explosion was a bomb in the aft cargo compartment, completely contradicting the Kirpal Inquiry and the CASB report with no substantive or new evidence for such a bizarre conclusion. Not only does the evidence conclusively show there was no bomb explosion in the aft cargo compartment, it shows there was no explosion of any sort back there and the area was closely examined for such an event because of JAL 123 and the infamous aft pressure bulkhead crack.

The allusion to gambling by betting money on 'experts' in regard to aviation safety is also distressing. Mr. Garstang's poorly substantiated conclusions carry little weight with me. Compare your email which is polite and informative to his factually incorrect, insulting, and bragging statements below and you will see what I mean.

Date: 27 Feb 1997 15:18:35 +0400

From: Securitas <Securitas@bst-tsb.x400.gc.ca>
To: "P=gc+internet; DDA.TYPE=RFC-822;
DDA.VALUE=barry(a)corazon.com" <barry@corazon.com>
Subject: RE: Crash cause of Air India Flight 182
Importance: normal
Autoforwarded: FALSE
Priority: normal

Thank you for your report expressing concern about the opening of cargo doors on B-747 aircraft. During any aircraft crash, investigators examine every piece of evidence, in order to determine cause. In the case of the Air India flight, the cargo door was in fact retrieved from the bottom of the ocean by the investigators. The latches were still in place, and there was no evidence on the edges of the door to indicate in-flight opening of that door.

On the other hand, there was other solid evidence indicating a bomb blast had occurred. Aircraft accident investigators are trained people. Anybody can say anything they want on the Internet. Put your money on the experts; you will win more often.

From: P=gc+internet; DDA.TYPE=RFC-822;
DDA.VALUE=barry(a)corazon.com
To: Securitas

Subject: Crash cause of Air India Flight 182
Date: Saturday, August 31, 1996 9:50PM
<<File Attachment: BDY3.P00>>
DATE: Aug 31 17:50:40 1996 GMT
IPMessageID: 32287B6A.1295(a)corazon.com
FROM: [P=gc+internet; DDA.TYPE=RFC-822;
DDA.VALUE=barry(a)corazon.com]
TO: Securitas
SUBJECT: Crash cause of Air India Flight 182
IMPORTANCE: normal
AUTO FORWARDED: FALSE
PRIORITY:
ATTACHMENTS: c:\BDY3.P00

--

Dear Safety Person, The cause of the Air India flight 182 crash of
a
Boeing 747-237B from Toronto to London in 1985 was an
inadvertent opened
forward cargo door which then tore of skin which then tore of
nose to
destruction of aircraft. Not a bomb. My safety concern to TSB
Securitas
is that it can happen again. To properly assess the risk to
Canadian air
passengers, visit the web site at <http://www.corazon.com> for a
fully
documented presentation of the issue of inadvertently opening
cargo
doors. Open doors causing destruction in early model Boeing
747s has
happened before, it has happened now, and it may happen again.
Please
assess door opening claim by visiting web site and evaluating

documents
supporting hypothesis. John Barry Smith

So, Mr. Tucker, you can see I have been at this for years. Steady and solid; the facts are there; and all the while the evidence corroborates the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. I plead with you to be able to meet and present my evidence to you and other Canadian aircraft accident investigators who respect research and evidence, who are not politically involved, and are not impressed by media hype of exciting myths about conspiracy bombers. There are no conspiracies, only physical laws of nature obeyed in twisted metal and sounds on data recorders. I rely on the reality of evidence for my conclusions not fearful fantasies of evil foreigners plotting to kill.

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart Blachford of the RCMP in Vancouver. The RCMP have as strong an interest as anyone in establishing what happened to AI Flight 182.

You may be right. They seem to have strong bias towards bomb and bombers, but you never know, they may have a real investigator who will consider any explanation that makes sense, has official documentation for support, and has an irrefutable precedent, United Airlines Flight 811.

I have also
forwarded your report to the Director of Air Investigations,

Thank you.

the
Investigator-in-Charge of our SWR Flight 111 investigation,

Thank you. I followed closely that investigation and found it to
be patient, professional, and thorough.

and the Director
of Engineering for their information.

Thank you.

I am of course available at any time to answer their queries as
they arise. The enormity of the implications is breathtaking, but
true. I hope they can get past the bias of years of media bomb
bomb bomb and look at my research of matching evidence to
confirmed mechanical events in United Airlines Flight 811 and
Trans World Airlines Flight 800.

With respect to the brief message in your second e-mail (of 8
May), there is
one point that I must clarify in reply. It is correct that the CASB
investigators' report never said it was a bomb that caused the
explosion;
however, the report also never said that it wasn't a bomb.

Yes, is the glass half full or half empty. But imagine the pressure on CASB to state it was a bomb. To not conclude it was a bomb shows that they did not just omit it, but really rejected it as a realistic explanation. Even now the RCMP is under intense pressure to allay the public fears and desire for revenge by prosecuting two foreign looking fellows for planting a bomb based on external circumstantial conspiracy evidence, just like Pan Am Flight 103.

In fact, to my knowledge, there was nobody on the CASB team who didn't consider a bomb to be the most likely explanation.

I understand the 1986 leaning towards bomb for the mystery cause of the explosion in the forward cargo compartment which CASB and Kirpal did agree on; the plane did come apart in flight. This is agreed upon and undeniable, so an explanation had to exist and a bomb explosion could cause that breakup, so, without a reasonable plausible alternative, what to say? Boom, bomb. For CASB to be cautious and reject the hysteria and just say explosion in the forward cargo compartment based on evidence only speaks highly of the mature wisdom of those officials at the time and now they are vindicated by events of a few years later in United Airlines Flight 811 which looked like a bomb, felt like a bomb, called a bomb by the crew, and yet, was not a bomb but an electrical problem with a cargo door.

If the CASB of 1986 had NTSB AAR 92/02 of United Airlines Flight 811 of 1992 to review, with its many significant matching similarities to Air India Flight 182, they would have had that reasonable plausible alternative to bomb and could have countered the 'bomb' explanation espoused by the politically

minded Judge Kirpal. It's understandable that in 1986 a bomb explosion could have been the cause of the explosion in the forward cargo compartment since there was no reasonable alternative. There is now and I invite/urge TSB to now use that luxury of hindsight and precedent to issue a supplemental AAR for Air India Flight 182. My Smith AAR report lays out the evidence, analysis, and conclusions to make the match and declare Air India Flight 182 to have as a probable cause the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation. Please evaluate the explanation on its own merits by experienced TSB investigators. I have high hopes that the gentlemen you forwarded my report to will do just that. Please forward this email to them should you believe it may help in their evaluations.

However, the aviation safety investigation conclusion on that point was, appropriately, left to the Kirpal Commission in India.

Well, Judge Kirpal was not an aircraft accident investigator nor was he a policeman involved with terrorist bombings. He could have relied on his Indian chief aircraft accident investigator, Mr. Khola, for information on why planes crash, and he could have relied on the Indian police force for evidence of bombings. but he did neither. He did the best he could trying to placate many pressures. His inadequate answers are shown by the lack of closure in the case. But again, in 1986 there was no precedent to rely on as United Airlines Flight 811 was about four years in the future. Judge Kirpal did the best he could under the circumstances, just as did CASB and others involved in the case.

The wisest probable cause conclusion based on the best evidence

was the CASB one, not surprisingly by professional aircraft accident investigators. Through similar subsequent accidents, that cautious and prudent conclusion can now be refined to satisfactorily explain the cause of the agreed upon explosion in the forward cargo compartment of Air India Flight 182, and it's not a bomb explosion but explosive decompression probably caused by faulty wiring shorting on a door unlatch motor.

AA Flight 96, a DC 10 over Windsor Ontario, in 1972 which had a cargo door inadvertently open in flight, and Swiss Air 111 are two accidents which are relevant to Air India Flight 182 and are well known to CASB and TSB officials. I know that when I say an inadvertently opened cargo door in flight in a wide body airliner is potentially catastrophic and that Kaptonized type Poly X insulation wiring in a wide body airliner is also potentially catastrophic by shorting, you will not look at me in derision but might say, "Could be, Smith, where's your evidence? Show me what you have. And make it snappy."

I have it, sir; please let me present it to you in depth. Endure the impatience and go through it with me, piece by piece, foddled engine by foddled engine, CVR by CVR, FDR by FDR, and leading edge by leading edge. I believe I may persuade you a supplemental TSB investigation into Air India Flight 182 is warranted based upon my presentation of my years of research, analysis, and conclusions based upon actual AARs of similar events and similar facts, data, and evidence. There will be no conspiracy nonsense but just airplanes and more airplanes.

I sense in you, Mr. Tucker, that you are walking a line of being professionally correct as an administrator in your dealings with a member of the public and yet also intrigued as an investigator by the raw data I have presented to you that may indicate that Air

India Flight 182 was in fact not a bomb explosion but a mechanical event which has happened before and can happen again. The implications are that a present danger may exist and thus continued discussion is warranted.

Let us have those discussions.

Sincerely,
Barry

John Barry Smith
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551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Background:

From Sergeant Blachford, 7 May 2001

"As per your email of April 10th, 2001 you advised you would be contacting me

the week of April 16-20th, 2001 and that you would have the requested data for

me. Could you please advise when I might receive that data.

Thank you and I look

forward to meeting you."

For Sergeant Blachford AITF:

Dear Sergeant Blachford, 10 April 2001

Thank you Sergeant Blachford for your recent letter to me of 28 Mar, 2001, file

number 85.3196. You stated that prior to our meeting I should send 'as much detail

as possible' 'which reflects that faulty wiring on Air India Flight 182 was the cause

of the 'downing'. I am preparing that data now for your review. I will be in

Vancouver all next week (the week of 16-20 April) and may be in position to hand

carry it to your 5255 Heather St. address.

Dear Sergeant Blachford, 16 May 2001,

Thank you for your letter of 7 May 2001, file number 85-3196, to which I reply:

To be picky, which is what aircraft accident investigators do, and please don't take this personally,

I did say, "may be in a position to hand carry it to....". I later determined that I was not in a position to hand carry it to you.

In your previous letter, you made the condition that before a meeting you must first receive my

research and analysis. I later believed that my research and analysis would not receive the

consideration they deserve.

And since I did not receive any acknowledgement from you of my 10 April 2001 email until now,

a month later, no rendezvous was set up between us for a meeting in April.

So, you see, we are off on the bad foot of misunderstanding already and that is not conducive to a

proper investigation/interview/interrogation of a potential witness with a high likelihood of

productive information being gained.

Maybe we can start again:

Smith/Blachford AITF letter 16 May 01

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I have spent years in researching and analyzing explosive decompression accidents in early model

Boeing 747s. Air India Flight 182 is one of those accidents. My conclusion, amply supported by

official government documents, is that Air India Flight 182 did in fact suffer an explosion in the

forward cargo compartment which led to the inflight breakup, as stated in conclusions by the 1986

Canadian Aviation Safety Board Aviation Occurrence Report.

The Canadian Aviation Safety Board respectfully submits as follows:

4.1 Cause-Related Findings

1. At 0714 GMT, 23 June 1985, and without warning, Air India Flight 182

was subjected to a sudden event at an altitude of 31,000 feet resulting in its crash

into the sea and the death of all on board.

2. The forward and aft cargo compartments ruptured before water impact.

3. The section aft of the wings of the aircraft separated from the forward portion before water impact.

4. There is no evidence to indicate that structural failure of the aircraft was the lead event in this occurrence.

5. There is considerable circumstantial and other evidence to indicate that the initial event was an explosion occurring in the forward cargo compartment. This

evidence is not conclusive. However, the evidence does not support any other conclusion.

Based upon my further research, again supported by various government aircraft accident reports (AAR), the explanation for that explosion is not that of a bomb but of an inadvertently ruptured open, at one or both of the midspan latches, forward cargo door caused by the known faulty Kapton type wiring shorting on the door unlatch motor which caused the explosive decompression which led to the inflight breakup. There is an irrefutable precedent for my conclusions of another early model Boeing 747 involved in the similar type event leaving similar type evidence, United Airlines Flight 811, a precedent not available at the time for the Canadian investigators to consider since it happened years later.

My research, analysis, and conclusions are available in a 117 page document, 'Smith AAR on Air India Flight 182,' with 120 pages of appendices. I can provide that document to you for your evaluation.

You asked to be advised when you might receive that data and you look forward to meeting me:

You may receive that data when we meet. I also look forward to meeting you. Let us now arrange the details.

I suggest my home in Carmel Valley, California, since all my computer data and research materials are located here as well as solving the family problem of my wife working as a Registered Nurse and I'm the parent taking care of our daughter before and after

school hours. For me to go back to Vancouver would be a hardship for the Smith family. I understand the AITF is flying to England and India interviewing witnesses so you're welcome down here and fully justified to obtain information from someone who has been working five years on Air India Flight 182 details.

I suggest a time at your convenience and the sooner the better because, as a consequence of my research, the implication is that a clear and present danger exists to the flying public in faulty wiring again causing a cargo door to open in flight causing fatalities in an early model Boeing 747.

The persons to be included in the meeting should consist of you (RCMP AITF), me (independent aircraft accident investigator), and a Transportation Safety Board of Canada aircraft accident

Smith/Blachford AITF letter 16 May 01

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investigator (TSB). I really must insist on this, as my analysis is very technical and detailed and the AITF should have a neutral, objective, aviation expert present to validate or refute my claims to

you. Your trip will be productive when you have an official expert at hand you can trust to

immediately advise you on the spot if what I say technically is nonsense or correct and thus worthy of further examination by the AITF.

I invite John Garstang, of course; however, since he has been seconded to the RCMP since 1988,

he is hardly an objective observer and thus the TSB official is required. I suggest Mr. Vic Gerden

of TSB since he did such an excellent investigation of the Swiss

Air 111 accident. A local Vancouver TSB official would also be satisfactory. If you wish to document the meeting, I suggest Paul Marquis, Editor, Aviation Safety Letter, Transport Canada, another Canadian government official who understands why airplanes crash. I will be referring to the AA Flight 96 DC-10 accident over Windsor, Ontario, Canada, in 1972 and Swiss Air 111 accident near Peggy's Cove, Canada; two accidents the TSB will be well aware of and which support my shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182. The TSB does not scoff at the suggestion that faulty wiring or an inadvertently opened cargo door on wide body airliners could have occurred in Air India Flight 182 because they know those causes have happened before and could happen again. They will know which questions to ask of me to rule in or rule out the explanation. RCMP and/or AITF understands criminal actions in terrorist bombings and conspiracies; however, the wiring/cargo door/explosive decompression is a non-criminal mechanical event in a plane crash. TSB participation is essential when talking about why the Boeing 747 called Air India Flight 182 came apart in the air. The following is very important: The Canadian aviation authorities were absolutely correct in their conclusions of 1986. Subsequent similar airplane crashes such as United Airlines Flight 811 now allow TSB in 2001 to supplement the earlier conclusions with a clearer explanation of the

explosion that caused Air India Flight 182 to breakup in flight amidships. The reason the RCMP and the AITF took so long to make accusations against persons is that there were no criminals to catch. If Air India Flight 182 had been a bombing, I believe the RCMP would have caught the perpetrators immediately and I would hope they would have been punished to the fullest extent of the law, and it's too bad Canada does not have the death penalty. Let me digress a moment in investigative philosophy: The RCMP has a mandate which is that of an investigative body which conducts interviews, examines evidence, and makes conclusions which are then presented to the Crown for possible prosecution. The prosecutors and the defence attorney then get together in an adversarial relationship during a trial with judge and jury. That is the way it is supposed to work and when it does work that way, much success is had.

However, I have noticed in the past few years that the investigative agencies involved with airplane crashes, specifically, the RCMP, FBI, NTSB, have become prosecutors pressing forward their own case only and omitting contrary evidence which might contradict their opinion. The agencies have become political, which is to say, giving scientific conclusions which please the political appointees of the moment who reflect the popular will of the moment.

The people of Canada believe a bomb blew up Air India Flight 182 and killed 329 men women and children. The people assume a bomb had to be put there by someone and they want that person or

persons punished. That is the political conclusion about the probable cause for the Air India Flight 182 tragedy.

Smith/Blachford AITF letter 16 May 01

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If the RCMP and the AITF are conducting the investigation with the bombing conclusion already made and are now looking for evidence to support that conclusion, I am not the person to talk to

because my evidence refutes that conspiracy conclusion and gives a mechanical alternative

explanation with precedent that shows that there was no bomb, and thus no criminal, and thus no

punishment to be meted out to satisfy the desires of the grieving.

In lieu of the bombing

explanation for the explosion in Air India Flight 182, I offer a plausible, reasonable, mechanical

explanation with precedent: The shorted wiring/cargo door rupture/explosive

decompression/inflight breakup sequence of events as modeled by United Airlines Flight 811.

There are no conspiracies by groups involved with Air India Flight 182 such as Boeing, NTSB,

TSB, AAIB, Air India, or the RCMP. Everyone is acting in their own perceived best interest. I am

not associated with any of those groups and am motivated by my near death haunting experience of

surviving a sudden night fatal jet airplane crash in which my pilot died.

The recent meeting led by the RCMP in which lewd telephone calls are alleged to have been made

by the accused is unworthy of an honorable investigation into an Air India airplane crash but

indicative of a prosecution tactic to discredit the character of a person on trial to the jury.

Mr. Dave Cross and Mr. Ian Donaldson of the Defence team for the accused, Mr. Ripudamen

Malik, suggested to me that the RCMP and the AITF are not interested in what happened to Air

India Flight 182 but are only interested in what the defence might use in trial so that the

prosecutors would have time to counter the conclusions, and not to confirm them or rule them out

by further investigation. The attorneys may be right. Their point of view is that the RCMP is an

adversary whereas I might see the RCMP/AITF/TSB as allies once the authorities understood my

explanation for Air India Flight 182. (Although I had discussions with the Defence team attorneys,

there was a clear understanding that I am an independent person who is free to act as I feel

appropriate.)

However, based upon your most recent letter, Sergeant

Blachford, I have hopes that quite possibly

there is a real investigator amongst you. There may very well be an investigator who does objective

research, searched the internet, reviewed my web site at www.corazon.com, read my emails to

RCMP, noticed the similarities of Air India Flight 182 to an incontrovertible similar accident,

United Airlines Flight 811, and decided to pursue the investigation further to rule in or rule out the

intriguing possibility that Air India Flight 182 was a mechanical accident and not a heinous crime.

The criminal analogy is that of a serial killer in many jurisdictions, over many years, with random

victims, but who always follows the same method of operation leaving a matching clue which links him to the crimes.

For the wiring/cargo door/explosive decompression explanation for four early model Boeing 747

fatal accidents over eleven years, it's the sudden loud sound on the CVR immediately followed by

the abrupt power cut to the FDRs. That sound, Sergeant Blachford, is not that of a bomb, but of an

explosive decompression. The killer is wiring; the inadvertent accomplice/bystander is the outward opening non-plug forward cargo door.

Someone at AITF, and it may very well be you, Sergeant Blachford, decided to follow up on the

previous inquiry you made to me. Someone may be willing to sit down with me accompanied by

an objective, neutral, government expert about airplane crashes, and patiently go through the

matching evidence of Air India Flight 182 to other similar accidents which left much similar

evidence that shows that the similar probable cause to be the initial event for all. The potential

confirmation of a present danger to the flying public demands it.

Smith/Blachford AITF letter 16 May 01

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So, on that hope. I have reconsidered and agree to provide you with my analysis and conclusions,

and meet with at least you and a TSB official in my home to forthrightly and timely answer all your

questions regarding my claim to you that Air India Flight 182 was not a bomb event but a

mechanical accident with precedent coupled with the urgent implication that a present danger to

public safety exists for the Canadian flying public.

To summarize: Meeting:

Documents to be made available: Smith AAR and appendices, and other documents as requested.

Location: 551 Country Club Drive, Carmel Valley, CA, USA

Time: At your convenience and I urge haste.

Participants: Smith, Blachford, Garstang, TSB (Gerden)

Transport Canada (Marquis) and others
as agreed upon.

Agenda: Clarification of the shorted wiring/cargo door rupture/
explosive decompression/inflight
breakup explanation for Air India Flight 182.

That is my message: I know you are interested in the messenger:

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135
certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650
hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

I am not an anonymous caller after midnight with whispered
unsubstantiated accusations about
minority groups.

I am a long time member of my community identifying myself
fully, giving ample communication

channels, and inviting you into my home as well as offering documentation from authoritative sources for all my technical conclusions.

If supported by evidence, is the AITF able to deviate from the conspiracy course at this late stage and conclude there was no bomb, no criminals involved? Is the AITF willing to offer an entirely different explanation for Air India Flight 182 other than the one promoted by the RCMP but consistent with CASB of 15 years ago? Is the AITF willing to accept the advice, counsel, and assistance from a fellow government agency, TSB, regarding this airplane crash?

I well understand the political difficulties involved and the consequences world wide of such a revelation. But, honorable investigators rely on the facts, data, and evidence to reach reasoned conclusions and let the chips fall where they may. Hindsight is valuable and available to us all when we examine subsequent similar airplane crashes. I assert that beyond a reasonable doubt, those realities support the probable cause for Air India Flight 182 as the shorted wiring/cargo door

Smith/Blachford AITF letter 16 May 01

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rupture/explosive decompression/inflight breakup explanation and refute a bomb explosion.

When you read my lengthy analysis and interview me, you too will be persuaded, if you have an open mind. The AITF can yet crack this case.

Hope springs eternal.

Cheers,

Barry

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barry@corazon.com
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From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Supplemental thoughts

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Please permit me to amplify my previous email with additional thoughts:

The current status of opinion for the probable cause of the inflight breakup of Air India Flight 182 in which 329 died is:

The CASB aircraft accident investigators who state it was an explosion of unstated cause in the forward cargo compartment and not the aft cargo compartment....which conflicts with.....

The Indian Judicial authority who states it was a bomb explosion in the forward cargo compartment and not the aft cargo compartment.....which conflicts with...

The AAIB representative who said it was an explosive decompression explosion in the forward cargo compartment and not the aft cargo compartment the cause of which was yet to be determined.....which conflicts with.....

The RCMP AITF police authority who state it was a bomb explosion in the aft cargo compartment and not the forward cargo compartment....which conflicts with....

This independent aircraft accident investigator who states it was an explosion in the forward cargo compartment and not the aft cargo compartment the cause of which is summed by the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation....which conflicts with....

The TSB who remains....silent...reluctant....on the bench...

Mr. Tucker, please, stand up, come forward, put yourself in play and assert your power and authority to sort out this contradictory cacophony of conflicting opinions about a momentous Canadian aviation event.

Your opinion carries the most weight amongst us; it must be heard. What is it? What happened to Air India Flight 182? Why? How?

Any report that exists can be supplemented, or revised, or updated, or upgraded. The Canadian Aviation Safety Board Aviation Occurrence Report regarding Air India Flight 182 can certainly be called Version 1.0 and a Version 1.1 can be an upgrade, to use a computer software analogy.

I personally recommend starting with a clean sheet of paper and treat the accident as you would as if it happened yesterday. Because of the peculiar nature of the accident with most of the wreckage still on the bottom of the ocean and the suddenness in which the event occurred, the evidence upon which the original investigators relied upon to make their conclusions and findings still exists in a hangar in Bombay and in dozens of videotapes and hundreds of high quality 35 MM color photographs now held by the Gendarmerie royale du Canada.

With the benefit and luxury of hindsight, subsequent similar accidents in similar aircraft under similar circumstances leaving similar evidence can now be evaluated for comparison.

Your TSB report will be the most up to date, the most comprehensive, and the most accurate. It is vitally needed, Mr. Tucker. Your expert opinion is needed by the Crown, by the Defence, by the RCMP AITF, by the manufacturer, by the airlines, and by the worldwide flying public in early model Boeing 747s, of which approximately 1100 are still in service.

To assist, I am sending the PDF of AAR of United Airlines Flight 811 and Air India Flight 182 Kirpal and CASB report. The electronic versions are very valuable for the ability to search quickly through for keywords. Trans World Airlines Flight 800 NTSB AAR 00/03 and Pan Am Flight 103 AAIB 2/90 are very large and can be sent to you if you wish and are available for download at <http://www.nts.gov> and <http://www.aaib.detr.gov.uk/index/index.htm>

I am also sending the Appendices to the Smith AAR for AI 182 in PDF, in case you do not have them; Appendix I is a personal, informal supplement.

These additional research materials may assist your staff which have received my AAR from you for their information. I am available day or night on any day to answer questions they may have and invite a meeting between us at your convenience.

The videotapes and color photographs of the 182 wreckage will be particularly interesting as there now exists much other real twisted metal to compare with; metal which now resides in hangars in Farnborough and Virginia in addition to Bombay. It's easier to find something if one knows what to look for; in this case it will be matching evidence in and around the forward cargo door to possibly match with Pan Am Flight 103, Trans World Airlines Flight 800, and United Airlines Flight 811, the subsequent incontrovertible accident with its many significant matches:

From Smith AAR:

7.18 Summary of matching evidence between Air India Flight 182 and United Airlines Flight 811 specifically:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. Section 41 retrofit not done
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J . Initial event at about 300 knots while proceeding

normally in all parameters

K. Initial event involves hull rupture in or near forward cargo door area

L. Initial event starts with sudden sound

M. Initial event sound is loud

N. Initial event sound is audible to humans

O. Initial event followed immediately by abrupt power cut to data recorders

P. Initial event sound not matched to explosion of bomb sound

Q. Initial event sound is matched to explosive decompression sound in wide body airliner

R. Torn off skin on fuselage above forward cargo door area

S. Evidence of explosion in forward cargo compartment

T. Foreign object damage to engine or cowling of engine number three

U. Foreign object damage to engine or cowling of engine number four

V. Right wing leading edge damaged in flight

W. Vertical stabilizer damaged in flight

X. Right horizontal stabilizer damaged in flight

Y. More severe inflight damage on starboard side than port side

Z. Port side relatively undamaged by inflight debris

AA. Vertical fuselage tear lines just aft or forward of the forward cargo door

AB. Fracture/tear/rupture at a midspan latch of forward cargo door

AC. Midspan latching status of forward cargo door not reported as latched

AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)

AE. Outwardly peeled skin on upper forward fuselage

AF. Rectangular shape of shattered area around forward cargo door

AG. Forward cargo door fractured in two longitudinally

AH. Status of aft cargo door as latched

AI. Passengers suffered decompression type injuries

AJ. At least nine missing and never recovered passenger bodies

AK. Initial official determination of probable cause as bomb explosion.

AL. Initial official determination modified from bomb explosion

AM. Structural failure considered for probable cause

AN. Inadvertently opened forward cargo door considered for probable cause

AO. Takeoff after sunset on fatal flight

AP. Takeoff after scheduled takeoff time on fatal flight

Smith AAR AI 182

The data from the CVR and FDR (the only direct evidence of the events of AI 182) still exist and are as accurate as ever. There now exists similar CVR and FDR tapes to compare with.

Dr. Hill, the pathologist from AAIB in Air India Flight 182 is alive, well, and still practicing in England. I spoke with him by telephone a few months ago and he is as professional as ever. His phone number is 207 407 0378.

I implore you, sir, please, become involved, this is, after all is said and done, a fatal aircraft accident that originated in Canada and killed Canadians. Take a crack at it.

Sincerely,

Barry
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **So true...**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 14 June 01

This article below about wiring is so true and supports my shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182.

Also, this is the 34th anniversary night of my ejection from my on fire suddenly jet airplane during training for carrier landings which killed my pilot. This accident is the impetus for my continuing interest in aviation safety and my efforts to prevent what happened to me from happening to others.

May I enquire, sir, as to the progress of my Smith AAR on Air India Flight 182 which you submitted to RCMP, DAI, IcC of SWR 111, and DE for their information? The implications of my report show a present danger to the flying public in faulty wiring causing forward cargo doors to inadvertently open in early model Boeing 747s, in addition to the already known and reported wiring caused fires in the forward cargo compartment.

Mr. Tucker, I am always ready to be interviewed/queried as to the details of my explanation and welcome correspondence.

Sincerely,
Barry

John Barry Smith
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551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart Blachford of the RCMP in Vancouver. The RCMP have as strong an interest as anyone in establishing what happened to AI Flight 182. I have also forwarded your report to the Director of Air Investigations, the Investigator-in-Charge of our SWR Flight 111 investigation, and the Director of Engineering for their information.

The Canadian Transportation Safety Board (TSB), which is now investigating the Swissair crash, and other countries' aviation agencies also received the Danish government accident report but made no recommendations related to Mylar.

TSB spokesman Jim Harris says the agency can't make recommendations based on another country's investigation. He says the TSB investigates accidents and is not a regulatory body like the FAA in the USA and its Canadian counterpart, Transport Canada.

U.S. knew of wiring flaws years before

TWA crash 1993 jet fire raised issues, but only after 2 crashes killed 459 did FAA act

By Gary Stoller

USA TODAY

Smoke and a burning electrical smell seeped into the passenger cabin of an arriving SAS jet as it taxied to a terminal in Copenhagen, Denmark. All 110 passengers scrambled out of the plane safely before a raging fire consumed much of the fuselage. For 8 years, that 1993 incident hasn't been reported in U.S. newspapers, although the U.S. government was involved in the accident investigation.

Now USA TODAY has obtained the Danish government's 72-page accident report, and it reveals that:

- * The fire on the SAS McDonnell Douglas MD-87 jet may have been a precursor of two deadly North American crashes -- TWA Flight 800 in 1996 and Swissair Flight 111 in 1998 -- in which investigators believe wiring problems and flammable cabin insulation may have played a role.

- * Two U.S. agencies involved in aviation safety -- the National Transportation Safety Board (NTSB) and the Federal Aviation Administration (FAA) -- assisted the SAS investigation and were aware of wiring and cabin insulation problems years before the North American accidents. Since those accidents, the FAA has issued a series of safety orders regarding inspections and modifications to wiring and the same type of cabin insulation.

- * A type of wire on more than half of the airline jets flying today can be very dangerous when it fails.

A fierce fire

The SAS accident, which occurred on a flight from Barcelona, was caused by electrical wire that short-circuited, igniting

flammable cabin insulation. "Continued arcing and sparking resulted in ignition of the cabin sidewall insulation material, which eventually developed into a fierce, uncontrollable fire," Denmark's Aircraft Accident Investigation Board (AAIB) wrote in its 1996 report.

The AAIB investigation found "clearly that the primary ignition source was that two wires, carrying an electrical load of 28-volt AC and 115-volt AC, respectively, became pinched between the aircraft structure and the recirculation fan duct."

The pinching caused the wires' outer insulation to chafe, exposing their metal conductors, the AAIB says. The bare wires touched one another and an adjacent piece of metal, leading to a short-circuit.

Three years after the SAS fire, NTSB investigators headed to the Atlantic Ocean off Long Island to determine what caused the center wing fuel tank of a TWA Boeing 747 jet to explode, killing all 230 aboard. The NTSB didn't determine a probable cause but said last year that the most likely source of ignition was electrical wiring that short-circuited.

In September 1998, more than 2 years after the Danish report was written -- a high-temperature fire ignited before Swissair Flight 111 crashed near Nova Scotia, killing all 229 people aboard. Canadian investigators, who are still investigating the accident and haven't yet determined a cause, say they found short-circuited wires and burned Mylar cabin insulation on the McDonnell Douglas MD-11 jet.

The Danish accident report reveals that the two wires that short-circuited on the SAS MD-87 had been installed between, and ignited, layers of Mylar insulation.

FAA conducted tests

As part of the investigation, the FAA performed fire tests on materials removed from the jet, according to a 1994 FAA letter in the Danish report.

The tests, conducted at FAA facilities in Atlantic City, N.J., showed that Mylar insulation failed the FAA's flammability requirements and could ignite from short-circuited wiring. Despite those tests, the FAA proposed no regulations to remove Mylar from planes or ban it from new aircraft until after the Swissair crash. In August 1999, the agency ordered airlines to remove Mylar from MD-11 and MD-80 series jets within 5 years.

When asked about the Danish accident report showing the FAA tested Mylar years earlier, FAA spokeswoman Alison Duquette said the agency accelerated Mylar-related research after the Swissair accident.

"Based on our new test that we developed, we found that Mylar does not meet an acceptable level of safety," she says.

Ed Block, a private expert who inspected aircraft wiring for an FAA subcommittee formed after the TWA accident, says that the FAA should have taken immediate action when it learned about the dangers of Mylar during the Danish accident investigation.

NTSB's participation

The NTSB, which assisted the Danish government in the SAS investigation, also was aware of the dangers of Mylar but made no call to have it removed.

"There are occasions when information developed in foreign investigations leads to Safety Board recommendations," says NTSB spokesman Ted Lopatkiewicz in a written statement. "No NTSB recommendations were issued as a result of the Danish investigation." The board refused further comment on the SAS accident report.

The Canadian Transportation Safety Board (TSB), which is now investigating the Swissair crash, and other countries' aviation agencies also received the Danish government accident report but made no recommendations related to Mylar.

TSB spokesman Jim Harris says the agency can't make

recommendations based on another country's investigation. He says the TSB investigates accidents and is not a regulatory body like the FAA in the USA and its Canadian counterpart, Transport Canada.

"Sadly, these agencies are all missing in action," Block says. "They're saying they don't care about the people in their country flying on these planes."

Peter Thulesen, the head of the Danish accident investigation board, declined to be interviewed or to answer written questions about the type of wiring that short-circuited on the SAS jet.

The FAA's letter in the Danish accident report, however, reveals that the wire type was polyimide, which is often called Kapton. Boeing, which acquired McDonnell Douglas after the SAS plane was built, says Kapton is the general-purpose, or most commonly used, wire on MD-87 aircraft.

It is also the type that runs through most Boeing and Airbus jets, including the Swissair MD-11 that crashed. Short-circuited Kapton wires were found by Canadian investigators in their probe of that accident.

Cracked wire's dangers

U.S. Navy and other electrical engineering studies have shown that a crack exposing a Kapton wire's metal conductor can lead to a powerful short-circuit. Such a reaction could result in a 10,000-degree Fahrenheit electric arc jumping out a wire, a flashover and a high-temperature fire.

In October, British government investigators concluded that Kapton wire malfunctioned, triggering an electrical arc that caused a bundle of wires to catch fire on a United Airlines Boeing 767 in 1998.

The lead investigator in that crash told USA TODAY that Kapton should not be installed on new jets and that older planes found to have cracked Kapton wiring should be grounded. Both Boeing

and Airbus use Kapton wire on their new planes.

Last March, the Australian airline Qantas issued a memo prohibiting its mechanics from using Kapton as a replacement wire, citing "ongoing incidents across the world involving Kapton wire." The memo, which was obtained by USA TODAY, calls for purging of all Kapton in inventory.

Officials at FAA headquarters in Washington say there is no evidence of a Kapton problem. Data on planes still being flown don't present serious concerns about Kapton wiring, provided it is carefully installed and maintained, the agency says.

The Danish government accident report, as well as other incidents in commercial and military aviation, provide more than enough evidence of a problem with Kapton, Block says.

"After the SAS fire, FAA officials should have realized they had a problem with Kapton wiring and made some prioritization to deal with Kapton arcing," he says. "They ignored the problem, and it still festers."

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:10 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: **Swiss Air 111 changes**

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker, 18 June 01

Below shows the impact of a conscientious effort by investigators to find out what happened in an accident and the good faith efforts of an airline to prevent it from happening again. Good work by TSB and Swiss Air. Not good by reluctance of Boeing to implement the changes for all.

Note the cameras in the cargo holds; that is very good.

I look forward to the opinion of Mr. Vic Gerden to my Smith AAR for Air India Flight 182. I also have concluded wiring is causing problems that were not apparent.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
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Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sunday newspaper, 6-17-2001
Swissair optimizes MD-11-Cockpits with modifications to their electrical system - as a direct consequence of their Flight 111 Crash cause deliberations.

FROM TIM VAN BEVEREN *ZURICH*

Two and a half years later, the consequences of the crash of SR Flight 111 near Halifax N.S. have continued to affect Swissair. Their remaining 19 MD-11 airliners are being radically converted in modifications to the electrical system in the cockpit area. For over one million Swiss Francs per jet: " ...primarily it's the electrical system that is to be significantly improved " according to Swissair documents made available to Sundays newspaper. There in Zurich the crash cause for the 111 and its 229 passengers is being assumed, despite the Canadian TSB Report being anticipated for public release not before the

beginning of 2002. Already many family members of Flight 111 victims have been "paid out". So now Swissair no longer wants to wait for the outcome of the final report of the Canadian accident investigation before implementing the safety fixes that it has identified. "Safety remains our highest priority" claims Swissair speaker Urs Peter Naef regarding the planned changes. "Cost-saving measures never conflict with the required expenditures on flight safety, which underlie our "mode plus" modification program initiative."

In Canada Investigators of the Transportation Safety board (TSB) express themselves reservedly over the planned SR procedure. Investigation leader Vic Gerden: "Swissair's efforts to reduce potential safety deficiencies are well-known to us." As a crash cause, it is so far certain only that an electrical fire in the wiring-bundles was crucially responsible. Because of the fire, important systems in the cockpit failed in quick succession, without which captain Urs Zimmerman and Copilot Stephan Loew could no longer control their machine.

In a few days the technical modifications will begin and they will naturally concentrate on the known SR111 trouble areas: - significant critical wire-bundles are to be separated out and fed, via a routing with greater electrical integrity and individual isolation, into the cockpit. In SR111 these wiring harnesses ran through a single focal point described as a critical node. It was specifically within this area in the ceiling (just forward and aft of the cockpit/cabin bulkhead) that the fire had devastatingly raged. It affected not only the emergency power systems but the "last-ditch" power feeder lines to the batteries as well. Now that these systems are to be split and segregated for greatest integrity, important protections will again be in place - for example the one that controls the emergency power turbine (or ADG - air driven generator). This propeller can be unfolded from a compartment in the fuselage in an emergency and in the airflow produces

current - like a hydroelectric direct current generator. In SR111 the Canadian investigators found that this critical emergency power turbine had given out no energy. Despite the crisis, its control functions had failed to deploy it - probably because, by that time, the associated wiring had been consumed by the fire. Video cameras and smoke detectors are also being installed by this "unique to Swissair" modification program. CCTV Video cameras are being installed everywhere: in the cargo-holds, in the electronics bay under the cockpit floor - as well as behind the cabin linings. allowing the pilots a never before possible view into potential fire zones. The pictures will come up on a small 14-centimeter monitor in the cockpit. In addition more smoke detectors are being strategically positioned. The objective is that crews would no longer be condemned to helpless seated inactivity in the case of fire. Fire extinguishing agents behind the cabin linings can squirt upon any detected fire.

All Swissair aircraft are to receive a new wholly integral emergency flight attitude instrument. It is to be operable from two separate power sources and will function reliably even if all other systems have broken down (as was the case with SR111 in its last few minutes of flight). Altogether the cockpit changes are to cost 20 to 23 million Swiss Francs according to calculations of a Swiss Aviation Expert. The extensive modifications are the result of ongoing Swissair internal investigations into the accident's most likely course of events.

Shortly after the crash on 3 September 1998 a Taskforce under the leadership of retired Swissair Technical Chief Willy Schurter began its work, paralleling that being done by the official Canadian TSB Team. They sought to track down all possible causes of the disaster. The SR MD-11 Electrical Rework is in addition to other earlier measures (such as changes in checklists and procedures) - but is seen as the most important outcome of these investigations. Although latterly consulting and then in

close co-operation with the US manufacturing firm Boeing, Swissair engineers unilaterally sought to analyse all factors of the accident themselves - in order to identify any deficiencies in the original type-certificated design. In a further internal document Swissair explains: "We knew that it needed three prerequisites for the initiation and propagation of a fire: a potential ignition source (e.g. arcing wires), fuel (e.g. thermal/acoustic blankets) and oxygen (i.e. air-conditioning system ventilation or crew oxygen system lines) ". As a consequence of its insights another risk-factors conclusion of the SR Halifax Taskforce presents a frightening new dimension to SR111: "We have clearly concluded that such contributing factors exist in each type of aircraft and that it is not simply a case of being type-specific to the MD-11." These were conclusions also reached by the TSB and sent to the certifying authority (the US FAA). To date the only ramifications of SR111 reaching beyond the MD-11 are the new emergency rules retroactively affecting the STC's (Supplemental Type Certification) of Inflight Entertainment Systems on just about every type of airliner in service today.

Nevertheless, neither manufacturers Boeing nor the American FAA supervisory authority want to even recommend (let alone mandate) the new Swissair safety precautions for all remaining MD-11's. If this was to be done, such a program could then logically expand to include most other types of airline aircraft exhibiting the identical type-certification deficiencies. The first Swissair machine should be converted and ready for return to service at the end of June 2001. Before the SR MD-11 Fleet is permitted to carry passengers following the incorporation of these system safety adjustments, it must pass a strict test flight program in Zurich. Preliminary re-certification assessments would normally be monitored by representatives of the FAA (the American airworthiness regulatory authority). However these

were carried out in the spring of 1999 so that these changes could proceed without delay to SR Flight Services. But because manufacturer Boeing withheld its agreement to these changes for a long time, there have been extensive delays in their implementation. Boeing sees much of the program as "enhancements" and not necessarily as required safety modifications. These new Swissair safety initiatives have now become even more expensive: Three SR MD-11's have only just completed their heavy maintenance checks. But now they must return to the hangar yet again for extensive rework. But it's not necessarily a case of spending a dollar to save a penny. Once you look at the cost of SR111 and its potential for costing the airline industry as a whole, it may well have been the other way round.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:10 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Sudden loud sound on CVR

Dear Mr. Tucker, 20 June 01

Well, longest daylight of the year tonight, that's good.

The TSB is not presently doing further investigation of the Air India 182 accident, nor is it planning to do so. We have limited resources and a backlog of investigation work-in-process; we do not believe that cargo door or wiring problems were involved in that occurrence; and we are confident that the RCMP are doing a thorough and unbiased investigation.

Therefore,
we do not believe we would be justified in diverting our
resources to that
occurrence.

I understand the way things are now, and of course, subject to
change. There is that pesky trial coming up and the RCMP is
saying bomb in aft cargo compartment and the CASB and Kirpal
stated explosion in forward cargo compartment, not a trifling
conflict. Just where was that bomb?

I find that you have raised some interesting points that
have potential use for us in our work.

Thanks. UAL 811 is a big point.

To that end, I am personally looking
through the material you send and forwarding copies, as I think
appropriate,
to the Dir. of Investigations - Air, the Dir. of Engineering, and the
IIC of
the SWR111 investigation. If you wish, I can also forward copies
to Sgt.
Blachford or the RCMP, but it seems more appropriate for you to
do that
yourself whenever you so choose.

Thanks. More eyeballs (or ears) is always good. I respect your
personal opinion most of all. I can tell an open mind that will put
emphasis on the evidence. A sudden loud sound on the CVR is
the only direct evidence that exists for Air India Flight 182, all
the rest is circumstantial or tangible consequence. The sudden
loud sound is everything and it says, 'Not a bomb explosion' but

'Explosive decompression that matches DC 10 cargo door event."
When in doubt, I always come back to the sudden loud sound on
the CVR's on all the four early model Boeing 747s that suffered
the inflight explosions forward of the wing. The sound is
incontrovertible.

>From one of your e-mails, I now also understand the reason for
your strong
interest in advancing aviation safety, and I respect you for that.

Thanks. I met the sons of my savior pilot years later, three of the
five children he left became Navy pilots.

If you
wish to continue sending material to me, I shall continue to
process it, as
outlined above, to the best of my ability.

Thanks, an open mind is all I ask. I would not expect detailed
replies, but welcome any queries from you or your staff should
they come up.

I
simply want you to understand my position with respect to your
inputs.

I understand. Thanks again for your reply.

Sincerely,

Barry

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135
certificate holder.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:10 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: **Startle/falling reflex**

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker,

23 June 01

At 9:20 PM -0400 6/20/01, Tucker, Bill wrote:

If you

wish to continue sending material to me, I shall continue to
process it, as

outlined above, to the best of my ability.

Thank you again for the opportunity to present some of my
research and conclusions for review. I trust your two day trip was
successful.

But first: Philosophy. To explain to myself the public's intense interest in aviation safety I go back to the basics. Infants are born with reflexes, two of which are the startle reflex and the grasping reflex. (Sucking is a third.) We are not born with the fear of fire, being crushed or drowning. We are born with the fear of a sudden loud sound and we are very afraid of falling. An infant will react by jerking when startled by a loud sound and the infant will instinctively grasp on to anything when it senses a fall backwards. A baby has to learn to fear fire or being squeezed too tightly and not to breathe underwater. So, being burned in car crash, crushed in a train wreck, or drowning in a ship sinking will always have less of a priority of a plane crash because a plane crash, especially one caused by a loud noise (explosive decompression or bomb explosion), holds two of the most primal of fears, startle and falling.

Because of these innate fears, severe reactions, even hysterical, are seen by X ray machines, sniffing dogs, etc, to try to stop a small percentage of probable causes of aviation accidents; sabotage. The billions of dollars could be better spent on pilot and maintenance training to reduce the crew error and mechanical problems which contribute to most of the accidents. However, the public demands a reduction in the fear of being startled in flight and then falling and a 'bomber' in a plane is terrifying.

That is why our job and in particular your job, sir, is so very very important. We must get it right, and if not exactly right the first time, then better the second time if we have the luxury of time and hindsight.

Second: Politics. A probable cause of an airplane accident which is high profile and involves literally hundreds of millions of

dollars, thousands of jobs, and the pride of several countries is an important probable cause. Of course it is political and that means finding an answer which everyone can live with. The problem is that usually probable causes mean someone can't 'live with it.' Accidents are usually complex with no single overriding factor but, human nature being what it is, politics demands simple, quick, and easy answers. Money always enters the picture and changes things too.

I understand all these things. A probable cause of a machine accident should be independent of all those factors and focus on the actual events regardless of culture of pilot, country of origin of the manufacturer, passenger list, or religion of the owner of the airline.

My explanation for four Boeing 747 accidents involves many countries, airlines, and agencies and a lot of money. I did not pick the flight numbers of these 747 accidents, the evidence did. Of the almost 40 747 hull losses in the past 30 years, only four fit my criteria for the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation. All four flight numbers are controversial because the official explanations are incomplete and contradictory.

Because the implications and consequences of the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for four 747 accidents are profound in a political and economic sense, please do not let that bias the TSB towards or against a particular probable cause; let the evidence speak for itself and there is much of it.

Third: Evidence.

Mr. Tucker, everyone talks about evidence but what is it? I use the legal terms of direct, tangible, and circumstantial; all of which can be very powerful and persuasive. The most is the direct. Direct evidence is the eyewitness, it's the participant, it's the CVR. The CVR was designed for this purpose; to tell us what happened up there, directly. The CVR heard what happened. Let the CVR speak and it says, "I heard a sudden loud sound that does not match a bomb explosion sound but does match an explosive decompression sound in a wide body airliner when the cargo door inadvertently opened in flight." And that is paraphrased from the official CASB and Kirpal report.

Let us assume the CASB and Kirpal report on the CVR sound is correct. The implication is that the probable cause of Air India Flight 182 was not a bomb explosion but something else and that warrants further investigation.

I have done that further investigation. I can match the CVR sudden loud sound, (the only direct incontrovertible evidence,) from the DC-10 to Air India Flight 182 to United Airlines Flight 811 to Trans World Airlines Flight 800 to Pan Am Flight 103.

In addition there are many other significant evidence matches among the four to be discussed later.

Yes, the claim is enormous and runs counter to the conventional wisdom for bombs for all, some for a day and some for years.

Conclusion:

My goal is not to persuade you for certain that Air India Flight 182 was not a bomb explosion, but to persuade you that the mechanical alternative of shorted wiring/cargo door rupture/

explosive decompression/inflight breakup warrants further investigation by the TSB because of the direct evidence on the actual accident flight and the matching evidence of later accident flights. The probable cause of AI 182 may be something else other than bomb based on subsequent similar accidents, particularly United Airlines Flight 811, and that probable cause of faulty wiring is still present and unrecognized by authority.

TSB is that authority that can determine or rule out the danger. Can you and your staff spare some time to correspond with me via letter or email regarding Air India Flight 182 and its similarity to United Airlines Flight 811? They can ask rebutting questions which should be easily apparent if my explanation is bogus and I can reply with official documentation to support all my claims.

7.18 Summary of matching evidence between Air India Flight 182 and United Airlines Flight 811 specifically: From Smith AAR for AI 182:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. Section 41 retrofit not done
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area

- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched
- AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)
- AE. Outwardly peeled skin on upper forward fuselage
- AF. Rectangular shape of shattered area around forward cargo door
- AG. Forward cargo door fractured in two longitudinally
- AH. Status of aft cargo door as latched
- AI. Passengers suffered decompression type injuries

- AJ. At least nine missing and never recovered passenger bodies
- AK. Initial official determination of probable cause as bomb explosion.
- AL. Initial official determination modified from bomb explosion
- AM. Structural failure considered for probable cause
- AN. Inadvertently opened forward cargo door considered for probable cause
- AO. Takeoff after sunset on fatal flight
- AP. Takeoff after scheduled takeoff time on fatal flight

At 9:20 PM -0400 6/20/01, Tucker, Bill wrote:

To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation.

I appreciate that sir, they are the experts and can quickly discern if my shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation warrants further attention by TSB.

If your staff asks the questions, I will try very hard to provide the answers; I've had twelve years at it.

'Not to know is bad. Not to want to know is worse. Not to hope is unthinkable. Not to care is unforgivable.'" - Nigerian saying.

Mr. Tucker, I believe you want to know, you hope to find out, and you care. I do too. Thanks again for listening to me.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
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From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **DI-Air, DE, IIC, AITF**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
June 01

23

Well, it's the 16th anniversary of Air India Flight 182 today. After reading and rereading the CASB and Kirpal reports so many times over the past years I can almost see and hear the Boeing 747s involved as they preflight, taxi, takeoff and land. There was the 747 going to Tokyo, the 747 from Tokyo to Bangkok, the 747 going to Toronto, the 747 going from Toronto to Montreal and

thence to London. Four Boeing 747s; all safe except one, Air India Flight 182. All four were supposed to have bombs on them. Add in Pan Am Flight 103 and Trans World Airlines Flight 800 and United Airlines Flight 811 which also were reported to have bombs in them and there were a total of seven Boeing 747s that had or were to have bombs on board at one time or the other. And of course, the bombs never went off when they were supposed to, either too early or too late or not at all or an explosion mistaken for a bomb. All of the four fatal accidents are intertwined with each other with Air India Flight 182 and Pan Am Flight 103 often relying on each other to support the bomb explanation.

Mr. Tucker, this conspiracy nonsense is contradictory, unproductive and non-scientific; I would prefer to leave it to the conspiracy people to play with, conspiracy people meaning the police, RCMP, FBI, and Scotland Yard who are paid to see plots everywhere.

I see singed metal, loud sounds on CVR, paint smears, twisted metal, broken turbine blades, fodded engines, and a forward cargo door frayed and damaged from an outward force lying on the ocean floor after a fall of five nautical miles from an explosion in flight leading to a total breakup, the nightmare come true for all of us pilots.

From CASB report:

All cargo doors were found intact and attached to the fuselage structure, except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have

been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed.

At 9:20 PM -0400 6/20/01, Tucker, Bill wrote:

To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

Thank you again, Mr. Tucker, for sending appropriate material to your staff; their opinions carry much weight. I'm curious as to what they are. The RCMP have acknowledged receipt of my Smith AAR for 182 that you sent them. Thank you for that, Mr. Tucker, they were sure to read it since it came from you. Sgt. Blachford has written me that he is taking the time to digest it and the earliest he can meet with me to discuss it is in mid August in California. I welcome all authorities to review my every email and all documents I create.

In regard to the specific departments such as Director of Investigations-Air, Director of Engineering, and the Investigator in Charge of Swiss Air 111, permit me to write as if I were addressing those gentlemen directly. I assume they have read my Smith AAR for Air India Flight 182 which lays out the premise of the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation and gives the

supporting documentation.

Director of Investigations-Air: I can understand the reluctance of become involved with a 16 year old crash. The evidence may be gone or altered, witnesses have moved or died, memories have faded, and who would want to pull a scab off a partially healed wound? However, Air India Flight 182 is unique in that the evidence is as fresh and accurate as ever in videotapes and high quality 35 mm film, the only direct witness is the CVR tape and it's memory is as clear as ever, and the wound is about to be opened in the Canadian court system in February.

My goal is not to persuade the TSB-Air, that faulty wiring caused the forward cargo door of AI 182 to inadvertently open in flight but to persuade TSB that a supplemental/update investigation report is warranted for reasons based on subsequent new evidence in a similar accident, United Airlines Flight 811. The TSB will be called to explain what happened to AI 182 at trial and, most importantly, a danger that existed in 1986 on this very night, still exists today, faulty wiring in early model Boeing 747s involved with the cargo door unlatch motor. Air India Flight 182 is not gone and forgotten; it is in the forefront of aviation safety.

To put it another way: Why is a update supplemental investigation warranted? The original dual investigations of CASB and the Kirpal inquiry of 1986 gave conflicting conclusions which left many questions. A similar accident occurred later which gave a probable cause that was not the same as the Kirpal inquiry finding. Three men are on trial for their life's freedoms which will require a full explanation of what happened to the airplane they are accused of blowing up and that means the TSB, and probably the Director of Investigations-Air, will be called to give his best accounting of the events. I submit

it is prudent, well prepared, and thinking ahead to incorporate the latest aviation safety data into an official opinion about a controversial accident. I call it 'accident' because it certainly is not an 'incident.' Who is the most qualified of all on the planet to give the most respected opinion about the aviation accident of AI 182? The police? A foreign judicial authority? The press? The NTSB? I believe the TSB is and that means Director of Investigations-Air. I would like to know, as many would, what is the current thinking by TSB-Air about Air India Flight 182, it is very important. The still active opinion by CASB is no bomb; has that changed? I respect the CASB opinion of 1986; they refused to be rushed into a probable cause that did not have the scientific support to uphold.

And most importantly, the updated supplemental investigation can rule in or rule out the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation because, if ruled in, then a clear and present danger exists to the flying public in early model Boeing 747s of which approximately 550 are still active.

The original CASB report is correct as far as it went. It made conclusions based solely on the evidence and although many on the team may have believed the cause of the explosion in the forward cargo compartment was bomb caused, the evidence was not there to support that conclusion, so the prudent and cautious conclusion was made of an explosion of undetermined cause, a judgment proven correct years later. The Canadian aviation accident authorities have made no errors of fact and they made no errors of judgment. There is nothing for the Canadian aviation accident investigators to correct, only supplement and clarify. What was the cause of the explosion in the forward cargo compartment the CASB said caused the inflight breakup? Only

now, 16 years later and three similar accidents later is the cause strongly suggested to be explosive decompression by a ruptured open forward cargo door at one or both of the midspan latches probably induced by faulty Poly X wiring.

The shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation is plausible, it is reasonable, it has precedent, and it has actual direct and tangible evidence to support it. How many matches does it take for one aircraft accident to give a suspicion that another had the same probable cause? It depends on the actual matches. Are they trivial or important? Air India Flight 182 and United Airlines Flight 811 have many significant ones, most of which are relevant to the inflight breakup. Both flights were:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. (Intentionally left blank.)
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders

- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched
- AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)
- AE. Outwardly peeled skin on upper forward fuselage
- AF. Rectangular shape of shattered area around forward cargo door
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- AH. Status of aft cargo door as latched
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- AK. Initial official determination of probable cause as bomb explosion.
- AL. Initial official determination modified from bomb explosion

AM. Structural failure considered for probable cause

AN. Inadvertently opened forward cargo door considered for probable cause

I submit to the Director of Investigations-Air that the above 38 officially documented matches between Air India Flight 182 and United Airlines Flight 811 are enough to say they may have both had the same probable cause for their fatalities after their inflight breakup. Is that a reasonable premise to make? Would that thus warrant an updated supplemental report to the CASB report to explain the mystery cause of the explosion? I assume I would be asked for further proof that what happened to United Airlines Flight 811 actually happened to United Airlines Flight 811. I can do that and invite queries.

United Airlines Flight 811 was incontrovertibly not a bomb explosion, incontrovertibly not a missile hit, incontrovertibly not a center tank explosion, and most incontrovertibly an inadvertently opened forward cargo door in flight probably caused by an electrical fault. United Airlines Flight 811 is the model for Air India Flight 182 except UAL 811 came back to tell what really happened. We must take advantage of that stroke of luck and the luxury of hindsight.

For Investigator in Charge of Swiss Air 111 (I assume Mr. Vic Gerden), I offer a probable cause for Air India Flight 182 of Poly X wiring, in the presence of moisture in the forward cargo hold, shorting on the door unlatch motor. Is that realistic? I believe that based on Trans World Airlines Flight 800 and Swiss Air 111 the knowledge of the faults of polyimide insulation in aircraft wiring is now well known. Is it realistic to make the supposition that the Kapton type wiring in Air India Flight 182 failed. <http://>

www.wire.nasa.gov/ is a new site demonstrating that the knowledge learned in Swiss Air is being applied across all aviation related areas, even space.

AA Flight 96 over Windsor Ontario in 1972 showed the potential catastrophic effects of an open cargo door in flight when the DC-10 almost went out of control and crashed when the small aft cargo door opened in flight. That problem was not fixed and it happened again two years later out of Paris and the Turkish airlines DC-10 cargo door opened in flight and the plane augered in killing all.

For me to say an open cargo door in Air India Flight 182 caused the accident is not unrealistic. Is a shorted wiring/cargo door rupture/explosive decompression/inflight breakup a reasonable premise to make? I would assume I would be asked why do I say such a thing and told to show proof. I can do that and invite queries. I would hope I have succeeded in showing that an alternative to the current bomb explosion explanation is plausible, reasonable, has precedent and therefore an update/supplemental report is warranted.

For the Director of Engineering I would offer explosive decompression and the 300 knots IAS and all its power on a weakened airframe with the huge hole in the nose forward of the wing around the forward cargo door as described in text and shown by a drawing in the Kirpal report to explain the inflight breakup.

I know an engineer understands the power of 8.9 PSI differential between inside and outside Air India Flight 182 and the always present 96921 pounds of pressure on the 10890 square inches of the 99 inch by 110 inch cargo door. There are ten latches holding

the 99 inch slice of fuselage closed. The bottom eight latches are close together and have additional locking sectors to prevent inadvertent back driving of the cams. The mid span latches are alone and in the middle of the 99 inches and have no locking sectors. The shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation offers the premise and documentation for the ruptures at one or both of the midspan latches of the forward cargo door of Air India Flight 182 which caused the explosive decompression causing the huge 30 foot by 40 foot hole in the nose on the right side as shown in drawings in the CASB report.

I know an engineer understands the power of 300 knots. 300 knots is higher than the highest wind on earth and would tear off or crumple the nose of a weakened airframe after the explosive decompression. Non-aviation oriented persons think that driving a car at 60 MPH and having a door open is a minor event with a little noise and small pressure on eardrums and pull over and close the thing. A Boeing 747 at 31000 feet at 300 knots having a huge door open is another matter with a potential total inflight breakup occurring. Is that a reasonable premise to make? I assume I would be asked to provide documented evidence to demonstrate what I believe the sequence of destruction of Air India Flight 182. I can do that based upon the inflight breakups of two other early model 747s that suffered hull rupture in flight near the forward cargo door, Trans World Airlines Flight 800 and Pan Am Flight 103.

For the Air India Task Force of the RCMP (Sgt Blachford) I would ask exactly where was this 'bomb explosion' you have accused three men of planting in Air India Flight 182? Is the bomb explosion in the forward cargo compartment as stated by the Kirpal Report? Is it in the aft cargo compartment as stated by

John Garstang recently who has been seconded to the RCMP for over a decade? Was the bomb loaded in Vancouver or in Montreal? Why does the RCMP say a bomb explosion anywhere in Air India Flight 182 when the Canadian aviation accident investigation authorities of the time declined to say it was a bomb explosion and would only state an explosion of undermined origin although the AAIB investigator flatly stated the explosion was not a bomb but an explosive decompression of a cause yet to be determined? The RCMP may not believe it is important to state exactly where a 'bomb' exploded on a plane but aviation accident experts know it is very important as even the placement of a few feet of an inflight explosion port or starboard has serious consequences. The aft cargo compartment and the forward cargo compartment are separated by many hundreds of feet and there is no interconnecting tunnel or any way for passengers to get into the cargo compartments in flight.

To say a bomb in the forward cargo compartment means the bomb was not loaded in Vancouver but in Montreal because all the baggage loaded in Vancouver went into the aft cargo compartment and the Montreal baggage went into the forward cargo compartment.

To say a bomb exploded in the aft cargo compartment is to contradict the CASB and Kirpal investigators who flatly said there was no explosion in the aft cargo compartment and they looked very closely for such an event. Is there any new evidence to make such a startling claim?

To say a bomb explosion at all is to second guess the Canadian experts on aviation accidents and side with an Indian judicial official who has no accident investigation experience and was under intense political pressure to declare the cause a bomb, even

so far as to dismiss the Indian Aviation Accident Investigator, Mr. Khola, and replace him with Judge Kirpal.

The AITF RCMP position is fraught with contradictions, relies heavily on circumstances of events far away, and not supported by the direct and tangible evidence. I look forward to meeting with Sgt Blachford in mid-August to sort out the confusion. I will say that the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation does satisfactorily answer all the incongruities and resolves all the contradictions listed above. It is the answer to the cause of the accident but may not be the answer they want to hear or believe. I have hopes there will be a real investigator there in the AITF who will follow the factual clues and not the media conjecture or conspiracy fantasies. It's never too late to get it right.

Many disagree with my explanation for Air India Flight 182. Disagreement is not rebuttal. I disagree with the RCMP but offer documentation and interpretation of evidence to rebut their bomb explosion explanation. No one has ever offered evidence to rebut the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation although many have offered disagreement. I shrug off disagreement but welcome attempts at factual rebuttal.

June 23rd, it's a date I always remember, just like December 21, July 17, and February 24, dates for early model Boeing 747s that suffered hull ruptures in flight that all gave a sudden loud sound on the CVR and all quickly followed by an abrupt power cut to the recorders.

Thank you again, sir, for permitting me to present some of my years of research and conclusions for your consideration.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: RE: Sudden loud sound on CVR

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,

25 June 01

I shall forward this to all of
them so they can note your addresses and your receptiveness to
any follow-up
queries they may have

Thank you, sir.

John G was loaned
or seconded to the RCMP on several occasions (maybe 3 or 4)
for short terms

of about 1-2 months - most recently this spring. Otherwise, he has continued working as a valued employee in our Engineering Branch.

Correction noted, my error, thank you.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Consensus on Location of explosion in Air India Flight 182 Part One

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Mr. Tucker,
July 01

2

Please allow me to present Part One of three parts of the shorted

wiring/forward cargo door rupture/explosive decompression/ inflight breakup explanation for Air India Flight 182 as if I were in a conference room with members of the TSB listening to me for a period of time. Part One is to establish a consensus on the location of the explosion in the forward cargo compartment on the right side that led to the inflight breakup. Part Two is to establish a consensus on the cause of the explosion. Part Three is to present conclusions, recommendations, and implications of the explanation.

As in any meeting, the participants can sit there and daydream until it's over and walk out with no comment except muttering under their breath, "Why do I have to put up with this crap?"

Or they can actively engage the speaker by heckling, asking pointed questions, or giving added confirmation to the ideas offered by their personal experiences. I accept all responses and will try to answer them appropriately. May I begin, sir?

Participants:

Mr. Bill Tucker, Director General, Investigation Operations.

Director of Investigations-Air

Director of Engineering

Mr. John Garstang, Engineering Branch

Mr. Vic Gerden, Investigator in Charge, SWR 111.

John Barry Smith, Independent Aircraft Accident Investigator.

Thank you all for allowing me this time to present an explanation for the possible cause of the fatal inflight breakup of Air India Flight 182 on 23 June, 1985. My goal is not to persuade you of the higher standard of 'probable cause' but to persuade in the easier standard of 'possible cause' for the accident. You alone

have access to the still accurate evidence of the inflight breakup in high quality film and data recorders which can raise the cause to 'probable' if applicable.

I would ask the TSB that if my three part presentation persuades that there is a new, possible, plausible, mechanical cause with precedent, then an updated supplemental investigation and report to the 1986 CASB AAR is warranted to rule it in or rule it out.

That is my goal; To have professional aviation safety officials of authority conduct an updated supplemental accident report on Air India Flight 182 to consider a possible cause of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation based upon matching evidence of subsequent similar accidents, in particular, United Airlines Flight 811 of 1989. The goal is to be reached in three parts: Part One is the determination of the location of the explosion and Part Two is the source of that explosion. Part Three is conclusions, recommendations, and implications. This is Part One.

If the new possible cause is correct, a consequence is that a present danger exists to the flying public because the fault of shorting wiring in the cargo door unlatch circuit still exists in the remaining 500 or so early model Boeing 747s still in service which would require airworthiness action to prevent a possible reoccurrence.

Why else to conduct a supplemental investigation into Air India Flight 182 other than imminent safety issues? Well, it happened a long time ago and much has been learned in the meantime that may clarify what exactly happened back then to answer the questions raised by initial reports, such as the unstated cause of the explosion in the forward cargo compartment on the right side.

Also, it is one of the most high profile, interesting, tragic, controversial, and mysterious plane crashes in Canadian history, right up there with the Arrow Gander crash and SWR 111, and current TSB investigators should have an opportunity at explaining it. Also, there are conflicting opinions of the probable cause among the authorities of CASB, AAIB, RCMP, and Indians which should be resolved. Also, there is an upcoming trial which will certainly ask questions of the TSB about what happened that day to that aircraft and having updated opinions on latest news already prepared for testimony would be most prudent.

The Smith AAR for AI 182 with appendices is my major item of reference as it lays out the case, has references, and includes supporting documents. I assume you all have copies of that 116 page report. If not, please tell me at barry@corazon.com and I will email the 1.2 meg PDF file to you. It includes color pictures, drawings, charts, and sketches as well as text which are very important to the understanding of the explanation.

Other documents which are used for support of the wiring/cargo door explanation are: The CASB report and the Kirpal Report for Air India Flight 182, NTSB AAR 90/01 and 92/02 for United Airlines Flight 811, AAIB 2/90 for Pan Am Flight 103, and NTSB AAR 00/03 for Trans World Airlines Flight 800. All are available electronically and can be sent to you by email; please ask and I will provide them to you.

In this first meeting I would like to get us all to reach a consensus on the specific location of the explosion in Air India Flight 182. The sought after consensus is that of an explosion in the forward cargo compartment on the right side of Air India Flight 182 which caused the inflight breakup that led to its destruction.

All opinion agrees there was a sudden explosion in Air India Flight 182 which led to the inflight breakup. There is some dispute as to where in the aircraft the explosion occurred and what caused it. I will attempt to clarify where and what in these three presentations.

Specific data about Air India Flight 182: Sequence in construction:#330, Construction Number 21473 Date completed: 19 June 78, Type Aircraft: B747-237B Type of wiring: Poly-X (Raychem Corp), accident date: June 23 1985

The CASB, Kirpal Inquiry, the AAIB representative, and this investigator all concluded that the explosion did occur in the forward cargo compartment on the right side and all ruled out any explosion of any cause in the aft cargo compartment. That conclusion of the locus of explosion in the forward cargo compartment on the right side was based upon the physical evidence of shattered and frayed forward cargo door, inflight damage on right side such as the leading edge of right wing and the direct evidence of the CVR sudden loud sound. The ruling out of other locations such as cockpit and passenger cabin was determined by absence of any necessary corroborative evidence.

The possible location of an explosion from any source in the aft cargo compartment was extensively evaluated at the time based upon the subsequent accident of JAL 123 in which the aft pressure bulkhead cracked, caused an explosive decompression which led to loss of control of the Boeing 747 and its destruction. The removal and reinstallation of the aft cargo door stops before the fatal flight of Air India Flight 182 also caused intense

examination for any type of explosion in the aft cargo compartment. There was suspicion of a potential problems in the aft section of Air India Flight 182 and thus the area was extensively examined and evaluated for an explosion by all authorities. Evidence of ruptures were found in both cargo compartments but no evidence of an explosion of any source was found in the aft cargo compartment, only the forward. All of the aft area of Air India Flight 182, especially the aft cargo compartment, was examined by video cameras and 35 MM film and evaluated by all investigators for an explosion but none was found. The unanimous undisputed opinions of all authority was of an explosion in the forward cargo compartment and no explosion in the aft cargo compartment. The evidence against an explosion of any type in the aft cargo compartment can be summed up thusly:

- A. Absence of required corroborative evidence to support the assertion of aft cargo compartment bomb explosion.
- B. Transponder off simultaneously as FDR and CVR
- C. Inflight damage by flying debris to pieces of airframe well forward of the aft cargo compartment such as leading edge of wing and engines.
- D. Overpressures in both cargo compartments, not just the aft.
- E. Intact aft and bulk cargo doors.
- F. Much straight and undamaged fuselage skin in the aft section.
- G. Conclusive evidence of an explosion in the forward cargo compartment to explain the inflight breakup of Air India Flight 182.
- H. General trajectory patterns from wreckage debris locations that match two other early model Boeing 747s, Pan Am Flight 103 and Trans World Airlines Flight 800, that experienced inflight breakups amidships from an explosion in or near the forward cargo compartment, not the aft cargo compartment, as

confirmed by the aircraft accident investigation authorities of the UK AAIB, and the USA NTSB.

A quote from the official Air India Flight 182 accident report states clearly:

" 2.11.6.5 Target 47 - Aft Cargo Compartment

This portion of the aft cargo compartment roller floor was located between BS 1600 and BS 1760. Based on the direction of cleat rotation on the skin panel (target 7) and the crossbeam displacement on this structure, target 47 moved aft in relation to the lower skin panel when it was detached from the lower skin. No other significant observation was noted. There was no evidence to indicate characteristics of an explosion emanating from the aft cargo compartment."

Another opinion has recently been offered by Mr. John Garstang, while acting as an independent investigator and assigned and assisting the RCMP AITF, that the explosion took place in the aft compartment and the source was a bomb. His implication is that no explosion of any cause took place in the forward cargo compartment. No new evidence has been presented to refute the earlier Canadian, Indian, British conclusions. If Mr. Garstang has evidence that explains how the Canadians, the British, the Indians, and this investigator got the location of the explosion wrong, then now is the time to present it among fellow investigators and not later on the witness stand during a highly public trial with inquisitive attorneys and incredulous reporters. A rebuttal to the Garstang report of 16 March 2001 with the conclusion of bomb in the aft cargo compartment is presented in

the Smith AAR of AI 182 of 1 May 2001.

Since the bomb explosion in the aft cargo compartment explanation comes from the RCMP which is primarily a police agency seeking criminals, an analogy comes to mind:

There was once a bank with two vaults which had no access between them. One was called the forward vault and the other the aft vault. One day it was discovered that all the money was gone from both vaults. Investigators investigated.

One group determined that the missing money was gone from the forward vault because it was stolen by three criminals but the missing money from the aft vault was not stolen.

Another investigator said the missing money from the forward vault was not stolen but disappeared for a reason yet to be determined and the missing money from the aft vault was also not stolen.

Another group said the money was gone from both vaults, no reason was given for the missing money in the forward vault but missing money not stolen from the aft vault.

Years went by as yet another group assumed a crime and sought the thieves of the missing money in the forward vault but did not search for any thieves for the missing money in the aft vault as everyone agreed the missing money in the aft vault was not stolen and therefore there were no thieves to catch.

Another independent investigator came upon the event with research of other similar missing money from banks and matched similar events and concluded the money was missing from the

forward vault because of a clerical error which has happened before and the missing money from the aft vault was a side effect. There were no crimes nor thieves of either vaults.

And then, sixteen years after the event, three men are arrested as thieves for robbing the...the...aft vault!

And the agency with the most expertise about missing money in aft and forward vaults ponders whether to become involved.

I ask that agency to become involved and determine where and why the money went from both vaults to supplement their previous report of no money stolen from the aft vault.

We investigators are all on the same side on this issue of safety and the cause of accidents; we are all well intentioned; and we all want the right answers; honorable disagreement is normal and can usually be resolved by additional interpretation of facts. All factual criticism or rebuttal is welcomed via email or telephone or letter.

Let me show you below what a real bomb explosion looks like when it goes off in the aft cargo compartment of an early model 747. This event did not happen to Air India Flight 182 because this evidence of the Bruntingthorpe real bombing is absent in the wreckage of Air India Flight 182.

The above bomb explosion would have been heard on the CVR, there were not large skin pieces near the explosion, there was explosive residue, the damaged area was very large, and the leading edge of the wing was not damaged. None of that corroborative bomb explosion damage was seen in Air India

Flight 182 wreckage.

Then let me show you below what a real electrically caused open forward cargo door in flight does to an early model 747, United Airlines Flight 811:

Above is United Airlines Flight 811 from NTSB AAR ('tremendous explosion' in the forward cargo compartment on the right side, as flightcrew was quoted).

Above is Air India Flight 182 from official AAR and matches United Airlines Flight 811, not the Bruntingthorpe bombing explosion evidence. Note the split longitudinally forward cargo door of Air India Flight 182 which matches exactly the recovered split cargo door of United Airlines Flight 811 picture below from NTSB AAR.

The corroborative real evidence which is present and matches Air India Flight 182 and United Airlines Flight 811 is listed below:

- A. Boeing 747
- B. Early model -100 or -200

- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. (Intentionally left blank.)
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo

door

AC. Midspan latching status of forward cargo door not reported as latched

AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)

AE. Outwardly peeled skin on upper forward fuselage

AF. Rectangular shape of shattered area around forward cargo door

AG. Forward cargo door fractured in two longitudinally

AH. Status of aft cargo door as latched

AI. Passengers suffered decompression type injuries

AJ. At least nine missing and never recovered passenger bodies

AK. Initial official determination of probable cause as bomb explosion.

AL. Initial official determination modified from bomb explosion

AM. Structural failure considered for probable cause

AN. Inadvertently opened forward cargo door considered for probable cause

Gentlemen, the immediate goal of this meeting is to gain consensus on the specific location of the explosion in Air India Flight 182 which caused the inflight breakup. Can we all agree at this time that the location was not the cockpit, the passenger cabin, the center fuel tank or the aft cargo compartment, all possible locations but ruled out by lack of corroborative evidence? Can we agree at this time, for the purposes of discussion, that the Canadians, the British, the Indians, and this independent investigator were correct and that the location of the explosion was in the forward cargo compartment on the right side based upon the physical evidence?

Assuming we do agree on the location of the explosion, what

was the cause?

Well, that is the question isn't it? Here's some choices of explosion source: Bomb, center fuel tank, missile hit, midair collision, and explosive decompression from hull rupture from metal fatigue of open window or cargo door.

If it is determined that the cause of the explosion was a bomb explosion, then I will be glad to stand around the water cooler and swap conspiracy tales of spies, anonymous informants, bribes for testimony, knocked off witnesses, sabotage in suitcases, x-ray machines that don't work and sniffing dogs that can't smell, explosions in airports far away, army assaults on temples, and bombs that never seem to go off when and where they are supposed to when set by incompetent terrorists who do happen to sneak two bombs onto two Boeing 747s on the same day at the same large metropolitan airport.

Until then, I shall stick to the physical evidence in airplane crashes because, after all, Air India Flight 182 was an airplane crash, not a bank robbery or an assassination or a truck hijacking; all crimes which might include the above ingredients for a good action adventure movie.

Let me end my Part One presentation at this time by assuming, for the purposes of further discussion to Part Two, a consensus has been reached that the specific location of the explosion in Air India Flight 182 which led to its inflight breakup was in the forward cargo compartment on the right side. Unless rebuttal or criticism is offered, Part One is therefore completed.

The presentation will continue for Part Two in a few days via email for the determination of the cause of the explosion in Air

India Flight 182. Let us use all the tools available to us in 2001 to find out the previously unstated cause of that powerful explosion and clear up that mystery presented by the CASB. I welcome all criticism, contrary opinion, or comment on data and conclusions presented so far.

After a meeting, there are usually informal talks among the participants and the presenter, commonly about personal stuff. The possible abrasive personality and lack of people skills of this discoverer are irrelevant to the determination of the correct probable cause of Air India Flight 182 but the style and demeanor of the messenger is always looked at and questioned. People like me who offer contrary perceptions to conventional wisdom are seldom charmers as we realize our egos are not important, only the facts, data, and evidence and the conclusions that they imply so we bluntly present the facts and implications with little regard for etiquette. Forgive any rudeness from me, please.

Anyway, here's my aviation history:

Commercial pilot, instrument rated, former FAA Part 135 certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650 hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

And here's my story. My life was saved in 1967 when my pilot thought of me during stress and told me to eject from our on-fire two seat carrier jet during night landing practice. We both

ejected; I lived and he died. My chute opened two seconds before I landed but he did not have those two seconds to open and he died of multiple traumatic injuries when he hit the ground. I became interested in aviation safety. When Pan Am Flight 103 occurred I immediately suspected explosive decompression from a hull rupture and could not shake that belief based on news reports. A few months later United Airlines Flight 811 happened and I immediately made the match. I continued to investigate although authorities had quickly called Pan Am Flight 103 a bomb and United Airlines Flight 811 an improperly latched forward cargo door. My cargo door explanation for both accidents was published in Flying magazine in 1992 but nothing came of it. In 1995 the internet allowed me to do more research and I obtained AARs for 103 and 811. I tried to refute the open cargo door explanation but could not because the evidence was not there; in fact the reports made it even clearer. During this time I was writing to authorities of my alarm at the potential risk from the cargo door event happening again. It did. On July 17, 1996, Trans World Airlines Flight 800 suffered an inflight breakup that left all the similar evidence of United Airlines Flight 811 and Pan Am Flight 103. I made the immediate UAL 811 match and informed the authorities. Again Trans World Airlines Flight 800 was called a bomb; a probable cause which remained primary for a year and a half. Right after the Trans World Airlines Flight 800 event and again using the internet search abilities, I was able to research all the hull losses of Boeing 747s and sadly Air India Flight 182 jumped right out as another possible shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup event because of all the similarities of evidence to the other three, in particular United Airlines Flight 811, the incontrovertible cargo door caused event and incontrovertibly not a bomb explosion, although it was initially thought to be a bomb.

The evidence picks the flight numbers, not me, and if you know of any more early model Boeing 747s that have experienced a hull rupture in flight from an internal explosion forward of the wing which leaves a sudden loud sound on the CVR followed abruptly by a power cut to the recorders, a foddled engine number three, inflight damage to right wing and right horizontal stabilizer, missing midspan latches and a shattered forward cargo door, please tell me so I can add that flight to the list of four, as all of them have most of this matching evidence.

They all had an inflight explosion near the forward edge of the wing and they were all thought to be bomb explosions but now have differing official explanations: Unstated and bomb for Air India Flight 182, bomb for Pan Am Flight 103, center tank explosion for Trans World Airlines Flight 800, and electrically caused open cargo door for United Airlines Flight 811. My common explanation for the common evidence is the common cause which unifies all, the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

However, that conclusion for all four 747s is for later; at this time there is but one tree under examination in this forest of four, Air India Flight 182. Based solely on the evidence of that aircraft wreckage and without comparing others, it was difficult to determine a probable cause for the explosion in 1986. All the investigators at the time did the best they could since they did not have the benefit of hindsight as we do. Explosive decompression caused by an inadvertently opened forward cargo door mimics a bomb explosion; the crew of United Airlines Flight 811 even reported to the tower they had a bomb go off after hearing the noise and looking at the damage. It's understandable to call the cause of Air India Flight 182 a bomb explosion at first blush.

I must emphasize that the Canadian investigators in 1986 have made no errors of fact or judgment. There is nothing for the Canadians to correct or apologize for; they were right as far as they went. Their caution in stating the cause of the explosion as unknown was warranted, justified by lack of corroborative evidence, and proven correct these many years later. It is now possible to further clarify that earlier CASB report to state the cause of the explosion by a TSB supplemental report based on the similar accidents of the ensuing 16 years. There is still no official Canadian aviation authority modification to the unstated cause for the explosion and therefore the CASB report must be considered the current Canadian aviation authority opinion.

Why me as discoverer? I am able to be objective because I am not: An airline employee, an attorney, work for Boeing, work for government, not a police officer, and not a family member of a victim. It is that objectivity plus my experience of 40 years in aviation and living through an aircraft accident that lets me face the unpleasant truth that Boeing airliners have a fatal design flaw of outward opening nonplug cargo doors and faulty Poly-X wiring which have caused four early model Boeing 747 accidents. My job or reputation or welfare of my family is not on the line and I am able to speak frankly. I well understand the profound implications of the wiring/cargo door explanation for these controversial accidents. So be it. Safety is the priority and let the chips fall where they may.

I am able to pursue my belief in aviation safety, specifically hull ruptures in early model Boeing 747s, because I: Personally have been in a sudden night fiery jet fatal airplane crash, retired on a fixed income which gives me the time for research, and love a good mystery. Airplane crashes are always a mystery, sometimes

hard to solve and sometimes easy. They are never supposed to happen but do; that's the mystery.

As accident investigators we all have a strong sense of justice and abhor injustice; in our case, the injustice of infants, children, and adult men and women who die in accidents that we know are preventable if we can only find out the causes so that they can be fixed and further deaths be prevented. We also know that if we get the probable cause wrong, then further injustice may occur; in this case, men imprisoned unjustly and reoccurring wiring problems in early model Boeing 747s.

We all have the common interest in solving those mysteries. You gentlemen have devoted your lives, your education, and your careers to the task; I respect you for that and thus offer my years of research, analysis, and conclusions to you for consideration and possible action.

Thank you for reading.

Please contact me at any time for any queries or discussion by phone, letter, or email at
John Barry Smith
(831) 659-3552 phone
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Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sincerely,
Barry

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Consensus on Cause of explosion in Air India Flight 182

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
July 01

5

Please allow me to present Part Two of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 as if I were in a conference room with members of the TSB listening to me for a period of time. Part Two is to establish a consensus on the cause of the explosion in the forward cargo compartment on the right side that led to the inflight breakup. May I begin, sir?

Participants:

Mr. Bill Tucker, Director General, Investigation Operations.
Director of Investigations-Air
Director of Engineering
Mr. John Garstang, Engineering Branch
Mr. Vic Gerden, Investigator in Charge, SWR 111.
John Barry Smith, Independent Aircraft Accident Investigator.

Thank you all for allowing me this second time to present an explanation for the possible cause of the fatal inflight breakup of Air India Flight 182 on 23 June, 1985. My goal is to persuade that there is a new possible, plausible, mechanical cause with precedent that exists for Air India Flight 182 and therefore an updated supplemental investigation and report to the 1986 CASB AAR is warranted.

References:

Smith AAR for AI 182 with appendices, CASB report and the Kirpal Report for Air India Flight 182, NTSB AAR 90/01 and 92/02 for United Airlines Flight 811, AAIB 2/90 for Pan Am Flight 103, and NTSB AAR 00/03 for Trans World Airlines Flight 800. All are available electronically and can be sent to you by email; please ask and I will provide them to you.

Part Two: Consensus on Cause of explosion in Air India Flight 182

Assuming that we agree for purposes of discussion that the location of the explosion which caused the total inflight breakup of Air India Flight 182 was in the forward cargo compartment on the right side, what was the cause of that explosion?

Well, that is the key question, because once we determine the probable cause, it can be corrected so that it does not reoccur. What were the opinions of other investigators? As it turns out, there is conflict, contradiction, and confusion among all.

The Canadian aviation accident investigators in the CASB in 1985/86 determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side but declined to state the cause of that explosion although under much pressure to declare it a bomb explosion. Their conclusions are understandable based upon the physical evidence for the location of the explosion and the lack of evidence to determine the cause. The later similar event of United Airlines Flight 811 did not happen until four years later. Explosive decompression by hull rupture leaves no residue, or timer, or metal casing of a bomb, or causes burns; all evidence lacking in Air India Flight 182 to support a bomb explosion explanation and therefore the bomb cause was not stated by the prudent Canadian investigators.

The British representative from the AAIB determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side and stated the cause of that explosion was not a bomb explosion but of an explosive decompression from a cause yet to be determined. Those conclusions are understandable based upon the physical evidence for the location of the explosion and the direct evidence of the sudden loud sound of the CVR which ruled out a bomb explosion and ruled in an explosive decompression by hull rupture of unknown cause based on what was known about wiring and cargo doors in 1985/86.

The Indian judicial investigating authority, Judge Kirpal, in the Kirpal Report determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side and stated the cause of that explosion to have been a bomb explosion. His findings are understandable based upon the physical evidence for the location of the explosion and the circumstantial evidence to deduce the cause as a bomb. In addition, the three assumptions upon which Judge Kirpal based his finding of a bomb explosion may have been valid in 1985 but were later shown to be incorrect in 1989 by a similar accident. The original aviation accident investigator, Mr. Kholá, was replaced within days of the accident by a judicial officer of the Court, Judge Kirpal, and therefore the aircraft accident report became a legal inquiry which was denied the priority inputs of aviation accident expert investigators who might have been expected to be less political and more prudent in stating the cause of the mystery explosion.

The recent declaration by a TSB investigator assigned to the RCMP, and at the behest of the AITF, that the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the aft cargo compartment and stated the cause of that explosion to have been a bomb explosion is not understandable because of the lack of new evidence or any reasoning which refutes the previous conclusions and findings of the Canadian, British, and Indian investigating authorities. This unsubstantiated conclusion of a bomb explosion in the aft cargo compartment also concludes there was no explosion of any cause in the forward cargo compartment which directly contradicts the tangible evidence of such an explosion and the opinions of the other accident investigators.

The conclusions reached by this independent aviation accident investigator that determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side and stated the cause of that explosion was not a bomb explosion but of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup sequence of events is understandable based upon his personal experiences in a sudden fatal jet airplane accident, the new research tool of the internet, the objectivity of not being connected to any of the parties and the luxury of hindsight. The conclusions of the location and cause of the explosion were based on the physical evidence, the data from recorders, the facts of previous preliminary and final reports from NTSB, TSB, and AAIB, and the many significant matching similarities between other wide body airliner fatal accidents such as SWR 111, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. This independent investigator agrees with the Canadian, British and Indian accident investigators' conclusions of 1985/1986 regarding the location and consequences of the explosion and agrees with the British investigator as to the cause being explosive decompression and supplements that cause as a ruptured open forward cargo door inflight at one or both of the midspan latches probably from faulty wiring in the door unlatch motor circuit.

Summary of offered old and new opinions: Some investigators say the explosion was in the forward cargo compartment and not in the aft while one says explosion the aft cargo compartment and not the forward; one investigative agency declines to state the cause of that explosion, one says definitely not a bomb, one say a bomb in forward, another says bomb in aft, and another

says wiring caused a forward cargo door to rupture open in flight causing explosive decompression which mimicked a bomb explosion.

The pondering, reluctance, and silence by the most authoritative and knowledgeable aviation safety accident agency for Air India Flight 182, the Transportation Safety Board of Canada, which also has close jurisdiction, is bewildering. There is a clear need for that aviation authority to step in and resolve all the conflicts, contradictions, and confusion as to what happened to Air India Flight 182 from an aviation accident investigation point of view, and not as a police action, a political event, or a judicial litigation. If the new cause of faulty wiring is correct, a present danger exists to the flying public. A TSB supplemental report of the earlier CASB report is urgently needed and clarifications required that uses hindsight of the similar aviation events of the past 16 years in relation to Air India Flight 182.

Until then, let us look at the choices for the cause of the explosion in the forward cargo compartment on the right side:

Based upon precedent in all airliners who have suffered inflight breakups which caused a sudden loud sound on the cockpit voice recorder while proceeding normally, a possibility could be that of a bomb explosion, a gunshot, an explosive decompression by an inadvertently opened window or cargo door, turbulence, lightning strike, fuel tank explosion, or other explanation which might become apparent in years to come.

Many potential causes have been considered, evaluated, and ruled out: Lightning and turbulence were not in the vicinity of Air India Flight 182 and the flight recorders showed no unusual maneuvers prior to breakup. A gunshot or open window would be

unlikely to cause the size hole necessary for the breakup since the 747 is designed to withstand a several foot wide hole in the fuselage (a safety aspect learned from the Comet hull rupture/ explosive decompression/inflight breakups). A fuel tank explosion was unlikely because of the lack of fire damaged wreckage with only a few pieces of wreckage burnt. That leaves bomb explosion or the inadvertent opening of a very large section of pressurized hull for a reasonable explanation for the sudden inflight breakup of Air India Flight 182

Is there a precedent for either alternative? There is an official probable cause of a bomb explosion in an early model Boeing 747 in the forward cargo compartment causing an inflight breakup but that bomb was alleged to have been on the left side, not the right side. That event was Pan Am Flight 103. It also has many other similarities such as the sudden loud sound on the CVR followed by an abrupt power cut to the recorders.

There is an official probable cause of an inadvertent opening of a very large section of pressurized hull in the forward cargo compartment causing a partial inflight breakup and that opening was on the right side. That event was United Airlines Flight 811. It also has many other similarities such as the sudden loud sound on the CVR followed by an abrupt power cut to the recorders. The closest official match to the events of Air India Flight 182 with its inflight breakup from an explosion in the forward cargo compartment on the right side is the inadvertent opening of a very large section of pressurized hull at the right side forward cargo door as shown by United Airlines Flight 811 below and Air India Flight 182 under it.

What caused the forward cargo door of United Airlines Flight 811 to inadvertently open in flight causing the explosive decompression and the partial inflight breakup? At first it was thought to have been a bomb explosion as reported by the flight crew who heard the explosion and saw the damage. After landing and ruling out a bomb, it was then thought to have been an improperly latched forward cargo door. An AAR was written with that probable cause made, NTSB AAR 90/01. That explanation was modified years later when the cargo door was retrieved from the ocean floor and found to have been properly latched but the wiring was frayed to bare wire and a switch may have been faulty so the probable cause of the inadvertently opened forward cargo door was changed to electrical wiring or switch and a new, supplemental AAR was written, NTSB AAR 92/02, excerpt below:

"EXECUTIVE SUMMARY

On February 24, 1989, United Airlines flight 811, a Boeing 747-122, experienced an explosive decompression as it was climbing between 22,000 and 23,000 feet after taking off from Honolulu, Hawaii, en route to Sydney, Australia with 3 flightcrew, 15 flight attendants, and 337 passengers aboard. The airplane made a successful emergency landing at Honolulu and the occupants evacuated the airplane. Examination of the airplane revealed that the forward lower lobe cargo door had separated in flight and had caused extensive damage to the fuselage and cabin structure adjacent to the door. Nine of the passengers had been ejected from the airplane and lost at sea. A year after the accident, the Safety Board was uncertain that the cargo door would be located and recovered from the Pacific Ocean. The Safety Board decided to proceed with a final report

based on the available evidence without the benefit of an actual examination of the door mechanism. The original report was adopted by the Safety Board on April 16, 1990, as NTSB/AAR-90/01.

Subsequently, on July 22, 1990, a search and recovery operation was begun by the U.S. Navy with the cost shared by the Safety Board, the Federal Aviation Administration, Boeing Aircraft Company, and United Airlines. The search and recovery effort was supported by Navy radar data on the separated cargo door, underwater sonar equipment, and a manned submersible vehicle. The effort was successful, and the cargo door was recovered in two pieces from the ocean floor at a depth of 14,200 feet on September 26 and October 1, 1990.

Before the recovery of the cargo door, the Safety Board believed that the door locking mechanisms had sustained damage in service prior to the accident flight to the extent that the door could have been closed and appeared to have been locked, when in fact the door was not fully latched. This belief was expressed in the report and was supported by the evidence available at the time. However, upon examination of the door, the damage to the locking mechanism did not support this hypothesis. Rather, the evidence indicated that the latch cams had been backdriven from the closed position into a nearly open position after the door had been closed and locked. The latch cams had been driven into the lock sectors that deformed so that they failed to prevent the back-driving.

Thus, as a result of the recovery and examination of the cargo door, the Safety Board's original analysis and probable cause have been modified. This report incorporates these changes and supersedes NTSB/AAR-90/01.

The issues in this investigation centered around the design and certification of the B-747 cargo doors, the operation and maintenance to assure the continuing airworthiness of the doors,

cabin safety, and emergency response.

The National Transportation Safety Board determines that the probable cause of this accident was the sudden opening of the forward lower lobe cargo door in flight and the subsequent explosive decompression. The door opening was attributed to a faulty switch or wiring in the door control system which permitted electrical actuation of the door latches toward the unlatched position after initial door closure and before takeoff. Contributing to the cause of the accident was a deficiency in the design of the cargo door locking mechanisms, which made them susceptible to deformation, allowing the door to become unlatched after being properly latched and locked. Also contributing to the accident was a lack of timely corrective actions by Boeing and the FAA following a 1987 cargo door opening incident on a Pan Am B-747.

As a result of this investigation, the Safety Board issued safety recommendations concerning cargo doors and other nonplug doors on pressurized transport category airplanes, cabin safety, and emergency response."

Below from CASB AAR for Air India Flight 182:

"All cargo doors were found intact and attached to the fuselage structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed. Because the damage appeared to be different than that seen on other wreckage pieces, an attempt to recover the door was made by CCGS John Cabot. Shortly after the wreckage broke clear of the water, the

area of the door to which the lift cable was attached broke free from the cargo door, and the wreckage settled back onto the sea bed. An attempt to relocate the door was unsuccessful."

Years later, with Trans World Airlines Flight 800 and SWR 111 occurring, the terrible aging characteristics of Kaptonized type wiring became apparent in commercial airliners while having been known to military aircraft.. The wiring/cargo door probable cause for Air India Flight 182 includes events, evidence, and faults which are well documented and have precedents such as the catastrophic consequences of an inadvertently open cargo door in flight with the DC-10 and Boeing 747 aircraft and faulty wiring causing causing problems in MD-11 and Boeing 747 aircraft.

This investigator further refines the cause of the explosive decompression by the inadvertently opened forward cargo door of United Airlines Flight 811 to be faulty wiring and the initial location of the failure of the forward cargo door to be the rupture at one or both of the midspan latches.

I offer the same explanation for Air India Flight 182: Faulty wiring causing the rupture of one or both of the midspan latches of the forward cargo door causing the explosive decompression which caused the inflight breakup.

Further evidence which matches the incontrovertible open cargo door explanation for United Airlines Flight 811 exists in the evidence matches between Air India Flight 182 and United Airlines Flight 811 below, presented in Part 1 and the Smith AAR for AI 182 and repeated here:

- A. Boeing 747
- B. Early model -100 or -200

- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. (Intentionally left blank.)
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo

door

AC. Midspan latching status of forward cargo door not reported as latched

AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)

AE. Outwardly peeled skin on upper forward fuselage

AF. Rectangular shape of shattered area around forward cargo door

AG. Forward cargo door fractured in two longitudinally

AH. Status of aft cargo door as latched

AI. Passengers suffered decompression type injuries

AJ. At least nine missing and never recovered passenger bodies

AK. Initial official determination of probable cause as bomb explosion.

AL. Initial official determination modified from bomb explosion

AM. Structural failure considered for probable cause

AN. Inadvertently opened forward cargo door considered for probable cause

The bomb explanation opinion for the explosion in the forward cargo compartment of Air India Flight 182 is only stated by one of the four authorities investigating which was the Indians in its Kirpal report, written by a judge, not an aviation accident investigator, and was based on assumptions later proven to be incorrect. The Indian Judge stated the cause was a bomb possibly because there was no other reasonable alternative offered to him in 1985/1986. He also based the choice of bomb explosion cause on premises that were later proven to be unreliable which were explosive decompression by structural failure could not cause an abrupt power cut to the flight recorders and it can, twinning could not be produced by an explosive decompression and it can, and floor panels can appear to be broken upwards when in fact the floor beams were broken

downward. He also could not have been aware of the several airworthiness directives issued to correct faults in the cargo doors that only became apparent in the ensuing years.

Summary of evidence for a bomb explosion in Air India Flight 182:

- A. Blackened erosion on some seat cushions.
- B. Cabinet had dent in it.
- C. Minor fire and explosive damage in cabin.
- D. Sudden and massive structural failure.
- E. The lining in one suitcase was severely tattered;
- F. Although the wooden spares box was burned, this could have happened after the occurrence;
- G. Although pieces of an overhead locker were damaged by fire, it is not known if the burning happened at the time of the occurrence;
- H. Although the pieces of U-section alloy clearly indicated evidence of an explosion, it is quite possible that these pieces were not associated with the aircraft;
- I. The bottoms of some seat cushions show indications of a possible explosion;
- J. The inside of the right wing root fillet appears to have been scorched; and
- K. The deformation of the floor of the upper deck storage cabinet might have been caused by an explosive shock wave generated below the cabin floor and inboard from the cabinet.
- L. Damage to the floor station and the presence of the fragments.
- M. Targets 362/396 and 399 which contain some evidence that an explosion emanated from the forward cargo compartment.
- N. Curling, cork-screwing, and saw tooth edges may also be indicative of an explosion though such fractures by themselves may not be conclusive evidence that an explosion was involved.

- O. The bang could have been caused by a rapid decompression but it could also have been caused by an explosive device.
- P. Marked similarities between the spectra of Indian Airlines 737 and Air India's Kanishka CVR.
- Q. Twinning on fragments of wreckage.

Summary of evidence against a bomb explosion for Air India Flight 182:

- R. Wooden boxes were found broken apart exhibiting no burn marks.
- S. An electronic device was found among some floating wreckage and was not modified as a detonating device.
- T. There was no evidence to indicate characteristics of an explosion emanating from the aft cargo compartment.
- U. No part of an explosive device, its detonator or timing mechanism was recovered.
- V. Certain characteristics of the noise indicate the possibility that the noise was the result of an explosive decompression.
- W. From the examination of the wreckage recovered and wreckage on the bottom, there is no indication that a fire or explosion emanated from the cabin or flight deck areas.
- X. The medical examination of the bodies also showed no fire or explosion type injuries.
- Y. A portion of the aft cargo compartment roller floor shows no indications characteristic of an explosion emanating from the aft cargo compartment.
- Z. No evidence of fire burns or explosive material could be found.
- AA. The floating wreckage recovered and showed there was no evidence of fire internal or external.
- AB. Examination of clothing from the bodies did not show any explosive fractures or any signs of burning.
- AC. The seat cushions and head cushions also did not show any

explosive characteristics.

AD. A number of lavatory doors and structure also did not show any damage consistent with explosion. The flight deck door showed no explosion damage inside or outside.

AE. There was no significant fire or explosion in the flight deck, first and tourist passenger cabin including several lavatories and the rear bulk cargo hold.

AF. The bang could have been caused by a rapid decompression and no sound of a 'bomb' preceded the bang.

AG. The only conclusion which can, however, be arrived at by the Court is that the aircraft had broken in midair and that there has been a rapid decompression in the aircraft.

AH. Twinning evidence is unreliable because of poor examining conditions and a powerful explosive decompression can be the cause of it.

To sum up the only two reasonable explanations for the cause of the explosion in the forward cargo compartment on the right side that caused the inflight breakup of Air India Flight 182 which are bomb explosion or inadvertently opened forward cargo door in flight:

1. Bomb explosion explanation has no exact precedent, the available supporting evidence is weak with alternative benign explanations for its presence, the required necessary corroborative evidence of a bomb explosion is absent, and the basis for the only authoritative opinion in 1986 of a bomb explosion has now been shown to be faulty by a subsequent accident and the bomb opinion finding was made by a non-aviation accident investigator.

2. Wiring/cargo door explanation has a very close precedent which has many significant evidence matches to Air India Flight 182, and subsequent accidents have confirmed the strong

suspicions that faulty wiring is the initial cause, and the bomb conclusion was unstated by Canadian aircraft accident investigators and ruled out by the British.

Air India Flight 182 did explode in flight; there has to be an explanation for the explosion. The two most likely possibilities are bomb explosion and hull rupture causing explosive decompression. Based upon the above reasoning, this investigator submits that the most likely cause to be that of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup sequence of events and not that of a bomb explosion although the first understandable false impression for Air India Flight 182 was that of a bomb by the noise, the damage, and political circumstances at the time of the explosion.

An analogy comes to mind:

A man is found lying dead in the street with blood coming from his head. There is a foreign man nearby who has a gun in his pants and is a known enemy of the dead man. The authorities blame the man with the gun and prefer not to check into the health records of the dead man nor examine the slippery pavement with the high curb in a favorite shopping mall. Years later, the man with the gun is charged with the crime based on the circumstantial evidence of the presence of the gun, the bleeding from the head of the dead man and the loss of blood that led to the death although the gun had not been fired and the gash in the dead man's head was too small for a gunshot wound. An independent investigator presents evidence that the dead man had had a history of aneurysms in his brain and probably slipped on the pavement as he was falling and hit his head on the curb causing the bloody gash. The artery had burst in the dead man's head and the ensuing internal loss of blood led to his death. And

it had happened again years later to members of the dead man's family which had a genetic weakness in their brain arteries causing them to burst when they shouldn't. The dead man and his family are beloved and people did not want to think there was an inherent flaw in the lineage but preferred to blame the foreigner with a gun.

I submit to you gentlemen that the obvious and most satisfying explanation for a complex accident is not always the correct one. Aviation accidents are extremely complex and hindsight is a rare luxury. Please use that luxury and issue a supplemental report on the extremely complex aviation accident of Air India Flight 182 which indicates there may be an inherent flaw in early model Boeing 747s in the wiring and non plug cargo doors.

If there is consensus for the possible cause of the explosion in the forward cargo compartment on the right side that led to the inflight breakup of Air India Flight 182 to be faulty wiring causing a cargo door rupture, then Part Three will be presented which presents conclusions, recommendations, and implications of that mechanical explanation.

Thank you for reading.

Please contact me at any time for any queries or discussion by phone, letter, or email at
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sincerely,
Barry

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
**Subject: Conclusions, Recommendations, and Implications
of wiring/cargo door explanation, Part Three**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
July 01

4

Please allow me to present Part Three of the shorted wiring/
forward cargo door rupture/explosive decompression/inflight
breakup explanation for Air India Flight 182 as if I were in a
conference room with members of the TSB listening to me for a
period of time. Part Three is to present the conclusions,
recommendations, and implications of the explanation for Air
India Flight 182. May I begin, sir?

Participants:

Mr. Bill Tucker, Director General, Investigation Operations.
Director of Investigations-Air
Director of Engineering

Mr. John Garstang, Engineering Branch
Mr. Vic Gerden, Investigator in Charge, SWR 111.
John Barry Smith, Independent Aircraft Accident Investigator.

Thank you all for allowing me this third time to present an explanation for the possible cause of the fatal inflight breakup of Air India Flight 182 on 23 June, 1985. Part Three is to present the conclusions, recommendations, and implications of the explanation.

References:

Smith AAR for AI 182 with appendices, CASB report and the Kirpal Report for Air India Flight 182, NTSB AAR 90/01 and 92/02 for United Airlines Flight 811, AAIB 2/90 for Pan Am Flight 103, and NTSB AAR 00/03 for Trans World Airlines Flight 800. All are available electronically and can be sent to you by email; please ask and I will provide them to you.

An analogy comes to mind:

Galileo was an amateur astronomer and announced that based upon his years of research and analysis of visual evidence of the skies that, counter to intuition, the earth in fact revolves around the sun and not the other way around. He was told no, he's wrong, he's crazy, he's ignored, he's told to shut up, but he kept on reviewing his evidence, realized his conclusions were still correct, understood the profound implications of his discovery, and kept on talking and publishing his findings.

He said to the authorities and the public, "Come over here, look through this telescope, see with your own eyes the moons of Jupiter which go around the planet and see how the planet goes around the sun, just like us. There is precedent for a moon going round a planet and a planet going round the sun, just like us. I

conclude we go round the sun, not the other way around.

The authorities and the public said, "We don't need no stinking telescopes, we can stand in our front yard and see the sun go round us. You're wrong and we are ignoring you." No scientific rebuttal evidence was ever presented to refute the earth goes round the sun explanation, only common opinions from non astronomers who held positions of power and silence from other astronomers.

He continued presenting his evidence which was irrefutable that the earth goes round the sun. The authorities held a meeting. They asked of themselves, "What can we live with? Can we live with the sun going round the earth?" They all agreed that they can live with that since that's the way it was for years and everything seemed to be OK. They asked, "Can we live with the earth going round the sun?" They all agreed that they could not live with that because books would have to be revised and rewritten; reputations would be tarnished; and the people would be uneasy. The authorities concluded the sun goes round the earth because that was the most satisfactory answer that most of the people could live with, and what the heck, what difference did it make?

Galileo spent the rest of his life under house arrest, no new support was given to the earth round the sun explanation, and all the while the moon still went round the earth and the earth still went round the sun.

I am asking the authorities to look through the telescope of the internet at these official government AARs for Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800, SWR 111, as well as my own report,

the Smith AAR for AI 182, to see the precedent and the evidence matches and similarities among all events which indicate they are just like United Airlines Flight 811 which contrary to intuition and first official reports, was not a bomb explosion but was a electrical/cargo door rupture explosive decompression.

The machine killed the humans, not the other way around.

Assuming for the purposes of this discussion:

The CASB, the British AAIB representative, the Indian Kirpal Inquiry, and this independent accident investigator are correct in stating that the location of the explosion which caused the inflight breakup of Air India Flight 182 which led to its destruction was in the forward cargo compartment on the right side; and,

This independent investigator is correct in stating the cause of that explosion is explosive decompression when the forward cargo door ruptures open in flight at one or both of the midspan latches caused by faulty wiring shorting on the door unlatch motor;

What are the implications of such a conclusion?

1. There exists a present danger to the flying public of the wiring again failing and turning the unlatch cams to the open position which could reproduce the fatal events of United Airlines Flight 811 in the 500 active early model Boeing 747s.
2. The Canadians were correct in 1985/86 in their CASB report in their location of the explosion and prudent in their caution for declining to state the cause.
3. There was no bomb explosion which means no crime which

means no criminals which means the three on trial for the 'bombing' are innocent of that particular crime.

4. The Indian Kirpal Inquiry was correct on the location of the explosion but incorrect on the cause of it which is understandable based upon what was known about wiring and cargo doors in 1985/86.

5. The British AAIB representative was correct in location of the explosion and the cause as non-bomb and of a cause yet to be determined.

6. Outward opening nonplug doors will find a way to open inadvertently in flight regardless of AD 'fixes' and should be modified to plug type doors.

7. Poly-X Kaptonized type wiring is faulty and should be replaced in all airliners that have it installed.

8. The shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup probable cause may have also occurred in Pan Am Flight 103.

9. The shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup probable cause may have also occurred in Trans World Airlines Flight 800 and therefore the center fuel tank explosion was not the initial event but secondary.

I ask that the TSB advance the safety of the aviation transportation mode by conducting an independent supplemental investigation, including, when necessary, a public inquiry into the transportation occurrence of Air India Flight 182 in order to make findings as to the causes and contributing factors;

* - identifying safety deficiencies as evidenced by transportation occurrences such as Pan Am Flight 103, United Airlines Flight 811, Trans World Airlines Flight 800, and SWR 111,

* - making recommendations designed to eliminate or reduce any such safety deficiencies, such as faulty wiring and non plug

cargo doors; and

* - reporting publicly on its investigations and on the findings in relation thereto in a supplemental, modified report of the 1986 CASB AAR.

Forgive my presumptuousness in suggesting a way to proceed but I realize you are the only ones with the authority and means of access to determine once and for all the cause of the Air India Flight 182 destruction:

1. Contact NTSB, AAIB, RCMP, and FAA, and state intentions to rule in or rule out the possible mechanical cause of wiring for Air India Flight 182 and request assistance. Many of the investigators that worked on the original AAR are still active and can provide first hand corroboration of new suspicions. These gentlemen below from US FAA and NTSB are fully aware of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation and may assist:

Robert Francis II
Vice Chairman
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Thomas E. Haueter
Chief, Major Investigations Division
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

John B. Drake
Division Chief

Aviation Engineering Division
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Al Dickinson,
Lead Investigator, TWA 800
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

James F. Wildey II
National Resource Specialist
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Thomas McSweeny
Director, Aircraft Certification Service
FAA National Headquarters
800 Independence Avenue, S.W
Washington D.C 20591

Lyle Streeter
FAA AAI
Aircraft Accident Investigator
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Ron Wojnar,
Manager

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Transport Airplane Directorate
1601 Lind Ave. S.W.
Renton, WA 98055-4056

Neil Schalekamp
Manager, Propulsion & Mechanical Systems and Cabin Safety
Branch
Transport Standards Staff
Transport Airplane Directorate, ANM-100
1601 Lind Ave. S.W.
Renton, WA 98055-4056

Bob Breneman,
Aerospace Engineer,
Federal Aviation Administration
Transport Airplane Directorate, ANM-100
1601 Lind Ave. S.W.
Renton, WA 98055-4056

2. Obtain evidence from respective agencies in their countries.

Air India Flight 182:

1. Copies of all videotapes, photographs, interview notes, and sketches now held by the RCMP, TSB, NTSB, AAIB, and BARC to include about 50 video tapes and nearly 3000 still photographs taken.
2. Access to all hard evidence of the wreckage which was retrieved from ocean now in Bombay.
3. Interviews with TSB, AAIB, and NTSB investigators who contributed to the AI 182 report through deposition or voluntary meeting.

4. Autopsy reports now held by Indian authorities.
5. Wreckage database and plots held by TSB
6. Passenger and cargo manifests held by TSB.
7. CVR and FDR printouts held by TSB.
8. All picture albums made of the wreckage, albums now held by TSB.

United Airlines Flight 811:

1. Copies of all videotapes, photographs, interview notes, and sketches now held by the NTSB.
2. Access to any existing wreckage.
3. Interviews with NTSB metallurgists, explosive expert and American law enforcement involved with the investigation.
4. Autopsy reports.
5. Wreckage database and plots.
6. Passenger and cargo manifests.
7. CVR and FDR printouts.

Pan Am Flight 103:

1. Interviews with NTSB metallurgists and Boeing explosive expert and British law enforcement involved with the investigation.
2. Copies of all videotapes, photographs, interview notes, and sketches now held by the AAIB and Scotland Yard.
3. Access inside the hangar at Farnborough of the Pan Am 103 wreckage.
4. Autopsy reports.
5. Wreckage database and plots.
6. Passenger and cargo manifests.

7. CVR and FDR printouts.

Trans World Airlines Flight 800

1. Access to the hangar where the wreckage of TWA 800 is stored for at least 40 hours (five days at 8 hours a day) by at least five of your team.
2. Copies of all photographs, videotapes, interviews about TWA 800 now held by FBI and NTSB.
3. Interviews with NTSB metallurgists, explosive expert and American law enforcement involved with the investigation.
4. Autopsy reports.
5. Wreckage database and plots.
6. Passenger and cargo manifests.
7. CVR and FDR printouts.

Manufacturer:

1. Copies of all memos, data, and information about cargo doors and cargo holds on Boeing 747s.
2. Copies of all memos, data, and information about cargo doors and cargo holds on DC-10, MD-11, and MD-12.

Airlines:

Pan Am, TWA, Air India, United Airlines:

1. Copies of all videotapes, photographs, interview notes, and sketches regarding PA 103, AI 182, TWA 800, and UAL 811
2. Access to any existing wreckage held by them.
3. Interviews with airline staff involved with the accidents.
4. Maintenance logs for the accident aircraft long before and just before the fatal flights.

Miscellaneous:

1. Copies of all data about Canadian Pacific Air Flight 003, another Boeing 747 supposed to have a bomb on board.
2. Copies of all Data about Airworthiness Directives about cargo door on commercial airliners held by FAA and NTSB data banks.
3. Examine closely the actual wreckage in hangars or evidence on videotape and 35 mm color film for matching clues of United Airlines Flight 811 in the midspan latch area, the bottom latch area and all around the forward cargo door which has been implicated in all four events.

From Kirpal Report:

3.2.9.1 All wreckage sighted was recorded on video tapes and all major items were recorded on 35 mm positive film.

3.2.10.12 After detailed macro photography of the recovered wreckage, the experts group mentioned in section 1.5.16 prepared a detailed factual report after carefully inspecting each of the targets recovered.

Recommendations:

1. Inspect all cargo door wiring for exposed bare wire in early model (-100 and -200 series) Boeing 747s.
2. Replace known faulty aromatic polyimide wiring in airliners.
3. Modify non-plug cargo doors into plug type doors.

The implications of the wiring/cargo door explanation are profound, controversial, and have great consequences for the flying public all over the world. The countries of USA, Canada, India, UK, New Zealand, Libya, and India are all directly involved by their investigations of years and millions of dollars and the loss of hundreds of their citizens as victims in the air and on the ground. Police type investigative agencies such as CIA, FBI, Scotland Yard, CSIS, RCMP, will have their procedures and

findings reexamined. Aviation agencies such as NTSB, FAA, AAIB and TSB will have their probable causes modified. Lawsuits will proliferate as hundreds of millions of dollars will change hands. Insurance companies will readjust their premiums to reflect the real risks of mechanical failure and the lesser risks of sabotage. Careers will be enhanced or diminished. Reputations will be made or damaged. And on and on....

But, after all is said and done, after the new probable cause is determined, recommendations are made and implemented, flying will be a little safer, the risk of dying will be a little less, the people of the world will be a little bit less afraid of their fellow citizens. And those are good things.

Thank you for reading.

Please contact me at any time for any queries or discussion by phone, letter, or email at
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sincerely,
Barry

Quotes about evidence for Air India Flight 182 Reports:

FEBRUARY 26, 1986 3.2.6.5 To facilitate identification of the wreckage located by Scarab it was necessary to position

aircraft maintenance personnel on board the ship. As the aircraft structure was badly torn, mutilated and distorted, serious difficulty was anticipated in identification of small pieces of structure. It was therefore essential that these maintenance personnel were provided with aircraft photographs, manufacturing drawings, parts catalogue, wiring diagram manuals and maintenance manuals.

3.2.9.1 All wreckage sighted was recorded on video tapes and all major items were recorded on 35 mm positive film.

3.2.10.1 During recovery operation the video tapes as well as photographs of the wreckage to be recovered, were supplied to the personnel on board the ship for facilitating identification and recovery of correct targets.

All the personnel involved in the recovery operation were shown the slides and photographs of the targets which were chosen for recovery on priority basis. The method and procedure of the recovery operation was discussed in detail and finalised. Another meeting was convened on 6.10.85

to clarify the doubts and to present the picture albums containing various photographs of targets to be recovered.

3.2.10.12 After detailed macro photography of the recovered wreckage, the experts group mentioned in section 1.5.16 prepared a detailed factual report after carefully inspecting each of the targets recovered. It was decided to send the wreckage to Bombay for which necessary crates were then prepared and the large pieces of wreckage were cut along the lines indicated by the experts group to facilitate their packing.

3.2.10.15 Efforts were made to repair Scarab so that the ship John Cabot could sail again in order to salvage as many pieces as possible. It was fortunate that the weather had not deteriorated. Some of the important but small pieces which had to be recovered had been placed in a basket at the bottom of the ocean.

The ship sailed out again after Scarab had been repaired. The basket was sought to be lifted, but, unfortunately, when it reached near the surface of the sea it overturned and the contents of the basket spilled and were never traced again.

3.2.1.5 Next phase was the task of :

- (a) Locating hundreds of pieces of wreckage by the combined use of sonar and video monitors.
- (b) Video and still photography of the pieces of wreckage.
- (c) Plotting the distribution of the wreckage.

All this was to be carried out under the directions of the Court.

3.2.2.1 The means (vehicles/equipment) proposed to be used in the locating, mapping and video photography of the wreckage were the CCGS John Cabot and SCARAB II.

3.2.2.4 The SCARAB II is a state-of-the-art system designed and built for tethered unmanned work at ocean depths of upto 6000 feet. Scarab's standard equipment are :

A complete optical suite.

3.2.2.5 The manipulators have a choice of grippers/claws/cutters etc. of any required description and size. The Scarab has three TV cameras mounted on separate pan/tilt mechanism to allow real time observation and video tape documentation. A 35 mm still camera was also installed and used in the present work. There was a choice of quartz-iodide flood lights to provide illumination.

3.2.2.7 The Scarab was equipped with a 360° high resolution Sonar with a range of 1000 meters. The Sonar was also capable of interrogating and detecting 37 KHz and 27 KHz pingers. It can function independently of the ship's facilities and is equipped with power generators and semiautomatic handling equipment.

3.2.5.1 The Scarab provided video tapes and still photographs. In the initial stages (upto 9.8.1985) the John Cabot was operating in peripheral areas and therefore few targets were found. Hence

the output of videotapes was small. In fact upto 9.8.85, only about 10 targets were found and only 3 video tapes were used up. But later, when John Cabot came close to and into the crucial areas, video tapes were recorded at a fast rate. Further, still photography facility on the Scarab was activated at about this time. Therefore, arrangements were made periodically to obtain the video tapes and films from John Cabot. Video tapes and still photographs (these required to be processed) were transported from John Cabot to Cork Control Centre.

3.2.5.2 About 50 video tapes and nearly 3000 still photographs (positives and transparencies) provided the visual information on the targets.

Arrangements had to be made at Cork for such viewing and study of the video tapes and still photographs. Video equipment (TV monitor plus VCR) suitable for viewing the video tapes had to be arranged.

3.2.5.3 The still photography used special professional quality colour film (35 mm), each roll having 800 frames. The film was diapositive. These had to be developed and transparencies obtained from them. Thereafter negatives and prints had to be made. Special equipment for viewing the transparencies had to be provided for continuous work. The video tapes, transparencies and prints provided the principal means of monitoring of the results of the operation

3.2.6.5 To facilitate identification of the wreckage located by Scarab it was necessary to position aircraft maintenance personnel on board the ship. As the aircraft structure was badly torn, mutilated and distorted, serious difficulty was anticipated in identification of small pieces of structure. It was therefore essential that these maintenance personnel were provided with aircraft photographs, manufacturing drawings, parts catalogue, wiring diagram manuals and maintenance manuals. Since carriage of such voluminous literature was not practicable, 3M

micro film reader printer

machines with micro film cassettes of the above literature were produced and installed on the ship. In case of difficulty of locating any particular information, the engineers were advised to contact Cork Search Centre by telex or telephone who, in turn, could seek the desired information from the manufacturers.

3.2.9 Extent of Damage

Photographic and Video Interpretation of Wreckage

Photographic Interpretation

3.2.9.1 All wreckage sighted was recorded on video tapes and all major items were recorded on 35 mm positive film. During the course of the investigation, several members of the investigation team had the opportunity to view the tapes and photographs. Subsequently, when some items were recovered, it became apparent that the optical image presented on video and still film had some limitation with respect to identification of damage or damage pattern. For example, the sine wave bending of target 7 appeared in the video and photographs as a sine wave fracture, and some of the buckling on target 35 was not evident in either the video or photographs. The interpretation of damage through photographic/video evidence without the physical evidence might be misleading, and any interpretation should take this into account.

3.2.10.1 During recovery operation the video tapes as well as photographs of the wreckage to be recovered, were supplied to the personnel on board the ship for facilitating identification and recovery of correct targets.

3.2.10.8 A meeting was held at 1400 hrs. on 4.10.85 on board CCGS John Cabot to establish/clarify the priorities for the wreckage recovery operation and coordination between John Cabot, Kreuzturm and Cork Search Centre. All the personnel

involved in the recovery operation were shown the slides and photographs of the targets which were chosen for recovery on priority basis. The method and procedure of the recovery operation was discussed in detail and finalised. Another meeting was convened on 6.10.85 to clarify the doubts and to present the picture albums containing various photographs of targets to be recovered.

3.2.10.9 A detail log of the activities of the ships John Cabot and Kreuzturm which started the recovery operation of 10.10.85, reveals the following :

(a) The Scarab working independently recovered the following

- (1) Basket at target 192 containing copilot's chair, 2 suitcases and radar antenna (12.10.85)
- (2) Target 8 - Lower fuselage skin of aft cargo compartment. (11.10.85).
- (3) Target 245 - Forward belly skin just aft of radome (16.10.85).
- (4) Target 350 - Economy class seats and carpet (23.10.85).
- (5) Target 296 - Piece of aft pressure bulkhead.

(b) The Scarab after attaching the grippers, bridal cable and lift line to the targets buoyed off the same to Kreuzturm which recovered the following targets :

- (1) Target 362/396 - Forward cargo fuselage skin from station 700 to 840 and STR 41L to 43R. (16.10.85).
- (2) Target 193 - Fuselage skin from station 720 to 860 and passenger door 2L (17.10.85)
- (3) Target 223 - Nose landing gear pressure deck web and stiffeners, container pieces (station 260-340)(19.10.85).
- (4) Target 181 - Wing skin with forward cargo compartment **SLIPPED OFF WITH GRIPPERS (21.10.85) AND WAS LOST.**
- (5) Target 399/358 - Fuselage skin from station 780 to 940 and STR 7R to 35R with 2R door (25.10.85). A body entrapped in

target 399/358 was recovered. Another body which came up to surface with the wreckage fell off into sea and was lost while hauling the wreckage on board. The recovered body was identified as of Dr. Mathew Alexander, a Canadian passenger and was brought to Cork by Fisherman's vessel "Orion" at 0130 hrs. on 28.10.85 and was sent for Post Mortem etc.

(6) Target 7 - Aft cargo compartment fuselage skin from station 1480 to 1860 (26.10.85).

(7) Target 47/50 - Aft cargo floor structure with roller tracks, frames, latch etc. from station 1600 to 1760 (27.10.85).

(8) Target 117 - Three rows of coach class seats with passenger cabin floor boards, broken floor beam (28.10.85).

(9) Target 35 - Aft Pressure Bulkhead piece (30.10.85).

3.2.10.12 After detailed macro photography of the recovered wreckage, the experts group mentioned in section 1.5.16 prepared a detailed factual report after carefully inspecting each of the targets recovered. It was decided to send the wreckage to Bombay for which necessary crates were then prepared and the large pieces of wreckage were cut along the lines indicated by the experts group to facilitate their packing.

The Canadian Transportation Investigation and Safety Board Act provides the legal framework governing the TSB's activities. Basically, the TSB has a mandate to advance safety in the marine, pipeline, rail, and aviation modes of transportation by:

* - conducting independent investigations, including, when necessary, public inquiries, into selected transportation occurrences in order to make findings as to their causes and contributing factors;

- * - identifying safety deficiencies as evidenced by transportation occurrences;
- * - making recommendations designed to eliminate or reduce any such safety deficiencies; and
- * - reporting publicly on its investigations and on the findings in relation thereto.

INDEPENDENCE

To enable the public to have confidence in the transportation accident investigation process, it is essential that the investigating agency be, and be seen to be, independent and free from any conflicts of interest when it investigates accidents, identifies safety deficiencies and makes safety recommendations. Independence is a key feature of the TSB. The board reports to Parliament through the President of the Queen's Privy Council for Canada and is separate from the other government agencies and departments. Its independence enables it to be fully objective in arriving at its conclusions and recommendations.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:10 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: RE: Consensus on Cause of explosion in Air India Flight 182

Dear Mr. Tucker, 13 July 01

Fine, glad to see they were sent and received OK; there were three parts, Location, Cause, and Conclusions.

I hope you have an enjoyable holiday and I await any comments you have when you return.

(I just saw the new movie with Robert De Niro and Marlon Brando, "The Score" filmed on location in Montreal. It reminded me of years ago when my wife and I cycled all through and around the city. It was a very bicycle friendly city.)

Cheers,
Barry

John Barry Smith
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Dear Mr. Smith,

Thanks. I was able to open the first file you sent (both formats), but I'll have to close a few applications before I can open the pictures. I am about to go on holidays, but I have printed your "conference room" text

to read
while I am away.

Sincerely,
Bill T..

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Startling SDR**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 22 July 2001,

Hope you had a good holiday and welcome back.

I just did research this evening and found this startling SDR in the FAA database: Capitals in original.

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
Engine Group : 4056
Engine Model : PW4056

Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29
A/C N Number : 199UA
Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

Mr. Tucker, this is very very scary knowing what we know about forward cargo doors opening in flight from electrical causes. If that CB had been pushed in (why was it out) during flight, that forward cargo door would have ruptured/opened with known catastrophic results. What is a 'controller' and what 'malfunctioned'? UAL, above incident airline and well familiar with UAL 811, had habit of pulling door CB out and were told to stop, order 8300.10 below. They are apparently still pulling the door CB and it may have saved their ass.

Sir, I hope you have decided to proceed with a supplemental report on Air India Flight 182 based on subsequent similar events such as United Airlines Flight 811 and for certain because of incidents like the above.

Please do something.

Sincerely,
Barry

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ORDER: 8300.10

APPENDIX: 4

BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
for Airworthiness (FSAW)

BULLETIN NUMBER: FSAW 93-50

BULLETIN TITLE: Inappropriate Use of Circuit Breakers
During B-747 Lower Lobe Cargo Door Operation

EFFECTIVE DATE: 06-02-94

1. SUBJECT. This FSIB informs inspectors of unsafe
procedures
being used by some operators to close and lock the lower

lobe
cargo doors of the Boeing 747 (B-747) series aircraft.

2. BACKGROUND.

A. This bulletin was developed after an inquiry by a foreign airworthiness authority into the special procedures used by a specific operator to close and lock the lower lobe cargo doors of B-747 series aircraft. The special procedure included in the operator's maintenance manual called for manual tripping of the cargo door control circuit breakers and the section 2 ground handling bus circuit breaker in order to further remove the possibility of power being applied accidentally to the cargo door control circuitry.

B. The manual tripping of the circuit breakers in special cargo door lock procedures is unnecessary and decreases the reliability of the circuit breakers to perform their intended function. Frequent switching of the breakers could cause them to trip before the point of rated voltage or not to trip at all. Both cases could have adverse effects (such as the following) in

relation to the safe operation of the cargo doors:

(1) Circuit breakers that trip before the point of rated voltage would cause increased manual operation of the cargo doors.

(2) Manual operation could introduce additional failure conditions, such as out-of-sequence operation and overdriving of the cargo door mechanisms.

(3) Service history has shown that manual operation of the cargo doors is more prone to cause damage; for example, the failure of a breaker to trip at the point of rated voltage could lead to failed components and fire.

2

C. The revision to the B-747 cargo door lock sectors warning system, in airplanes compliant with Airworthiness Directive (AD) 90-09-06, provides an increased level of integrity so that manual tripping of the circuit breakers is not necessary to prevent the possibility of an uncommanded opening of the cargo

doors.

Furthermore, power to the cargo door is automatically removed by the Master Latch Lock System upon first motion of the Master Latch Lock Switch away from the fully unlocked position.

3. ACTION. Principal maintenance inspectors (PMI) having certificate management responsibilities for operators of Boeing 747 series aircraft should ensure that this information is brought to the attention of their respective operators. Any operators using this procedure should be discouraged from its continued use.

4. INQUIRIES. This FSIB was developed by SEA.AEG. Any questions regarding this information should be directed to AFS-510 at (703) 661-0333, extension 5018.

5. EXPIRATION. This FSIB will expire on 05-31-95.

/s/

Edgar C. Fell

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:10 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Government of India reconsideration of Air India Flight 182

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker, 2 Aug 2001

Thank you for reply and for reading two of the three 'cybermeeting' docs.

Also thanks for forwarding the SDR of another forward cargo door opening on its own by electrical cause. Let us hope that does not happen in the air or that the FE or copilot does not push in that CB in the air and start that catastrophic sequence. I'm interested in the opinions of the 3 or 4 other people you sent it to. I'm also interested in the opinions of the other listed in the 'cybermeeting' about this issue. They must be concerned as I am.

I am of course disappointed that TSB does not contemplate a supplemental report on Air India Flight 182 but understand workload, budget, and staff limitations. But, I realize that that choice can change in a minute with more incidents like the SDR above. I believe there are already enough warnings by these faulty wiring caused open doors to launch a supplemental but....I shall keep you informed of any new discoveries and I hope they stay only incidents.

The RCMP are doing an investigation but their conclusions do not make sense and contradict the realities of aircraft accidents. They are not aircraft accident investigators but police and this is an airplane crash not a bank robbery. Sgt Blachford of RCMP

AITF said in his last mail to me that he would meet with me in Mid August but I have not heard from him since. If we do meet, I can show him the false thinking in his 'bomb' explanation for Air India Flight 182 in the aft cargo compartment or the forward.

Also noted is your figurative 'open door' to a supplemental report depending on what the RCMP or the upcoming trial generates. If the RCMP investigation or the trial shows that expert TSB technical advice and opinion is required, would the TSB then provide that information? I feel quite sure both circumstances will do that eventually.

Regarding a suggestion of a re-consideration of the Govt of India safety investigation report, you state you should do so the the Govt of India. Great idea, Mr. Tucker. I stayed out of the political arena, but that may be the way to go. The aviation authorities of India may wish to get a crack at explaining Air India Flight 182 as they were quickly excluded from the original investigation and replaced by a judicial judge. Would you do that? A request to the Director General of Civil Aviation, New Delhi, India to reconsider Air India Flight 182 based upon similar subsequent accidents that suggest an alternative explanation exists of a mechanical cause with a precedent? Mr. H.S. Khola, Director of Air Safety, Civil Aviation Department, New Delhi may still be there and receptive to your suggestion to become involved.

The below excerpt from the Kirpal report does state that India has the authority to investigate the accident.

"INITIAL ACTION TAKEN BY THE GOVERNMENT OF INDIA

1.2.1 Initial intimation of the accident was received by Air India who, in turn, communicated the same to Mr. H.S. Khola,

Director of Air Safety, Civil Aviation Department, New Delhi.
The Accident Investigation Branch of United Kingdom also sent information to the Director General of Civil Aviation, New Delhi to the effect that the accident had taken place on international waters and as such it was India which was the authority to investigate the accident in accordance with the provisions of ICAO Annex 13.

1.2.2 Thereupon Order No. AV.15013/8/85-AS dated 23rd June, 1985 was issued by the Director General of Civil Aviation whereby Mr. H.S.Khola was appointed Inspector of Accidents for the purpose of carrying out the investigation into the aforesaid air accident. This appointment was made under Rule 71 of the Aircraft Rules, 1937."

Thanks again, Mr. Tucker, for replying and sending on the SDR to others for opinion and trust your working holiday was successful. My wife and daughter are in Hawaii as I type and here I am at home. They are having a great time visiting relatives and swimming.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Dear Mr. Smith,

Thanks. I'm back as of Monday (though have one more week to look forward to in late Aug) and am catching up on e-mail again. During my holiday, I enjoyed reading two of the bigger docs you had sent me.

Re the info. below, I was not aware of that. I found it of interest and have forwarded it to 3 or 4 other people.

Re your closing para about a supplemental report on Air India 182, I don't think we can contemplate doing so in view of present workload and the fact of the very extensive RCMP investigation and the upcoming trial. We would at least want to see what the latter generates. Also, if we were to suggest

re-consideration of the Govt of India safety investigation report, I believe we should do so to the Govt of India.

Bill Tucker.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Sunday, July 22, 2001 11:18 PM

> To: Tucker, Bill

> Subject: Startling SDR

>

> W.T. (Bill) Tucker

> Director General,
> Investigation Operations
>
> Dear Mr. Tucker, 22 July 2001,
>
> Hope you had a good holiday and welcome back.
>
> I just did research this evening and found this startling SDR in
the FAA
> database: Capitals in original.
>
> Difficulty Date : 10/11/00
> Operator Type : Air Carrier
> ATA Code : 5210
> Part Name : CONTROLLER
> Aircraft Manufacturer : BOEING
> Aircraft Group : 747
> Aircraft Model : 747422
> Engine Manufacturer : PWA
> Engine Group : 4056
> Engine Model : PW4056
> Part/Defect Location : CARGO DOOR
> Part Condition : MALFUNCTIONED
> Submitter Code : Carrier
> Operator Desig. : UALA
> Precautionary Procedure : NONE
> Nature : OTHER
> Stage of Flight : INSP/MAINT
> District Office Region : Western/Pacific US office #29
> A/C N Number : 199UA
> Aircraft Serial No. : 28717
>
> Discrepancy/Corrective Action:FWD CARGO DOOR

OPENED BY ITSELF WHEN CB

> PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE

> RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR

> OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

>

> Mr. Tucker, this is very very scary knowing what we know about forward

> cargo doors opening in flight from electrical causes. If that CB had been

> pushed in (why was it out) during flight, that forward cargo door would

> have ruptured/opened with known catastrophic results. What is a

> 'controller' and what 'malfunctioned'? UAL, above incident airline and

> well familiar with UAL 811, had habit of pulling door CB out and were told

> to stop, order 8300.10 below. They are apparently still pulling the door

> CB and it may have saved their ass.

>

> Sir, I hope you have decided to proceed with a supplemental report on Air

> India Flight 182 based on subsequent similar events such as United

> Airlines Flight 811 and for certain because of incidents like the above.

>

> Please do something.

>

> Sincerely,
> Barry
>
> John Barry Smith
> (831) 659-3552 phone
> 551 Country Club Drive,
> Carmel Valley, CA 93924
> www.corazon.com
> barry@corazon.com
>
> ORDER: 8300.10
>
> APPENDIX: 4
>
> BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
> for Airworthiness (FSAW)
>
> BULLETIN NUMBER: FSAW 93-50
>
> BULLETIN TITLE: Inappropriate Use of Circuit Breakers
> During B-747 Lower Lobe Cargo Door Operation
>
> EFFECTIVE DATE: 06-02-94
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> 1. SUBJECT. This FSIB informs inspectors of unsafe
procedures
> being used by some operators to close and lock the lower lobe
> cargo doors of the Boeing 747 (B-747) series aircraft.
>
> 2. BACKGROUND.
>
> A. This bulletin was developed after an inquiry by a foreign

> airworthiness authority into the special procedures used by a
> specific operator to close and lock the lower lobe cargo doors
of
> B-747 series aircraft. The special procedure included in the
> operator's maintenance manual called for manual tripping of
the
> cargo door control circuit breakers and the section 2 ground
> handling bus circuit breaker in order to further remove the
> possibility of power being applied accidentally to the cargo
door
> control circuitry.
>
> B. The manual tripping of the circuit breakers in special cargo
> door lock procedures is unnecessary and decreases the
reliability
> of the circuit breakers to perform their intended function.
> Frequent switching of the breakers could cause them to trip
> before the point of rated voltage or not to trip at all. Both
> cases could have adverse effects (such as the following) in
> relation to the safe operation of the cargo doors:
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> (1) Circuit breakers that trip before the point of rated voltage
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> C. The revision to the B-747 cargo door lock sectors warning
> system, in airplanes compliant with Airworthiness Directive
(AD)

> 90-09-06, provides an increased level of integrity so that
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> tripping of the circuit breakers is not necessary to prevent the
> possibility of an uncommanded opening of the cargo doors.

> Furthermore, power to the cargo door is automatically removed
by

> the Master Latch Lock System upon first motion of the Master
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>

> 3. ACTION. Principal maintenance inspectors (PMI) having
> certificate management responsibilities for operators of Boeing
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> 4. INQUIRIES. This FSIB was developed by SEA.AEG. Any
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> AFS-510 at (703) 661-0333, extension 5018.

>

> 5. EXPIRATION. This FSIB will expire on 05-31-95.

>

>

>

> /s/

> Edgar C. Fell

>

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Warning/Alert/Interview me/Placentia**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Mr. Tucker, 9 Aug 2001

I just read about the RCMP taking over a ship collision investigation. Hmmmm. You have indicated the TSB will stand aside as the RCMP does the aircraft accident re-investigation (which now has the bomb going off in the aft cargo compartment contrary to earlier official conclusions.)

Please, Mr. Tucker, do not let this Air India Flight 182 event pass by. I have presented evidence that shows there is a strong possibility the forward cargo door opened in flight and a good possibility that the cause was wiring. The loyalty is to the living and the problem which occurred in 1985 exists to this day in 2001. Potentially catastrophic hull ruptures in Boeing 747s caused by an inadvertently ruptured open cargo door have occurred by official count in 1987, 1989, 1991, and 2000, in the air and on the ground. By my count after twelve years of research the count is 1985 with Air India Flight 182, 1987 with Pan Am 125, 1988 with Pan Am Flight 103, 1989 with United Airlines Flight 811, 1991 with UAL preflight, 1996 with Trans World Airlines Flight 800, and 2000 with UAL post flight. Seven

events in Boeing 747 that have killed nine officially and 838 by my count.

You did not tell me I was wrong. You gave no rebuttal nor any effort at refutation. I know why. It can't be done using facts, data, and evidence. I have tried myself for years to prove it is a wrong explanation, but the evidence always supports the wiring/cargo door sequence starting with the sudden loud sound on the CVR which is present on all four fatal aircraft.

Please do not ignore the warning that is presented by this identified person with official documents and who has experience in these matters. The eighth time of wiring causing the door unlatch motor to turn on when it shouldn't can happen again, as it has in the far past, the past, and the near past, October, 2000, only ten months ago. (Capitals in original report from US FAA SDR. Note it was a 747-400)

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
Engine Group : 4056
Engine Model : PW4056
Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE

Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29
A/C N Number : 199UA
Aircraft Serial No. : 28717
Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

What were the opinions of your staff of aviation accident investigators regarding my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for four Boeing 747 fatal events?

Director of Investigations-Air
Director of Engineering
Mr. John Garstang, Engineering Branch
Mr. Vic Gerden, Investigator in Charge, SWR 111.

Do they offer any rebuttal? Offering an alternative such as bomb or missile or fuel tank explosion is not rebuttal but disagreement.

The seriousness of this alert/warning is such that either it is worthy of preventive action or it is not, but to do nothing is not right. Some warnings can be ignored and some can't without further investigation. I believe based upon the evidence of Air India Flight 182 and evidence of other fatal accidents, that this warning about faulty wiring causing cargo doors to open when they shouldn't is a warning that can not be prudently ignored but

must have further investigation to rule it in or rule it out. A warning about a potential explosive decompression caused by compressed air occurring on a Boeing 747 is just as serious about a warning about an explosive decompression caused by chemical means.

Have your staff interview me so they can either rule in or rule out the mechanical explanation. Let me enter into an email dialogue with them; we can talk as pilot to pilot.

I am not a drunk on a phone late at night saying check some airplanes because of some horrid plot afoot. (That might get a response sadly). I am experienced, I offer incontrovertible evidence, I am identified, I invite interviews, I plead for consideration and inspections of the wiring for cargo doors in Boeing 747s as well as a supplemental investigation into Canada's largest mystery aviation accident.

Has any professional contact been made with Indian Transportation Safety officials? Can you give me an contacts to email to with the results of my research?

What would the attorneys for the trial have to do or ask for TSB to become involved with Air India Flight 182?

Mr. Tucker, it seems that the conspiracy minded people are everywhere (That's a joke) and are in charge, such as FBI and RCMP (That's not a joke.)

Please consider Air India Flight 182 an airplane crash first (As CASB did years ago) requiring transport safety officials to evaluate or re-evaluate and not a bank robbery for which the police can take a 'lead role.'

By the way, paint smears are very important clues to United Airlines Flight 811, Pan Am Flight 103, and Trans World Airlines Flight 800 which support the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. Video examination of Air India Flight 182 may very well show important matching paint smears. It's another example of how subsequent accidents can be used to review the past and clarify some issues. It's learning from experience.

Please do not let this Air India Flight 182 event go by. It's an active issue legally and reveals a potential public safety issue to Canadian citizens in wiring and cargo doors in Boeing 747s. Please have your staff contact me for further discussions. Please ask the Indians to become involved in an updated report.

(Regarding Placentia Bay below: I was in the Navy as an enlisted aircrewmember flying P2V Neptune ASW patrol aircraft with VP-10 out of Naval Air Station Argentia Newfoundland in 1962. I walked around Placentia. Ah, the rain, ah the rocks, as, the wind, ah the cold, ah, the fog....it was very tough flying out of there for our 12 hour patrols but I look back and loved it. Every flight was an adventure of subs, or liners, or ice or mechanical problems and electronic problems to overcome on those aging WW II designed planes. I was 18 and remember Argentia and Placentia so vividly.)

Sincerely,

Barry

John Barry Smith

(831) 659-3552 phone

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Carmel Valley, CA 93924

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RCMP to take lead role in investigation of fatal high-seas collision

Updated: Thu, Aug 09 1:13 PM EDT

The bow of the tanker Virgo remains moored at the Come By Chance oil refinery in Placentia Bay, Nfld. (CP/St. John's Telegram/Gary Hebbard) (CP)COME BY CHANCE, Nfld. (CP) - The RCMP are taking over from Transport Canada as the lead agency in investigating a recent collision on the high seas that killed three American fishermen.

The change, announced Thursday by Transport Canada, raises the possibility that the investigation of the tanker Virgo - now anchored in Newfoundland's Placentia Bay - will turn to criminal matters. But a spokesman for Transport Canada declined to explain the significance of the change.

The Mounties were scheduled to hold a news conference in nearby Clarenville, Nfld., to clear up the confusion.

Meanwhile, the U.S. Coast Guard "will continue to play an active role," said Transport Canada spokesman Paul Doucet.

An investigator from the U.S. Coast Guard spent Thursday inspecting the 180-metre Virgo, which was one of several ships in the area when the trawler Starbound was hit by another ship Sunday and sank.

Joseph Marcantonio, the captain of the 28-metre Starbound, was

the only survivor.

The tanker's log books were seized and the crew told to stay on board after it arrived at an oil refinery near Come by Chance, Nfld., early Tuesday.

Since the collision occurred in U.S. waters - about 210 kilometres off Cape Ann, Mass. - the U.S. Coast Guard took the lead role in the investigation.

The oil tanker, owned by Russian-based Primorsk Shipping, was built in 1995. It displays the usual assortment of dents and scratches found on tankers, which normally require the aid of tug boats when docking.

But local fishermen have pointed to fresh scratches etched in green paint near the Virgo's protruding bow.

The Starbound was painted green.

"I saw the (scratches) when we got right along side of her this morning," Walter Brinston said Wednesday as he manoeuvred his heaving, 10-metre fishing boat in the shadow of the hulking tanker. "But it's just paint. Who knows what it means?"

Still, there were no obvious signs of a violent crash earlier in the day during an informal inspection of the 38,000-tonne tanker.

The skipper of a tugboat, who has been pushing tankers around Placentia Bay for eight years, said he didn't notice anything unusual about the ship after a brief sailpast with reporters on board.

Several divers also inspected Virgo on Wednesday, but the dive leader refused to say what they found or who the team was working for.

The divers spent more than an hour inspecting the underside of the ship's hull, close to the stern, on one side.

It's at that point where there are some larger dents near the high-water line, though none of them appear to be new.

The company has said the ship's captain, Vladimir Ivanov, had no knowledge of a collision.

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:10 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Defence team contact**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Mr. Tucker, 10 August 2001,

The Defence Team for Air India Flight 182 has contacted me and asked for:

At Thu Aug 9 18:48:26 2001, Jaswinder S. Parmar wrote:
Can you forward me all your correspondence with the TSB so I can forward it to the appropriate people. We have a defence team meeting on the 17th of

this month and I would like to bring this issue to the for front.

Mr. Tucker, may I do so?

The reference files such as the government AARs for 182, 103, 811, and 800 and my AAR for 182 which I sent you are already available to the defence team. The emails in questions are attached below and were sent by you to me. They are all proper, correct, and consistent with Canadian policy. The value of them to the defence team is to show them that there is a responsible, fair, government official in the investigation process who can be trusted to respect the facts, data, and evidence as shown by the recorders and twisted metal. They have been battered by the RCMP and the AITF in their attempts to obtain a conviction to alleviate the grief of the public over the sudden loss of 329 persons in Air India Flight 182. The RCMP have not played fair in this, in my opinion, as they think they are trying to catch very bad guys and have not given sufficient thought to a mechanical explanation for this plane crash.

The defence team and the accused Sikhs are very leery of any Canadian official and trust very few people. I have tried to persuade them that the TSB is a potential ally in that it is independent and concentrates on why planes crash, not why people do bad things. I really do believe that. Leave the conspiracies to the RCMP and the crashes to the TSB.

I believe it is worthwhile to show the emails below to the defence team to show that there is a real human out there who has experience in these matters, has political clout to get things done, follows up on correspondence, commands a talented staff, and is fair and polite.

The vital agencies and persons are aware of the shorted wiring/ forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182: RCMP, AITF with Sgt Blachford and John Garstang: TSB with you, sir, and your staff, and the defence team for the accused which involves the Crown attorneys and therefore the government of Canada. In addition the AAIB and the NTSB are well aware of the wiring/ cargo door explanation for Air India Flight 182. Only the Indian government remains ignorant of the alternative mechanical explanation.

I would like to see all groups talking to each other. You see, I know this a mechanical problem which can be fixed and needs to be fixed quickly before it happens again. This is not a case of crime and punishment with secret this and that. This is a case of a plane crash from a cause which can be prevented. Cooperation is needed sooner or later.

I appreciate any thoughts you have on this, Mr. Tucker.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

X-From_: Bill.Tucker@tsb.gc.ca Thu May 24 15:21:34 2001

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <Barry@corazon.com>
Cc: "Delorme, Paulette" <Paulette.Delorme@tsb.gc.ca>
Subject: Air India Flt. 182
Date: Thu, 24 May 2001 18:22:47 -0400

Dear Mr. Smith:

Thank you for your e-mail messages of 2 May and 8 May (sent to Ms. P. Delorme, Office of the Executive Director) concerning the crash of Air India Flight 182 that occurred on 23 June 1985.

First, I must respond that the Transportation Safety Board of Canada (TSB-C) has no mandate to re-open the aviation safety investigation of the AI Flt.182 occurrence. As you may be aware, the TSB-C was not established until 1990, and the Aviation Occurrence Report you referred to was prepared by the Canadian Aviation Safety Board, the predecessor to the TSB-C. More importantly, in accordance with ICAO Annex 13, the investigation of that accident was led by the Government of India; the CASB report was prepared as input to India's investigation.

That said, we certainly have more than a passing interest in the circumstances of the AI Flt. 182 tragedy. We are interested because of the

very nature of our chosen careers. We are interested because quite a few TSB staff were working for the CASB at the time (myself included), and many of that group were involved in the AI Flt.182 investigation. Above all, we are interested because of the enormity of the tragedy, the links to Canada and the fact that there has not yet been closure on this matter - almost 16 years after the event. As you are aware, the RCMP have been conducting a criminal investigation into the circumstances of the crash ever since 1985. In accordance with Canadian law, both the CASB and the TSB-C have provided the RCMP with copies of material from our file - excluding, of course, any information that is privileged under our Act. The information provided includes material that was produced by John Garstang.

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart Blachford of the RCMP in Vancouver. The RCMP have as strong an interest as anyone in establishing what happened to AI Flight 182. I have also forwarded your report to the Director of Air Investigations, the Investigator-in-Charge of our SWR Flight 111 investigation, and the Director of Engineering for their information.

With respect to the brief message in your second e-mail (of 8 May), there is one point that I must clarify in reply. It is correct that the CASB investigators' report never said it was a bomb that caused the explosion; however, the report also never said that it wasn't a bomb. In fact, to my knowledge, there was nobody on the CASB team who didn't consider a bomb to be the most likely explanation. However, the aviation safety investigation conclusion on that point was, appropriately, left to the Kirpal Commission in India.

Thank you again for your messages.
W.T. (Bill) Tucker
Director General,
Investigation Operations

-----Original Message-----

From: John Barry Smith Eudora
[SMTP:Barry@corazon.com]
Sent: Wednesday, May 02, 2001 11:37 PM
To: paulette.delorme@tsb.gc.ca
Subject: Air India Flight 182 Probable Cause

Transportation Safety Board of Canada

Dear Fellow aircraft accident investigators, 2 May 01

I am an independent investigator concentrating specifically on early

model Boeing 747s that suffer inadvertent decompressions in flight. After years of research and analysis, my conclusion is that four fatal Boeing 747 accidents were caused by faulty poly-x wiring shorting on the forward cargo door unlatch motor leading to the rupture of one or both of the midspan latches leading to explosive decompression which resulted in amidships breakup for three of the aircraft and a large hole on the right side just forward of the wing on the remaining aircraft. I refer to Air India Flight 182, Pan Am 103, United Airlines Flight 811, and Trans World Airlines Flight 800. UAL 811 is the aircraft that did not come totally apart and landed with its incontrovertible evidence that matches up with the other three in so many significant ways as to imply they all had the same probable cause for the initial event.

Regarding Air India Flight 182, an accident in which Canadian public safety organizations are intimately involved, I have written a report supporting my findings and have quoted extensively from the Canadian Aviation Occurrence Report of 1986 of the Canadian Aviation Safety Bureau.

Please note that the Canadian aviation accident investigators never said it was a bomb that caused the agreed upon explosion in the forward cargo compartment of AI 182. The Canadian aviation accident investigators were absolutely correct in their conclusions of 1986 and only by subsequent similar accidents is the cause of that unexplained explosion now clear.

I am sending by Word file my Smith AAR for AI 182 for your evaluation. Should you find the wiring/cargo door/explosive decompression explanation a plausible, reasonable, alternative explanation with precedent for the destruction of AI 182, then the issue of a clear and present danger to the Canadian flying public becomes apparent as the cargo door wiring in early model Boeing 747s has not been inspected for the tell tale cracking that the polyimide insulation shows before shorting.

I invite your queries to me for further details by phone or email. Regardless, a supplemental AAR for AI 182 is probably warranted since TSB has never actually given its official opinion regarding one the most celebrated of all tragic Canadian aviation accidents, equal to the Arrow

Gander crash and Swiss Air 111.

Swiss Air 111 showed the vulnerability of widebody airliners to the faulty Kapton type wiring insulation which I conclude is the probable cause for Air India Flight 182. The 1972 DC-10 event over Windsor, Ontario, when a cargo door inadvertently opened, presaged the Paris Turkish Airlines DC-10 cargo door accident. Therefore, when I say that faulty wiring is causing cargo doors to inadvertently rupture open in wide body airliners, I believe you will say it's possible but did it happen for AI 182 and ask for the evidence. That evidence is presented in my report.

Very Respectfully,

John Barry Smith
Independent Aircraft Accident Investigator
barry@corazon.com
www.corazon. <<http://www.corazon.com/>>
com <<http://www.corazon.com/>>831 659 3552
551 Country Club Drive,
Carmel Valley, CA USA 93924

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Tuesday, May 08, 2001 2:00 PM
To: Trans Safety Board Canada

Subject: Mounties now say 'bomb' in aft of Air India
Flight
182

Yes, the Mounties are saying the 'bomb' was in the Aft
compartment
of Air India Flight 182 and want to put three guys in jail for life
for
putting it there.

Ha!

Can you do something about this nonsense?

Cheers,

John Barry Smith

X-From_: Bill.Tucker@tsb.gc.ca Wed Jun 20 18:18:46 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Swiss Air 111 changes
Date: Wed, 20 Jun 2001 21:20:48 -0400

Dear Mr. Smith,

This is in reply to your series of e-mails, and to clarify the TSB
position
in case there is a misunderstanding. I'm sorry I have not been
able to
reply sooner. I shall be away for the next two work days and I
had a reply
to you on my "must do" list before leaving tonight.

The TSB is not presently doing further investigation of the Air India 182 accident, nor is it planning to do so. We have limited resources and a backlog of investigation work-in-process; we do not believe that cargo door or wiring problems were involved in that occurrence; and we are confident that the RCMP are doing a thorough and unbiased investigation. Therefore, we do not believe we would be justified in diverting our resources to that occurrence.

That said, I am not suggesting that your concerns and your analysis are all invalid. In fact, I find that you have raised some interesting points that have potential use for us in our work. To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

>From one of your e-mails, I now also understand the reason for your strong

interest in advancing aviation safety, and I respect you for that.
If you
wish to continue sending material to me, I shall continue to
process it, as
outlined above, to the best of my ability. However, I cannot
promise
immediate processing and I cannot engage in direct and detailed
dialog on
all the material you send me; I simply have too much other work
to do.
Right now I have over 150 e-mails in my in-box to read and
action; there
will be well over 200 when I return next week. I am not
complaining, I
simply want you to understand my position with respect to your
inputs.

Sincerely,

Bill Tucker.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Monday, June 18, 2001 11:59 AM

> To: Tucker, Bill

> Subject: Swiss Air 111 changes

>

> W.T. (Bill) Tucker

> Director General,

> Investigation Operations

>

> Dear Mr. Tucker, 18 June 01

>

- > Below shows the impact of a conscientious effort by investigators to find
- > out what happened in an accident and the good faith efforts of an airline
- > to prevent it from happening again. Good work by TSB and Swiss Air. Not
- > good by reluctance of Boeing to implement the changes for all.
- >
- > Note the cameras in the cargo holds; that is very good.
- >
- > I look forward to the opinion of Mr. Vic Gerden to my Smith AAR for Air
- > India Flight 182. I also have concluded wiring is causing problems that
- > were not apparent.
- >
- > Sincerely,
- > Barry
- >
- > John Barry Smith
- > (831) 659-3552 phone
- > 551 Country Club Drive,
- > Carmel Valley, CA 93924
- > www.corazon.com
- > barry@corazon.com
- >
- > Sunday newspaper, 6-17-2001
- >
- > Swissair optimizes MD-11-Cockpits with modifications to their electrical
- > system - as a direct consequence of their Flight 111 Crash cause
- > deliberations.

- >
- > FROM TIM VAN BEVEREN ZURICH
- >
- > Two and a half years later, the consequences of the crash of SR Flight 111
- > near Halifax N.S. have continued to affect Swissair. Their remaining 19
- > MD-11 airliners are being radically converted in modifications to the
- > electrical system in the cockpit area. For over one million Swiss Francs
- > per jet: " ...primarily it's the electrical system that is to be
- > significantly improved " according to Swissair documents made available to
- > Sundays newspaper. There in Zurich the crash cause for the 111 and its 229
- > passengers is being assumed, despite the Canadian TSB Report being
- > anticipated for public release not before the beginning of 2002. Already
- > many family members of Flight 111 victims have been "paid out". So now
- > Swissair no longer wants to wait for the outcome of the final report of
- > the Canadian accident investigation before implementing the safety fixes
- > that it has identified. "Safety remains our highest priority " claims
- > Swissair speaker Urs Peter Naef regarding the planned changes. "
- > Cost-saving measures never conflict with the required expenditures on
- > flight safety, which underlie our "mode plus" modification

program

> initiative."

>

> In Canada Investigators of the Transportation Safety board (TSB) express

> themselves reservedly over the planned SR procedure.

Investigation leader

> Vic Gerden: "Swissair's efforts to reduce potential safety deficiencies

> are well-known to us." As a crash cause, it is so far certain only that an

> electrical fire in the wiring-bundles was crucially responsible.

Because

> of the fire, important systems in the cockpit failed in quick succession,

> without which captain Urs Zimmerman and Copilot Stephan Loew could no

> longer control their machine.

>

> In a few days the technical modifications will begin and they will

> naturally concentrate on the known SR111 trouble areas: - significant

> critical wire-bundles are to be separated out and fed, via a routing with

> greater electrical integrity and individual isolation, into the cockpit.

> In SR111 these wiring harnesses ran through a single focal point described

> as a critical node. It was specifically within this area in the ceiling

> (just forward and aft of the cockpit/cabin bulkhead) that the fire had

> devastatingly raged. It affected not only the emergency power systems but

> the "last-ditch" power feeder lines to the batteries as well. Now that

> these systems are to be split and segregated for greatest integrity,

> important protections will again be in place - for example the one that

> controls the emergency power turbine (or ADG - air driven generator). This

> propeller can be unfolded from a compartment in the fuselage in an

> emergency and in the airflow produces current - like a hydroelectric

> direct current generator. In SR111 the Canadian investigators found that

> this critical emergency power turbine had given out no energy. Despite the

> crisis, its control functions had failed to deploy it - probably because,

> by that time, the associated wiring had been consumed by the fire. Video

> cameras and smoke detectors are also being installed by this "unique to

> Swissair" modification program. CCTV Video cameras are being installed

> everywhere: in the cargo-holds, in the electronics bay under the cockpit

> floor - as well as behind the cabin linings. allowing the pilots a never

> before possible view into potential fire zones. The pictures will come up

> on a small 14-centimeter monitor in the cockpit. In addition

more smoke

> detectors are being strategically positioned. The objective is that crews

> would no longer be condemned to helpless seated inactivity in the case of

> fire. Fire extinguishing agents behind the cabin linings can squirt upon

> any detected fire.

>

> All Swissair aircraft are to receive a new wholly integral emergency

> flight attitude instrument. It is to be operable from two separate power

> sources and will function reliably even if all other systems have broken

> down (as was the case with SR111 in its last few minutes of flight).

> Altogether the cockpit changes are to cost 20 to 23 million Swiss Francs

> according to calculations of a Swiss Aviation Expert. The extensive

> modifications are the result of ongoing Swissair internal investigations

> into the accident's most likely course of events.

>

> Shortly after the crash on 3 September 1998 a Taskforce under the

> leadership of retired Swissair Technical Chief Willy Schurter began its

> work, paralleling that being done by the official Canadian TSB Team. They

> sought to track down all possible causes of the disaster. The SR MD-11

- > Electrical Rework is in addition to other earlier measures (such as
- > changes in checklists and procedures) - but is seen as the most important
- > outcome of these investigations. Although latterly consulting and then in
- > close co-operation with the US manufacturing firm Boeing, Swissair
- > engineers unilaterally sought to analyse all factors of the accident
- > themselves - in order to identify any deficiencies in the original
- > type-certificated design. In a further internal document Swissair
- > explains: "We knew that it needed three prerequisites for the initiation
- > and propagation of a fire: a potential ignition source (e.g. arcing
- > wires), fuel (e.g. thermal/acoustic blankets) and oxygen (i.e.
- > air-conditioning system ventilation or crew oxygen system lines) ". As a
- > consequence of its insights another risk-factors conclusion of the SR
- > Halifax Taskforce presents a frightening new dimension to SR111: "We have
- > clearly concluded that such contributing factors exist in each type of
- > aircraft and that it is not simply a vase of being type-specific to the
- > MD-11." These were conclusions also reached by the TSB and sent to the
- > certifying authority (the US FAA). To date the only ramifications of SR111
- > reaching beyond the MD-11 are the new emergency rules

retroactively

> affecting the STC's (Supplemental Type Certification) of Inflight

> Entertainment Systems on just about every type of airliner in service

> today.

>

> Nevertheless, neither manufacturers Boeing nor the American FAA

> supervisory authority want to even recommend (let alone mandate) the new

> Swissair safety precautions for all remaining MD-11's. If this was to be

> done, such a program could then logically expand to include most other

> types of airline aircraft exhibiting the identical type-certification

> deficiencies. The first Swissair machine should be converted and ready for

> return to service at the end of June 2001. Before the SR MD-11 Fleet is

> permitted to carry passengers following the incorporation of these system

> safety adjustments, it must pass a strict test flight program in Zurich.

> Preliminary re-certification assessments would normally be monitored by

> representatives of the FAA (the American airworthiness regulatory

> authority). However these were carried out in the spring of 1999 so that

> these changes could proceed without delay to SR Flight Services. But

- > because manufacturer Boeing withheld its agreement to these changes for a
- > long time, there have been extensive delays in their implementation.
- > Boeing sees much of the program as "enhancements" and not necessarily as
- > required safety modifications. These new Swissair safety initiatives have
- > now become even more expensive: Three SR MD-11's have only just completed
- > their heavy maintenance checks. But now they must return to the hangar yet
- > again for extensive rework. But it's not necessarily a case of spending a
- > dollar to save a penny. Once you look at the cost of SR111 and its
- > potential for costing the airline industry as a whole, it may well have
- > been the other way round.

X-From_: Bill.Tucker@tsb.gc.ca Mon Jun 25 11:04:11 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "'John Barry Smith'" <barry@corazon.com>
Subject: RE: Sudden loud sound on CVR
Date: Mon, 25 Jun 2001 14:05:37 -0400

Dear Mr. Smith,

Your reponse below prompts a further reply from me. I appreciated the understanding demonstrated in your e-mail. I do have an open mind (or at least I hope and try to), and I will strive to retain it long after I

retire
from the TSB.

I am now up to date with your correspondence, except for one left to read that you sent me on 23 June. I have targetted specific elements to specific people (e.g, the Appendix on Wiring to our SWR 111 IIC (Yes, that's Vic Gerden) as well as to Dir of Inv. - Air). I shall forward this to all of them so they can note your addresses and your receptiveness to any follow-up queries they may have

Bill Tucker..

P.S. In one of the things I read, you indicated that John Garstang had been seconded to the RCMP for over a decade. That is not so; John G was loaned or seconded to the RCMP on several occasions (maybe 3 or 4) for short terms of about 1-2 months - most recently this spring. Otherwise, he has continued working as a valued employee in our Engineering Branch.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Wednesday, June 20, 2001 9:43 PM

> To: Tucker, Bill

> Subject: Sudden loud sound on CVR
>
> Dear Mr. Tucker, 20 June 01
>
> Well, longest daylight of the year tonight, that's good.
>
>>
>>The TSB is not presently doing further investigation of the
Air India 182
>>accident, nor is it planning to do so. We have limited
resources and a
>>backlog of investigation work-in-process; we do not believe
that cargo
> door
>>or wiring problems were involved in that occurrence; and we
are confident
>>that the RCMP are doing a thorough and unbiased
investigation.
> Therefore,
>>we do not believe we would be justified in diverting our
resources to
> that
>>occurrence.
>
> I understand the way things are now, and of course, subject to
> change. There is that pesky trial coming up and the RCMP is
saying
> bomb in aft cargo compartment and the CASB and Kirpal
stated
> explosion in forward cargo compartment, not a trifling conflict.
Just
> where was that bomb?
>

>> I find that you have raised some interesting points that
>> have potential use for us in our work.
>
> Thanks. UAL 811 is a big point.
>
>> To that end, I am personally looking
>> through the material you send and forwarding copies, as I
think
> appropriate,
>> to the Dir. of Investigations - Air, the Dir. of Engineering, and
the IIC
> of
>> the SWR111 investigation. If you wish, I can also forward
copies to Sgt.
>> Blachford or the RCMP, but it seems more appropriate for you
to do that
>> yourself whenever you so choose.
>
>
> Thanks. More eyeballs (or ears) is always good. I respect your
> personal opinion most of all. I can tell an open mind that will
put
> emphasis on the evidence. A sudden loud sound on the CVR is
the only
> direct evidence that exists for Air India Flight 182, all the rest
is
> circumstantial or tangible consequence. The sudden loud sound
is
> everything and it says, 'Not a bomb explosion' but 'Explosive
> decompression that matches DC 10 cargo door event.'" When in
doubt, I
> always come back to the sudden loud sound on the CVR's on
all the

> four early model Boeing 747s that suffered the inflight
explosions
> forward of the wing. The sound is incontrovertible.
>
> >
> >>From one of your e-mails, I now also understand the reason
for your
> strong
> >interest in advancing aviation safety, and I respect you for
that.
>
> Thanks. I met the sons of my savior pilot years later, three of
the
> five children he left became Navy pilots.
>
>
> > If you
> >wish to continue sending material to me, I shall continue to
process it,
> as
> >outlined above, to the best of my ability.
>
>
> Thanks, an open mind is all I ask. I would not expect detailed
> replies, but welcome any queries from you or your staff should
they
> come up.
>
> > I
> >simply want you to understand my position with respect to
your inputs.
>
>

> I understand. Thanks again for your reply.
>
> Sincerely,
> Barry
>
> John Barry Smith
> (831) 659-3552 phone
> 551 Country Club Drive,
> Carmel Valley, CA 93924
> www.corazon.com
> barry@corazon.com
> Commercial pilot, instrument rated, former FAA Part 135
certificate
> holder.

X-From_: Bill.Tucker@tsb.gc.ca Fri Jul 13 17:36:16 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Consensus on Cause of explosion in Air India
Flight 182
Date: Fri, 13 Jul 2001 20:38:37 -0400

Dear Mr. Smith,

Thanks. I was able to open the first file you sent (both formats),
but I'll
have to close a few applications before I can open the pictures. I
am about
to go on holidays, but I have printed your "conference room" text
to read
while I am away.

Sincerely,

Bill T..

---Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]

Sent: Thursday, July 05, 2001 11:17 PM

To: Tucker, Bill

Subject: PDF Consensus on Cause of explosion in Air
India
Flight 182

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
6 July 01

Attached is Part Two of my shorted wiring/forward cargo
door
rupture/explosive decompression/inflight breakup presentation
in PDF

format. It is identical to the email just sent. PDF may be easier
to

forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith

(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]
> Sent: Thursday, July 05, 2001 11:17 PM
> To: Tucker, Bill
> Subject: Consensus on Cause of explosion in Air India Flight
182

>

> << Message: Untitled Attachment >> << File:
811nosetogether.jpg >> <<
> File: 182nosetogether.jpg >>

X-From_: Bill.Tucker@tsb.gc.ca Fri Jul 13 18:55:38 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Consensus on Cause of explosion in Air India
Flight 182
Date: Fri, 13 Jul 2001 21:58:00 -0400

Dear Mr. Smith.

Re: >>> I hope you have an enjoyable holiday and I await any
comments you
have when you return

Thanks very much.

Bill T..

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Friday, July 13, 2001 9:16 PM

> To: Tucker, Bill

> Subject: RE: Consensus on Cause of explosion in Air India
Flight 182

>

>

> Dear Mr. Tucker, 13 July 01

>

> Fine, glad to see they were sent and received OK; there were
three parts,

> Location, Cause, and Conclusions.

>

> I hope you have an enjoyable holiday and I await any
comments you have

> when you return.

>

> (I just saw the new movie with Robert De Niro and Marlon
Brando, "The

> Score" filmed on location in Montreal. It reminded me of years
ago when my

> wife and I cycled all through and around the city. It was a very
bicycle

> friendly city.)

>

> Cheers,

> Barry

>

> John Barry Smith

> (831) 659-3552 phone
> 551 Country Club Drive,
> Carmel Valley, CA 93924
> www.corazon.com
> barry@corazon.com
>
>
>
>
>
>
>
>
>>Dear Mr. Smith,
>>
>>Thanks. I was able to open the first file you sent (both
formats), but
> I'll
>>have to close a few applications before I can open the
pictures. I am
> about
>>to go on holidays, but I have printed your "conference room"
text to read
>>while I am away.
>>
>>Sincerely,
>>
>>Bill T..
>>

X-From_: Bill.Tucker@tsb.gc.ca Fri Aug 3 15:25:09 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Startling SDR
Date: Fri, 3 Aug 2001 18:24:11 -0400

Dear Mr. Smith,

Thanks. I'm back as of Monday (though have one more week to look forward to in late Aug) and am catching up on e-mail again. During my holiday, I enjoyed reading two of the bigger docs you had sent me.

Re the info. below, I was not aware of that. I found it of interest and have forwarded it to 3 or 4 other people.

Re your closing para about a supplemental report on Air India 182, I don't think we can contemplate doing so in view of present workload and the fact of the very extensive RCMP investigation and the upcoming trial. We would at least want to see what the latter generates. Also, if we were to suggest

re-consideration of the Govt of India safety investigation report, I believe we should do so to the Govt of India.

Bill Tucker.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Sunday, July 22, 2001 11:18 PM

> To: Tucker, Bill

> Subject: Startling SDR
>
> W.T. (Bill) Tucker
> Director General,
> Investigation Operations
>
> Dear Mr. Tucker, 22 July 2001,
>
> Hope you had a good holiday and welcome back.
>
> I just did research this evening and found this startling SDR in
the FAA
> database: Capitals in original.
>
> Difficulty Date : 10/11/00
> Operator Type : Air Carrier
> ATA Code : 5210
> Part Name : CONTROLLER
> Aircraft Manufacturer : BOEING
> Aircraft Group : 747
> Aircraft Model : 747422
> Engine Manufacturer : PWA
> Engine Group : 4056
> Engine Model : PW4056
> Part/Defect Location : CARGO DOOR
> Part Condition : MALFUNCTIONED
> Submitter Code : Carrier
> Operator Desig. : UALA
> Precautionary Procedure : NONE
> Nature : OTHER
> Stage of Flight : INSP/MAINT
> District Office Region : Western/Pacific US office #29
> A/C N Number : 199UA

- > Aircraft Serial No. : 28717
- >
- > Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB
- > PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE
- > RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR
- > OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.
- >
- > Mr. Tucker, this is very very scary knowing what we know about forward
- > cargo doors opening in flight from electrical causes. If that CB had been
- > pushed in (why was it out) during flight, that forward cargo door would
- > have ruptured/opened with known catastrophic results. What is a
- > 'controller' and what 'malfunctioned'? UAL, above incident airline and
- > well familiar with UAL 811, had habit of pulling door CB out and were told
- > to stop, order 8300.10 below. They are apparently still pulling the door
- > CB and it may have saved their ass.
- >
- > Sir, I hope you have decided to proceed with a supplemental report on Air
- > India Flight 182 based on subsequent similar events such as United
- > Airlines Flight 811 and for certain because of incidents like the above.

>
> Please do something.
>
> Sincerely,
> Barry
>
> John Barry Smith
> (831) 659-3552 phone
> 551 Country Club Drive,
> Carmel Valley, CA 93924
> www.corazon.com
> barry@corazon.com
>
> ORDER: 8300.10
>
> APPENDIX: 4
>
> BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
> for Airworthiness (FSAW)
>
> BULLETIN NUMBER: FSAW 93-50
>
> BULLETIN TITLE: Inappropriate Use of Circuit Breakers
> During B-747 Lower Lobe Cargo Door Operation
>
> EFFECTIVE DATE: 06-02-94
> -----
> 1. SUBJECT. This FSIB informs inspectors of unsafe
procedures
> being used by some operators to close and lock the lower lobe
> cargo doors of the Boeing 747 (B-747) series aircraft.
>

> 2. BACKGROUND.

>

> A. This bulletin was developed after an inquiry by a foreign
> airworthiness authority into the special procedures used by a
> specific operator to close and lock the lower lobe cargo doors
of

> B-747 series aircraft. The special procedure included in the
> operator's maintenance manual called for manual tripping of
the

> cargo door control circuit breakers and the section 2 ground
> handling bus circuit breaker in order to further remove the
> possibility of power being applied accidentally to the cargo
door

> control circuitry.

>

> B. The manual tripping of the circuit breakers in special cargo
> door lock procedures is unnecessary and decreases the
reliability

> of the circuit breakers to perform their intended function.

> Frequent switching of the breakers could cause them to trip
> before the point of rated voltage or not to trip at all. Both
> cases could have adverse effects (such as the following) in
> relation to the safe operation of the cargo doors:

>

> (1) Circuit breakers that trip before the point of rated voltage
> would cause increased manual operation of the cargo doors.

>

> (2) Manual operation could introduce additional failure
> conditions, such as out-of-sequence operation and overdriving
of

> the cargo door mechanisms.

>

> (3) Service history has shown that manual operation of the

cargo

> doors is more prone to cause damage; for example, the failure of

> a breaker to trip at the point of rated voltage could lead to
> failed components and fire.

>

>

2

>

> C. The revision to the B-747 cargo door lock sectors warning
> system, in airplanes compliant with Airworthiness Directive
(AD)

> 90-09-06, provides an increased level of integrity so that
manual

> tripping of the circuit breakers is not necessary to prevent the
> possibility of an uncommanded opening of the cargo doors.

> Furthermore, power to the cargo door is automatically removed
by

> the Master Latch Lock System upon first motion of the Master
> Latch Lock Switch away from the fully unlocked position.

>

> 3. ACTION. Principal maintenance inspectors (PMI) having
> certificate management responsibilities for operators of Boeing
> 747 series aircraft should ensure that this information is
> brought to the attention of their respective operators. Any
> operators using this procedure should be discouraged from its
> continued use.

>

> 4. INQUIRIES. This FSIB was developed by SEA.AEG. Any
> questions regarding this information should be directed to
> AFS-510 at (703) 661-0333, extension 5018.

>

> 5. EXPIRATION. This FSIB will expire on 05-31-95.

>

>
>
> /s/
> Edgar C. Fell
>

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:11 PM PDT

X-From_: Bill.Tucker@tsb.gc.ca Thu May 24 15:21:34 2001

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

To: "John Barry Smith" <Barry@corazon.com>

Cc: "Delorme, Paulette" <Paulette.Delorme@tsb.gc.ca>

Subject: Air India Flt. 182

Date: Thu, 24 May 2001 18:22:47 -0400

Dear Mr. Smith:

Thank you for your e-mail messages of 2 May and 8 May (sent to Ms. P.

Delorme, Office of the Executive Director) concerning the crash of Air India

Flight 182 that occurred on 23 June 1985.

First, I must respond that the Transportation Safety Board of Canada (TSB-C)

has no mandate to re-open the aviation safety investigation of the AI

Flt.182 occurrence. As you may be aware, the TSB-C was not

established until 1990, and the Aviation Occurrence Report you referred to was prepared by the Canadian Aviation Safety Board, the predecessor to the TSB-C. More importantly, in accordance with ICAO Annex 13, the investigation of that accident was led by the Government of India; the CASB report was prepared as input to India's investigation.

That said, we certainly have more than a passing interest in the circumstances of the AI Flt. 182 tragedy. We are interested because of the very nature of our chosen careers. We are interested because quite a few TSB staff were working for the CASB at the time (myself included), and many of that group were involved in the AI Flt.182 investigation. Above all, we are interested because of the enormity of the tragedy, the links to Canada and the fact that there has not yet been closure on this matter - almost 16 years after the event. As you are aware, the RCMP have been conducting a criminal investigation into the circumstances of the crash ever since 1985. In accordance with Canadian law, both the CASB and the TSB-C have provided the RCMP with copies of material from our file - excluding, of course, any information that is privileged under our Act. The information

provided
includes material that was produced by John Garstang.

In view of the foregoing, I forwarded a copy of your report to
Sgt. Bart
Blachford of the RCMP in Vancouver. The RCMP have as
strong an interest as
anyone in establishing what happened to AI Flight 182. I have
also
forwarded your report to the Director of Air Investigations, the
Investigator-in-Charge of our SWR Flight 111 investigation, and
the Director
of Engineering for their information.

With respect to the brief message in your second e-mail (of 8
May), there is
one point that I must clarify in reply. It is correct that the CASB
investigators' report never said it was a bomb that caused the
explosion;
however, the report also never said that it wasn't a bomb. In fact,
to my
knowledge, there was nobody on the CASB team who didn't
consider a bomb to
be the most likely explanation. However, the aviation safety
investigation
conclusion on that point was, appropriately, left to the Kirpal
Commission
in India.

Thank you again for your messages.

W.T. (Bill) Tucker

Director General,
Investigation Operations

-----Original Message-----

From: John Barry Smith Eudora
[SMTP:Barry@corazon.com]

Sent: Wednesday, May 02, 2001 11:37 PM

To: paulette.delorme@tsb.gc.ca

Subject: Air India Flight 182 Probable Cause

Transportation Safety Board of Canada

Dear Fellow aircraft accident investigators, 2 May 01

I am an independent investigator concentrating specifically on early model Boeing 747s that suffer inadvertent decompressions in flight. After years of research and analysis, my conclusion is that four fatal Boeing 747 accidents were caused by faulty poly-x wiring shorting on the forward cargo door unlatch motor leading to the rupture of one or both of the midspan latches leading to explosive decompression which resulted in amidships breakup for three of the aircraft and a large hole on the right side just forward of the wing on the remaining aircraft. I refer to Air India Flight 182, Pan Am 103, United Airlines Flight 811, and Trans World Airlines Flight 800. UAL 811 is the aircraft that did not come totally apart and

landed with
its incontrovertible evidence that matches up with the other three
in so
many significant ways as to imply they all had the same probable
cause for
the initial event.

Regarding Air India Flight 182, an accident in which
Canadian public
safety organizations are intimately involved, I have written a
report
supporting my findings and have quoted extensively from the
Canadian
Aviation Occurrence Report of 1986 of the Canadian Aviation
Safety Bureau.

Please note that the Canadian aviation accident investigators
never
said it was a bomb that caused the agreed upon explosion in the
forward
cargo compartment of AI 182. The Canadian aviation accident
investigators
were absolutely correct in their conclusions of 1986 and only by
subsequent
similar accidents is the cause of that unexplained explosion now
clear.

I am sending by Word file my Smith AAR for AI 182 for
your
evaluation. Should you find the wiring/cargo door/explosive
decompression
explanation a plausible, reasonable, alternative explanation with
precedent

for the destruction of AI 182, then the issue of a clear and present danger to the Canadian flying public becomes apparent as the cargo door wiring in early model Boeing 747s has not been inspected for the tell tale cracking that the polyimide insulation shows before shorting.

I invite your queries to me for further details by phone or email. Regardless, a supplemental AAR for AI 182 is probably warranted since TSB has never actually given its official opinion regarding one the most celebrated of all tragic Canadian aviation accidents, equal to the Arrow Gander crash and Swiss Air 111.

Swiss Air 111 showed the vulnerability of widebody airliners to the faulty Kapton type wiring insulation which I conclude is the probable cause for Air India Flight 182. The 1972 DC-10 event over Windsor, Ontario, when a cargo door inadvertently opened, presaged the Paris Turkish Airlines DC-10 cargo door accident. Therefore, when I say that faulty wiring is causing cargo doors to inadvertently rupture open in wide body airliners, I believe you will say it's possible but did it happen for AI 182 and ask for the evidence. That evidence is presented in my report.

Very Respectfully,

John Barry Smith
Independent Aircraft Accident Investigator
barry@corazon.com
www.corazon. <<http://www.corazon.com/>>
com <<http://www.corazon.com/>>831 659 3552
551 Country Club Drive,
Carmel Valley, CA USA 93924

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Tuesday, May 08, 2001 2:00 PM
To: Trans Safety Board Canada
Subject: Mounties now say 'bomb' in aft of Air India
Flight
182

Yes, the Mounties are saying the 'bomb' was in the Aft
compartment
of Air India Flight 182 and want to put three guys in jail for life
for
putting it there.

Ha!

Can you do something about this nonsense?

Cheers,

John Barry Smith

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Supplemental TSB report for Air India Flight 182
Cc:
Bcc:
X-Attachments: :Master:319840:RCMPblachfor16may01.pdf:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,

24 May 01

Well, sir, thank you very much for your polite and informative email to me regarding the administrative details of the Air India Flight 182 accident. I do call it an 'accident' and not a 'downing' as the RCMP AITF, specifically Sgt Blachford, calls it.

Sgt. Blachford has been in contact with me and requests a meeting and documents, a suggestion I have accepted with the requirement that a TSB aircraft accident investigator be present to interpret the technical details of an aircraft inflight breakup, an occurrence which a policeman would not be expected to understand. I've attached my most recent letter to the RCMP AITF in text and as a PDF file.

First, I must respond that the Transportation Safety Board of Canada (TSB-C) has no mandate to re-open the aviation safety investigation of the AI Flt.182 occurrence.

Well, not yet. Is it not judicious to be prepared for the trial in

February when a TSB official will most certainly be called to the witness stand to present the current Canadian aviation accident experts' opinion about Air India Flight 182 for which two men are on trial for their life's freedoms?

Also, my research and conclusions indicate a present danger to the public safety in known faulty wiring again causing the forward cargo door of early model 747s to open in flight leading to fatalities, just like United Airlines Flight 811. Would it not be prudent to check out that startling claim by an experienced and educated aviation person?

When you say "Re-open" you imply the investigation was closed. My understanding is that the Air India Flight 182 investigation in the AITF has been open and ongoing for about 16 years. I would phrase the suggestion as providing a 'supplemental' report to the existing CASB report although later in this email I justify the suggestion for an entirely new AAR on Air India Flight 182 done by TSB alone.

As you may be aware, the TSB-C was not established until 1990, and the Aviation Occurrence Report you referred to was prepared by the Canadian Aviation Safety Board, the predecessor to the TSB-C. More importantly, in accordance with ICAO Annex 13, the investigation of that accident was led by the Government of India; the CASB report was prepared as input to India's investigation.

As I read the CASB aviation occurrence report, it appears to be selected portions of the Kirpal inquiry with notable omissions,

such as the assumptions of 'twinning' being proof positive of a bomb, and most importantly omitting the conclusion of a 'bomb' although the thought was there in everyone's minds.

The Canadians are to be complimented on resisting the intense political pressure at the time to call the cause of the agreed upon explosion in the forward cargo compartment as a bomb explosion. The UK AAIB representative, Mr. Davis, said the cause was not a bomb. The non aircraft investigator judge said it was a bomb, and the Canadian aircraft accident investigators declined to say one way or the other. Who was correct? Well, after 16 years and several similar accidents, it is now clear to me that the UK and the CASB air accident investigators were most correct.

The CASB were cautious, as all good investigators are, and only concluded that which was supported by real evidence of only an explosion in the forward cargo compartment. Period. That wise conclusion was confirmed years later by the event of United Airlines Flight 811 which refuted all of Judge Kirpal's reasons for grasping for a 'bomb' in the face of contradictory evidence such as the sudden loud sound on the CVR which matched a DC 10 explosive decompression sound and not a bomb sound.

Mr. Tucker, I read a lot of accident reports and the CASB occurrence report of 1986 was meticulous, precise, and cautious. They acted as investigators, not prosecutors. Now is the time to supplement that cautious and later proven to be correct report with an update. The update can be used to rule in or rule out the match to the subsequent event of United Airlines Flight 811 which would indicate a present danger to the flying public and prepare some fellow for the cross examination by the defence of the accused in the February 2002 trial. After all, it was a plane

crash, not a bank robbery, and current Canadian officials who know about plane crashes will be called to explain to the Court and jury just how and why a Boeing 747 came apart in the air so long ago.

Please do not wash your hands of Air India Flight 182. It's not done and gone. Accident investigations are based on precedent. We learn what happened now by what happened before. In one sense, a investigation is never complete because more and more is learned as similar accidents in similar circumstances leaving similar evidence occur allowing a refinement of the probable cause.

That said, we certainly have more than a passing interest in the circumstances of the AI Flt. 182 tragedy. We are interested because of the very nature of our chosen careers.

Too right.

We are interested because quite a few TSB staff were working for the CASB at the time (myself included), and many of that group were involved in the AI Flt.182 investigation. Above all, we are interested because of the enormity of the tragedy, the links to Canada and the fact that there has not yet been closure on this matter - almost 16 years after the event.

Very frustrating, I agree. And the way to resolve that frustration is to confront the mystery again. There can be closure and

satisfactory answers with a new supplemental report on the older one which can now examine the amazing significant similarities with United Airlines Flight 811, Trans World Airlines Flight 800, and Pan Am Flight 103. Of course you are interested. I'm miffed because most of the people I talk to don't even recall the tragic event even though it killed so many, many more than the other three.

United Airlines Flight 811 had an original AAR, 90/01, which was later superceded by an entirely new AAR on the same event, AAR 92/02. There is precedent for TSB to write an entirely new AAR with its own conclusions based upon actual examination of the evidence in videotapes and not rely on the Indian judiciary and their interpretations. The confirming proof exists in the videotapes and high quality 35 MM color photographs of the actual Air India Flight 182 wreckage that can now be matched to United Airlines Flight 811. TSB has access to those films via RCMP and specific expertise to properly evaluate that evidence.

TSB is entitled to conduct its own investigation for its own report and not have to refer to a dissolved agency or a foreign judicial official for opinions about a Canadian aviation accident which is still as potent as ever. AITF is after the 'bombers'; let the TSB go after a mechanical explanation based upon the matching event of United Airlines Flight 811, an event not available to CASB for consideration in 1986 but available to you and TSB now.

The match to United Airlines Flight 811 and the other two make Air India Flight 182 even more of a significant aviation investigation other than a 747 that exploded inflight and was thought to be a bomb but was not, just like Trans World Airlines Flight 800 for 17 months. Other AARs can now be updated and a current safety problem of wiring can be identified and fixed.

May I digress a moment, Mr. Tucker. The Airbus A380 will hold 650 passengers and it has a fatal design flaw, that of outward opening non plug cargo doors. The small sized balloon of Comet burst at a window, the medium balloon of a DC 10 burst at a cargo door of AA 96, the large balloon of a 747 burst at a cargo door of United Airlines Flight 811, and now the huge balloon of the A380 may burst at the same place. The cargo doors must be designed like the passenger doors; plug type. Now is the time for authority to rule in or rule out my conclusion that forward cargo doors of 747s are rupturing open in flight at one or both of the midspan latches. If confirmed, then the A380 and subsequent airliners can correct this major design flaw which is acknowledged in NTSB AAR 92/02, that of outward opening non plug cargo doors.

And do we not agree that Pan Am Flight 103 does not have closure either? Is that event satisfactorily resolved in your mind? Can you really believe a 20 inch shatter zone on the port side of the nose caused by a 'bomb' can cause the nose of 747 to come off in flight even as we know that United Airlines Flight 811 had a ten foot by 15 foot hole in the nose and the plane stayed aloft?

As you are aware, the RCMP have been conducting a criminal investigation into the circumstances of the crash ever since 1985.

In accordance with Canadian law, both the CASB and the TSB-C have provided the RCMP with copies of material from our file - excluding, of course, any information that is privileged under our Act. The information provided includes material that was produced by John Garstang.

Ahh, Mr. John Garstang.....He emailed me in 1997 with incorrect information. I replied and he called me on the phone later to correct his email report that the door was recovered intact as, in fact, neither cargo door was recovered. And there was not '...other solid evidence indicating a bomb blast had occurred.' Both his statements are misleading and incorrect. And now, 16 years later, he issues a report from the RCMP stating the explosion was a bomb in the aft cargo compartment, completely contradicting the Kirpal Inquiry and the CASB report with no substantive or new evidence for such a bizarre conclusion. Not only does the evidence conclusively show there was no bomb explosion in the aft cargo compartment, it shows there was no explosion of any sort back there and the area was closely examined for such an event because of JAL 123 and the infamous aft pressure bulkhead crack.

The allusion to gambling by betting money on 'experts' in regard to aviation safety is also distressing. Mr. Garstang's poorly substantiated conclusions carry little weight with me. Compare your email which is polite and informative to his factually incorrect, insulting, and bragging statements below and you will see what I mean.

Date: 27 Feb 1997 15:18:35 +0400

From: Securitas <Securitas@bst-tsb.x400.gc.ca>

To: "P=gc+internet; DDA.TYPE=RFC-822;

DDA.VALUE=barry(a)corazon.com" <barry@corazon.com>

Subject: RE: Crash cause of Air India Flight 182

Importance: normal

Autoforwarded: FALSE

Priority: normal

Thank you for your report expressing concern about the opening of cargo doors on B-747 aircraft. During any aircraft crash, investigators examine every piece of evidence, in order to determine cause. In the case of the Air India flight, the cargo door was in fact retrieved from the bottom of the ocean by the investigators. The latches were still in place, and there was no evidence on the edges of the door to indicate in-flight opening of that door.

On the other hand, there was other solid evidence indicating a bomb blast had occurred. Aircraft accident investigators are trained people. Anybody can say anything they want on the Internet. Put your money on the experts; you will win more often.

From: P=gc+internet; DDA.TYPE=RFC-822;
DDA.VALUE=barry(a)corazon.com
To: Securitas
Subject: Crash cause of Air India Flight 182
Date: Saturday, August 31, 1996 9:50PM
<<File Attachment: BDY3.P00>>
DATE: Aug 31 17:50:40 1996 GMT
IPMessageID: 32287B6A.1295(a)corazon.com
FROM: [P=gc+internet; DDA.TYPE=RFC-822;
DDA.VALUE=barry(a)corazon.com]
TO: Securitas

SUBJECT: Crash cause of Air India Flight 182

IMPORTANCE: normal

AUTO FORWARDED: FALSE

PRIORITY:

ATTACHMENTS: c:\BDY3.P00

--

Dear Safety Person, The cause of the Air India flight 182 crash of a

Boeing 747-237B from Toronto to London in 1985 was an inadvertent opened

forward cargo door which then tore of skin which then tore of nose to

destruction of aircraft. Not a bomb. My safety concern to TSB Securitas

is that it can happen again. To properly assess the risk to Canadian air

passengers, visit the web site at <http://www.corazon.com> for a fully

documented presentation of the issue of inadvertently opening cargo

doors. Open doors causing destruction in early model Boeing 747s has

happened before, it has happened now, and it may happen again.

Please

assess door opening claim by visiting web site and evaluating documents

supporting hypothesis. John Barry Smith

So, Mr. Tucker, you can see I have been at this for years. Steady and solid; the facts are there; and all the while the evidence corroborates the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight

182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. I plead with you to be able to meet and present my evidence to you and other Canadian aircraft accident investigators who respect research and evidence, who are not politically involved, and are not impressed by media hype of exciting myths about conspiracy bombers. There are no conspiracies, only physical laws of nature obeyed in twisted metal and sounds on data recorders. I rely on the reality of evidence for my conclusions not fearful fantasies of evil foreigners plotting to kill.

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart Blachford of the RCMP in Vancouver. The RCMP have as strong an interest as anyone in establishing what happened to AI Flight 182.

You may be right. They seem to have strong bias towards bomb and bombers, but you never know, they may have a real investigator who will consider any explanation that makes sense, has official documentation for support, and has an irrefutable precedent, United Airlines Flight 811.

I have also forwarded your report to the Director of Air Investigations,

Thank you.

the Investigator-in-Charge of our SWR Flight 111 investigation,

Thank you. I followed closely that investigation and found it to be patient, professional, and thorough.

and the Director
of Engineering for their information.

Thank you.

I am of course available at any time to answer their queries as they arise. The enormity of the implications is breathtaking, but true. I hope they can get past the bias of years of media bomb bomb bomb and look at my research of matching evidence to confirmed mechanical events in United Airlines Flight 811 and Trans World Airlines Flight 800.

With respect to the brief message in your second e-mail (of 8 May), there is one point that I must clarify in reply. It is correct that the CASB investigators' report never said it was a bomb that caused the explosion; however, the report also never said that it wasn't a bomb.

Yes, is the glass half full or half empty. But imagine the pressure on CASB to state it was a bomb. To not conclude it was a bomb shows that they did not just omit it, but really rejected it as a realistic explanation. Even now the RCMP is under intense pressure to allay the public fears and desire for revenge by prosecuting two foreign looking fellows for planting a bomb based on external circumstantial conspiracy evidence, just like Pan Am Flight 103.

In fact, to my knowledge, there was nobody on the CASB team who didn't consider a bomb to be the most likely explanation.

I understand the 1986 leaning towards bomb for the mystery cause of the explosion in the forward cargo compartment which CASB and Kirpal did agree on; the plane did come apart in flight. This is agreed upon and undeniable, so an explanation had to exist and a bomb explosion could cause that breakup, so, without a reasonable plausible alternative, what to say? Boom, bomb. For CASB to be cautious and reject the hysteria and just say explosion in the forward cargo compartment based on evidence only speaks highly of the mature wisdom of those officials at the time and now they are vindicated by events of a few years later in United Airlines Flight 811 which looked like a bomb, felt like a bomb, called a bomb by the crew, and yet, was not a bomb but an electrical problem with a cargo door.

If the CASB of 1986 had NTSB AAR 92/02 of United Airlines Flight 811 of 1992 to review, with its many significant matching similarities to Air India Flight 182, they would have had that reasonable plausible alternative to bomb and could have countered the 'bomb' explanation espoused by the politically minded Judge Kirpal. It's understandable that in 1986 a bomb explosion could have been the cause of the explosion in the forward cargo compartment since there was no reasonable alternative. There is now and I invite/urge TSB to now use that luxury of hindsight and precedent to issue a supplemental AAR for Air India Flight 182. My Smith AAR report lays out the evidence, analysis, and conclusions to make the match and declare Air India Flight 182 to have as a probable cause the

shorted wiring/cargo door rupture/explosive decompression/ inflight breakup explanation. Please evaluate the explanation on its own merits by experienced TSB investigators. I have high hopes that the gentlemen you forwarded my report to will do just that. Please forward this email to them should you believe it may help in their evaluations.

However, the aviation safety investigation conclusion on that point was, appropriately, left to the Kirpal Commission in India.

Well, Judge Kirpal was not an aircraft accident investigator nor was he a policeman involved with terrorist bombings. He could have relied on his Indian chief aircraft accident investigator, Mr. Khola, for information on why planes crash, and he could have relied on the Indian police force for evidence of bombings. but he did neither. He did the best he could trying to placate many pressures. His inadequate answers are shown by the lack of closure in the case. But again, in 1986 there was no precedent to rely on as United Airlines Flight 811 was about four years in the future. Judge Kirpal did the best he could under the circumstances, just as did CASB and others involved in the case.

The wisest probable cause conclusion based on the best evidence was the CASB one, not surprisingly by professional aircraft accident investigators. Through similar subsequent accidents, that cautious and prudent conclusion can now be refined to satisfactorily explain the cause of the agreed upon explosion in the forward cargo compartment of Air India Flight 182, and it's not a bomb explosion but explosive decompression probably caused by faulty wiring shorting on a door unlatch motor.

AA Flight 96, a DC 10 over Windsor Ontario, in 1972 which had a cargo door inadvertently open in flight, and Swiss Air 111 are two accidents which are relevant to Air India Flight 182 and are well known to CASB and TSB officials. I know that when I say an inadvertently opened cargo door in flight in a wide body airliner is potentially catastrophic and that Kaptonized type Poly X insulation wiring in a wide body airliner is also potentially catastrophic by shorting, you will not look at me in derision but might say, "Could be, Smith, where's your evidence? Show me what you have. And make it snappy."

I have it, sir; please let me present it to you in depth. Endure the impatience and go through it with me, piece by piece, foddled engine by foddled engine, CVR by CVR, FDR by FDR, and leading edge by leading edge. I believe I may persuade you a supplemental TSB investigation into Air India Flight 182 is warranted based upon my presentation of my years of research, analysis, and conclusions based upon actual AARs of similar events and similar facts, data, and evidence. There will be no conspiracy nonsense but just airplanes and more airplanes.

I sense in you, Mr. Tucker, that you are walking a line of being professionally correct as an administrator in your dealings with a member of the public and yet also intrigued as an investigator by the raw data I have presented to you that may indicate that Air India Flight 182 was in fact not a bomb explosion but a mechanical event which has happened before and can happen again. The implications are that a present danger may exist and thus continued discussion is warranted.

Let us have those discussions.

Sincerely,

Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Background:

From Sergeant Blachford, 7 May 2001

"As per your email of April 10th, 2001 you advised you would be contacting me the week of April 16-20th, 2001 and that you would have the requested data for me. Could you please advise when I might receive that data. Thank you and I look forward to meeting you."

For Sergeant Blachford AITF:

Dear Sergeant Blachford, 10 April 2001

Thank you Sergeant Blachford for your recent letter to me of 28 Mar, 2001, file number 85.3196. You stated that prior to our meeting I should send 'as much detail as possible' 'which reflects that faulty wiring on Air India Flight 182 was the cause of the 'downing''. I am preparing that data now for your review. I

will be in

Vancouver all next week (the week of 16-20 April) and may be in position to hand

carry it to your 5255 Heather St. address.

Dear Sergeant Blachford, 16 May 2001,

Thank you for your letter of 7 May 2001, file number 85-3196, to which I reply:

To be picky, which is what aircraft accident investigators do, and please don't take this personally,

I did say, "may be in a position to hand carry it to....". I later determined that I was not in a position to hand carry it to you.

In your previous letter, you made the condition that before a meeting you must first receive my research and analysis. I later believed that my research and analysis would not receive the consideration they deserve.

And since I did not receive any acknowledgement from you of my 10 April 2001 email until now, a month later, no rendezvous was set up between us for a meeting in April.

So, you see, we are off on the bad foot of misunderstanding already and that is not conducive to a proper investigation/interview/interrogation of a potential witness with a high likelihood of productive information being gained.

Maybe we can start again:

Smith/Blachford AITF letter 16 May 01

1

I have spent years in researching and analyzing explosive decompression accidents in early model

Boeing 747s. Air India Flight 182 is one of those accidents. My conclusion, amply supported by

official government documents, is that Air India Flight 182 did in fact suffer an explosion in the forward cargo compartment which led to the inflight breakup, as stated in conclusions by the 1986 Canadian Aviation Safety Board Aviation Occurrence Report. The Canadian Aviation Safety Board respectfully submits as follows:

4.1 Cause-Related Findings

1. At 0714 GMT, 23 June 1985, and without warning, Air India Flight 182

was subjected to a sudden event at an altitude of 31,000 feet resulting in its crash

into the sea and the death of all on board.

2. The forward and aft cargo compartments ruptured before water impact.

3. The section aft of the wings of the aircraft separated from the forward

portion before water impact.

4. There is no evidence to indicate that structural failure of the aircraft was the

lead event in this occurrence.

5. There is considerable circumstantial and other evidence to indicate that the

initial event was an explosion occurring in the forward cargo compartment. This

evidence is not conclusive. However, the evidence does not support any other

conclusion.

Based upon my further research, again supported by various government aircraft accident reports

(AAR), the explanation for that explosion is not that of a bomb but of an inadvertently ruptured

open, at one or both of the midspan latches, forward cargo door

caused by the known faulty Kapton type wiring shorting on the door unlatch motor which caused the explosive decompression which led to the inflight breakup. There is an irrefutable precedent for my conclusions of another early model Boeing 747 involved in the similar type event leaving similar type evidence, United Airlines Flight 811, a precedent not available at the time for the Canadian investigators to consider since it happened years later.

My research, analysis, and conclusions are available in a 117 page document, 'Smith AAR on Air India Flight 182,' with 120 pages of appendices. I can provide that document to you for your evaluation.

You asked to be advised when you might receive that data and you look forward to meeting me:

You may receive that data when we meet. I also look forward to meeting you. Let us now arrange the details.

I suggest my home in Carmel Valley, California, since all my computer data and research materials are located here as well as solving the family problem of my wife working as a Registered Nurse and I'm the parent taking care of our daughter before and after school hours. For me to go back to Vancouver would be a hardship for the Smith family. I understand the AITF is flying to England and India interviewing witnesses so you're welcome down here and fully justified to obtain information from someone who has been working five years on Air India Flight 182 details.

I suggest a time at your convenience and the sooner the better

because, as a consequence of my research, the implication is that a clear and present danger exists to the flying public in faulty wiring again causing a cargo door to open in flight causing fatalities in an early model Boeing 747.

The persons to be included in the meeting should consist of you (RCMP AITF), me (independent aircraft accident investigator), and a Transportation Safety Board of Canada aircraft accident

Smith/Blachford AITF letter 16 May 01

2

investigator (TSB). I really must insist on this, as my analysis is very technical and detailed and the AITF should have a neutral, objective, aviation expert present to validate or refute my claims to

you. Your trip will be productive when you have an official expert at hand you can trust to

immediately advise you on the spot if what I say technically is nonsense or correct and thus worthy of further examination by the AITF.

I invite John Garstang, of course; however, since he has been seconded to the RCMP since 1988,

he is hardly an objective observer and thus the TSB official is required. I suggest Mr. Vic Gerden

of TSB since he did such an excellent investigation of the Swiss Air 111 accident. A local

Vancouver TSB official would also be satisfactory. If you wish to document the meeting, I suggest

Paul Marquis, Editor, Aviation Safety Letter, Transport Canada, another Canadian government

official who understands why airplanes crash.

I will be referring to the AA Flight 96 DC-10 accident over Windsor, Ontario, Canada, in 1972 and

Swiss Air 111 accident near Peggy's Cove, Canada; two accidents the TSB will be well aware of and which support my shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182. The TSB does not scoff at the suggestion that faulty wiring or an inadvertently opened cargo door on wide body airliners could have occurred in Air India Flight 182 because they know those causes have happened before and could happen again. They will know which questions to ask of me to rule in or rule out the explanation. RCMP and/or AITF understands criminal actions in terrorist bombings and conspiracies; however, the wiring/cargo door/explosive decompression is a non-criminal mechanical event in a plane crash. TSB participation is essential when talking about why the Boeing 747 called Air India Flight 182 came apart in the air. The following is very important: The Canadian aviation authorities were absolutely correct in their conclusions of 1986. Subsequent similar airplane crashes such as United Airlines Flight 811 now allow TSB in 2001 to supplement the earlier conclusions with a clearer explanation of the explosion that caused Air India Flight 182 to breakup in flight amidships. The reason the RCMP and the AITF took so long to make accusations against persons is that there were no criminals to catch. If Air India Flight 182 had been a bombing, I believe the RCMP would have caught the perpetrators immediately and I would hope they would have been punished to the fullest extent of

the law, and it's too bad Canada does not have the death penalty. Let me digress a moment in investigative philosophy: The RCMP has a mandate which is that of an investigative body which conducts interviews, examines evidence, and makes conclusions which are then presented to the Crown for possible prosecution. The prosecutors and the defence attorney then get together in an adversarial relationship during a trial with judge and jury. That is the way it is supposed to work and when it does work that way, much success is had.

However, I have noticed in the past few years that the investigative agencies involved with airplane crashes, specifically, the RCMP, FBI, NTSB, have become prosecutors pressing forward their own case only and omitting contrary evidence which might contradict their opinion. The agencies have become political, which is to say, giving scientific conclusions which please the political appointees of the moment who reflect the popular will of the moment.

The people of Canada believe a bomb blew up Air India Flight 182 and killed 329 men women and children. The people assume a bomb had to be put there by someone and they want that person or persons punished. That is the political conclusion about the probable cause for the Air India Flight 182 tragedy.

Smith/Blachford AITF letter 16 May 01

3

If the RCMP and the AITF are conducting the investigation with the bombing conclusion already made and are now looking for evidence to support that

conclusion, I am not the person to talk to because my evidence refutes that conspiracy conclusion and gives a mechanical alternative explanation with precedent that shows that there was no bomb, and thus no criminal, and thus no punishment to be meted out to satisfy the desires of the grieving.

In lieu of the bombing explanation for the explosion in Air India Flight 182, I offer a plausible, reasonable, mechanical explanation with precedent: The shorted wiring/cargo door rupture/explosive decompression/inflight breakup sequence of events as modeled by United Airlines Flight 811.

There are no conspiracies by groups involved with Air India Flight 182 such as Boeing, NTSB, TSB, AAIB, Air India, or the RCMP. Everyone is acting in their own perceived best interest. I am not associated with any of those groups and am motivated by my near death haunting experience of surviving a sudden night fatal jet airplane crash in which my pilot died.

The recent meeting led by the RCMP in which lewd telephone calls are alleged to have been made by the accused is unworthy of an honorable investigation into an Air India airplane crash but indicative of a prosecution tactic to discredit the character of a person on trial to the jury.

Mr. Dave Cross and Mr. Ian Donaldson of the Defence team for the accused, Mr. Ripudamen

Malik, suggested to me that the RCMP and the AITF are not interested in what happened to Air India Flight 182 but are only interested in what the defence might use in trial so that the

prosecutors would have time to counter the conclusions, and not to confirm them or rule them out by further investigation. The attorneys may be right. Their point of view is that the RCMP is an adversary whereas I might see the RCMP/AITF/TSB as allies once the authorities understood my explanation for Air India Flight 182. (Although I had discussions with the Defence team attorneys, there was a clear understanding that I am an independent person who is free to act as I feel appropriate.)

However, based upon your most recent letter, Sergeant Blachford, I have hopes that quite possibly there is a real investigator amongst you. There may very well be an investigator who does objective research, searched the internet, reviewed my web site at www.corazon.com, read my emails to RCMP, noticed the similarities of Air India Flight 182 to an incontrovertible similar accident, United Airlines Flight 811, and decided to pursue the investigation further to rule in or rule out the intriguing possibility that Air India Flight 182 was a mechanical accident and not a heinous crime.

The criminal analogy is that of a serial killer in many jurisdictions, over many years, with random victims, but who always follows the same method of operation leaving a matching clue which links him to the crimes.

For the wiring/cargo door/explosive decompression explanation for four early model Boeing 747 fatal accidents over eleven years, it's the sudden loud sound on the CVR immediately followed by the abrupt power cut to the FDRs. That sound, Sergeant

Blachford, is not that of a bomb, but of an explosive decompression. The killer is wiring; the inadvertent accomplice/bystander is the outward opening non-plug forward cargo door. Someone at AITF, and it may very well be you, Sergeant Blachford, decided to follow up on the previous inquiry you made to me. Someone may be willing to sit down with me accompanied by an objective, neutral, government expert about airplane crashes, and patiently go through the matching evidence of Air India Flight 182 to other similar accidents which left much similar evidence that shows that the similar probable cause to be the initial event for all. The potential confirmation of a present danger to the flying public demands it. Smith/Blachford AITF letter 16 May 01

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So, on that hope. I have reconsidered and agree to provide you with my analysis and conclusions, and meet with at least you and a TSB official in my home to forthrightly and timely answer all your questions regarding my claim to you that Air India Flight 182 was not a bomb event but a mechanical accident with precedent coupled with the urgent implication that a present danger to public safety exists for the Canadian flying public.

To summarize: Meeting:

Documents to be made available: Smith AAR and appendices, and other documents as requested.

Location: 551 Country Club Drive, Carmel Valley, CA, USA

Time: At your convenience and I urge haste.

Participants: Smith, Blachford, Garstang, TSB (Gerden)

Transport Canada (Marquis) and others

as agreed upon.

Agenda: Clarification of the shorted wiring/cargo door rupture/
explosive decompression/inflight
breakup explanation for Air India Flight 182.

That is my message: I know you are interested in the messenger:

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135
certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650
hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

I am not an anonymous caller after midnight with whispered
unsubstantiated accusations about
minority groups.

I am a long time member of my community identifying myself
fully, giving ample communication
channels, and inviting you into my home as well as offering
documentation from authoritative
sources for all my technical conclusions.

If supported by evidence, is the AITF able to deviate from the
conspiracy course at this late stage
and conclude there was no bomb, no criminals involved? Is the
AITF willing to offer an entirely
different explanation for Air India Flight 182 other than the one

promoted by the RCMP but consistent with CASB of 15 years ago? Is the AITF willing to accept the advice, counsel, and assistance from a fellow government agency, TSB, regarding this airplane crash?

I well understand the political difficulties involved and the consequences world wide of such a revelation. But, honorable investigators rely on the facts, data, and evidence to reach reasoned conclusions and let the chips fall where they may. Hindsight is valuable and available to us all when we examine subsequent similar airplane crashes. I assert that beyond a reasonable doubt, those realities support the probable cause for Air India Flight 182 as the shorted wiring/cargo door

Smith/Blachford AITF letter 16 May 01

5

rupture/explosive decompression/inflight breakup explanation and refute a bomb explosion.

When you read my lengthy analysis and interview me, you too will be persuaded, if you have an open mind. The AITF can yet crack this case.

Hope springs eternal.

Cheers,

Barry

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,

Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Smith/Blachford AITF letter 16 May 01

6

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Smith AAR Appendices A, B, C, D, E
Cc:
Bcc:
X-Attachments: :Master:319840:Appendix A (WP).pdf: :Master:
319840:Appendix B (WP).pdf: :Master:319840:Appendix C
(WP).pdf: :Master:319840:Appendix D (WP).pdf: :Master:
319840:Appendix E (WP).pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as PDF files are appendices A, B, C, D, E to the Smith
AAR on AI 182.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>

Subject: Smith AAR Appendix I
Cc:
Bcc:
X-Attachments: :Master:319840:Appendix I (WP).pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as a PDF file is appendix I to the Smith AAR on AI 182.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com

barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Smith AAR Appendices F, G, H, J,

Cc:

Bcc:

X-Attachments: :Master:319840:Appendix F (WP).pdf: :Master:
319840:Appendix G (WP).pdf: :Master:319840:Appendix H
(WP).pdf: :Master:319840:Appendix J Bruntingthorpe.pdf:

W.T. (Bill) Tucker

Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as PDF files are appendices F, G, H, J, to the Smith
AAR on AI 182.

Sincerely,
Barry
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Official AI 182 Reports in PDF
Cc:
Bcc:
X-Attachments: :Master:320077:182.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as PDF file is the CASB and Kirpal Inquiry reports.

Sincerely,

Barry
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: UAL 811 NTSB AAR in PDF
Cc:
Bcc:
X-Attachments: :Master:320077:81192/02.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as a PDF file is the NTSB AAR 92/02 for United
Airlines Flight 811.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Supplemental thoughts
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Please permit me to amplify my previous email with additional thoughts:

The current status of opinion for the probable cause of the inflight breakup of Air India Flight 182 in which 329 died is:

The CASB aircraft accident investigators who state it was an explosion of unstated cause in the forward cargo compartment and not the aft cargo compartment....which conflicts with.....

The Indian Judicial authority who states it was a bomb explosion in the forward cargo compartment and not the aft cargo compartment.....which conflicts with...

The AAIB representative who said it was an explosive decompression explosion in the forward cargo compartment and not the aft cargo compartment the cause of which was yet to be determined.....which conflicts with.....

The RCMP AITF police authority who state it was a bomb

explosion in the aft cargo compartment and not the forward cargo compartment....which conflicts with....

This independent aircraft accident investigator who states it was an explosion in the forward cargo compartment and not the aft cargo compartment the cause of which is summed by the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation....which conflicts with....

The TSB who remains....silent...reluctant....on the bench...

Mr. Tucker, please, stand up, come forward, put yourself in play and assert your power and authority to sort out this contradictory cacophony of conflicting opinions about a momentous Canadian aviation event.

Your opinion carries the most weight amongst us; it must be heard. What is it? What happened to Air India Flight 182? Why? How?

Any report that exists can be supplemented, or revised, or updated, or upgraded. The Canadian Aviation Safety Board Aviation Occurrence Report regarding Air India Flight 182 can certainly be called Version 1.0 and a Version 1.1 can be an upgrade, to use a computer software analogy.

I personally recommend starting with a clean sheet of paper and treat the accident as you would as if it happened yesterday. Because of the peculiar nature of the accident with most of the wreckage still on the bottom of the ocean and the suddenness in which the event occurred, the evidence upon which the original investigators relied upon to make their conclusions and findings still exists in a hangar in Bombay and in dozens of videotapes

and hundreds of high quality 35 MM color photographs now held by the Gendarmerie royale du Canada.

With the benefit and luxury of hindsight, subsequent similar accidents in similar aircraft under similar circumstances leaving similar evidence can now be evaluated for comparison.

Your TSB report will be the most up to date, the most comprehensive, and the most accurate. It is vitally needed, Mr. Tucker. Your expert opinion is needed by the Crown, by the Defence, by the RCMP AITF, by the manufacturer, by the airlines, and by the worldwide flying public in early model Boeing 747s, of which approximately 1100 are still in service.

To assist, I am sending the PDF of AAR of United Airlines Flight 811 and Air India Flight 182 Kirpal and CASB report. The electronic versions are very valuable for the ability to search quickly through for keywords. Trans World Airlines Flight 800 NTSB AAR 00/03 and Pan Am Flight 103 AAIB 2/90 are very large and can be sent to you if you wish and are available for download at <http://www.nts.gov> and <http://www.aaib.detr.gov.uk/index/index.htm>

I am also sending the Appendices to the Smith AAR for AI 182 in PDF, in case you do not have them; Appendix I is a personal, informal supplement.

These additional research materials may assist your staff which have received my AAR from you for their information. I am available day or night on any day to answer questions they may have and invite a meeting between us at your convenience.

The videotapes and color photographs of the 182 wreckage will be particularly interesting as there now exists much other real

twisted metal to compare with; metal which now resides in hangars in Farnborough and Virginia in addition to Bombay. It's easier to find something if one knows what to look for; in this case it will be matching evidence in and around the forward cargo door to possibly match with Pan Am Flight 103, Trans World Airlines Flight 800, and United Airlines Flight 811, the subsequent incontrovertible accident with its many significant matches:

From Smith AAR:

7.18 Summary of matching evidence between Air India Flight 182 and United Airlines Flight 811 specifically:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. Section 41 retrofit not done
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J . Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans

- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched
- AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)

AE. Outwardly peeled skin on upper forward fuselage
AF. Rectangular shape of shattered area around forward cargo door
AG. Forward cargo door fractured in two longitudinally
AH. Status of aft cargo door as latched
AI. Passengers suffered decompression type injuries
AJ. At least nine missing and never recovered passenger bodies
AK. Initial official determination of probable cause as bomb explosion.
AL. Initial official determination modified from bomb explosion
AM. Structural failure considered for probable cause
AN. Inadvertently opened forward cargo door considered for probable cause
AO. Takeoff after sunset on fatal flight
AP. Takeoff after scheduled takeoff time on fatal flight
Smith AAR AI 182

The data from the CVR and FDR (the only direct evidence of the events of AI 182) still exist and are as accurate as ever. There now exists similar CVR and FDR tapes to compare with.

Dr. Hill, the pathologist from AAIB in Air India Flight 182 is alive, well, and still practicing in England. I spoke with him by telephone a few months ago and he is as professional as ever. His phone number is 207 407 0378.

I implore you, sir, please, become involved, this is, after all is said and done, a fatal aircraft accident that originated in Canada

and killed Canadians. Take a crack at it.

Sincerely,

Barry
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: PDF of Smith AAR for AI 182
Cc:
Bcc:
X-Attachments: :Master:331906:SmithReportfinalfor.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 30 May 01

Attached is the Smith AAR for AI 182 dated 1 May 01 in PDF and supercedes the earlier Word file which had formatting problems. PDF allows the color photographs to be where they should and keeps the indents in proper order.

Sincerely,
Barry
John Barry Smith

(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Sgt Blachford contacted me
Cc:
Bcc:
X-Attachments:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 30 May 01

Sgt Blachford wrote me a letter received today. He confirms he has received my Smith AAR from you, will 'review and digest the contents of this report', will not be available for a meeting with me until mid August, and will be in touch with me in the 'near future'.

My reply to him below.

I have created my original Word file Smith AAR into a PDF file which incorporated the Garstang report of 16 March 01 and an additional appendix which included the Bruntingthorpe event. I trust this is the one you sent to RCMP and your staff.

Anyway, I will send the PDF of my updated report via separate

email and will send by snail mail a hard copy of the updated AAR and the appendices to the Head Office in Hull, Quebec, Place de Centre, 4th floor, 200 Promenade du Portage, K1A 1K8, address. If you are located elsewhere, please inform me and I'll send it there.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Dear Sergeant Blachford,
30 May 2001

Thank you for your letter of 24 May 2001, file number 85-3196, to which I reply:

I'm glad that Mr. Tucker of TSB has forwarded my Smith AAR for AI 182 to you. That means that technical aircraft questions

can be answered by TSB or me. I shall send the attachments/ appendices to you by snail mail to the Heather Street address as well as a hard copy of the actual AAR.

I ask that you take note of Appendix J which is about the Bruntingthorpe bombing of a Boeing 747. Note the photograph that shows a real bomb going off in a real Boeing 747 leaving real evidence. Then note the photograph in my AAR of UAL 811 and the huge hole on the starboard side of the nose which occurs when a real electrical problem causes a real large door to inadvertently open in flight on a real Boeing 747 leaving much real evidence.

Then compare AI 182 to both of those real, incontrovertible and indisputably explained events and you will clearly see that the real bombing evidence of Bruntingthorpe is absent in AI 182 and the real explosive decompression evidence from the ruptured open cargo door of UAL 811 is present in AI 182.

There are actually thousands of pages of accident reports and public docket information on hard copy, electronic memory, and CDs that are relevant to AI 182 and are on file here with me. All four accidents are controversial and have generated much official investigation and reports. I do not refer much to media speculation and rely on official reports for support of my claims.

I appreciate your intent to fully study the Smith AAR as it is dense and full of facts and documentation. At any time please call for any clarifications via email or telephone.

Mid August is fine for a meeting or sooner at your convenience and I have to add the situation is urgent from a public safety point of view.

I look forward to our meeting in the future. If I call you Sergeant, you might call me Major as I was in the Army or I can call you Bart and you can call me Barry.

Cheers,

Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: So true...
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Mr. Tucker, 14 June 01

This article below about wiring is so true and supports my shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182.

Also, this is the 34th anniversary night of my ejection from my on fire suddenly jet airplane during training for carrier landings

which killed my pilot. This accident is the impetus for my continuing interest in aviation safety and my efforts to prevent what happened to me from happening to others.

May I enquire, sir, as to the progress of my Smith AAR on Air India Flight 182 which you submitted to RCMP, DAI, IcC of SWR 111, and DE for their information? The implications of my report show a present danger to the flying public in faulty wiring causing forward cargo doors to inadvertently open in early model Boeing 747s, in addition to the already known and reported wiring caused fires in the forward cargo compartment.

Mr. Tucker, I am always ready to be interviewed/queried as to the details of my explanation and welcome correspondence.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart Blachford of the RCMP in Vancouver. The RCMP have as strong an interest as anyone in establishing what happened to AI Flight 182. I have

also
forwarded your report to the Director of Air Investigations, the Investigator-in-Charge of our SWR Flight 111 investigation, and the Director of Engineering for their information.

The Canadian Transportation Safety Board (TSB), which is now investigating the Swissair crash, and other countries' aviation agencies also received the Danish government accident report but made no recommendations related to Mylar.

TSB spokesman Jim Harris says the agency can't make recommendations based on another country's investigation. He says the TSB investigates accidents and is not a regulatory body like the FAA in the USA and its Canadian counterpart, Transport Canada.

U.S. knew of wiring flaws years before TWA crash 1993 jet fire raised issues, but only after 2 crashes killed 459 did FAA act

By Gary Stoller
USA TODAY

Smoke and a burning electrical smell seeped into the passenger

cabin of an arriving SAS jet as it taxied to a terminal in Copenhagen, Denmark. All 110 passengers scrambled out of the plane safely before a raging fire consumed much of the fuselage. For 8 years, that 1993 incident hasn't been reported in U.S. newspapers, although the U.S. government was involved in the accident investigation.

Now USA TODAY has obtained the Danish government's 72-page accident report, and it reveals that:

- * The fire on the SAS McDonnell Douglas MD-87 jet may have been a precursor of two deadly North American crashes -- TWA Flight 800 in 1996 and Swissair Flight 111 in 1998 -- in which investigators believe wiring problems and flammable cabin insulation may have played a role.

- * Two U.S. agencies involved in aviation safety -- the National Transportation Safety Board (NTSB) and the Federal Aviation Administration (FAA) -- assisted the SAS investigation and were aware of wiring and cabin insulation problems years before the North American accidents. Since those accidents, the FAA has issued a series of safety orders regarding inspections and modifications to wiring and the same type of cabin insulation.

- * A type of wire on more than half of the airline jets flying today can be very dangerous when it fails.

A fierce fire

The SAS accident, which occurred on a flight from Barcelona, was caused by electrical wire that short-circuited, igniting flammable cabin insulation. "Continued arcing and sparking resulted in ignition of the cabin sidewall insulation material, which eventually developed into a fierce, uncontrollable fire," Denmark's Aircraft Accident Investigation Board (AAIB) wrote in its 1996 report.

The AAIB investigation found "clearly that the primary ignition source was that two wires, carrying an electrical load of 28-volt AC and 115-volt AC, respectively, became pinched between the

aircraft structure and the recirculation fan duct."

The pinching caused the wires' outer insulation to chafe, exposing their metal conductors, the AAIB says. The bare wires touched one another and an adjacent piece of metal, leading to a short-circuit.

Three years after the SAS fire, NTSB investigators headed to the Atlantic Ocean off Long Island to determine what caused the center wing fuel tank of a TWA Boeing 747 jet to explode, killing all 230 aboard. The NTSB didn't determine a probable cause but said last year that the most likely source of ignition was electrical wiring that short-circuited.

In September 1998, more than 2 years after the Danish report was written -- a high-temperature fire ignited before Swissair Flight 111 crashed near Nova Scotia, killing all 229 people aboard. Canadian investigators, who are still investigating the accident and haven't yet determined a cause, say they found short-circuited wires and burned Mylar cabin insulation on the McDonnell Douglas MD-11 jet.

The Danish accident report reveals that the two wires that short-circuited on the SAS MD-87 had been installed between, and ignited, layers of Mylar insulation.

FAA conducted tests

As part of the investigation, the FAA performed fire tests on materials removed from the jet, according to a 1994 FAA letter in the Danish report.

The tests, conducted at FAA facilities in Atlantic City, N.J., showed that Mylar insulation failed the FAA's flammability requirements and could ignite from short-circuited wiring.

Despite those tests, the FAA proposed no regulations to remove Mylar from planes or ban it from new aircraft until after the Swissair crash. In August 1999, the agency ordered airlines to remove Mylar from MD-11 and MD-80 series jets within 5 years.

When asked about the Danish accident report showing the FAA tested Mylar years earlier, FAA spokeswoman Alison Duquette said the agency accelerated Mylar-related research after the Swissair accident.

"Based on our new test that we developed, we found that Mylar does not meet an acceptable level of safety," she says.

Ed Block, a private expert who inspected aircraft wiring for an FAA subcommittee formed after the TWA accident, says that the FAA should have taken immediate action when it learned about the dangers of Mylar during the Danish accident investigation.

NTSB's participation

The NTSB, which assisted the Danish government in the SAS investigation, also was aware of the dangers of Mylar but made no call to have it removed.

"There are occasions when information developed in foreign investigations leads to Safety Board recommendations," says NTSB spokesman Ted Lopatkiewicz in a written statement. "No NTSB recommendations were issued as a result of the Danish investigation." The board refused further comment on the SAS accident report.

The Canadian Transportation Safety Board (TSB), which is now investigating the Swissair crash, and other countries' aviation agencies also received the Danish government accident report but made no recommendations related to Mylar.

TSB spokesman Jim Harris says the agency can't make recommendations based on another country's investigation. He says the TSB investigates accidents and is not a regulatory body like the FAA in the USA and its Canadian counterpart, Transport Canada.

"Sadly, these agencies are all missing in action," Block says.

"They're saying they don't care about the people in their country flying on these planes."

Peter Thulesen, the head of the Danish accident investigation board, declined to be interviewed or to answer written questions about the type of wiring that short-circuited on the SAS jet. The FAA's letter in the Danish accident report, however, reveals that the wire type was polyimide, which is often called Kapton. Boeing, which acquired McDonnell Douglas after the SAS plane was built, says Kapton is the general-purpose, or most commonly used, wire on MD-87 aircraft. It is also the type that runs through most Boeing and Airbus jets, including the Swissair MD-11 that crashed. Short-circuited Kapton wires were found by Canadian investigators in their probe of that accident.

Cracked wire's dangers

U.S. Navy and other electrical engineering studies have shown that a crack exposing a Kapton wire's metal conductor can lead to a powerful short-circuit. Such a reaction could result in a 10,000-degree Fahrenheit electric arc jumping out a wire, a flashover and a high-temperature fire.

In October, British government investigators concluded that Kapton wire malfunctioned, triggering an electrical arc that caused a bundle of wires to catch fire on a United Airlines Boeing 767 in 1998.

The lead investigator in that crash told USA TODAY that Kapton should not be installed on new jets and that older planes found to have cracked Kapton wiring should be grounded. Both Boeing and Airbus use Kapton wire on their new planes.

Last March, the Australian airline Qantas issued a memo prohibiting its mechanics from using Kapton as a replacement wire, citing "ongoing incidents across the world involving Kapton wire." The memo, which was obtained by USA TODAY, calls for purging of all Kapton in inventory.

Officials at FAA headquarters in Washington say there is no evidence of a Kapton problem. Data on planes still being flown

don't present serious concerns about Kapton wiring, provided it is carefully installed and maintained, the agency says. The Danish government accident report, as well as other incidents in commercial and military aviation, provide more than enough evidence of a problem with Kapton, Block says. "After the SAS fire, FAA officials should have realized they had a problem with Kapton wiring and made some prioritization to deal with Kapton arcing," he says. "They ignored the problem, and it still festers."

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Swiss Air 111 changes

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker, 18 June 01

Below shows the impact of a conscientious effort by investigators to find out what happened in an accident and the good faith efforts of an airline to prevent it from happening again. Good work by TSB and Swiss Air. Not good by reluctance of Boeing to implement the changes for all.

Note the cameras in the cargo holds; that is very good.

I look forward to the opinion of Mr. Vic Gerden to my Smith AAR for Air India Flight 182. I also have concluded wiring is causing problems that were not apparent.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sunday newspaper, 6-17-2001
Swissair optimizes MD-11-Cockpits with modifications to their
electrical system - as a direct consequence of their Flight 111
Crash cause deliberations.

FROM TIM VAN BEVEREN *ZURICH*

Two and a half years later, the consequences of the crash of SR
Flight 111 near Halifax N.S. have continued to affect Swissair.
Their remaining 19 MD-11 airliners are being radically
converted in modifications to the electrical system in the cockpit
area. For over one million Swiss Francs per jet: " ...primarily it's
the electrical system that is to be significantly improved "
according to Swissair documents made available to Sundays
newspaper. There in Zurich the crash cause for the 111 and its
229 passengers is being assumed, despite the Canadian TSB
Report being anticipated for public release not before the
beginning of 2002. Already many family members of Flight 111
victims have been "paid out". So now Swissair no longer wants
to wait for the outcome of the final report of the Canadian
accident investigation before implementing the safety fixes that it
has identified. "Safety remains our highest priority " claims
Swissair speaker Urs Peter Naef regarding the planned changes. "

Cost-saving measures never conflict with the required expenditures on flight safety, which underlie our "mode plus" modification program initiative."

In Canada Investigators of the Transportation Safety board (TSB) express themselves reservedly over the planned SR procedure. Investigation leader Vic Gerden: "Swissair's efforts to reduce potential safety deficiencies are well-known to us." As a crash cause, it is so far certain only that an electrical fire in the wiring-bundles was crucially responsible. Because of the fire, important systems in the cockpit failed in quick succession, without which captain Urs Zimmerman and Copilot Stephan Loew could no longer control their machine.

In a few days the technical modifications will begin and they will naturally concentrate on the known SR111 trouble areas: - significant critical wire-bundles are to be separated out and fed, via a routing with greater electrical integrity and individual isolation, into the cockpit. In SR111 these wiring harnesses ran through a single focal point described as a critical node. It was specifically within this area in the ceiling (just forward and aft of the cockpit/cabin bulkhead) that the fire had devastatingly raged. It affected not only the emergency power systems but the "last-ditch" power feeder lines to the batteries as well. Now that these systems are to be split and segregated for greatest integrity, important protections will again be in place - for example the one that controls the emergency power turbine (or ADG - air driven generator). This propeller can be unfolded from a compartment in the fuselage in an emergency and in the airflow produces current - like a hydroelectric direct current generator. In SR111 the Canadian investigators found that this critical emergency power turbine had given out no energy. Despite the crisis, its control functions had failed to deploy it - probably because, by that time, the associated wiring had been consumed by the fire. Video cameras and smoke detectors are also being installed by

this "unique to Swissair" modification program. CCTV Video cameras are being installed everywhere: in the cargo-holds, in the electronics bay under the cockpit floor - as well as behind the cabin linings. allowing the pilots a never before possible view into potential fire zones. The pictures will come up on a small 14-centimeter monitor in the cockpit. In addition more smoke detectors are being strategically positioned. The objective is that crews would no longer be condemned to helpless seated inactivity in the case of fire. Fire extinguishing agents behind the cabin linings can squirt upon any detected fire.

All Swissair aircraft are to receive a new wholly integral emergency flight attitude instrument. It is to be operable from two separate power sources and will function reliably even if all other systems have broken down (as was the case with SR111 in its last few minutes of flight). Altogether the cockpit changes are to cost 20 to 23 million Swiss Francs according to calculations of a Swiss Aviation Expert. The extensive modifications are the result of ongoing Swissair internal investigations into the accident's most likely course of events.

Shortly after the crash on 3 September 1998 a Taskforce under the leadership of retired Swissair Technical Chief Willy Schurter began its work, paralleling that being done by the official Canadian TSB Team. They sought to track down all possible causes of the disaster. The SR MD-11 Electrical Rework is in addition to other earlier measures (such as changes in checklists and procedures) - but is seen as the most important outcome of these investigations. Although latterly consulting and then in close co-operation with the US manufacturing firm Boeing, Swissair engineers unilaterally sought to analyse all factors of the accident themselves - in order to identify any deficiencies in the original type-certificated design. In a further internal document Swissair explains: "We knew that it needed three prerequisites for the initiation and propagation of a fire: a potential ignition

source (e.g. arcing wires), fuel (e.g. thermal/acoustic blankets) and oxygen (i.e. air-conditioning system ventilation or crew oxygen system lines) ". As a consequence of its insights another risk-factors conclusion of the SR Halifax Taskforce presents a frightening new dimension to SR111: "We have clearly concluded that such contributing factors exist in each type of aircraft and that it is not simply a case of being type-specific to the MD-11." These were conclusions also reached by the TSB and sent to the certifying authority (the US FAA). To date the only ramifications of SR111 reaching beyond the MD-11 are the new emergency rules retroactively affecting the STC's (Supplemental Type Certification) of Inflight Entertainment Systems on just about every type of airliner in service today.

Nevertheless, neither manufacturers Boeing nor the American FAA supervisory authority want to even recommend (let alone mandate) the new Swissair safety precautions for all remaining MD-11's. If this was to be done, such a program could then logically expand to include most other types of airline aircraft exhibiting the identical type-certification deficiencies. The first Swissair machine should be converted and ready for return to service at the end of June 2001. Before the SR MD-11 Fleet is permitted to carry passengers following the incorporation of these system safety adjustments, it must pass a strict test flight program in Zurich. Preliminary re-certification assessments would normally be monitored by representatives of the FAA (the American airworthiness regulatory authority). However these were carried out in the spring of 1999 so that these changes could proceed without delay to SR Flight Services. But because manufacturer Boeing withheld its agreement to these changes for a long time, there have been extensive delays in their implementation. Boeing sees much of the program as "enhancements" and not necessarily as required safety

modifications. These new Swissair safety initiatives have now become even more expensive: Three SR MD-11's have only just completed their heavy maintenance checks. But now they must return to the hangar yet again for extensive rework. But it's not necessarily a case of spending a dollar to save a penny. Once you look at the cost of SR111 and its potential for costing the airline industry as a whole, it may well have been the other way round.

X-From_: Bill.Tucker@tsb.gc.ca Wed Jun 20 18:18:46 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Swiss Air 111 changes
Date: Wed, 20 Jun 2001 21:20:48 -0400

Dear Mr. Smith,

This is in reply to your series of e-mails, and to clarify the TSB position in case there is a misunderstanding. I'm sorry I have not been able to reply sooner. I shall be away for the next two work days and I had a reply to you on my "must do" list before leaving tonight.

The TSB is not presently doing further investigation of the Air India 182 accident, nor is it planning to do so. We have limited resources and a backlog of investigation work-in-process; we do not believe that cargo door or wiring problems were involved in that occurrence; and we are confident that the RCMP are doing a thorough and unbiased investigation.

Therefore,
we do not believe we would be justified in diverting our
resources to that
occurrence.

That said, I am not suggesting that your concerns and your
analysis are all
invalid. In fact, I find that you have raised some interesting
points that
have potential use for us in our work. To that end, I am
personally looking
through the material you send and forwarding copies, as I think
appropriate,
to the Dir. of Investigations - Air, the Dir. of Engineering, and the
IIC of
the SWR111 investigation. If you wish, I can also forward copies
to Sgt.
Blachford or the RCMP, but it seems more appropriate for you to
do that
yourself whenever you so choose.

>From one of your e-mails, I now also understand the reason for
your strong
interest in advancing aviation safety, and I respect you for that.
If you
wish to continue sending material to me, I shall continue to
process it, as
outlined above, to the best of my ability. However, I cannot
promise
immediate processing and I cannot engage in direct and detailed
dialog on
all the material you send me; I simply have too much other work
to do.

Right now I have over 150 e-mails in my in-box to read and action; there will be well over 200 when I return next week. I am not complaining, I simply want you to understand my position with respect to your inputs.

Sincerely,

Bill Tucker.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Monday, June 18, 2001 11:59 AM

> To: Tucker, Bill

> Subject: Swiss Air 111 changes

>

> W.T. (Bill) Tucker

> Director General,

> Investigation Operations

>

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- > per jet: " ...primarily it's the electrical system that is to be
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- > Sundays newspaper. There in Zurich the crash cause for the 111 and its 229
- > passengers is being assumed, despite the Canadian TSB Report being
- > anticipated for public release not before the beginning of 2002.

Already

- > many family members of Flight 111 victims have been "paid out". So now
 - > Swissair no longer wants to wait for the outcome of the final report of
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 - > Cost-saving measures never conflict with the required expenditures on
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- > (just forward and aft of the cockpit/cabin bulkhead) that the fire had

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have
> been the other way round.

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Sudden loud sound on CVR

Cc:

Bcc:

X-Attachments:

Dear Mr. Tucker, 20 June 01

Well, longest daylight of the year tonight, that's good.

The TSB is not presently doing further investigation of the Air
India 182
accident, nor is it planning to do so. We have limited resources
and a
backlog of investigation work-in-process; we do not believe that
cargo door
or wiring problems were involved in that occurrence; and we are
confident
that the RCMP are doing a thorough and unbiased investigation.
Therefore,
we do not believe we would be justified in diverting our
resources to that

occurrence.

I understand the way things are now, and of course, subject to change. There is that pesky trial coming up and the RCMP is saying bomb in aft cargo compartment and the CASB and Kirpal stated explosion in forward cargo compartment, not a trifling conflict. Just where was that bomb?

I find that you have raised some interesting points that have potential use for us in our work.

Thanks. UAL 811 is a big point.

To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

Thanks. More eyeballs (or ears) is always good. I respect your personal opinion most of all. I can tell an open mind that will put emphasis on the evidence. A sudden loud sound on the CVR is the only direct evidence that exists for Air India Flight 182, all the rest is circumstantial or tangible consequence. The sudden loud sound is everything and it says, 'Not a bomb explosion' but 'Explosive decompression that matches DC 10 cargo door event.' When in doubt, I always come back to the sudden loud sound on the CVR's on all the four early model Boeing 747s that suffered

the inflight explosions forward of the wing. The sound is incontrovertible.

>From one of your e-mails, I now also understand the reason for your strong interest in advancing aviation safety, and I respect you for that.

Thanks. I met the sons of my savior pilot years later, three of the five children he left became Navy pilots.

If you wish to continue sending material to me, I shall continue to process it, as outlined above, to the best of my ability.

Thanks, an open mind is all I ask. I would not expect detailed replies, but welcome any queries from you or your staff should they come up.

I simply want you to understand my position with respect to your inputs.

I understand. Thanks again for your reply.

Sincerely,
Barry

John Barry Smith

(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com
Commercial pilot, instrument rated, former FAA Part 135
certificate holder.

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Startle/falling reflex
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,

23 June 01

At 9:20 PM -0400 6/20/01, Tucker, Bill wrote:

If you
wish to continue sending material to me, I shall continue to
process it, as
outlined above, to the best of my ability.

Thank you again for the opportunity to present some of my
research and conclusions for review. I trust your two day trip was
successful.

But first: Philosophy. To explain to myself the public's intense
interest in aviation safety I go back to the basics. Infants are born

with reflexes, two of which are the startle reflex and the grasping reflex. (Sucking is a third.) We are not born with the fear of fire, being crushed or drowning. We are born with the fear of a sudden loud sound and we are very afraid of falling. An infant will react by jerking when startled by a loud sound and the infant will instinctively grasp on to anything when it senses a fall backwards. A baby has to learn to fear fire or being squeezed too tightly and not to breathe underwater. So, being burned in car crash, crushed in a train wreck, or drowning in a ship sinking will always have less of a priority of a plane crash because a plane crash, especially one caused by a loud noise (explosive decompression or bomb explosion), holds two of the most primal of fears, startle and falling.

Because of these innate fears, severe reactions, even hysterical, are seen by X ray machines, sniffing dogs, etc, to try to stop a small percentage of probable causes of aviation accidents; sabotage. The billions of dollars could be better spent on pilot and maintenance training to reduce the crew error and mechanical problems which contribute to most of the accidents. However, the public demands a reduction in the fear of being startled in flight and then falling and a 'bomber' in a plane is terrifying.

That is why our job and in particular your job, sir, is so very very important. We must get it right, and if not exactly right the first time, then better the second time if we have the luxury of time and hindsight.

Second: Politics. A probable cause of an airplane accident which is high profile and involves literally hundreds of millions of dollars, thousands of jobs, and the pride of several countries is an important probable cause. Of course it is political and that means

finding an answer which everyone can live with. The problem is that usually probable causes mean someone can't 'live with it.' Accidents are usually complex with no single overriding factor but, human nature being what it is, politics demands simple, quick, and easy answers. Money always enters the picture and changes things too.

I understand all these things. A probable cause of a machine accident should be independent of all those factors and focus on the actual events regardless of culture of pilot, country of origin of the manufacturer, passenger list, or religion of the owner of the airline.

My explanation for four Boeing 747 accidents involves many countries, airlines, and agencies and a lot of money. I did not pick the flight numbers of these 747 accidents, the evidence did. Of the almost 40 747 hull losses in the past 30 years, only four fit my criteria for the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation. All four flight numbers are controversial because the official explanations are incomplete and contradictory.

Because the implications and consequences of the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for four 747 accidents are profound in a political and economic sense, please do not let that bias the TSB towards or against a particular probable cause; let the evidence speak for itself and there is much of it.

Third: Evidence.

Mr. Tucker, everyone talks about evidence but what is it? I use the legal terms of direct, tangible, and circumstantial; all of

which can be very powerful and persuasive. The most is the direct. Direct evidence is the eyewitness, it's the participant, it's the CVR. The CVR was designed for this purpose; to tell us what happened up there, directly. The CVR heard what happened. Let the CVR speak and it says, "I heard a sudden loud sound that does not match a bomb explosion sound but does match an explosive decompression sound in a wide body airliner when the cargo door inadvertently opened in flight." And that is paraphrased from the official CASB and Kirpal report.

Let us assume the CASB and Kirpal report on the CVR sound is correct. The implication is that the probable cause of Air India Flight 182 was not a bomb explosion but something else and that warrants further investigation.

I have done that further investigation. I can match the CVR sudden loud sound, (the only direct incontrovertible evidence,) from the DC-10 to Air India Flight 182 to United Airlines Flight 811 to Trans World Airlines Flight 800 to Pan Am Flight 103.

In addition there are many other significant evidence matches among the four to be discussed later.

Yes, the claim is enormous and runs counter to the conventional wisdom for bombs for all, some for a day and some for years.

Conclusion:

My goal is not to persuade you for certain that Air India Flight 182 was not a bomb explosion, but to persuade you that the mechanical alternative of shorted wiring/cargo door rupture/explosive decompression/inflight breakup warrants further investigation by the TSB because of the direct evidence on the

actual accident flight and the matching evidence of later accident flights. The probable cause of AI 182 may be something else other than bomb based on subsequent similar accidents, particularly United Airlines Flight 811, and that probable cause of faulty wiring is still present and unrecognized by authority.

TSB is that authority that can determine or rule out the danger. Can you and your staff spare some time to correspond with me via letter or email regarding Air India Flight 182 and its similarity to United Airlines Flight 811? They can ask rebutting questions which should be easily apparent if my explanation is bogus and I can reply with official documentation to support all my claims.

7.18 Summary of matching evidence between Air India Flight 182 and United Airlines Flight 811 specifically: From Smith AAR for AI 182:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. Section 41 retrofit not done
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud

- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched
- AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)
- AE. Outwardly peeled skin on upper forward fuselage
- AF. Rectangular shape of shattered area around forward cargo door
- AG. Forward cargo door fractured in two longitudinally
- AH. Status of aft cargo door as latched
- AI. Passengers suffered decompression type injuries
- AJ. At least nine missing and never recovered passenger bodies

AK. Initial official determination of probable cause as bomb explosion.

AL. Initial official determination modified from bomb explosion

AM. Structural failure considered for probable cause

AN. Inadvertently opened forward cargo door considered for probable cause

AO. Takeoff after sunset on fatal flight

AP. Takeoff after scheduled takeoff time on fatal flight

At 9:20 PM -0400 6/20/01, Tucker, Bill wrote:

To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation.

I appreciate that sir, they are the experts and can quickly discern if my shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation warrants further attention by TSB.

If your staff asks the questions, I will try very hard to provide the answers; I've had twelve years at it.

'Not to know is bad. Not to want to know is worse. Not to hope is unthinkable. Not to care is unforgivable.'" - Nigerian saying.

Mr. Tucker, I believe you want to know, you hope to find out, and you care. I do too. Thanks again for listening to me.

Sincerely,

Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: DI-Air, DE, IIC, AITF
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
June 01

23

Well, it's the 16th anniversary of Air India Flight 182 today. After reading and rereading the CASB and Kirpal reports so many times over the past years I can almost see and hear the Boeing 747s involved as they preflight, taxi, takeoff and land. There was the 747 going to Tokyo, the 747 from Tokyo to Bangkok, the 747 going to Toronto, the 747 going from Toronto to Montreal and thence to London. Four Boeing 747s; all safe except one, Air India Flight 182. All four were supposed to have bombs on them.

Add in Pan Am Flight 103 and Trans World Airlines Flight 800 and United Airlines Flight 811 which also were reported to have bombs in them and there were a total of seven Boeing 747s that had or were to have bombs on board at one time or the other. And of course, the bombs never went off when they were supposed to, either too early or too late or not at all or an explosion mistaken for a bomb. All of the four fatal accidents are intertwined with each other with Air India Flight 182 and Pan Am Flight 103 often relying on each other to support the bomb explanation.

Mr. Tucker, this conspiracy nonsense is contradictory, unproductive and non-scientific; I would prefer to leave it to the conspiracy people to play with, conspiracy people meaning the police, RCMP, FBI, and Scotland Yard who are paid to see plots everywhere.

I see singed metal, loud sounds on CVR, paint smears, twisted metal, broken turbine blades, fodded engines, and a forward cargo door frayed and damaged from an outward force lying on the ocean floor after a fall of five nautical miles from an explosion in flight leading to a total breakup, the nightmare come true for all of us pilots.

From CASB report:

All cargo doors were found intact and attached to the fuselage structure, except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed.

At 9:20 PM -0400 6/20/01, Tucker, Bill wrote:

To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

Thank you again, Mr. Tucker, for sending appropriate material to your staff; their opinions carry much weight. I'm curious as to what they are. The RCMP have acknowledged receipt of my Smith AAR for 182 that you sent them. Thank you for that, Mr. Tucker, they were sure to read it since it came from you. Sgt. Blachford has written me that he is taking the time to digest it and the earliest he can meet with me to discuss it is in mid August in California. I welcome all authorities to review my every email and all documents I create.

In regard to the specific departments such as Director of Investigations-Air, Director of Engineering, and the Investigator in Charge of Swiss Air 111, permit me to write as if I were addressing those gentlemen directly. I assume they have read my Smith AAR for Air India Flight 182 which lays out the premise of the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation and gives the supporting documentation.

Director of Investigations-Air: I can understand the reluctance of become involved with a 16 year old crash. The evidence may be gone or altered, witnesses have moved or died, memories have faded, and who would want to pull a scab off a partially healed wound? However, Air India Flight 182 is unique in that the evidence is as fresh and accurate as ever in videotapes and high quality 35 mm film, the only direct witness is the CVR tape and it's memory is as clear as ever, and the wound is about to be opened in the Canadian court system in February.

My goal is not to persuade the TSB-Air, that faulty wiring caused the forward cargo door of AI 182 to inadvertently open in flight but to persuade TSB that a supplemental/update investigation report is warranted for reasons based on subsequent new evidence in a similar accident, United Airlines Flight 811. The TSB will be called to explain what happened to AI 182 at trial and, most importantly, a danger that existed in 1986 on this very night, still exists today, faulty wiring in early model Boeing 747s involved with the cargo door unlatch motor. Air India Flight 182 is not gone and forgotten; it is in the forefront of aviation safety.

To put it another way: Why is a update supplemental investigation warranted? The original dual investigations of CASB and the Kirpal inquiry of 1986 gave conflicting conclusions which left many questions. A similar accident occurred later which gave a probable cause that was not the same as the Kirpal inquiry finding. Three men are on trial for their life's freedoms which will require a full explanation of what happened to the airplane they are accused of blowing up and that means the TSB, and probably the Director of Investigations-Air, will be called to give his best accounting of the events. I submit it is prudent, well prepared, and thinking ahead to incorporate the latest aviation safety data into an official opinion about a

controversial accident. I call it 'accident' because it certainly is not an 'incident.' Who is the most qualified of all on the planet to give the most respected opinion about the aviation accident of AI 182? The police? A foreign judicial authority? The press? The NTSB? I believe the TSB is and that means Director of Investigations-Air. I would like to know, as many would, what is the current thinking by TSB-Air about Air India Flight 182, it is very important. The still active opinion by CASB is no bomb; has that changed? I respect the CASB opinion of 1986; they refused to be rushed into a probable cause that did not have the scientific support to uphold.

And most importantly, the updated supplemental investigation can rule in or rule out the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation because, if ruled in, then a clear and present danger exists to the flying public in early model Boeing 747s of which approximately 550 are still active.

The original CASB report is correct as far as it went. It made conclusions based solely on the evidence and although many on the team may have believed the cause of the explosion in the forward cargo compartment was bomb caused, the evidence was not there to support that conclusion, so the prudent and cautious conclusion was made of an explosion of undetermined cause, a judgment proven correct years later. The Canadian aviation accident authorities have made no errors of fact and they made no errors of judgment. There is nothing for the Canadian aviation accident investigators to correct, only supplement and clarify. What was the cause of the explosion in the forward cargo compartment the CASB said caused the inflight breakup? Only now, 16 years later and three similar accidents later is the cause strongly suggested to be explosive decompression by a ruptured

open forward cargo door at one or both of the midspan latches probably induced by faulty Poly X wiring.

The shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation is plausible, it is reasonable, it has precedent, and it has actual direct and tangible evidence to support it. How many matches does it take for one aircraft accident to give a suspicion that another had the same probable cause? It depends on the actual matches. Are they trivial or important? Air India Flight 182 and United Airlines Flight 811 have many significant ones, most of which are relevant to the inflight breakup. Both flights were:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. (Intentionally left blank.)
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression

sound in wide body airliner

R. Torn off skin on fuselage above forward cargo door area

S. Evidence of explosion in forward cargo compartment

T. Foreign object damage to engine or cowling of engine number three

U. Foreign object damage to engine or cowling of engine number four

V. Right wing leading edge damaged in flight

W. Vertical stabilizer damaged in flight

X. Right horizontal stabilizer damaged in flight

Y. More severe inflight damage on starboard side than port side

Z. Port side relatively undamaged by inflight debris

AA. Vertical fuselage tear lines just aft or forward of the forward cargo door

AB. Fracture/tear/rupture at a midspan latch of forward cargo door

AC. Midspan latching status of forward cargo door not reported as latched

AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)

AE. Outwardly peeled skin on upper forward fuselage

AF. Rectangular shape of shattered area around forward cargo door

AG. Forward cargo door fractured in two longitudinally

AH. Status of aft cargo door as latched

AI. Passengers suffered decompression type injuries

AJ. At least nine missing and never recovered passenger bodies

AK. Initial official determination of probable cause as bomb explosion.

AL. Initial official determination modified from bomb explosion

AM. Structural failure considered for probable cause

AN. Inadvertently opened forward cargo door considered for

probable cause

I submit to the Director of Investigations-Air that the above 38 officially documented matches between Air India Flight 182 and United Airlines Flight 811 are enough to say they may have both had the same probable cause for their fatalities after their inflight breakup. Is that a reasonable premise to make? Would that thus warrant an updated supplemental report to the CASB report to explain the mystery cause of the explosion? I assume I would be asked for further proof that what happened to United Airlines Flight 811 actually happened to United Airlines Flight 811. I can do that and invite queries.

United Airlines Flight 811 was incontrovertibly not a bomb explosion, incontrovertibly not a missile hit, incontrovertibly not a center tank explosion, and most incontrovertibly an inadvertently opened forward cargo door in flight probably caused by an electrical fault. United Airlines Flight 811 is the model for Air India Flight 182 except UAL 811 came back to tell what really happened. We must take advantage of that stroke of luck and the luxury of hindsight.

For Investigator in Charge of Swiss Air 111 (I assume Mr. Vic Gerden), I offer a probable cause for Air India Flight 182 of Poly X wiring, in the presence of moisture in the forward cargo hold, shorting on the door unlatch motor. Is that realistic? I believe that based on Trans World Airlines Flight 800 and Swiss Air 111 the knowledge of the faults of polyimide insulation in aircraft wiring is now well known. Is it realistic to make the supposition that the Kapton type wiring in Air India Flight 182 failed. <http://www.wire.nasa.gov/> is a new site demonstrating that the knowledge learned in Swiss Air is being applied across all

aviation related areas, even space.

AA Flight 96 over Windsor Ontario in 1972 showed the potential catastrophic effects of an open cargo door in flight when the DC-10 almost went out of control and crashed when the small aft cargo door opened in flight. That problem was not fixed and it happened again two years later out of Paris and the Turkish airlines DC-10 cargo door opened in flight and the plane augered in killing all.

For me to say an open cargo door in Air India Flight 182 caused the accident is not unrealistic. Is a shorted wiring/cargo door rupture/explosive decompression/inflight breakup a reasonable premise to make? I would assume I would be asked why do I say such a thing and told to show proof. I can do that and invite queries. I would hope I have succeeded in showing that an alternative to the current bomb explosion explanation is plausible, reasonable, has precedent and therefore an update/supplemental report is warranted.

For the Director of Engineering I would offer explosive decompression and the 300 knots IAS and all its power on a weakened airframe with the huge hole in the nose forward of the wing around the forward cargo door as described in text and shown by a drawing in the Kirpal report to explain the inflight breakup.

I know an engineer understands the power of 8.9 PSI differential between inside and outside Air India Flight 182 and the always present 96921 pounds of pressure on the 10890 square inches of the 99 inch by 110 inch cargo door. There are ten latches holding the 99 inch slice of fuselage closed. The bottom eight latches are close together and have additional locking sectors to prevent

inadvertent back driving of the cams. The mid span latches are alone and in the middle of the 99 inches and have no locking sectors. The shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation offers the premise and documentation for the ruptures at one or both of the midspan latches of the forward cargo door of Air India Flight 182 which caused the explosive decompression causing the huge 30 foot by 40 foot hole in the nose on the right side as shown in drawings in the CASB report.

I know an engineer understands the power of 300 knots. 300 knots is higher than the highest wind on earth and would tear off or crumple the nose of a weakened airframe after the explosive decompression. Non-aviation oriented persons think that driving a car at 60 MPH and having a door open is a minor event with a little noise and small pressure on eardrums and pull over and close the thing. A Boeing 747 at 31000 feet at 300 knots having a huge door open is another matter with a potential total inflight breakup occurring. Is that a reasonable premise to make? I assume I would be asked to provide documented evidence to demonstrate what I believe the sequence of destruction of Air India Flight 182. I can do that based upon the inflight breakups of two other early model 747s that suffered hull rupture in flight near the forward cargo door, Trans World Airlines Flight 800 and Pan Am Flight 103.

For the Air India Task Force of the RCMP (Sgt Blachford) I would ask exactly where was this 'bomb explosion' you have accused three men of planting in Air India Flight 182? Is the bomb explosion in the forward cargo compartment as stated by the Kirpal Report? Is it in the aft cargo compartment as stated by John Garstang recently who has been seconded to the RCMP for over a decade? Was the bomb loaded in Vancouver or in

Montreal? Why does the RCMP say a bomb explosion anywhere in Air India Flight 182 when the Canadian aviation accident investigation authorities of the time declined to say it was a bomb explosion and would only state an explosion of undermined origin although the AAIB investigator flatly stated the explosion was not a bomb but an explosive decompression of a cause yet to be determined? The RCMP may not believe it is important to state exactly where a 'bomb' exploded on a plane but aviation accident experts know it is very important as even the placement of a few feet of an inflight explosion port or starboard has serious consequences. The aft cargo compartment and the forward cargo compartment are separated by many hundreds of feet and there is no interconnecting tunnel or any way for passengers to get into the cargo compartments in flight.

To say a bomb in the forward cargo compartment means the bomb was not loaded in Vancouver but in Montreal because all the baggage loaded in Vancouver went into the aft cargo compartment and the Montreal baggage went into the forward cargo compartment.

To say a bomb exploded in the aft cargo compartment is to contradict the CASB and Kirpal investigators who flatly said there was no explosion in the aft cargo compartment and they looked very closely for such an event. Is there any new evidence to make such a startling claim?

To say a bomb explosion at all is to second guess the Canadian experts on aviation accidents and side with an Indian judicial official who has no accident investigation experience and was under intense political pressure to declare the cause a bomb, even so far as to dismiss the Indian Aviation Accident Investigator, Mr. Khola, and replace him with Judge Kirpal.

The AITF RCMP position is fraught with contradictions, relies heavily on circumstances of events far away, and not supported by the direct and tangible evidence. I look forward to meeting with Sgt Blachford in mid-August to sort out the confusion. I will say that the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation does satisfactorily answer all the incongruities and resolves all the contradictions listed above. It is the answer to the cause of the accident but may not be the answer they want to hear or believe. I have hopes there will be a real investigator there in the AITF who will follow the factual clues and not the media conjecture or conspiracy fantasies. It's never too late to get it right.

Many disagree with my explanation for Air India Flight 182. Disagreement is not rebuttal. I disagree with the RCMP but offer documentation and interpretation of evidence to rebut their bomb explosion explanation. No one has ever offered evidence to rebut the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation although many have offered disagreement. I shrug off disagreement but welcome attempts at factual rebuttal.

June 23rd, it's a date I always remember, just like December 21, July 17, and February 24, dates for early model Boeing 747s that suffered hull ruptures in flight that all gave a sudden loud sound on the CVR and all quickly followed by an abrupt power cut to the recorders.

Thank you again, sir, for permitting me to present some of my years of research and conclusions for your consideration.

Sincerely,

Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

X-From_: Bill.Tucker@tsb.gc.ca Mon Jun 25 11:04:11 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Sudden loud sound on CVR
Date: Mon, 25 Jun 2001 14:05:37 -0400

Dear Mr. Smith,

Your reponse below prompts a further reply from me. I appreciated the understanding demonstrated in your e-mail. I do have an open mind (or at least I hope and try to), and I will strive to retain it long after I retire from the TSB.

I am now up to date with your correspondence, except for one left to read that you sent me on 23 June. I have targetted specific elements to specific people (e.g, the Appendix on Wiring to our SWR 111 IIC (Yes, that's Vic Gerden) as well as to Dir of Inv. - Air). I shall forward this to all of

them so they can note your addresses and your receptiveness to any follow-up queries they may have

Bill Tucker..

P.S. In one of the things I read, you indicated that John Garstang had been seconded to the RCMP for over a decade. That is not so; John G was loaned or seconded to the RCMP on several occasions (maybe 3 or 4) for short terms of about 1-2 months - most recently this spring. Otherwise, he has continued working as a valued employee in our Engineering Branch.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Wednesday, June 20, 2001 9:43 PM

> To: Tucker, Bill

> Subject: Sudden loud sound on CVR

>

> Dear Mr. Tucker, 20 June 01

>

> Well, longest daylight of the year tonight, that's good.

>

>>

>>The TSB is not presently doing further investigation of the Air India 182

>>accident, nor is it planning to do so. We have limited resources and a

> >backlog of investigation work-in-process; we do not believe that cargo
> door
> >or wiring problems were involved in that occurrence; and we are confident
> >that the RCMP are doing a thorough and unbiased investigation.
> Therefore,
> >we do not believe we would be justified in diverting our resources to
> that
> >occurrence.
>
> I understand the way things are now, and of course, subject to
> change. There is that pesky trial coming up and the RCMP is saying
> bomb in aft cargo compartment and the CASB and Kirpal stated
> explosion in forward cargo compartment, not a trifling conflict.
Just
> where was that bomb?
>
> > I find that you have raised some interesting points that
> >have potential use for us in our work.
>
> Thanks. UAL 811 is a big point.
>
> > To that end, I am personally looking
> >through the material you send and forwarding copies, as I think
> appropriate,
> >to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC

> of
> >the SWR111 investigation. If you wish, I can also forward
copies to Sgt.
> >Blachford or the RCMP, but it seems more appropriate for you
to do that
> >yourself whenever you so choose.
>
>
> Thanks. More eyeballs (or ears) is always good. I respect your
> personal opinion most of all. I can tell an open mind that will
put
> emphasis on the evidence. A sudden loud sound on the CVR is
the only
> direct evidence that exists for Air India Flight 182, all the rest
is
> circumstantial or tangible consequence. The sudden loud sound
is
> everything and it says, 'Not a bomb explosion' but 'Explosive
> decompression that matches DC 10 cargo door event.' When in
doubt, I
> always come back to the sudden loud sound on the CVR's on
all the
> four early model Boeing 747s that suffered the inflight
explosions
> forward of the wing. The sound is incontrovertible.
>
> >
> >>From one of your e-mails, I now also understand the reason
for your
> strong
> >interest in advancing aviation safety, and I respect you for
that.
>

> Thanks. I met the sons of my savior pilot years later, three of
the
> five children he left became Navy pilots.
>
>
>> If you
>> wish to continue sending material to me, I shall continue to
process it,
> as
>> outlined above, to the best of my ability.
>
>
> Thanks, an open mind is all I ask. I would not expect detailed
> replies, but welcome any queries from you or your staff should
they
> come up.
>
>> I
>> simply want you to understand my position with respect to
your inputs.
>
>
> I understand. Thanks again for your reply.
>
> Sincerely,
> Barry
>
> John Barry Smith
> (831) 659-3552 phone
> 551 Country Club Drive,
> Carmel Valley, CA 93924
> www.corazon.com
> barry@corazon.com

> Commercial pilot, instrument rated, former FAA Part 135
certificate
> holder.

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: RE: Sudden loud sound on CVR
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,

25 June 01

I shall forward this to all of
them so they can note your addresses and your receptiveness to
any follow-up
queries they may have

Thank you, sir.

John G was loaned
or seconded to the RCMP on several occasions (maybe 3 or 4)
for short terms
of about 1-2 months - most recently this spring. Otherwise, he
has
continued working as a valued employee in our Engineering
Branch.

Correction noted, my error, thank you.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Part One in PDF file
Cc:
Bcc:
X-Attachments: :Master:6105:tuckerone.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
July 01

2

Attached is Part One of my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup presentation in PDF format. It is identical to the email just sent. PDF may be easier to forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Consensus on Location of explosion in Air India Flight
182 Part One

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,
Investigation Operations

Dear Mr. Tucker,

2

July 01

Please allow me to present Part One of three parts of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 as if I were in a conference room with members of the TSB listening to me for a period of time. Part One is to establish a consensus on the location of the explosion in the forward cargo compartment on the right side that led to the inflight breakup. Part Two is to establish a consensus on the cause of the explosion. Part Three is to present conclusions, recommendations, and implications of the

explanation.

As in any meeting, the participants can sit there and daydream until it's over and walk out with no comment except muttering under their breath, "Why do I have to put up with this crap?"

Or they can actively engage the speaker by heckling, asking pointed questions, or giving added confirmation to the ideas offered by their personal experiences. I accept all responses and will try to answer them appropriately. May I begin, sir?

Participants:

Mr. Bill Tucker, Director General, Investigation Operations.

Director of Investigations-Air

Director of Engineering

Mr. John Garstang, Engineering Branch

Mr. Vic Gerden, Investigator in Charge, SWR 111.

John Barry Smith, Independent Aircraft Accident Investigator.

Thank you all for allowing me this time to present an explanation for the possible cause of the fatal inflight breakup of Air India Flight 182 on 23 June, 1985. My goal is not to persuade you of the higher standard of 'probable cause' but to persuade in the easier standard of 'possible cause' for the accident. You alone have access to the still accurate evidence of the inflight breakup in high quality film and data recorders which can raise the cause to 'probable' if applicable.

I would ask the TSB that if my three part presentation persuades that there is a new, possible, plausible, mechanical cause with precedent, then an updated supplemental investigation and report to the 1986 CASB AAR is warranted to rule it in or rule it out.

That is my goal; To have professional aviation safety officials of authority conduct an updated supplemental accident report on Air India Flight 182 to consider a possible cause of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation based upon matching evidence of subsequent similar accidents, in particular, United Airlines Flight 811 of 1989. The goal is to be reached in three parts: Part One is the determination of the location of the explosion and Part Two is the source of that explosion. Part Three is conclusions, recommendations, and implications. This is Part One.

If the new possible cause is correct, a consequence is that a present danger exists to the flying public because the fault of shorting wiring in the cargo door unlatch circuit still exists in the remaining 500 or so early model Boeing 747s still in service which would require airworthiness action to prevent a possible reoccurrence.

Why else to conduct a supplemental investigation into Air India Flight 182 other than imminent safety issues? Well, it happened a long time ago and much has been learned in the meantime that may clarify what exactly happened back then to answer the questions raised by initial reports, such as the unstated cause of the explosion in the forward cargo compartment on the right side. Also, it is one of the most high profile, interesting, tragic, controversial, and mysterious plane crashes in Canadian history, right up there with the Arrow Gander crash and SWR 111, and current TSB investigators should have an opportunity at explaining it. Also, there are conflicting opinions of the probable cause among the authorities of CASB, AAIB, RCMP, and Indians which should be resolved. Also, there is an upcoming trial which will certainly ask questions of the TSB about what

happened that day to that aircraft and having updated opinions on latest news already prepared for testimony would be most prudent.

The Smith AAR for AI 182 with appendices is my major item of reference as it lays out the case, has references, and includes supporting documents. I assume you all have copies of that 116 page report. If not, please tell me at barry@corazon.com and I will email the 1.2 meg PDF file to you. It includes color pictures, drawings, charts, and sketches as well as text which are very important to the understanding of the explanation.

Other documents which are used for support of the wiring/cargo door explanation are: The CASB report and the Kirpal Report for Air India Flight 182, NTSB AAR 90/01 and 92/02 for United Airlines Flight 811, AAIB 2/90 for Pan Am Flight 103, and NTSB AAR 00/03 for Trans World Airlines Flight 800. All are available electronically and can be sent to you by email; please ask and I will provide them to you.

In this first meeting I would like to get us all to reach a consensus on the specific location of the explosion in Air India Flight 182. The sought after consensus is that of an explosion in the forward cargo compartment on the right side of Air India Flight 182 which caused the inflight breakup that led to its destruction.

All opinion agrees there was a sudden explosion in Air India Flight 182 which led to the inflight breakup. There is some dispute as to where in the aircraft the explosion occurred and what caused it. I will attempt to clarify where and what in these three presentations.

Specific data about Air India Flight 182: Sequence in construction:#330, Construction Number 21473 Date completed: 19 June 78, Type Aircraft: B747-237B Type of wiring: Poly-X (Raychem Corp), accident date: June 23 1985

The CASB, Kirpal Inquiry, the AAIB representative, and this investigator all concluded that the explosion did occur in the forward cargo compartment on the right side and all ruled out any explosion of any cause in the aft cargo compartment. That conclusion of the locus of explosion in the forward cargo compartment on the right side was based upon the physical evidence of shattered and frayed forward cargo door, inflight damage on right side such as the leading edge of right wing and the direct evidence of the CVR sudden loud sound. The ruling out of other locations such as cockpit and passenger cabin was determined by absence of any necessary corroborative evidence.

The possible location of an explosion from any source in the aft cargo compartment was extensively evaluated at the time based upon the subsequent accident of JAL 123 in which the aft pressure bulkhead cracked, caused an explosive decompression which led to loss of control of the Boeing 747 and its destruction. The removal and reinstallation of the aft cargo door stops before the fatal flight of Air India Flight 182 also caused intense examination for any type of explosion in the aft cargo compartment. There was suspicion of a potential problems in the aft section of Air India Flight 182 and thus the area was extensively examined and evaluated for an explosion by all authorities. Evidence of ruptures were found in both cargo compartments but no evidence of an explosion of any source was found in the aft cargo compartment, only the forward. All of the aft area of Air India Flight 182, especially the aft cargo

compartment, was examined by video cameras and 35 MM film and evaluated by all investigators for an explosion but none was found. The unanimous undisputed opinions of all authority was of an explosion in the forward cargo compartment and no explosion in the aft cargo compartment. The evidence against an explosion of any type in the aft cargo compartment can be summed up thusly:

- A. Absence of required corroborative evidence to support the assertion of aft cargo compartment bomb explosion.
- B. Transponder off simultaneously as FDR and CVR
- C. Inflight damage by flying debris to pieces of airframe well forward of the aft cargo compartment such as leading edge of wing and engines.
- D. Overpressures in both cargo compartments, not just the aft.
- E. Intact aft and bulk cargo doors.
- F. Much straight and undamaged fuselage skin in the aft section.
- G. Conclusive evidence of an explosion in the forward cargo compartment to explain the inflight breakup of Air India Flight 182.
- H. General trajectory patterns from wreckage debris locations that match two other early model Boeing 747s, Pan Am Flight 103 and Trans World Airlines Flight 800, that experienced inflight breakups amidships from an explosion in or near the forward cargo compartment, not the aft cargo compartment, as confirmed by the aircraft accident investigation authorities of the UK AAIB, and the USA NTSB.

A quote from the official Air India Flight 182 accident report states clearly:

" 2.11.6.5 Target 47 - Aft Cargo Compartment

This portion of the aft cargo compartment roller floor was

located between BS 1600 and BS 1760. Based on the direction of cleat rotation on the skin panel (target 7) and the crossbeam displacement on this structure, target 47 moved aft in relation to the lower skin panel when it was detached from the lower skin. No other significant observation was noted. There was no evidence to indicate characteristics of an explosion emanating from the aft cargo compartment."

Another opinion has recently been offered by Mr. John Garstang, while acting as an independent investigator and assigned and assisting the RCMP AITF, that the explosion took place in the aft compartment and the source was a bomb. His implication is that no explosion of any cause took place in the forward cargo compartment. No new evidence has been presented to refute the earlier Canadian, Indian, British conclusions. If Mr. Garstang has evidence that explains how the Canadians, the British, the Indians, and this investigator got the location of the explosion wrong, then now is the time to present it among fellow investigators and not later on the witness stand during a highly public trial with inquisitive attorneys and incredulous reporters. A rebuttal to the Garstang report of 16 March 2001 with the conclusion of bomb in the aft cargo compartment is presented in the Smith AAR of AI 182 of 1 May 2001.

Since the bomb explosion in the aft cargo compartment explanation comes from the RCMP which is primarily a police agency seeking criminals, an analogy comes to mind:

There was once a bank with two vaults which had no access between them. One was called the forward vault and the other

the aft vault. One day it was discovered that all the money was gone from both vaults. Investigators investigated.

One group determined that the missing money was gone from the forward vault because it was stolen by three criminals but the missing money from the aft vault was not stolen.

Another investigator said the missing money from the forward vault was not stolen but disappeared for a reason yet to be determined and the missing money from the aft vault was also not stolen.

Another group said the money was gone from both vaults, no reason was given for the missing money in the forward vault but missing money not stolen from the aft vault.

Years went by as yet another group assumed a crime and sought the thieves of the missing money in the forward vault but did not search for any thieves for the missing money in the aft vault as everyone agreed the missing money in the aft vault was not stolen and therefore there were no thieves to catch.

Another independent investigator came upon the event with research of other similar missing money from banks and matched similar events and concluded the money was missing from the forward vault because of a clerical error which has happened before and the missing money from the aft vault was a side effect. There were no crimes nor thieves of either vaults.

And then, sixteen years after the event, three men are arrested as thieves for robbing the...the...aft vault!

And the agency with the most expertise about missing money in

aft and forward vaults ponders whether to become involved.

I ask that agency to become involved and determine where and why the money went from both vaults to supplement their previous report of no money stolen from the aft vault.

We investigators are all on the same side on this issue of safety and the cause of accidents; we are all well intentioned; and we all want the right answers; honorable disagreement is normal and can usually be resolved by additional interpretation of facts. All factual criticism or rebuttal is welcomed via email or telephone or letter.

Let me show you below what a real bomb explosion looks like when it goes off in the aft cargo compartment of an early model 747. This event did not happen to Air India Flight 182 because this evidence of the Bruntingthorpe real bombing is absent in the wreckage of Air India Flight 182.

The above bomb explosion would have been heard on the CVR, there were not large skin pieces near the explosion, there was explosive residue, the damaged area was very large, and the leading edge of the wing was not damaged. None of that corroborative bomb explosion damage was seen in Air India Flight 182 wreckage.

Then let me show you below what a real electrically caused open forward cargo door in flight does to an early model 747, United Airlines Flight 811:

Above is United Airlines Flight 811 from NTSB AAR

('tremendous explosion' in the forward cargo compartment on the right side, as flightcrew was quoted).

Above is Air India Flight 182 from official AAR and matches United Airlines Flight 811, not the Bruntingthorpe bombing explosion evidence. Note the split longitudinally forward cargo door of Air India Flight 182 which matches exactly the recovered split cargo door of United Airlines Flight 811 picture below from NTSB AAR.

The corroborative real evidence which is present and matches Air India Flight 182 and United Airlines Flight 811 is listed below:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. (Intentionally left blank.)
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters

- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched
- AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)
- AE. Outwardly peeled skin on upper forward fuselage
- AF. Rectangular shape of shattered area around forward cargo door
- AG. Forward cargo door fractured in two longitudinally

- AH. Status of aft cargo door as latched
- AI. Passengers suffered decompression type injuries
- AJ. At least nine missing and never recovered passenger bodies
- AK. Initial official determination of probable cause as bomb explosion.
- AL. Initial official determination modified from bomb explosion
- AM. Structural failure considered for probable cause
- AN. Inadvertently opened forward cargo door considered for probable cause

Gentlemen, the immediate goal of this meeting is to gain consensus on the specific location of the explosion in Air India Flight 182 which caused the inflight breakup. Can we all agree at this time that the location was not the cockpit, the passenger cabin, the center fuel tank or the aft cargo compartment, all possible locations but ruled out by lack of corroborative evidence? Can we agree at this time, for the purposes of discussion, that the Canadians, the British, the Indians, and this independent investigator were correct and that the location of the explosion was in the forward cargo compartment on the right side based upon the physical evidence?

Assuming we do agree on the location of the explosion, what was the cause?

Well, that is the question isn't it? Here's some choices of explosion source: Bomb, center fuel tank, missile hit, midair collision, and explosive decompression from hull rupture from metal fatigue of open window or cargo door.

If it is determined that the cause of the explosion was a bomb explosion, then I will be glad to stand around the water cooler

and swap conspiracy tales of spies, anonymous informants, bribes for testimony, knocked off witnesses, sabotage in suitcases, x-ray machines that don't work and sniffing dogs that can't smell, explosions in airports far away, army assaults on temples, and bombs that never seem to go off when and where they are supposed to when set by incompetent terrorists who do happen to sneak two bombs onto two Boeing 747s on the same day at the same large metropolitan airport.

Until then, I shall stick to the physical evidence in airplane crashes because, after all, Air India Flight 182 was an airplane crash, not a bank robbery or an assassination or a truck hijacking; all crimes which might include the above ingredients for a good action adventure movie.

Let me end my Part One presentation at this time by assuming, for the purposes of further discussion to Part Two, a consensus has been reached that the specific location of the explosion in Air India Flight 182 which led to its inflight breakup was in the forward cargo compartment on the right side. Unless rebuttal or criticism is offered, Part One is therefore completed.

The presentation will continue for Part Two in a few days via email for the determination of the cause of the explosion in Air India Flight 182. Let us use all the tools available to us in 2001 to find out the previously unstated cause of that powerful explosion and clear up that mystery presented by the CASB. I welcome all criticism, contrary opinion, or comment on data and conclusions presented so far.

After a meeting, there are usually informal talks among the participants and the presenter, commonly about personal stuff. The possible abrasive personality and lack of people skills of this

discoverer are irrelevant to the determination of the correct probable cause of Air India Flight 182 but the style and demeanor of the messenger is always looked at and questioned. People like me who offer contrary perceptions to conventional wisdom are seldom charmers as we realize our egos are not important, only the facts, data, and evidence and the conclusions that they imply so we bluntly present the facts and implications with little regard for etiquette. Forgive any rudeness from me, please.

Anyway, here's my aviation history:

Commercial pilot, instrument rated, former FAA Part 135 certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650 hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

And here's my story. My life was saved in 1967 when my pilot thought of me during stress and told me to eject from our on-fire two seat carrier jet during night landing practice. We both ejected; I lived and he died. My chute opened two seconds before I landed but he did not have those two seconds to open and he died of multiple traumatic injuries when he hit the ground. I became interested in aviation safety. When Pan Am Flight 103 occurred I immediately suspected explosive decompression from a hull rupture and could not shake that belief based on news reports. A few months later United Airlines Flight 811 happened and I immediately made the match. I continued to investigate although authorities had quickly called Pan Am Flight 103 a

bomb and United Airlines Flight 811 an improperly latched forward cargo door. My cargo door explanation for both accidents was published in Flying magazine in 1992 but nothing came of it. In 1995 the internet allowed me to do more research and I obtained AARs for 103 and 811. I tried to refute the open cargo door explanation but could not because the evidence was not there; in fact the reports made it even clearer. During this time I was writing to authorities of my alarm at the potential risk from the cargo door event happening again. It did. On July 17, 1996, Trans World Airlines Flight 800 suffered an inflight breakup that left all the similar evidence of United Airlines Flight 811 and Pan Am Flight 103. I made the immediate UAL 811 match and informed the authorities. Again Trans World Airlines Flight 800 was called a bomb; a probable cause which remained primary for a year and a half. Right after the Trans World Airlines Flight 800 event and again using the internet search abilities, I was able to research all the hull losses of Boeing 747s and sadly Air India Flight 182 jumped right out as another possible shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup event because of all the similarities of evidence to the other three, in particular United Airlines Flight 811, the incontrovertible cargo door caused event and incontrovertibly not a bomb explosion, although it was initially thought to be a bomb.

The evidence picks the flight numbers, not me, and if you know of any more early model Boeing 747s that have experienced a hull rupture in flight from an internal explosion forward of the wing which leaves a sudden loud sound on the CVR followed abruptly by a power cut to the recorders, a foddred engine number three, inflight damage to right wing and right horizontal stabilizer, missing midspan latches and a shattered forward cargo door, please tell me so I can add that flight to the list of four, as

all of them have most of this matching evidence.

They all had an inflight explosion near the forward edge of the wing and they were all thought to be bomb explosions but now have differing official explanations: Unstated and bomb for Air India Flight 182, bomb for Pan Am Flight 103, center tank explosion for Trans World Airlines Flight 800, and electrically caused open cargo door for United Airlines Flight 811. My common explanation for the common evidence is the common cause which unifies all, the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

However, that conclusion for all four 747s is for later; at this time there is but one tree under examination in this forest of four, Air India Flight 182. Based solely on the evidence of that aircraft wreckage and without comparing others, it was difficult to determine a probable cause for the explosion in 1986. All the investigators at the time did the best they could since they did not have the benefit of hindsight as we do. Explosive decompression caused by an inadvertently opened forward cargo door mimics a bomb explosion; the crew of United Airlines Flight 811 even reported to the tower they had a bomb go off after hearing the noise and looking at the damage. It's understandable to call the cause of Air India Flight 182 a bomb explosion at first blush.

I must emphasize that the Canadian investigators in 1986 have made no errors of fact or judgment. There is nothing for the Canadians to correct or apologize for; they were right as far as they went. Their caution in stating the cause of the explosion as unknown was warranted, justified by lack of corroborative evidence, and proven correct these many years later. It is now possible to further clarify that earlier CASB report to state the cause of the explosion by a TSB supplemental report based on

the similar accidents of the ensuing 16 years. There is still no official Canadian aviation authority modification to the unstated cause for the explosion and therefore the CASB report must be considered the current Canadian aviation authority opinion.

Why me as discoverer? I am able to be objective because I am not: An airline employee, an attorney, work for Boeing, work for government, not a police officer, and not a family member of a victim. It is that objectivity plus my experience of 40 years in aviation and living through an aircraft accident that lets me face the unpleasant truth that Boeing airliners have a fatal design flaw of outward opening nonplug cargo doors and faulty Poly-X wiring which have caused four early model Boeing 747 accidents. My job or reputation or welfare of my family is not on the line and I am able to speak frankly. I well understand the profound implications of the wiring/cargo door explanation for these controversial accidents. So be it. Safety is the priority and let the chips fall where they may.

I am able to pursue my belief in aviation safety, specifically hull ruptures in early model Boeing 747s, because I: Personally have been in a sudden night fiery jet fatal airplane crash, retired on a fixed income which gives me the time for research, and love a good mystery. Airplane crashes are always a mystery, sometimes hard to solve and sometimes easy. They are never supposed to happen but do; that's the mystery.

As accident investigators we all have a strong sense of justice and abhor injustice; in our case, the injustice of infants, children, and adult men and women who die in accidents that we know are preventable if we can only find out the causes so that they can be fixed and further deaths be prevented. We also know that if we get the probable cause wrong, then further injustice may occur;

in this case, men imprisoned unjustly and reoccurring wiring problems in early model Boeing 747s.

We all have the common interest in solving those mysteries. You gentlemen have devoted your lives, your education, and your careers to the task; I respect you for that and thus offer my years of research, analysis, and conclusions to you for consideration and possible action.

Thank you for reading.

Please contact me at any time for any queries or discussion by phone, letter, or email at

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,

Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Sincerely,

Barry

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Consensus on Cause of explosion in Air India Flight 182

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker,
July 01

5

Please allow me to present Part Two of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 as if I were in a conference room with members of the TSB listening to me for a period of time. Part Two is to establish a consensus on the cause of the explosion in the forward cargo compartment on the right side that led to the inflight breakup. May I begin, sir?

Participants:

Mr. Bill Tucker, Director General, Investigation Operations.

Director of Investigations-Air

Director of Engineering

Mr. John Garstang, Engineering Branch

Mr. Vic Gerden, Investigator in Charge, SWR 111.

John Barry Smith, Independent Aircraft Accident Investigator.

Thank you all for allowing me this second time to present an explanation for the possible cause of the fatal inflight breakup of Air India Flight 182 on 23 June, 1985. My goal is to persuade that there is a new possible, plausible, mechanical cause with precedent that exists for Air India Flight 182 and therefore an updated supplemental investigation and report to the 1986 CASB AAR is warranted.

References:

Smith AAR for AI 182 with appendices, CASB report and the Kirpal Report for Air India Flight 182, NTSB AAR 90/01 and 92/02 for United Airlines Flight 811, AAIB 2/90 for Pan Am Flight 103, and NTSB AAR 00/03 for Trans World Airlines

Flight 800. All are available electronically and can be sent to you by email; please ask and I will provide them to you.

Part Two: Consensus on Cause of explosion in Air India Flight 182

Assuming that we agree for purposes of discussion that the location of the explosion which caused the total inflight breakup of Air India Flight 182 was in the forward cargo compartment on the right side, what was the cause of that explosion?

Well, that is the key question, because once we determine the probable cause, it can be corrected so that it does not reoccur. What were the opinions of other investigators? As it turns out, there is conflict, contradiction, and confusion among all.

The Canadian aviation accident investigators in the CASB in 1985/86 determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side but declined to state the cause of that explosion although under much pressure to declare it a bomb explosion. Their conclusions are understandable based upon the physical evidence for the location of the explosion and the lack of evidence to determine the cause. The later similar event of United Airlines Flight 811 did not happen until four years later. Explosive decompression by hull rupture leaves no residue, or timer, or metal casing of a bomb, or causes burns; all evidence lacking in Air India Flight 182 to support a bomb explosion explanation and therefore the bomb cause was not stated by the prudent Canadian investigators.

The British representative from the AAIB determined the location of the explosion which caused the inflight breakup

which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side and stated the cause of that explosion was not a bomb explosion but of an explosive decompression from a cause yet to be determined. Those conclusions are understandable based upon the physical evidence for the location of the explosion and the direct evidence of the sudden loud sound of the CVR which ruled out a bomb explosion and ruled in an explosive decompression by hull rupture of unknown cause based on what was known about wiring and cargo doors in 1985/86.

The Indian judicial investigating authority, Judge Kirpal, in the Kirpal Report determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side and stated the cause of that explosion to have been a bomb explosion. His findings are understandable based upon the physical evidence for the location of the explosion and the circumstantial evidence to deduce the cause as a bomb. In addition, the three assumptions upon which Judge Kirpal based his finding of a bomb explosion may have been valid in 1985 but were later shown to be incorrect in 1989 by a similar accident. The original aviation accident investigator, Mr. Khola, was replaced within days of the accident by a judicial officer of the Court, Judge Kirpal, and therefore the aircraft accident report became a legal inquiry which was denied the priority inputs of aviation accident expert investigators who might have been expected to be less political and more prudent in stating the cause of the mystery explosion.

The recent declaration by a TSB investigator assigned to the RCMP, and at the behest of the AITF, that the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the aft cargo

compartment and stated the cause of that explosion to have been a bomb explosion is not understandable because of the lack of new evidence or any reasoning which refutes the previous conclusions and findings of the Canadian, British, and Indian investigating authorities. This unsubstantiated conclusion of a bomb explosion in the aft cargo compartment also concludes there was no explosion of any cause in the forward cargo compartment which directly contradicts the tangible evidence of such an explosion and the opinions of the other accident investigators.

The conclusions reached by this independent aviation accident investigator that determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side and stated the cause of that explosion was not a bomb explosion but of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup sequence of events is understandable based upon his personal experiences in a sudden fatal jet airplane accident, the new research tool of the internet, the objectivity of not being connected to any of the parties and the luxury of hindsight. The conclusions of the location and cause of the explosion were based on the physical evidence, the data from recorders, the facts of previous preliminary and final reports from NTSB, TSB, and AAIB, and the many significant matching similarities between other wide body airliner fatal accidents such as SWR 111, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. This independent investigator agrees with the Canadian, British and Indian accident investigators' conclusions of 1985/1986 regarding the location and consequences of the explosion and agrees with the British investigator as to the cause being explosive decompression and supplements that cause as a

ruptured open forward cargo door inflight at one or both of the midspan latches probably from faulty wiring in the door unlatch motor circuit.

Summary of offered old and new opinions: Some investigators say the explosion was in the forward cargo compartment and not in the aft while one says explosion the aft cargo compartment and not the forward; one investigative agency declines to state the cause of that explosion, one says definitely not a bomb, one say a bomb in forward, another says bomb in aft, and another says wiring caused a forward cargo door to rupture open in flight causing explosive decompression which mimicked a bomb explosion.

The pondering, reluctance, and silence by the most authoritative and knowledgeable aviation safety accident agency for Air India Flight 182, the Transportation Safety Board of Canada, which also has close jurisdiction, is bewildering. There is a clear need for that aviation authority to step in and resolve all the conflicts, contradictions, and confusion as to what happened to Air India Flight 182 from an aviation accident investigation point of view, and not as a police action, a political event, or a judicial litigation. If the new cause of faulty wiring is correct, a present danger exists to the flying public. A TSB supplemental report of the earlier CASB report is urgently needed and clarifications required that uses hindsight of the similar aviation events of the past 16 years in relation to Air India Flight 182.

Until then, let us look at the choices for the cause of the explosion in the forward cargo compartment on the right side:

Based upon precedent in all airliners who have suffered inflight breakups which caused a sudden loud sound on the cockpit voice

recorder while proceeding normally, a possibility could be that of a bomb explosion, a gunshot, an explosive decompression by an inadvertently opened window or cargo door, turbulence, lightning strike, fuel tank explosion, or other explanation which might become apparent in years to come.

Many potential causes have been considered, evaluated, and ruled out: Lightning and turbulence were not in the vicinity of Air India Flight 182 and the flight recorders showed no unusual maneuvers prior to breakup. A gunshot or open window would be unlikely to cause the size hole necessary for the breakup since the 747 is designed to withstand a several foot wide hole in the fuselage (a safety aspect learned from the Comet hull rupture/explosive decompression/inflight breakups). A fuel tank explosion was unlikely because of the lack of fire damaged wreckage with only a few pieces of wreckage burnt. That leaves bomb explosion or the inadvertent opening of a very large section of pressurized hull for a reasonable explanation for the sudden inflight breakup of Air India Flight 182

Is there a precedent for either alternative? There is an official probable cause of a bomb explosion in an early model Boeing 747 in the forward cargo compartment causing an inflight breakup but that bomb was alleged to have been on the left side, not the right side. That event was Pan Am Flight 103. It also has many other similarities such as the sudden loud sound on the CVR followed by an abrupt power cut to the recorders.

There is an official probable cause of an inadvertent opening of a very large section of pressurized hull in the forward cargo compartment causing a partial inflight breakup and that opening was on the right side. That event was United Airlines Flight 811. It also has many other similarities such as the sudden loud sound

on the CVR followed by an abrupt power cut to the recorders. The closest official match to the events of Air India Flight 182 with its inflight breakup from an explosion in the forward cargo compartment on the right side is the inadvertent opening of a very large section of pressurized hull at the right side forward cargo door as shown by United Airlines Flight 811 below and Air India Flight 182 under it.

What caused the forward cargo door of United Airlines Flight 811 to inadvertently open in flight causing the explosive decompression and the partial inflight breakup? At first it was thought to have been a bomb explosion as reported by the flight crew who heard the explosion and saw the damage. After landing and ruling out a bomb, it was then thought to have been an improperly latched forward cargo door. An AAR was written with that probable cause made, NTSB AAR 90/01. That explanation was modified years later when the cargo door was retrieved from the ocean floor and found to have been properly latched but the wiring was frayed to bare wire and a switch may have been faulty so the probable cause of the inadvertently opened forward cargo door was changed to electrical wiring or switch and a new, supplemental AAR was written, NTSB AAR 92/02, excerpt below:

"EXECUTIVE SUMMARY

On February 24, 1989, United Airlines flight 811, a Boeing 747-122, experienced an explosive decompression as it was climbing between 22,000 and 23,000 feet after taking off from Honolulu, Hawaii, en route to Sydney, Australia with 3

flightcrew, 15 flight attendants, and 337 passengers aboard. The airplane made a successful emergency landing at Honolulu and the occupants evacuated the airplane. Examination of the airplane revealed that the forward lower lobe cargo door had separated in flight and had caused extensive damage to the fuselage and cabin structure adjacent to the door. Nine of the passengers had been ejected from the airplane and lost at sea. A year after the accident, the Safety Board was uncertain that the cargo door would be located and recovered from the Pacific Ocean. The Safety Board decided to proceed with a final report based on the available evidence without the benefit of an actual examination of the door mechanism. The original report was adopted by the Safety Board on April 16, 1990, as NTSB/AAR-90/01.

Subsequently, on July 22, 1990, a search and recovery operation was begun by the U.S. Navy with the cost shared by the Safety Board, the Federal Aviation Administration, Boeing Aircraft Company, and United Airlines. The search and recovery effort was supported by Navy radar data on the separated cargo door, underwater sonar equipment, and a manned submersible vehicle. The effort was successful, and the cargo door was recovered in two pieces from the ocean floor at a depth of 14,200 feet on September 26 and October 1, 1990.

Before the recovery of the cargo door, the Safety Board believed that the door locking mechanisms had sustained damage in service prior to the accident flight to the extent that the door could have been closed and appeared to have been locked, when in fact the door was not fully latched. This belief was expressed in the report and was supported by the evidence available at the time. However, upon examination of the door, the damage to the locking mechanism did not support this hypothesis. Rather, the evidence indicated that the latch cams had been backdriven from the closed position into a nearly open position after the door had

been closed and locked. The latch cams had been driven into the lock sectors that deformed so that they failed to prevent the back-driving.

Thus, as a result of the recovery and examination of the cargo door, the Safety Board's original analysis and probable cause have been modified. This report incorporates these changes and supersedes NTSB/AAR-90/01.

The issues in this investigation centered around the design and certification of the B-747 cargo doors, the operation and maintenance to assure the continuing airworthiness of the doors, cabin safety, and emergency response.

The National Transportation Safety Board determines that the probable cause of this accident was the sudden opening of the forward lower lobe cargo door in flight and the subsequent explosive decompression. The door opening was attributed to a faulty switch or wiring in the door control system which permitted electrical actuation of the door latches toward the unlatched position after initial door closure and before takeoff. Contributing to the cause of the accident was a deficiency in the design of the cargo door locking mechanisms, which made them susceptible to deformation, allowing the door to become unlatched after being properly latched and locked. Also contributing to the accident was a lack of timely corrective actions by Boeing and the FAA following a 1987 cargo door opening incident on a Pan Am B-747.

As a result of this investigation, the Safety Board issued safety recommendations concerning cargo doors and other nonplug doors on pressurized transport category airplanes, cabin safety, and emergency response."

Below from CASB AAR for Air India Flight 182:

"All cargo doors were found intact and attached to the fuselage

structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed. Because the damage appeared to be different than that seen on other wreckage pieces, an attempt to recover the door was made by CCGS John Cabot. Shortly after the wreckage broke clear of the water, the area of the door to which the lift cable was attached broke free from the cargo door, and the wreckage settled back onto the sea bed. An attempt to relocate the door was unsuccessful."

Years later, with Trans World Airlines Flight 800 and SWR 111 occurring, the terrible aging characteristics of Kaptonized type wiring became apparent in commercial airliners while having been known to military aircraft.. The wiring/cargo door probable cause for Air India Flight 182 includes events, evidence, and faults which are well documented and have precedents such as the catastrophic consequences of an inadvertently open cargo door in flight with the DC-10 and Boeing 747 aircraft and faulty wiring causing causing problems in MD-11 and Boeing 747 aircraft.

This investigator further refines the cause of the explosive decompression by the inadvertently opened forward cargo door of United Airlines Flight 811 to be faulty wiring and the initial location of the failure of the forward cargo door to be the rupture at one or both of the midspan latches.

I offer the same explanation for Air India Flight 182: Faulty wiring causing the rupture of one or both of the midspan latches of the forward cargo door causing the explosive decompression

which caused the inflight breakup.

Further evidence which matches the incontrovertible open cargo door explanation for United Airlines Flight 811 exists in the evidence matches between Air India Flight 182 and United Airlines Flight 811 below, presented in Part 1 and the Smith AAR for AI 182 and repeated here:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. (Intentionally left blank.)
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three

- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched
- AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)
- AE. Outwardly peeled skin on upper forward fuselage
- AF. Rectangular shape of shattered area around forward cargo door
- AG. Forward cargo door fractured in two longitudinally
- AH. Status of aft cargo door as latched
- AI. Passengers suffered decompression type injuries
- AJ. At least nine missing and never recovered passenger bodies
- AK. Initial official determination of probable cause as bomb explosion.
- AL. Initial official determination modified from bomb explosion
- AM. Structural failure considered for probable cause
- AN. Inadvertently opened forward cargo door considered for probable cause

The bomb explanation opinion for the explosion in the forward cargo compartment of Air India Flight 182 is only stated by one of the four authorities investigating which was the Indians in its Kirpal report, written by a judge, not an aviation accident

investigator, and was based on assumptions later proven to be incorrect. The Indian Judge stated the cause was a bomb possibly because there was no other reasonable alternative offered to him in 1985/1986. He also based the choice of bomb explosion cause on premises that were later proven to be unreliable which were explosive decompression by structural failure could not cause an abrupt power cut to the flight recorders and it can, twinning could not be produced by an explosive decompression and it can, and floor panels can appear to be broken upwards when in fact the floor beams were broken downward. He also could not have been aware of the several airworthiness directives issued to correct faults in the cargo doors that only became apparent in the ensuing years.

Summary of evidence for a bomb explosion in Air India Flight 182:

- A. Blackened erosion on some seat cushions.
- B. Cabinet had dent in it.
- C. Minor fire and explosive damage in cabin.
- D. Sudden and massive structural failure.
- E. The lining in one suitcase was severely tattered;
- F. Although the wooden spares box was burned, this could have happened after the occurrence;
- G. Although pieces of an overhead locker were damaged by fire, it is not known if the burning happened at the time of the occurrence;
- H. Although the pieces of U-section alloy clearly indicated evidence of an explosion, it is quite possible that these pieces were not associated with the aircraft;
- I. The bottoms of some seat cushions show indications of a possible explosion;
- J. The inside of the right wing root fillet appears to have been scorched; and

K. The deformation of the floor of the upper deck storage cabinet might have been caused by an explosive shock wave generated below the cabin floor and inboard from the cabinet.

L. Damage to the floor station and the presence of the fragments.

M. Targets 362/396 and 399 which contain some evidence that an explosion emanated from the forward cargo compartment.

N. Curling, cork-screwing, and saw tooth edges may also be indicative of an explosion though such fractures by themselves may not be conclusive evidence that an explosion was involved.

O. The bang could have been caused by a rapid decompression but it could also have been caused by an explosive device.

P. Marked similarities between the spectra of Indian Airlines 737 and Air India's Kanishka CVR.

Q. Twinning on fragments of wreckage.

Summary of evidence against a bomb explosion for Air India Flight 182:

R. Wooden boxes were found broken apart exhibiting no burn marks.

S. An electronic device was found among some floating wreckage and was not modified as a detonating device.

T. There was no evidence to indicate characteristics of an explosion emanating from the aft cargo compartment.

U. No part of an explosive device, its detonator or timing mechanism was recovered.

V. Certain characteristics of the noise indicate the possibility that the noise was the result of an explosive decompression.

W. From the examination of the wreckage recovered and wreckage on the bottom, there is no indication that a fire or explosion emanated from the cabin or flight deck areas.

X. The medical examination of the bodies also showed no fire or explosion type injuries.

Y. A portion of the aft cargo compartment roller floor shows no indications characteristic of an explosion emanating from the aft cargo compartment.

Z. No evidence of fire burns or explosive material could be found.

AA. The floating wreckage recovered and showed there was no evidence of fire internal or external.

AB. Examination of clothing from the bodies did not show any explosive fractures or any signs of burning.

AC. The seat cushions and head cushions also did not show any explosive characteristics.

AD. A number of lavatory doors and structure also did not show any damage consistent with explosion. The flight deck door showed no explosion damage inside or outside.

AE. There was no significant fire or explosion in the flight deck, first and tourist passenger cabin including several lavatories and the rear bulk cargo hold.

AF. The bang could have been caused by a rapid decompression and no sound of a 'bomb' preceded the bang.

AG. The only conclusion which can, however, be arrived at by the Court is that the aircraft had broken in midair and that there has been a rapid decompression in the aircraft.

AH. Twinning evidence is unreliable because of poor examining conditions and a powerful explosive decompression can be the cause of it.

To sum up the only two reasonable explanations for the cause of the explosion in the forward cargo compartment on the right side that caused the inflight breakup of Air India Flight 182 which are bomb explosion or inadvertently opened forward cargo door in flight:

1. Bomb explosion explanation has no exact precedent, the available supporting evidence is weak with alternative benign

explanations for its presence, the required necessary corroborative evidence of a bomb explosion is absent, and the basis for the only authoritative opinion in 1986 of a bomb explosion has now been shown to be faulty by a subsequent accident and the bomb opinion finding was made by a non-aviation accident investigator.

2. Wiring/cargo door explanation has a very close precedent which has many significant evidence matches to Air India Flight 182, and subsequent accidents have confirmed the strong suspicions that faulty wiring is the initial cause, and the bomb conclusion was unstated by Canadian aircraft accident investigators and ruled out by the British.

Air India Flight 182 did explode in flight; there has to be an explanation for the explosion. The two most likely possibilities are bomb explosion and hull rupture causing explosive decompression. Based upon the above reasoning, this investigator submits that the most likely cause to be that of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup sequence of events and not that of a bomb explosion although the first understandable false impression for Air India Flight 182 was that of a bomb by the noise, the damage, and political circumstances at the time of the explosion.

An analogy comes to mind:

A man is found lying dead in the street with blood coming from his head. There is a foreign man nearby who has a gun in his pants and is a known enemy of the dead man. The authorities blame the man with the gun and prefer not to check into the health records of the dead man nor examine the slippery pavement with the high curb in a favorite shopping mall. Years

later, the man with the gun is charged with the crime based on the circumstantial evidence of the presence of the gun, the bleeding from the head of the dead man and the loss of blood that led to the death although the gun had not been fired and the gash in the dead man's head was too small for a gunshot wound. An independent investigator presents evidence that the dead man had had a history of aneurysms in his brain and probably slipped on the pavement as he was falling and hit his head on the curb causing the bloody gash. The artery had burst in the dead man's head and the ensuing internal loss of blood led to his death. And it had happened again years later to members of the dead man's family which had a genetic weakness in their brain arteries causing them to burst when they shouldn't. The dead man and his family are beloved and people did not want to think there was an inherent flaw in the lineage but preferred to blame the foreigner with a gun.

I submit to you gentlemen that the obvious and most satisfying explanation for a complex accident is not always the correct one. Aviation accidents are extremely complex and hindsight is a rare luxury. Please use that luxury and issue a supplemental report on the extremely complex aviation accident of Air India Flight 182 which indicates there may be an inherent flaw in early model Boeing 747s in the wiring and non plug cargo doors.

If there is consensus for the possible cause of the explosion in the forward cargo compartment on the right side that led to the inflight breakup of Air India Flight 182 to be faulty wiring causing a cargo door rupture, then Part Three will be presented which presents conclusions, recommendations, and implications of that mechanical explanation.

Thank you for reading.

Please contact me at any time for any queries or discussion by
phone, letter, or email at
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sincerely,
Barry

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: PDF Consensus on Cause of explosion in Air India
Flight 182
Cc:
Bcc:
X-Attachments: :Master:341462:tuckertwo.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
July 01

6

Attached is Part Two of my shorted wiring/forward cargo door
rupture/explosive decompression/inflight breakup presentation in
PDF format. It is identical to the email just sent. PDF may be
easier to forward as the pictures and text are in one file.

Sincerely,

Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: PDF of Conclusions, Recommendations, and
Implications of wiring/cargo door explanation, Part Three
Cc:
Bcc:
X-Attachments: :Master:341462:tuckerthree.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

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July 01

6

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Sincerely,
Barry

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www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Conclusions, Recommendations, and Implications of
wiring/cargo door explanation, Part Three
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
July 01

4

Please allow me to present Part Three of the shorted wiring/
forward cargo door rupture/explosive decompression/inflight
breakup explanation for Air India Flight 182 as if I were in a
conference room with members of the TSB listening to me for a
period of time. Part Three is to present the conclusions,
recommendations, and implications of the explanation for Air
India Flight 182. May I begin, sir?

Participants:

Mr. Bill Tucker, Director General, Investigation Operations.
Director of Investigations-Air
Director of Engineering

Mr. John Garstang, Engineering Branch
Mr. Vic Gerden, Investigator in Charge, SWR 111.
John Barry Smith, Independent Aircraft Accident Investigator.

Thank you all for allowing me this third time to present an explanation for the possible cause of the fatal inflight breakup of Air India Flight 182 on 23 June, 1985. Part Three is to present the conclusions, recommendations, and implications of the explanation.

References:

Smith AAR for AI 182 with appendices, CASB report and the Kirpal Report for Air India Flight 182, NTSB AAR 90/01 and 92/02 for United Airlines Flight 811, AAIB 2/90 for Pan Am Flight 103, and NTSB AAR 00/03 for Trans World Airlines Flight 800. All are available electronically and can be sent to you by email; please ask and I will provide them to you.

An analogy comes to mind:

Galileo was an amateur astronomer and announced that based upon his years of research and analysis of visual evidence of the skies that, counter to intuition, the earth in fact revolves around the sun and not the other way around. He was told no, he's wrong, he's crazy, he's ignored, he's told to shut up, but he kept on reviewing his evidence, realized his conclusions were still correct, understood the profound implications of his discovery, and kept on talking and publishing his findings.

He said to the authorities and the public, "Come over here, look through this telescope, see with your own eyes the moons of Jupiter which go around the planet and see how the planet goes around the sun, just like us. There is precedent for a moon going round a planet and a planet going round the sun, just like us. I

conclude we go round the sun, not the other way around.

The authorities and the public said, "We don't need no stinking telescopes, we can stand in our front yard and see the sun go round us. You're wrong and we are ignoring you." No scientific rebuttal evidence was ever presented to refute the earth goes round the sun explanation, only common opinions from non astronomers who held positions of power and silence from other astronomers.

He continued presenting his evidence which was irrefutable that the earth goes round the sun. The authorities held a meeting. They asked of themselves, "What can we live with? Can we live with the sun going round the earth?" They all agreed that they can live with that since that's the way it was for years and everything seemed to be OK. They asked, "Can we live with the earth going round the sun?" They all agreed that they could not live with that because books would have to be revised and rewritten; reputations would be tarnished; and the people would be uneasy. The authorities concluded the sun goes round the earth because that was the most satisfactory answer that most of the people could live with, and what the heck, what difference did it make?

Galileo spent the rest of his life under house arrest, no new support was given to the earth round the sun explanation, and all the while the moon still went round the earth and the earth still went round the sun.

I am asking the authorities to look through the telescope of the internet at these official government AARs for Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800, SWR 111, as well as my own report,

the Smith AAR for AI 182, to see the precedent and the evidence matches and similarities among all events which indicate they are just like United Airlines Flight 811 which contrary to intuition and first official reports, was not a bomb explosion but was a electrical/cargo door rupture explosive decompression.

The machine killed the humans, not the other way around.

Assuming for the purposes of this discussion:

The CASB, the British AAIB representative, the Indian Kirpal Inquiry, and this independent accident investigator are correct in stating that the location of the explosion which caused the inflight breakup of Air India Flight 182 which led to its destruction was in the forward cargo compartment on the right side; and,

This independent investigator is correct in stating the cause of that explosion is explosive decompression when the forward cargo door ruptures open in flight at one or both of the midspan latches caused by faulty wiring shorting on the door unlatch motor;

What are the implications of such a conclusion?

1. There exists a present danger to the flying public of the wiring again failing and turning the unlatch cams to the open position which could reproduce the fatal events of United Airlines Flight 811 in the 500 active early model Boeing 747s.
2. The Canadians were correct in 1985/86 in their CASB report in their location of the explosion and prudent in their caution for declining to state the cause.
3. There was no bomb explosion which means no crime which

means no criminals which means the three on trial for the 'bombing' are innocent of that particular crime.

4. The Indian Kirpal Inquiry was correct on the location of the explosion but incorrect on the cause of it which is understandable based upon what was known about wiring and cargo doors in 1985/86.

5. The British AAIB representative was correct in location of the explosion and the cause as non-bomb and of a cause yet to be determined.

6. Outward opening nonplug doors will find a way to open inadvertently in flight regardless of AD 'fixes' and should be modified to plug type doors.

7. Poly-X Kaptonized type wiring is faulty and should be replaced in all airliners that have it installed.

8. The shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup probable cause may have also occurred in Pan Am Flight 103.

9. The shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup probable cause may have also occurred in Trans World Airlines Flight 800 and therefore the center fuel tank explosion was not the initial event but secondary.

I ask that the TSB advance the safety of the aviation transportation mode by conducting an independent supplemental investigation, including, when necessary, a public inquiry into the transportation occurrence of Air India Flight 182 in order to make findings as to the causes and contributing factors;

* - identifying safety deficiencies as evidenced by transportation occurrences such as Pan Am Flight 103, United Airlines Flight 811, Trans World Airlines Flight 800, and SWR 111,

* - making recommendations designed to eliminate or reduce any such safety deficiencies, such as faulty wiring and non plug

cargo doors; and

* - reporting publicly on its investigations and on the findings in relation thereto in a supplemental, modified report of the 1986 CASB AAR.

Forgive my presumptuousness in suggesting a way to proceed but I realize you are the only ones with the authority and means of access to determine once and for all the cause of the Air India Flight 182 destruction:

1. Contact NTSB, AAIB, RCMP, and FAA, and state intentions to rule in or rule out the possible mechanical cause of wiring for Air India Flight 182 and request assistance. Many of the investigators that worked on the original AAR are still active and can provide first hand corroboration of new suspicions. These gentlemen below from US FAA and NTSB are fully aware of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation and may assist:

Robert Francis II
Vice Chairman
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Thomas E. Haueter
Chief, Major Investigations Division
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

John B. Drake
Division Chief

Aviation Engineering Division
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Al Dickinson,
Lead Investigator, TWA 800
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

James F. Wildey II
National Resource Specialist
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Thomas McSweeny
Director, Aircraft Certification Service
FAA National Headquarters
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Washington D.C 20591

Lyle Streeter
FAA AAI
Aircraft Accident Investigator
FAA National Headquarters
800 Independence Avenue, S.W
Building FOB 10A, Room 838,
Washington D.C 20591

Ron Wojnar,
Manager

Federal Aviation Administration
Transport Airplane Directorate
1601 Lind Ave. S.W.
Renton, WA 98055-4056

Neil Schalekamp
Manager, Propulsion & Mechanical Systems and Cabin Safety
Branch
Transport Standards Staff
Transport Airplane Directorate, ANM-100
1601 Lind Ave. S.W.
Renton, WA 98055-4056

Bob Breneman,
Aerospace Engineer,
Federal Aviation Administration
Transport Airplane Directorate, ANM-100
1601 Lind Ave. S.W.
Renton, WA 98055-4056

2. Obtain evidence from respective agencies in their countries.

Air India Flight 182:

1. Copies of all videotapes, photographs, interview notes, and sketches now held by the RCMP, TSB, NTSB, AAIB, and BARC to include about 50 video tapes and nearly 3000 still photographs taken.
2. Access to all hard evidence of the wreckage which was retrieved from ocean now in Bombay.
3. Interviews with TSB, AAIB, and NTSB investigators who contributed to the AI 182 report through deposition or voluntary meeting.

4. Autopsy reports now held by Indian authorities.
5. Wreckage database and plots held by TSB
6. Passenger and cargo manifests held by TSB.
7. CVR and FDR printouts held by TSB.
8. All picture albums made of the wreckage, albums now held by TSB.

United Airlines Flight 811:

1. Copies of all videotapes, photographs, interview notes, and sketches now held by the NTSB.
2. Access to any existing wreckage.
3. Interviews with NTSB metallurgists, explosive expert and American law enforcement involved with the investigation.
4. Autopsy reports.
5. Wreckage database and plots.
6. Passenger and cargo manifests.
7. CVR and FDR printouts.

Pan Am Flight 103:

1. Interviews with NTSB metallurgists and Boeing explosive expert and British law enforcement involved with the investigation.
2. Copies of all videotapes, photographs, interview notes, and sketches now held by the AAIB and Scotland Yard.
3. Access inside the hangar at Farnborough of the Pan Am 103 wreckage.
4. Autopsy reports.
5. Wreckage database and plots.
6. Passenger and cargo manifests.

7. CVR and FDR printouts.

Trans World Airlines Flight 800

1. Access to the hangar where the wreckage of TWA 800 is stored for at least 40 hours (five days at 8 hours a day) by at least five of your team.
2. Copies of all photographs, videotapes, interviews about TWA 800 now held by FBI and NTSB.
3. Interviews with NTSB metallurgists, explosive expert and American law enforcement involved with the investigation.
4. Autopsy reports.
5. Wreckage database and plots.
6. Passenger and cargo manifests.
7. CVR and FDR printouts.

Manufacturer:

1. Copies of all memos, data, and information about cargo doors and cargo holds on Boeing 747s.
2. Copies of all memos, data, and information about cargo doors and cargo holds on DC-10, MD-11, and MD-12.

Airlines:

Pan Am, TWA, Air India, United Airlines:

1. Copies of all videotapes, photographs, interview notes, and sketches regarding PA 103, AI 182, TWA 800, and UAL 811
2. Access to any existing wreckage held by them.
3. Interviews with airline staff involved with the accidents.
4. Maintenance logs for the accident aircraft long before and just before the fatal flights.

Miscellaneous:

1. Copies of all data about Canadian Pacific Air Flight 003, another Boeing 747 supposed to have a bomb on board.
2. Copies of all Data about Airworthiness Directives about cargo door on commercial airliners held by FAA and NTSB data banks.
3. Examine closely the actual wreckage in hangars or evidence on videotape and 35 mm color film for matching clues of United Airlines Flight 811 in the midspan latch area, the bottom latch area and all around the forward cargo door which has been implicated in all four events.

From Kirpal Report:

3.2.9.1 All wreckage sighted was recorded on video tapes and all major items were recorded on 35 mm positive film.

3.2.10.12 After detailed macro photography of the recovered wreckage, the experts group mentioned in section 1.5.16 prepared a detailed factual report after carefully inspecting each of the targets recovered.

Recommendations:

1. Inspect all cargo door wiring for exposed bare wire in early model (-100 and -200 series) Boeing 747s.
2. Replace known faulty aromatic polyimide wiring in airliners.
3. Modify non-plug cargo doors into plug type doors.

The implications of the wiring/cargo door explanation are profound, controversial, and have great consequences for the flying public all over the world. The countries of USA, Canada, India, UK, New Zealand, Libya, and India are all directly involved by their investigations of years and millions of dollars and the loss of hundreds of their citizens as victims in the air and on the ground. Police type investigative agencies such as CIA, FBI, Scotland Yard, CSIS, RCMP, will have their procedures and

findings reexamined. Aviation agencies such as NTSB, FAA, AAIB and TSB will have their probable causes modified. Lawsuits will proliferate as hundreds of millions of dollars will change hands. Insurance companies will readjust their premiums to reflect the real risks of mechanical failure and the lesser risks of sabotage. Careers will be enhanced or diminished. Reputations will be made or damaged. And on and on....

But, after all is said and done, after the new probable cause is determined, recommendations are made and implemented, flying will be a little safer, the risk of dying will be a little less, the people of the world will be a little bit less afraid of their fellow citizens. And those are good things.

Thank you for reading.

Please contact me at any time for any queries or discussion by phone, letter, or email at
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sincerely,
Barry

Quotes about evidence for Air India Flight 182 Reports:

FEBRUARY 26, 1986 3.2.6.5 To facilitate identification of the wreckage located by Scarab it was necessary to position

aircraft maintenance personnel on board the ship. As the aircraft structure was badly torn, mutilated and distorted, serious difficulty was anticipated in identification of small pieces of structure. It was therefore essential that these maintenance personnel were provided with aircraft photographs, manufacturing drawings, parts catalogue, wiring diagram manuals and maintenance manuals.

3.2.9.1 All wreckage sighted was recorded on video tapes and all major items were recorded on 35 mm positive film.

3.2.10.1 During recovery operation the video tapes as well as photographs of the wreckage to be recovered, were supplied to the personnel on board the ship for facilitating identification and recovery of correct targets.

All the personnel involved in the recovery operation were shown the slides and photographs of the targets which were chosen for recovery on priority basis. The method and procedure of the recovery operation was discussed in detail and finalised. Another meeting was convened on 6.10.85

to clarify the doubts and to present the picture albums containing various photographs of targets to be recovered.

3.2.10.12 After detailed macro photography of the recovered wreckage, the experts group mentioned in section 1.5.16 prepared a detailed factual report after carefully inspecting each of the targets recovered. It was decided to send the wreckage to Bombay for which necessary crates were then prepared and the large pieces of wreckage were cut along the lines indicated by the experts group to facilitate their packing.

3.2.10.15 Efforts were made to repair Scarab so that the ship John Cabot could sail again in order to salvage as many pieces as possible. It was fortunate that the weather had not deteriorated. Some of the important but small pieces which had to be recovered had been placed in a basket at the bottom of the ocean.

The ship sailed out again after Scarab had been repaired. The basket was sought to be lifted, but, unfortunately, when it reached near the surface of the sea it overturned and the contents of the basket spilled and were never traced again.

3.2.1.5 Next phase was the task of :

- (a) Locating hundreds of pieces of wreckage by the combined use of sonar and video monitors.
- (b) Video and still photography of the pieces of wreckage.
- (c) Plotting the distribution of the wreckage.

All this was to be carried out under the directions of the Court.

3.2.2.1 The means (vehicles/equipment) proposed to be used in the locating, mapping and video photography of the wreckage were the CCGS John Cabot and SCARAB II.

3.2.2.4 The SCARAB II is a state-of-the-art system designed and built for tethered unmanned work at ocean depths of upto 6000 feet. Scarab's standard equipment are :

A complete optical suite.

3.2.2.5 The manipulators have a choice of grippers/claws/cutters etc. of any required description and size. The Scarab has three TV cameras mounted on separate pan/tilt mechanism to allow real time observation and video tape documentation. A 35 mm still camera was also installed and used in the present work. There was a choice of quartz-iodide flood lights to provide illumination.

3.2.2.7 The Scarab was equipped with a 360° high resolution Sonar with a range of 1000 meters. The Sonar was also capable of interrogating and detecting 37 KHz and 27 KHz pingers. It can function independently of the ship's facilities and is equipped with power generators and semiautomatic handling equipment.

3.2.5.1 The Scarab provided video tapes and still photographs. In the initial stages (upto 9.8.1985) the John Cabot was operating in peripheral areas and therefore few targets were found. Hence

the output of videotapes was small. In fact upto 9.8.85, only about 10 targets were found and only 3 video tapes were used up. But later, when John Cabot came close to and into the crucial areas, video tapes were recorded at a fast rate. Further, still photography facility on the Scarab was activated at about this time. Therefore, arrangements were made periodically to obtain the video tapes and films from John Cabot. Video tapes and still photographs (these required to be processed) were transported from John Cabot to Cork Control Centre.

3.2.5.2 About 50 video tapes and nearly 3000 still photographs (positives and transparencies) provided the visual information on the targets.

Arrangements had to be made at Cork for such viewing and study of the video tapes and still photographs. Video equipment (TV monitor plus VCR) suitable for viewing the video tapes had to be arranged.

3.2.5.3 The still photography used special professional quality colour film (35 mm), each roll having 800 frames. The film was diapositive. These had to be developed and transparencies obtained from them. Thereafter negatives and prints had to be made. Special equipment for viewing the transparencies had to be provided for continuous work. The video tapes, transparencies and prints provided the principal means of monitoring of the results of the operation

3.2.6.5 To facilitate identification of the wreckage located by Scarab it was necessary to position aircraft maintenance personnel on board the ship. As the aircraft structure was badly torn, mutilated and distorted, serious difficulty was anticipated in identification of small pieces of structure. It was therefore essential that these maintenance personnel were provided with aircraft photographs, manufacturing drawings, parts catalogue, wiring diagram manuals and maintenance manuals. Since carriage of such voluminous literature was not practicable, 3M

micro film reader printer

machines with micro film cassettes of the above literature were produced and installed on the ship. In case of difficulty of locating any particular information, the engineers were advised to contact Cork Search Centre by telex or telephone who, in turn, could seek the desired information from the manufacturers.

3.2.9 Extent of Damage

Photographic and Video Interpretation of Wreckage

Photographic Interpretation

3.2.9.1 All wreckage sighted was recorded on video tapes and all major items were recorded on 35 mm positive film. During the course of the investigation, several members of the investigation team had the opportunity to view the tapes and photographs. Subsequently, when some items were recovered, it became apparent that the optical image presented on video and still film had some limitation with respect to identification of damage or damage pattern. For example, the sine wave bending of target 7 appeared in the video and photographs as a sine wave fracture, and some of the buckling on target 35 was not evident in either the video or photographs. The interpretation of damage through photographic/video evidence without the physical evidence might be misleading, and any interpretation should take this into account.

3.2.10.1 During recovery operation the video tapes as well as photographs of the wreckage to be recovered, were supplied to the personnel on board the ship for facilitating identification and recovery of correct targets.

3.2.10.8 A meeting was held at 1400 hrs. on 4.10.85 on board CCGS John Cabot to establish/clarify the priorities for the wreckage recovery operation and coordination between John Cabot, Kreuzturm and Cork Search Centre. All the personnel

involved in the recovery operation were shown the slides and photographs of the targets which were chosen for recovery on priority basis. The method and procedure of the recovery operation was discussed in detail and finalised. Another meeting was convened on 6.10.85 to clarify the doubts and to present the picture albums containing various photographs of targets to be recovered.

3.2.10.9 A detail log of the activities of the ships John Cabot and Kreuzturm which started the recovery operation of 10.10.85, reveals the following :

(a) The Scarab working independently recovered the following

- (1) Basket at target 192 containing copilot's chair, 2 suitcases and radar antenna (12.10.85)
- (2) Target 8 - Lower fuselage skin of aft cargo compartment. (11.10.85).
- (3) Target 245 - Forward belly skin just aft of radome (16.10.85).
- (4) Target 350 - Economy class seats and carpet (23.10.85).
- (5) Target 296 - Piece of aft pressure bulkhead.

(b) The Scarab after attaching the grippers, bridal cable and lift line to the targets buoyed off the same to Kreuzturm which recovered the following targets :

- (1) Target 362/396 - Forward cargo fuselage skin from station 700 to 840 and STR 41L to 43R. (16.10.85).
- (2) Target 193 - Fuselage skin from station 720 to 860 and passenger door 2L (17.10.85)
- (3) Target 223 - Nose landing gear pressure deck web and stiffeners, container pieces (station 260-340)(19.10.85).
- (4) Target 181 - Wing skin with forward cargo compartment **SLIPPED OFF WITH GRIPPERS (21.10.85) AND WAS LOST.**
- (5) Target 399/358 - Fuselage skin from station 780 to 940 and STR 7R to 35R with 2R door (25.10.85). A body entrapped in

target 399/358 was recovered. Another body which came up to surface with the wreckage fell off into sea and was lost while hauling the wreckage on board. The recovered body was identified as of Dr. Mathew Alexander, a Canadian passenger and was brought to Cork by Fisherman's vessel "Orion" at 0130 hrs. on 28.10.85 and was sent for Post Mortem etc.

(6) Target 7 - Aft cargo compartment fuselage skin from station 1480 to 1860 (26.10.85).

(7) Target 47/50 - Aft cargo floor structure with roller tracks, frames, latch etc. from station 1600 to 1760 (27.10.85).

(8) Target 117 - Three rows of coach class seats with passenger cabin floor boards, broken floor beam (28.10.85).

(9) Target 35 - Aft Pressure Bulkhead piece (30.10.85).

3.2.10.12 After detailed macro photography of the recovered wreckage, the experts group mentioned in section 1.5.16 prepared a detailed factual report after carefully inspecting each of the targets recovered. It was decided to send the wreckage to Bombay for which necessary crates were then prepared and the large pieces of wreckage were cut along the lines indicated by the experts group to facilitate their packing.

The Canadian Transportation Investigation and Safety Board Act provides the legal framework governing the TSB's activities. Basically, the TSB has a mandate to advance safety in the marine, pipeline, rail, and aviation modes of transportation by:

* - conducting independent investigations, including, when necessary, public inquiries, into selected transportation occurrences in order to make findings as to their causes and contributing factors;

- * - identifying safety deficiencies as evidenced by transportation occurrences;
- * - making recommendations designed to eliminate or reduce any such safety deficiencies; and
- * - reporting publicly on its investigations and on the findings in relation thereto.

INDEPENDENCE

To enable the public to have confidence in the transportation accident investigation process, it is essential that the investigating agency be, and be seen to be, independent and free from any conflicts of interest when it investigates accidents, identifies safety deficiencies and makes safety recommendations. Independence is a key feature of the TSB. The board reports to Parliament through the President of the Queen's Privy Council for Canada and is separate from the other government agencies and departments. Its independence enables it to be fully objective in arriving at its conclusions and recommendations.

X-From_: Bill.Tucker@tsb.gc.ca Fri Jul 13 17:36:16 2001

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

To: "John Barry Smith" <barry@corazon.com>

Subject: RE: Consensus on Cause of explosion in Air India Flight 182

Date: Fri, 13 Jul 2001 20:38:37 -0400

Dear Mr. Smith,

Thanks. I was able to open the first file you sent (both formats), but I'll have to close a few applications before I can open the pictures. I am about to go on holidays, but I have printed your "conference room" text

to read
while I am away.

Sincerely,

Bill T..

---Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Thursday, July 05, 2001 11:17 PM
To: Tucker, Bill
Subject: PDF Consensus on Cause of explosion in Air
India
Flight 182

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
6 July 01

Attached is Part Two of my shorted wiring/forward cargo
door
rupture/explosive decompression/inflight breakup presentation
in PDF

format. It is identical to the email just sent. PDF may be easier
to

forward as the pictures and text are in one file.

Sincerely,

Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924

> -----Original Message-----
> From: John Barry Smith [SMTP:barry@corazon.com]
> Sent: Thursday, July 05, 2001 11:17 PM
> To: Tucker, Bill
> Subject: Consensus on Cause of explosion in Air India Flight
182
>
> << Message: Untitled Attachment >> << File:
811nosetogether.jpg >> <<
> File: 182nosetogether.jpg >>

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: RE: Consensus on Cause of explosion in Air India
Flight 182
Cc:
Bcc:
X-Attachments:

Dear Mr. Tucker, 13 July 01

Fine, glad to see they were sent and received OK; there were
three parts, Location, Cause, and Conclusions.

I hope you have an enjoyable holiday and I await any comments

you have when you return.

(I just saw the new movie with Robert De Niro and Marlon Brando, "The Score" filmed on location in Montreal. It reminded me of years ago when my wife and I cycled all through and around the city. It was a very bicycle friendly city.)

Cheers,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

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From: John Barry Smith <barry@corazon.com>
Subject: RE: Consensus on Cause of explosion in Air India
Flight 182
Cc:
Bcc:
X-Attachments:

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Cheers,
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John Barry Smith
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Sincerely,
Bill T..

X-From_: Bill.Tucker@tsb.gc.ca Fri Jul 13 18:55:38 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Consensus on Cause of explosion in Air India Flight 182
Date: Fri, 13 Jul 2001 21:58:00 -0400

Dear Mr. Smith.

Re: >>> I hope you have an enjoyable holiday and I await any comments you have when you return

Thanks very much.

Bill T..

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Friday, July 13, 2001 9:16 PM

> To: Tucker, Bill

> Subject: RE: Consensus on Cause of explosion in Air India
Flight 182

>

>

> Dear Mr. Tucker, 13 July 01

>

> Fine, glad to see they were sent and received OK; there were
three parts,

> Location, Cause, and Conclusions.

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> friendly city.)

>

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>
> John Barry Smith
> (831) 659-3552 phone
> 551 Country Club Drive,
> Carmel Valley, CA 93924
> www.corazon.com
> barry@corazon.com
>
>
>
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>
>>Dear Mr. Smith,
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text to read
>>while I am away.
>>
>>Sincerely,
>>
>>Bill T..
>>

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Startling SDR

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker, 22 July 2001,

Hope you had a good holiday and welcome back.

I just did research this evening and found this startling SDR in the FAA database: Capitals in original.

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
Engine Group : 4056
Engine Model : PW4056
Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT

District Office Region : Western/Pacific US office #29
A/C N Number : 199UA
Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

Mr. Tucker, this is very very scary knowing what we know about forward cargo doors opening in flight from electrical causes. If that CB had been pushed in (why was it out) during flight, that forward cargo door would have ruptured/opened with known catastrophic results. What is a 'controller' and what 'malfunctioned'? UAL, above incident airline and well familiar with UAL 811, had habit of pulling door CB out and were told to stop, order 8300.10 below. They are apparently still pulling the door CB and it may have saved their ass.

Sir, I hope you have decided to proceed with a supplemental report on Air India Flight 182 based on subsequent similar events such as United Airlines Flight 811 and for certain because of incidents like the above.

Please do something.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone

551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

ORDER: 8300.10

APPENDIX: 4

BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
for Airworthiness (FSAW)

BULLETIN NUMBER: FSAW 93-50

BULLETIN TITLE: Inappropriate Use of Circuit Breakers
During B-747 Lower Lobe Cargo Door Operation

EFFECTIVE DATE: 06-02-94

1. SUBJECT. This FSIB informs inspectors of unsafe procedures being used by some operators to close and lock the lower lobe cargo doors of the Boeing 747 (B-747) series aircraft.

2. BACKGROUND.

A. This bulletin was developed after an inquiry by a foreign airworthiness authority into the special procedures used

by a specific operator to close and lock the lower lobe cargo doors of B-747 series aircraft. The special procedure included in the operator's maintenance manual called for manual tripping of the cargo door control circuit breakers and the section 2 ground handling bus circuit breaker in order to further remove the possibility of power being applied accidentally to the cargo door control circuitry.

B. The manual tripping of the circuit breakers in special cargo door lock procedures is unnecessary and decreases the reliability of the circuit breakers to perform their intended function. Frequent switching of the breakers could cause them to trip before the point of rated voltage or not to trip at all. Both cases could have adverse effects (such as the following) in relation to the safe operation of the cargo doors:

(1) Circuit breakers that trip before the point of rated voltage would cause increased manual operation of the cargo doors.

(2) Manual operation could introduce additional failure

conditions, such as out-of-sequence operation and overdriving of the cargo door mechanisms.

(3) Service history has shown that manual operation of the cargo doors is more prone to cause damage; for example, the failure of a breaker to trip at the point of rated voltage could lead to failed components and fire.

2

C. The revision to the B-747 cargo door lock sectors warning system, in airplanes compliant with Airworthiness Directive (AD) 90-09-06, provides an increased level of integrity so that manual tripping of the circuit breakers is not necessary to prevent the possibility of an uncommanded opening of the cargo doors. Furthermore, power to the cargo door is automatically removed by the Master Latch Lock System upon first motion of the Master Latch Lock Switch away from the fully unlocked position.

3. ACTION. Principal maintenance inspectors (PMI)

having
certificate management responsibilities for operators of
Boeing
747 series aircraft should ensure that this information is
brought to the attention of their respective operators. Any
operators using this procedure should be discouraged from
its
continued use.

4. INQUIRIES. This FSIB was developed by SEA.AEG.
Any
questions regarding this information should be directed to
AFS-510 at (703) 661-0333, extension 5018.

5. EXPIRATION. This FSIB will expire on 05-31-95.

/s/

Edgar C. Fell

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Two matched events of uncommanded cargo door
openings, old and new

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker
Director General,

Investigation Operations

Dear Mr. Tucker, 22 July 2001,

Below are two events (both UAL) which support the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for four other Boeing 747 accidents.

The alarming part of the recently discovered SDR about the uncommanded forward cargo door opening is that it occurred in a 747-400 which is supposed to have fixed the faulty PolyX/Kapton wiring situation.

The electrical fault which causes the cargo door to open when it shouldn't is still present. If event happens in flight, catastrophe ensues.

Please follow up somehow on this precursor event. Please open supplemental investigation into Air India Flight 182 which shall examine an alternative mechanical explanation with precedent and now continuing problems which support the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

Please have specialized staff contact me for further clarification.

I've notified AAIB, NTSB, and FAA of my findings but have heard nothing back yet.

The problem is intermittent which is the most difficult to resolve. It needs heavy horsepower to find and fix.

Sincerely,

Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

New Service Difficulty Report SDR:

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
Engine Group : 4056
Engine Model : PW4056
Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29
A/C N Number : 199UA
Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

From AAR 92/02 United Airlines Flight 811

1.17.6 Uncommanded Cargo Door Opening--UAL B-747, JFK Airport

On June 13, 1991, UAL maintenance personnel were unable to electrically open the aft cargo door on a Boeing 747-222B, N152UA, at JFK Airport, Jamaica, New York. The airplane was one of two used exclusively on nonstop flights between Narita, Japan, and JFK. This particular airplane had accumulated 19,053 hours and 1,547 cycles at the time of the occurrence.

The airplane was being prepared for flight at the UAL maintenance hangar when an inspection of the circuit breaker panel revealed that the C-288 (aft cargo door) circuit breaker had popped. The circuit breaker, located in the electrical equipment bay just forward of the forward cargo compartment, was reset, and it popped again a few seconds later. A decision was made to defer further

work until the airplane was repositioned at the gate for the flight. The airplane was then taxied to the gate, and work on the door resumed.

The aft cargo door was cranked open manually, the C-288 circuit breaker was reset, and it stayed in place. The door was then closed electrically and cycled a couple of times without incident. With the door closed, one of the two "cannon plug" (multiple pin) connectors was removed from the J-4 junction box located

on the upper portion of the interior of the door. The wiring bundle from the junction box to the fuselage was then manipulated while readings were taken on the cannon plug pins using a volt/ohmmeter. Fluctuations in electrical resistance were noted. When the plug was reattached to the J-4 junction box, the door began to open with no activation of the electrical door open switches. The C-288 circuit breaker was pulled, and the door operation ceased. When the circuit breaker was reset, the door continued to the full open position, and the lift actuator motor continued to run for several seconds until the circuit breaker was again pulled. At this time, a flexible conduit, which covered a portion of the wiring bundle, was slid along the bundle toward the J-4 junction box, revealing several wires with insulation breaches and damage.

UAL personnel notified the Safety Board of the occurrence, and the airplane was examined at JFK by representatives of the Safety Board, United Airlines, and Boeing. After the wires in the damaged area were electrically isolated, electrical operation of the door was normal when the door was unlocked. When the door was locked (master latch lock handle closed), activation of the door control switches had no effect on the door. This indicated that the S2 master latch lock switch was operating as expected (removing power from the door when it was locked). After the on-site examinations, the wiring bundle was cut from the airplane and taken to the Safety Board's materials laboratory for further examination.

The wiring bundle with the damaged wires contained all electric control wires (28 volt DC) and power wires (115 volt AC) that pass between the fuselage and the aft cargo door. From the forward side of the J-4 junction box, the bundle progresses in the forward direction, just above the forward pressure relief door, then upward, following the forward lift actuator arms. The bundle then enters an empty space between two floor beams,

where the bundle has an approximate 180-degree bend when the door is closed. From this location, the wiring bundle progresses inboard, through a fore-to-aft intercostal between two floor beams. The wiring bundle then splits, with wires going in several directions.

The bundle is covered by the flexible conduit approximately from the lower end of the lift actuator arms to the fore-to-aft intercostal between the floor beams.

The conduit covering the wiring bundle is intended to prevent the wire bundle from being damaged during opening and closing of the door and during cargo handling operations. The conduit is a sealed flexible interconnector consisting of a convoluted helical brass innercore covered by a bronze braid. The innercore is soldered at every other convolute, and should be capable of withstanding pressures exceeding 1,000 pounds per square inch (psi). Boeing has indicated that the conduit is an evolutionary improvement and that it has been installed on all B-747 airplanes produced since 1981 (from line number 489 on). Airplane N152UA was delivered in April 1987.

Airplanes produced prior to 1981, including N4713U, used a bungee retraction system, to retract the cargo door wire bundle. Guidelines for the replacement of the bungee system with the flexible conduit were covered in Boeing Service Bulletin 747-752-2170, dated August 1981. The service bulletin was prompted by reports that the wire bundle bungee retraction system had not retracted the wire bundle sufficiently to prevent trapping the bundle between the cargo door and the door frame. UAL did not perform the retrofit on N4713U, which was line number 89, nor was the company required to do so.

Examination of the wires in the damaged area on the wiring bundle revealed that four of the wires were similar in appearance, with insulation breaches that progressed through to the underlying conductor. Adjacent to the breach on these four wires,

the insulation was blackened, as if it had been burned. Another wire contained an extensive breach but no evidence of burned insulation. The damaged area was located on the bundle at a position approximately corresponding to a conduit support bracket and attached standoff pin on the upper arm of the forward lift actuator mechanism. This support bracket was found bent in the forward direction. In addition, mechanical damage was noted on adjacent components in this area.

A second damaged area was noted on the wiring bundle at a position approximately corresponding to the conduit swivel clamp at the elbow between the two arms of the forward lift actuator mechanism. Wires in this area were missing portions of their exterior coating, but no breaches to the underlying conductors were noted.

The exterior braid on the conduit contained minor rub marks and was slightly kinked at a position corresponding to the area on the wires with breached insulation. Additional examinations revealed that the innercore of the conduit contained multiple circumferential cracks in the areas corresponding to the damage areas on the wires. The cracks were in the convoluted innercore directly adjacent to the inside diameter of the conduit.

The lock sectors, latch cams, and latch pins from the aft cargo door were examined on the incident airplane and were generally in excellent condition. There was no evidence to suggest that the cams had ever been electrically (or manually) driven into or through the lock sectors.

Boeing also informed the Safety Board that, in May of 1991, a B-747 operated by Qantas was found to have chafing of the wires in the wire bundle to the aft cargo door. This airplane also had a flexible conduit protecting the wires, and the chafing was located approximately at the standoff pin on the bracket at the upper arm of the forward lift actuator.

The Safety Board determined that the chafing of the wires on the

airplane involved in the JFK occurrence was caused by, or was greatly accelerated by, the circumferential cracks in the conduit and that the cracks in the conduit were caused either by repeated flexing of the conduit as the cargo door opens and shuts or by unusual stresses on the conduit generated concurrently with damage to the conduit guide bracket and attached standoff pin on the upper end of the forward lift actuator upper arm.

A portion of the wire bundle for the forward cargo door on many B-747 airplanes is also covered by a flexible conduit that is very similar to the conduit for the aft cargo door. However, there are substantial differences between the orientation of the flexible conduits for the two doors, and the Safety Board has not become aware of problems associated with the flexible conduit for the forward door.

Nevertheless, because of the concerns about the chafed wires and possible electrical short circuits, on August 28, 1991, the Safety Board recommended that the FAA:

Issue an Airworthiness Directive applicable to all Boeing 747 airplanes with a flexible conduit protecting the wiring bundle between the fuselage and aft cargo door to require an expedited inspection of:

- (1) the wiring bundle in the area normally covered by the conduit for the presence of damaged insulation (using either an electrical test method or visual examination);
- (2) the conduit support bracket and attached standoff pin on the upper arm of the forward lift actuator mechanism;
- (3) the flexible conduit for the presence of cracking in the convoluted innercore.

Wires with damaged insulation should be repaired before further service. Damage to the flexible conduit, conduit support bracket and standoff pin should result in an immediate replacement of the conduit as well as the damaged parts. The inspection should be repeated at an appropriate cyclic interval. (Class II, Priority

Action) (A-91-83)

Evaluate the design, installation, and operation of the forward cargo door flexible conduits on Boeing 747 airplanes so equipped and issue, if warranted, an Airworthiness Directive for inspection and repair of the flexible conduit and underlying wiring bundle, similar to the provisions recommended in A-91-83. (Class II, Priority Action) (A-91-84)

The FAA responded to these safety recommendations on November 1, 1991, stating that it agreed with the intent of the recommendations and that the issuance of an NPRM was being considered to address the issues in the safety recommendations. The Safety Board replied on November 27, 1991, classifying each of the recommendations as "Open--Acceptable Response," pending the completion of the rulemaking process. Since that exchange of correspondence, the FAA has published an NPRM which is now being reviewed by the Safety Board. Safety Recommendations A-91-83 and -84 will continue to be classified as "Open--Acceptable Response" until an acceptable final rule is published.

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Electrical cause of uncommanded forward cargo door opening initiated by civilians.

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 July 01

Below is back story to United Airlines Flight 811 and how civilians were able to get the door retrieved and the proper cause of it opening determined as electrical and not improperly latched.

Sometimes worthy information can come from the public, especially ones who are directly involved such as family member or crewmember of victim. Kevin and Susan Campbell lost their son and I lost my pilot.

Please note comments below relating directly to Air India Flight 182.

Please start supplemental investigation into Air India Flight 182.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: SMANDKJC@aol.com
Date: Sun, 22 Aug 1999 22:39:33 EDT
Subject: From Kevin Campbell
To: barry@corazon.com
CC: rocketman@hawaii.rr.com

Dear Barry , Steve emailed on your reply , Thank you for your

kind comments
about our work. As you know we live in NZ but we own an apt
here in Waikiki
and usually spend from may till end sept here .This year we were
late
arriving as our first grandchild was due early may , He did not
arrive until
the 19th and we stayed to help out our daughter until the 1st
june . Our son
in law gave us a computer so they could email pictures of the
new baby . I
have resisted getting a computer as I cant type but seem to be
managing OK .
Anyway as soon as I got on line the first search I did was 811 and
got your
site , it all sounded very familiar to me and I could tell you had
obviously
done your homework . Steve had visited us in NZ in Feb just as
we moved into
our new apt there after selling our family home so I asked Steve
if he had
been in contact with you and what spurred your interest in cargo
doors { I
should have explored your site a bit more and I would have
found the reason
myself but I was just starting searching the web and only hit the
one page]
Steve did not know what your motives were so I thought I would
contact you
myself , however I had bought a lot of my documents over with
me this trip as
I had to fly on to Seattle to do an interview with the BBC
Panorama program

for a documentary on aircraft wiring problems following the release to the media of the Swissair wreckage , the doco is cofunded by the Discovery Channel and may show [Or a USA version of it] on TLC depending on wether they want to upset Boeing or not . The request to do this doco followed a very good doco done by Channel 9 Sydney on their Sunday program titled "Fire in the Sky" also about Kapton wire in Feb of this year .I had lent BBC some of my documents including my submission to the NTSB on the cause of 811 and also a document I had written in 1989 I called "Countdown to Disaster" detailing the sequence of events leading up to and beyond the 811 disaster . I still have not had them returned but Steve can email them to you if you have never seen them. As you are probably aware we did an investigation on 811 and have appeared in the media many times . We had many stories about our efforts in NZ newspapers ,magazines and TVNZ followed us on one visit to the USA and did a Documentry on our investigation { the email from the guy in NZ that you sent Steve was from one of the team that was to do a computer simulation of my theory compared to the NTSB theory as soon as they tried to program the NTSB theory

they could see it did not compute and it was then they realised I had to be correct and were behind me 100%. the same people did the Americas Cup simulations] The WALL STREET JOURNAL did a front page article on our efforts on 24th feb 1990 and I have done several articles with Byron Acihido of the Seattle Times among others . In all we took 7 trips to the USA investigating 811and they started with a look at the aircraft at Hickam AFB were we took many pictures of the damage and I was able to rule out corosion as the cause . We attended the NTSB hearing at Seattle and managed to steal all of the documents from the NTSB metalurgists seat after the hearing ended . Initially they would only give us the list of witness`s but after complaining to the media at the first recess they gave us a press set and said we could have anything off the press table when the hearing ended two days later . At the end of proceedings we gave an interview to The Honolulu Advertiser and when it finished we went back in to get the stuff off the press table, as I was looking at it my wife Susan walked up to the top table and yelled out there was a good set of stuff here , we grabbed a box loaded it in and took off just as the NTSB guys were

coming back in with a trolley to load it up . We hailed a taxi and were off .

It took months to look at it and absorb it all but the result was " Countdown to Disaster"

We have stayed with both Dave Cronin and Al Slader many times .On one visit to the NTSB we got copies of all the passenger safety statements and wrote to

everyone that had replyd to the Questionair . Mainly they were First and

Business class passengers with a few coach as well . We visited everyone who

replyd to us , Flying in to Seattle and driving to Denver New York Florida

San Diego San Francisco Lake Tahoe and back up to Seattle .

Boeing would

never talk to us directly only through their legal people [Perkins Coie] and

initially United would not talk to us either but a year after the accident

when United had gone from the most popular to the carrier of last resort for

NZ passengers we got an invitation to visit the United maintenance base in

San Francisco . they were just going to do a PR job on us but it did not work

out that way and we got stuck into each of the VP`s and told them were they

had failed , when one broke down we knew we had them and it ended up with the

Senior VP United Joe O Gorman giving us a personal escort around the base

and getting answers to everything we wanted to know . We stood in the cargo bay of a 747 while they operated the door and I pointed to the Conduit at the top of the door and said that that was where I thought the Arc had originated from. as we walked back across the tarmac I spotted a newly painted 747 with a number I did not recognise , when we got back to the motel I checked my records and there was no N4724U . so asked the next day if it was N4713U renumbered and they had to admit it was .

We were in Hawaii for the search for the cargo door and I tried every avenue to be on that sub or even the recovery boat without success. I was phoned within an hour of the recovery of the door and told that they had a contingency plan , if the door revealed the NTSB were correct the door was to be released to the media in Hawaii ,if the door showed that the Campbells were correct the door was going straight to Boeing . He said that the door is going straight to Boeing . We flew to Seattle but were told we could not see the door , we drove to Washington to see the NTSB and as we entered the office we were told they could spare us 5 minutes, about 3 hours later we held a set of the recovered C locks and Lock sectors and they admitted we were

correct , that they would ensure that the aircraft would be fixed but not to

hold our breath waiting for a new report ever to be released .

After lunch

with them I asked " in light of what we now know on 811 do you still think

that Air India was a bomb ?"

The reply was that we never thought that Air India was a bomb in fact the

video shows a cargo door exactly the same as 811.

I wrote to both Air India and the Canadian Safety Board with my findings on

811 but did not even have the courtesy of a reply .

I was very upset to read your theory on TWA 800 as I thought we had the

problem beat but it had never occurred to me that if the pull in hooks opened

that the door could break in half , this is of course exactly what 811` s did

but I had put it down to the fact that it struck the side of the fuselage as

it opened and levered out the hinge and the section above it .

Fate intervened on 811 and the door opened on the 747 at JFK and they could

no longer withhold the revised report on 811 . The new report however still

does not admit that 811 got the signal to open right there at 23000 ft

insisting it happened before takeoff . This is a much less scary scenario for

Boeing and the NTSB as they still believe that other safeguards preclude it

from getting a signal after shutdown of the APU and the ground

switch which I believe is a load of baloney .Are you aware that the original door design for the 747 called for a warning light that would have advised the cockpit of a S2 switch failure and the fact that power was still available to the door latch actuators? I had the document that showed this system deleted by whiteout and no one would ever answer my question wether the aircraft was certified with this system or not as it never made it into production . I lobbied very hard for this system to be reinstated but it wasnt , I guess that would have opened up liability problems for Boeing I lent the document to a journalist and have never got it back either . You probably have plenty of questions for me but I will run through the ones you asked Stuart Mc Clure and answer any that I can .
Dave Cronin PO Box 4263 Incline Village NV 89451-8320 Tel 702 831 7746 Fax 702 831 3615 . Dave was flying the plane manually getting the last bit of pleasure before he retired , as it blew he just let it go and it went up and sideways about 50 ft { I have the engine readouts and you can see that airflow was cut over the engine intakes] Dave and I both believe that had it been on autopilot it would have broken the nose off at the 41

section joint
which is a known weak point { This is what happened to Pan Am
103 and TWA
800] all of the beams in the business section were broken and I
actually
stood in the cargo hold of N4713U at Hickam and lifted the floor
off the
temporary struts with one hand , the floor was only held up by
the cargo
containers after the door went . Actually the only bit of solid
floor left in
business class was where our son sat in 12H But the shock wave
went from the
back past Lee moving the toilets beside him { forward of the
hole] forward
12" it bounced off the front of the plane came back and broke
his seat
off its legs or mountings , it also blew the eardrums of most of
the first
class passengers and in some cases blew up their teeth if they had
air
cavities in them Dave is a very experienced glider pilot and
called on all
his skills to get the plane back but it was dropping at 1000 ft p/m
it was at
22000 ft 22 minutes out and at METO speed it crashed to a
perfect landing at
Honolulu International Airport it could never have gone around
for another
attempt { I have the CVR printout and it makes chilling
reading } What was
heard ? The CVR has a thump followed 1.8 seconds later by a
loud explosion {

I failed in my bid to listen to the actual tape ,I only wanted to actually hear the sound myself but was denied }Talking to the passengers some off them heard a hiss followed by an explosion described as being like "A thousand handclaps " no one saw the passengers go . One passenger in first class {with a Ph D in physics } nearest to the door said he heard something start up immediately prior to the thump . the NTSB never interviewed him and dismissed this as being the elevator to the galley but the steward was already in the galley at the time of the explosion and I dont think the elevator was moving . So the sequence was a whir a thump a hiss and then 1.8 seconds later the explosion . Dave had time to say " what the # was that " and Al replied "I don't know "between the thump and the explosion The CVR's power was then off for 21.4 seconds I have the all the NTSB photos and my own of the door frame area,the side frames and the sills are in perfect condition ,the 8 bottom pins are all goughed but otherwise OK the forward mid span pin is also goughed and the mtg bracket had moved outward on its bolts , the rear mid span pin was goughed and the bracket was held by one bolt the other 3 had broken . It

takes 1.5 seconds for the 8 C Locks on the bottom of the door to open followed by the opening of the pull in hooks , with the 1.8 second time gap when the hiss was heard I take that to be the time that the door had blown off the 8 C Locks and it was held by the pull in hooks until they also opened sufficiently for the door to blow off them as well . Something had to be different to PAN AM 10 out of London where the door was closed by the slipstream and they got back safely.

At least one passenger was ingested by engine no 3 . I have the Coroners report on what they found and I have seen what they removed from the engine apart from the body bits . It was not our son as we had to give a DNA sample and the result was negative Steve recently spoke to someone who inspected the engine the day it happened and thought the red on the turbine was seat material until he touched it and realised what it was They told us that they gave the aircraft parts a Hawaiian burial at sea but I doubt it , they certainly did not give us the seat parts that we could have used in an action against the seat manufacturer [Weber Aircraft Co] We have photos of damage to the wings , the top of the aircraft and to the vertical stabiliser , we hope that one of these killed our son as we

know he
could have survived the fall to the sea 22000 ft and over 4
minutes below .
parts were still falling out of the sky after 811 was back on the
ground in
Honolulu. We have the reports from all the services that attended
the
accident . We found they knew Lee was missing by about 4 AM
local time but it
was not till about 12 Hrs later that they phoned us from Chicago
and said he
was missing presumed dead .The damage to No3 engine was
caused by a body or
bodies , luggage and aircraft parts . Damage to No 4 was mainly
by luggage .
N4713U did not have the lock sectors strengthed by aluminium
{the first
fix]but I would think that PAN AM 103 would have as PAN AM
did not wait for
Boeing to supply the steel kits but made their own and fitted
them to their
fleet after the London incident , as they realised the implications
of not
doing so . As detailed in "Countdown " Boeing devised a one
time test to
check the integrity of the cargo door locking system , they told
the airlines
to hit the door open switch to see what happened , a day later
they stopped
the test as operators were calling to say it was damaging the
planes ,
obviously lots of aircraft had failed S2 switches and the actuators
were live

just waiting for a stray arc to doom the plane and the passengers and the
FAA still gave up to 2 years to replace the lock sectors with steel ones .

Regards Kevin and Susan Campbell

X-From_: Bill.Tucker@tsb.gc.ca Fri Aug 3 15:25:09 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "'John Barry Smith'" <barry@corazon.com>
Subject: RE: Startling SDR
Date: Fri, 3 Aug 2001 18:24:11 -0400

Dear Mr. Smith,

Thanks. I'm back as of Monday (though have one more week to look forward to in late Aug) and am catching up on e-mail again. During my holiday, I enjoyed reading two of the bigger docs you had sent me.

Re the info. below, I was not aware of that. I found it of interest and have forwarded it to 3 or 4 other people.

Re your closing para about a supplemental report on Air India 182, I don't think we can contemplate doing so in view of present workload and the fact of the very extensive RCMP investigation and the upcoming trial. We would at least want to see what the latter generates. Also, if we were to suggest

re-consideration of the Govt of India safety investigation report, I believe we should do so to the Govt of India.

Bill Tucker.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Sunday, July 22, 2001 11:18 PM

> To: Tucker, Bill

> Subject: Startling SDR

>

> W.T. (Bill) Tucker

> Director General,

> Investigation Operations

>

> Dear Mr. Tucker, 22 July 2001,

>

> Hope you had a good holiday and welcome back.

>

> I just did research this evening and found this startling SDR in the FAA

> database: Capitals in original.

>

> Difficulty Date : 10/11/00

> Operator Type : Air Carrier

> ATA Code : 5210

> Part Name : CONTROLLER

> Aircraft Manufacturer : BOEING

> Aircraft Group : 747

> Aircraft Model : 747422

- > Engine Manufacturer : PWA
- > Engine Group : 4056
- > Engine Model : PW4056
- > Part/Defect Location : CARGO DOOR
- > Part Condition : MALFUNCTIONED
- > Submitter Code : Carrier
- > Operator Desig. : UALA
- > Precautionary Procedure : NONE
- > Nature : OTHER
- > Stage of Flight : INSP/MAINT
- > District Office Region : Western/Pacific US office #29
- > A/C N Number : 199UA
- > Aircraft Serial No. : 28717
- >
- > Discrepancy/Corrective Action:FWD CARGO DOOR
OPENED BY ITSELF WHEN CB
- > PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE
PUSHED IN, WHEN PRESSURE
- > RELIEF DOOR HANDLE WAS OPENED THE DOOR
LATCHES OPENED AND THEN THE DOOR
- > OPENED ON ITS OWN. COULD NOT DUPLICATE
PROBLEM AFTER INITIAL OPENING.
- >
- > Mr. Tucker, this is very very scary knowing what we know
about forward
- > cargo doors opening in flight from electrical causes. If that CB
had been
- > pushed in (why was it out) during flight, that forward cargo
door would
- > have ruptured/opened with known catastrophic results. What is
a
- > 'controller' and what 'malfunctioned'? UAL, above incident
airline and

> well familiar with UAL 811, had habit of pulling door CB out
and were told
> to stop, order 8300.10 below. They are apparently still pulling
the door
> CB and it may have saved their ass.
>
> Sir, I hope you have decided to proceed with a supplemental
report on Air
> India Flight 182 based on subsequent similar events such as
United
> Airlines Flight 811 and for certain because of incidents like the
above.
>
> Please do something.
>
> Sincerely,
> Barry
>
> John Barry Smith
> (831) 659-3552 phone
> 551 Country Club Drive,
> Carmel Valley, CA 93924
> www.corazon.com
> barry@corazon.com
>
> ORDER: 8300.10
>
> APPENDIX: 4
>
> BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
> for Airworthiness (FSAW)
>

> BULLETIN NUMBER: FSAW 93-50

>

> BULLETIN TITLE: Inappropriate Use of Circuit Breakers

> During B-747 Lower Lobe Cargo Door Operation

>

> EFFECTIVE DATE: 06-02-94

> -----

> 1. SUBJECT. This FSIB informs inspectors of unsafe procedures

> being used by some operators to close and lock the lower lobe

> cargo doors of the Boeing 747 (B-747) series aircraft.

>

> 2. BACKGROUND.

>

> A. This bulletin was developed after an inquiry by a foreign

> airworthiness authority into the special procedures used by a

> specific operator to close and lock the lower lobe cargo doors of

> B-747 series aircraft. The special procedure included in the

> operator's maintenance manual called for manual tripping of the

> cargo door control circuit breakers and the section 2 ground

> handling bus circuit breaker in order to further remove the

> possibility of power being applied accidentally to the cargo door

> control circuitry.

>

> B. The manual tripping of the circuit breakers in special cargo

> door lock procedures is unnecessary and decreases the reliability

> of the circuit breakers to perform their intended function.

> Frequent switching of the breakers could cause them to trip

> before the point of rated voltage or not to trip at all. Both

- > cases could have adverse effects (such as the following) in
- > relation to the safe operation of the cargo doors:
- >
- > (1) Circuit breakers that trip before the point of rated voltage
- > would cause increased manual operation of the cargo doors.
- >
- > (2) Manual operation could introduce additional failure
- > conditions, such as out-of-sequence operation and overdriving
- of
- > the cargo door mechanisms.
- >
- > (3) Service history has shown that manual operation of the
- cargo
- > doors is more prone to cause damage; for example, the failure
- of
- > a breaker to trip at the point of rated voltage could lead to
- > failed components and fire.

- >
- >
- >
- > C. The revision to the B-747 cargo door lock sectors warning
- > system, in airplanes compliant with Airworthiness Directive
- (AD)
- > 90-09-06, provides an increased level of integrity so that
- manual
- > tripping of the circuit breakers is not necessary to prevent the
- > possibility of an uncommanded opening of the cargo doors.
- > Furthermore, power to the cargo door is automatically removed
- by
- > the Master Latch Lock System upon first motion of the Master
- > Latch Lock Switch away from the fully unlocked position.
- >
- > 3. ACTION. Principal maintenance inspectors (PMI) having

> certificate management responsibilities for operators of Boeing
> 747 series aircraft should ensure that this information is
> brought to the attention of their respective operators. Any
> operators using this procedure should be discouraged from its
> continued use.

>

> 4. INQUIRIES. This FSIB was developed by SEA.AEG. Any
> questions regarding this information should be directed to
> AFS-510 at (703) 661-0333, extension 5018.

>

> 5. EXPIRATION. This FSIB will expire on 05-31-95.

>

>

>

> /s/

> Edgar C. Fell

>

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Government of India reconsideration of Air India Flight
182

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker, 2 Aug 2001

Thank you for reply and for reading two of the three
'cybermeeting' docs.

Also thanks for forwarding the SDR of another forward cargo

door opening on its own by electrical cause. Let us hope that does not happen in the air or that the FE or copilot does not push in that CB in the air and start that catastrophic sequence. I'm interested in the opinions of the 3 or 4 other people you sent it to. I'm also interested in the opinions of the other listed in the 'cybermeeting' about this issue. They must be concerned as I am.

I am of course disappointed that TSB does not contemplate a supplemental report on Air India Flight 182 but understand workload, budget, and staff limitations. But, I realize that that choice can change in a minute with more incidents like the SDR above. I believe there are already enough warnings by these faulty wiring caused open doors to launch a supplemental but....I shall keep you informed of any new discoveries and I hope they stay only incidents.

The RCMP are doing an investigation but their conclusions do not make sense and contradict the realities of aircraft accidents. They are not aircraft accident investigators but police and this is an airplane crash not a bank robbery. Sgt Blachford of RCMP AITF said in his last mail to me that he would meet with me in Mid August but I have not heard from him since. If we do meet, I can show him the false thinking in his 'bomb' explanation for Air India Flight 182 in the aft cargo compartment or the forward.

Also noted is your figurative 'open door' to a supplemental report depending on what the RCMP or the upcoming trial generates. If the RCMP investigation or the trial shows that expert TSB technical advice and opinion is required, would the TSB then provide that information? I feel quite sure both circumstances will do that eventually.

Regarding a suggestion of a re-consideration of the Govt of India

safety investigation report, you state you should do so the the Govt of India. Great idea, Mr. Tucker. I stayed out of the political arena, but that may be the way to go. The aviation authorities of India may wish to get a crack at explaining Air India Flight 182 as they were quickly excluded from the original investigation and replaced by a judicial judge. Would you do that? A request to the Director General of Civil Aviation, New Delhi, India to reconsider Air India Flight 182 based upon similar subsequent accidents that suggest an alternative explanation exists of a mechanical cause with a precedent? Mr. H.S. Khola, Director of Air Safety, Civil Aviation Department, New Delhi may still be there and receptive to your suggestion to become involved.

The below excerpt from the Kirpal report does state that India has the authority to investigate the accident.

"INITIAL ACTION TAKEN BY THE GOVERNMENT OF INDIA

1.2.1 Initial intimation of the accident was received by Air India who, in turn, communicated the same to Mr. H.S. Khola, Director of Air Safety, Civil Aviation Department, New Delhi. The Accident Investigation Branch of United Kingdom also sent information to the Director General of Civil Aviation, New Delhi to the effect that the accident had taken place on international waters and as such it was India which was the authority to investigate the accident in accordance with the provisions of ICAO Annex 13.

1.2.2 Thereupon Order No. AV.15013/8/85-AS dated 23rd June, 1985 was issued by the Director General of Civil Aviation whereby Mr. H.S.Khola was appointed Inspector of Accidents for the purpose of carrying out the investigation into the aforesaid air accident. This appointment was made under Rule 71 of the Aircraft Rules, 1937."

Thanks again, Mr. Tucker, for replying and sending on the SDR to others for opinion and trust your working holiday was successful. My wife and daughter are in Hawaii as I type and here I am at home. They are having a great time visiting relatives and swimming.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Dear Mr. Smith,

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Bill Tucker.

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> Sent: Sunday, July 22, 2001 11:18 PM
> To: Tucker, Bill
> Subject: Startling SDR
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> Director General,
> Investigation Operations
>
> Dear Mr. Tucker, 22 July 2001,
>
> Hope you had a good holiday and welcome back.
>
> I just did research this evening and found this startling SDR in
the FAA
> database: Capitals in original.
>
> Difficulty Date : 10/11/00
> Operator Type : Air Carrier

> ATA Code : 5210
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> Aircraft Manufacturer : BOEING
> Aircraft Group : 747
> Aircraft Model : 747422
> Engine Manufacturer : PWA
> Engine Group : 4056
> Engine Model : PW4056
> Part/Defect Location : CARGO DOOR
> Part Condition : MALFUNCTIONED
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> Precautionary Procedure : NONE
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> ORDER: 8300.10

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> APPENDIX: 4

>
> BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
> for Airworthiness (FSAW)
>
> BULLETIN NUMBER: FSAW 93-50
>
> BULLETIN TITLE: Inappropriate Use of Circuit Breakers
> During B-747 Lower Lobe Cargo Door Operation
>
> EFFECTIVE DATE: 06-02-94
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> /s/

> Edgar C. Fell

>

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Warning/Alert/Interview me/Placentia

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker, 9 Aug 2001

I just read about the RCMP taking over a ship collision investigation. Hmmmm. You have indicated the TSB will stand aside as the RCMP does the aircraft accident re-investigation (which now has the bomb going off in the aft cargo compartment contrary to earlier official conclusions.)

Please, Mr. Tucker, do not let this Air India Flight 182 event pass by. I have presented evidence that shows there is a strong possibility the forward cargo door opened in flight and a good possibility that the cause was wiring. The loyalty is to the living and the problem which occurred in 1985 exists to this day in 2001. Potentially catastrophic hull ruptures in Boeing 747s caused by an inadvertently ruptured open cargo door have occurred by official count in 1987, 1989, 1991, and 2000, in the air and on the ground. By my count after twelve years of research the count is 1985 with Air India Flight 182, 1987 with Pan Am 125, 1988 with Pan Am Flight 103, 1989 with United Airlines Flight 811, 1991 with UAL preflight, 1996 with Trans World Airlines Flight 800, and 2000 with UAL post flight. Seven events in Boeing 747 that have killed nine officially and 838 by my count.

You did not tell me I was wrong. You gave no rebuttal nor any effort at refutation. I know why. It can't be done using facts, data, and evidence. I have tried myself for years to prove it is a wrong explanation, but the evidence always supports the wiring/cargo door sequence starting with the sudden loud sound on the CVR which is present on all four fatal aircraft.

Please do not ignore the warning that is presented by this identified person with official documents and who has experience in these matters. The eighth time of wiring causing the door

unlock motor to turn on when it shouldn't can happen again, as it has in the far past, the past, and the near past, October, 2000, only ten months ago. (Capitals in original report from US FAA SDR. Note it was a 747-400)

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
Engine Group : 4056
Engine Model : PW4056
Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29
A/C N Number : 199UA
Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

What were the opinions of your staff of aviation accident investigators regarding my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for four Boeing 747 fatal events?

Director of Investigations-Air

Director of Engineering

Mr. John Garstang, Engineering Branch

Mr. Vic Gerden, Investigator in Charge, SWR 111.

Do they offer any rebuttal? Offering an alternative such as bomb or missile or fuel tank explosion is not rebuttal but disagreement.

The seriousness of this alert/warning is such that either it is worthy of preventive action or it is not, but to do nothing is not right. Some warnings can be ignored and some can't without further investigation. I believe based upon the evidence of Air India Flight 182 and evidence of other fatal accidents, that this warning about faulty wiring causing cargo doors to open when they shouldn't is a warning that can not be prudently ignored but must have further investigation to rule it in or rule it out. A warning about a potential explosive decompression caused by compressed air occurring on a Boeing 747 is just as serious about a warning about an explosive decompression caused by chemical means.

Have your staff interview me so they can either rule in or rule out the mechanical explanation. Let me enter into an email dialogue with them; we can talk as pilot to pilot.

I am not a drunk on a phone late at night saying check some airplanes because of some horrid plot afoot. (That might get a response sadly). I am experienced, I offer incontrovertible

evidence, I am identified, I invite interviews, I plead for consideration and inspections of the wiring for cargo doors in Boeing 747s as well as a supplemental investigation into Canada's largest mystery aviation accident.

Has any professional contact been made with Indian Transportation Safety officials? Can you give me an contacts to email to with the results of my research?

What would the attorneys for the trial have to do or ask for TSB to become involved with Air India Flight 182?

Mr. Tucker, it seems that the conspiracy minded people are everywhere (That's a joke) and are in charge, such as FBI and RCMP (That's not a joke.)

Please consider Air India Flight 182 an airplane crash first (As CASB did years ago) requiring transport safety officials to evaluate or re-evaluate and not a bank robbery for which the police can take a 'lead role.'

By the way, paint smears are very important clues to United Airlines Flight 811, Pan Am Flight 103, and Trans World Airlines Flight 800 which support the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. Video examination of Air India Flight 182 may very well show important matching paint smears. It's another example of how subsequent accidents can be used to review the past and clarify some issues. It's learning from experience.

Please do not let this Air India Flight 182 event go by. It's an active issue legally and reveals a potential public safety issue to Canadian citizens in wiring and cargo doors in Boeing 747s.

Please have your staff contact me for further discussions. Please ask the Indians to become involved in an updated report.

(Regarding Placentia Bay below: I was in the Navy as an enlisted aircrewmember flying P2V Neptune ASW patrol aircraft with VP-10 out of Naval Air Station Argentia Newfoundland in 1962. I walked around Placentia. Ah, the rain, ah the rocks, as, the wind, ah the cold, ah, the fog....it was very tough flying out of there for our 12 hour patrols but I look back and loved it. Every flight was an adventure of subs, or liners, or ice or mechanical problems and electronic problems to overcome on those aging WW II designed planes. I was 18 and remember Argentia and Placentia so vividly.)

Sincerely,

Barry

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,

Carmel Valley, CA 93924

www.corazon.com

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RCMP to take lead role in investigation of fatal high-seas collision

Updated: Thu, Aug 09 1:13 PM EDT

The bow of the tanker Virgo remains moored at the Come By Chance oil refinery in Placentia Bay, Nfld. (CP/St. John's Telegram/Gary Hebbard) (CP)COME BY CHANCE, Nfld. (CP) - The RCMP are taking over from Transport Canada as the lead agency in investigating a recent collision on the high seas that

killed three American fishermen.

The change, announced Thursday by Transport Canada, raises the possibility that the investigation of the tanker Virgo - now anchored in Newfoundland's Placentia Bay - will turn to criminal matters. But a spokesman for Transport Canada declined to explain the significance of the change.

The Mounties were scheduled to hold a news conference in nearby Clarenville, Nfld., to clear up the confusion.

Meanwhile, the U.S. Coast Guard "will continue to play an active role," said Transport Canada spokesman Paul Doucet.

An investigator from the U.S. Coast Guard spent Thursday inspecting the 180-metre Virgo, which was one of several ships in the area when the trawler Starbound was hit by another ship Sunday and sank.

Joseph Marcantonio, the captain of the 28-metre Starbound, was the only survivor.

The tanker's log books were seized and the crew told to stay on board after it arrived at an oil refinery near Come by Chance, Nfld., early Tuesday.

Since the collision occurred in U.S. waters - about 210 kilometres off Cape Ann, Mass. - the U.S. Coast Guard took the lead role in the investigation.

The oil tanker, owned by Russian-based Primorsk Shipping, was built in 1995. It displays the usual assortment of dents and scratches found on tankers, which normally require the aid of tug

boats when docking.

But local fishermen have pointed to fresh scratches etched in green paint near the Virgo's protruding bow.

The Starbound was painted green.

"I saw the (scratches) when we got right along side of her this morning," Walter Brinston said Wednesday as he manoeuvred his heaving, 10-metre fishing boat in the shadow of the hulking tanker. "But it's just paint. Who knows what it means?"

Still, there were no obvious signs of a violent crash earlier in the day during an informal inspection of the 38,000-tonne tanker.

The skipper of a tugboat, who has been pushing tankers around Placentia Bay for eight years, said he didn't notice anything unusual about the ship after a brief sailpast with reporters on board.

Several divers also inspected Virgo on Wednesday, but the dive leader refused to say what they found or who the team was working for.

The divers spent more than an hour inspecting the underside of the ship's hull, close to the stern, on one side.

It's at that point where there are some larger dents near the high-water line, though none of them appear to be new.

The company has said the ship's captain, Vladimir Ivanov, had no knowledge of a collision.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:11 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: What are opinions of your aviation experts about Air India Flight 182?

Dear Mr. Tucker, 24 Aug 01

I have not heard back from you regarding release of our email correspondence to the defence team so they did not get your opinions about Air India Flight 182, as valuable as they are to all concerned. The defence team continues to believe that the Canadian authorities at all levels are against them and will not cooperate either way. I told them the TSB was neutral, open, and scientific.

I have also been corresponding with the RCMP and AITF, if they request our correspondence, is it all right to give it to them?

This whole release of information just scares everyone. Why? We are the good guys. Bad buys are secretive and deceptive. This was not a secret flight, we are not at war, and only civilians were killed. This was a plane crash not a bombing raid.

Everybody is afraid. Mr. Tucker, please don't be afraid of the political repercussions of Air India Flight 182 not being a bomb but a shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. As long as the facts back up the conclusions, TSB will be respected and on firm ground.

Well, it's loyalties in conflict, that's for sure. Please come out on the side of science and proper aviation accident investigations. The Kirpal Inquiry was not an AAR, it was a judicial inquiry that said a bomb explosion. The CASB was an AAR and it did not say bomb. It said the correct explanation as far as it went. Four years later they would have been able to go further and explain the source of the unnamed explosion that tore Air India Flight 182 apart with the occurrence of United Airlines Flight 811.

Please note and this is very important to me: No one, and that include media, RCMP AITF, TSB, AAIB, NTSB, FBI etc, have never asked substantive questions regarding the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup and have never refuted it.

Mr. Tucker, you have asked no questions and have not refuted the explanation either. Why is that? It is an alert from an experienced aviator who advises to check all the wiring in and around the forward cargo door area and all wiring dealing with opening the forward cargo door on all Boeing 747s. The danger is present and has occurred in the past as recently at October 2000. Some warnings can be ignored such as UFO with a midair with an airliner going to happen soon....some warnings can't be ignored but must be checked out and ruled out or ruled in and action taken. My warning is in that category: faulty wiring is causing forward cargo doors to open in flight in Boeing 747s.

Air India Flight 182 was not caused by a bomb explosion but by the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

I may be politically naive regarding the relationships between government agencies, attorneys, and the police, but so what? The message is everything and it is an aviation safety alert based upon precedent and documents and experience.

The implications of the discovery of a cause of a plane crash is that several controversial accidents are now explained, Air India Flight 182, Pan Am Flight 103, and Trans World Airlines Flight 800.

At 6:22 PM -0400 5/24/01, Tucker, Bill wrote:

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart

Blachford of the RCMP in Vancouver. The RCMP have as strong an interest as

anyone in establishing what happened to AI Flight 182. I have also

forwarded your report to the Director of Air Investigations, the Investigator-in-Charge of our SWR Flight 111 investigation, and the Director of Engineering for their information.

You said you would forward the Smith AAR to the RCMP and they acknowledged receipt of it from you so I know you are a man of your word, Mr. Tucker. I look eagerly forward to the opinion of the aviation experts regarding my explanation. I believe that once they examine my report closely they will find it all makes sense and is very accurate with very reasonable conclusions and recommendations.

What were the opinions of your Director of Investigations-Air? I know he has one because he has the Smith AAR for Air India Flight 182 and you told me you forwarded a copy to him.

What were the opinions of your Director of Engineering? That would include John Garstang who knows about Air India Flight 182.

What were the opinions of your Mr. Vic Gerden, Investigator in Charge, SWR 111. Mr. Gerden knows about PolyX and Kapton wiring and the problems they cause which is at the heart of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

What were their opinions, Mr. Tucker? Please do not dismiss me

and my message without consulting with them. If you have their opinions, please tell me. If they tell me that they believe it was a bomb in the forward cargo compartment, or the aft cargo compartment, or wherever the mood is today, then I will desist from asking the Director General, Investigation Operations, to additionally investigate a plane crash from years ago which has relevance today and may reveal a current mechanical problems in planes flying today.

If they say the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup could be correct for Air India Flight 182, then please take action with a supplemental AAR to the CASB one, and then ask that the wiring in Boeing 747s involved with the forward cargo door be checked for integrity.

Sincerely,
Barry

John Barry Smith
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www.corazon.com
barry@corazon.com

Below from source quoting source
According to a source of mine in Air Transat, one of their A330s - KTS - has been subject to serious fuel leak problems for some time now and an engineer has been travelling with it constantly. It would be interesting to see if this is the aircraft involved in today's incident.

Canadian plane makes emergency landing in the Azores, nine injured

LAJES, Azores Islands (CP) - A Canadian Air Transat plane with 293 passengers on board ran out of fuel and had to make an emergency landing Friday on the Azores Islands, injuring nine people, airport authorities said.

"They had 10 minutes of fuel and were 20 minutes away of arriving at this airport," said Antonio Costa-Coelho, chief of staff at Lajes airport in the Azores, a group of mid-Atlantic islands about 1,450 kilometres off the coast of Portugal. The plane flew the last 10 minutes "with just the wind and the wings," said Costa-Coelho.

The landing burst the airliner's tires and spilled fuel on the runway, shutting down the airport, Portugal's Lusa news agency reported.

"He reached the runway without the engines and made the landing. He had to pull very hard on the brakes, so he made a little fire in the tires and made some damage on the runway," Costa-Coelho said.

A statement from the Regional Service of Civil Protection and Firefighters of the Azores said nine passengers were slightly injured in the emergency landing. It gave no further details.

The crew and most of the passengers are fine, said Costa-Coelho. He believed one woman was taken to the hospital but her injuries were not life threatening.

According to Lusa, the Airbus-330 developed a fuel leak on a flight between Toronto and Lisbon and had to land at the Azores, a group of nine islands belonging to Portugal.

"The pilot was very cool," said Costa-Coelho. "Without engines it is very difficult."

In Ottawa, a spokesman for the Foreign Affairs Department said the government was in touch with the airline to check on the well-being of the passengers.

Friday's was the second incident involving an Air Transat airliner in a week.

On Saturday night, a Lockheed L-1011 carrying 324 passengers and 14 crew to Toronto had to be evacuated at Orlando international airport after smoke poured into the plane's cabin.

Two people suffered minor injuries.

Air Transat specializes in charter flights from several Canadian and European cities to vacation destinations, according to the company's Web site.

The airline has a fleet of 23 aircraft.

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Faulty wires in SWR 111 and Air India Flight 182**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 28 August 2001,

"Faulty wires are "the igniter" of many potentially deadly inflight problems, he said."

I am saying the same thing, sir. TSB and I agree on the large issue. The more specific issue is crashes in which those 'faulty wires' are involved. Please check out the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Air India Flight 182 and others.

Sincerely,
Barry

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barry@corazon.com

Vic Gerden, Chief Inspector of Swissair flight 111, left, reads his statement while Benoit Bouchard, Chairman of the Transportation Safety Board of Canada, looks on. (CP /Tom Hanson) (CP)OTTAWA (CP) - Investigators into the 1998 Swissair crash called Tuesday for a ban on flammable materials in planes and tougher aircraft wiring tests, a move hailed as a huge step by one of the aviation industry's most vocal critics. "That's a giant leap for humankind," said Ed Block, a wiring and air crash expert based near Philadelphia. Faulty wires are "the igniter" of many potentially deadly inflight problems, he said.

The Transportation Safety Board, which is continuing its probe of the disaster, also wants a reassessment of systems such as air conditioning which could help feed oxygen to onboard fires.

Swissair Flight 111, an MD-11, slammed into the ocean off Nova Scotia on Sept. 2, 1998, killing all 229 people on board.

"We are recommending a far more stringent certification test regime for electrical wires - one that takes into account the various ways in which wires may fail," said the safety board.

"Over the years, manufacturers have become very good at making sure that seats and interior cabin panels burn as little as

possible in . . . a crash," said chairman Benoit Bouchard.

"But it is also true that in behind those panels - often in places where there are few, if any, defences in terms of fire detection and suppression - you can find various materials that can sustain a fire. And these materials don't just burn; they can also emit toxic gases and excessive amounts of smoke."

They include a rubber-like substance called elastomeric material, used on MD-11s to cap unused duct openings in air conditioning systems.

"An airplane should not crash as a result of one ignition source," said Vic Gerden, chief investigator into the Swissair tragedy.

Time and more research are needed to discern the cost and practicality of the board's fourth round of recommendations, Gerden said.

Block has been fighting for safer aircraft wiring for years. He co-authored a report, released earlier this month, that studied international aviation incidents over the last three decades. It cites more than 400 cases of wire-related problems from 1972 to 2000, ranging from fatal crashes to reports of cockpit smoke.

Block praised the safety board for recommending tougher tests that he says are long overdue. But real change will depend on whether regulatory agencies such as the powerful Federal Aviation Administration (FAA) in the United States turns the recommendations into new rules.

"This is an issue that is being addressed with research that the FAA started and more will be done over the next few years," said

spokesman Les Dorr.

"We feel we need to upgrade those," he said of performance tests currently conducted on aircraft wiring.

"I cannot speculate on what our formal response to the (board) recommendations might be. But certainly we will consider them."

An MD-11 contains about 250 kilometres of electrical wire and rewiring a single plane would cost several million dollars.

Canada's safety board is testing 20 burnt wires it believes were damaged by electrical arcs between wires on the doomed Swissair flight.

It has found evidence that fire developed in the ceiling near the cockpit, but hasn't discovered the cause. Wiring problems have long been suspected.

The board, along with its counterpart in the United States, has issued several recommendations and advisories since the ongoing probe began.

"Our purpose in issuing these recommendations now is to enhance the safety of the travelling public as quickly as possible," said Bouchard, 61, who is retiring after five years as chairman.

The probe is not expected to wrap up before next year.

"It would be nice to see it solved," said Miles Gerety of Connecticut, whose brother Pierce, 56, was on Flight 111. "But

the older I get and the longer it goes on, I don't know what solved is.

"The fact that my brother died in a terrible crash, it makes me concerned about air safety, but it doesn't make me obsessed with it," he said, adding he's still a frequent flier.

Tuesday's wiring recommendation will have a major impact, said Cliff MacKay, president of the Air Transport Association of Canada, representing airlines and flight schools.

"It's going to be very important not just to Canada but to the industry around the world.

"Costs are always an issue, but it's never been something that the industry has flinched at."

Previous safety board recommendations include:

- Inspect cockpit wiring on all MD-11s.
- Give flight recorders independent power sources and the capacity to record up to two hours rather than 30 minutes.
- Reduce or eliminate metallized Mylar blanket insulation, found to be flammable. Mylar is currently being removed from aircraft worldwide at an estimated cost of at least \$1 billion.
- Review firefighting capabilities and improve fire suppression and detection equipment on aircraft.

The painstaking Swissair investigation has so far cost \$52 million, much of it spent lifting more than two million pieces of

wreckage from the ocean floor off Peggy's Cove, N.S.

Pilots aboard the plane reported smoke in the cockpit about 53 minutes after leaving New York en route to Geneva. The plane's electrical systems began failing some 15 minutes later before the jet plunged into the Atlantic Ocean.

Canada's safety board is an independent agency that reports to Parliament. It promotes safety in marine, pipeline, rail, and air travel by investigating accidents to assess causes and contributing factors.

It makes recommendations geared to fix or reduce such problems and makes its findings public.

The Transportation Safety Board of Canada has issued several recommendations and safety advisories since Swissair Flight 111 plunged into the Atlantic Ocean on Sept. 2, 1998, killing all 229 people on board. Their investigation has also led their American counterpart, the National Transportation Safety Board, to recommend new safety regulations:

January 1999: Based on the Canadian board's investigation, the American agency asks the Federal Aviation Administration in the United States to inspect cockpit wiring on all MD-11s.

March 1999: The Canadian board recommends flight recorders have independent power sources and be able to record up to two hours rather than 30 minutes.

August 1999: The Federal Aviation Administration orders metallized Mylar blanket insulation be replaced after it is found

to be flammable. The Canadian board had issued an advisory that Mylar use be reduced or eliminated.

September 1999: The Federal Aviation Administration bans the in-flight entertainment system used on Flight 111, calling it "not compatible with the design concept of the MD-11."

April 2000: Acting on a directive from Canadian investigators, the Federal Aviation Administration orders map-reading lights on MD-11s inspected or shut off. In inspections of about 12 aircraft, flammable Mylar blanket insulation was found pressed against many of the lights and showed signs of heat damage.

April 2000: The Federal Aviation Administration issues eight safety orders concerning MD-11 electrical systems, bringing to over 30 the number of airworthiness directives released since the crash.

December 2000: The Canadian board issues five safety recommendations aimed at detecting and suppressing in-flight fires. Also recommends revising cockpit crew's emergency checklist to save time in event of fire.

Aug. 28, 2001: The Canadian board issues three more safety recommendations designed to stop the spread of fires and to enhance the certification requirements for aircraft electrical wiring.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:11 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: RE: Defence team contact

Dear Mr. Smith

In answer to your question, you may certainly forward the e-mail.

I'm sorry to be so late in responding. As I said before, I'll do my best to review your e-mails and forward relevant material to other TSB staff, but I can't undertake to deal with them promptly. There is just too much information from you and too much other work for me to undertake to do otherwise.
Bill T..

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Mr. Tucker, 10 Sep 01

Thank you for permission to forward copies of our emails during these past few months. I believe this will show the defence team that the TSB is patient, objective, and will listen to reason.

I may have sent too much information for prompt evaluation; my only explanation is that I feel a sense of urgency.

I'm standing by for any queries from your staff. It can't hurt to ask questions, now can it?

Sincerely,

Barry
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
Subject: **Tucker emails**

X-From_: Bill.Tucker@tsb.gc.ca Thu May 24 15:21:34 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <Barry@corazon.com>
Cc: "Delorme, Paulette" <Paulette.Delorme@tsb.gc.ca>
Subject: Air India Flt. 182
Date: Thu, 24 May 2001 18:22:47 -0400

Dear Mr. Smith:

Thank you for your e-mail messages of 2 May and 8 May (sent to Ms. P. Delorme, Office of the Executive Director) concerning the crash of Air India Flight 182 that occurred on 23 June 1985.

First, I must respond that the Transportation Safety Board of Canada (TSB-C) has no mandate to re-open the aviation safety investigation of the AI

Flt.182 occurrence. As you may be aware, the TSB-C was not established until 1990, and the Aviation Occurrence Report you referred to was prepared by the Canadian Aviation Safety Board, the predecessor to the TSB-C. More importantly, in accordance with ICAO Annex 13, the investigation of that accident was led by the Government of India; the CASB report was prepared as input to India's investigation.

That said, we certainly have more than a passing interest in the circumstances of the AI Flt. 182 tragedy. We are interested because of the very nature of our chosen careers. We are interested because quite a few TSB staff were working for the CASB at the time (myself included), and many of that group were involved in the AI Flt.182 investigation. Above all, we are interested because of the enormity of the tragedy, the links to Canada and the fact that there has not yet been closure on this matter - almost 16 years after the event. As you are aware, the RCMP have been conducting a criminal investigation into the circumstances of the crash ever since 1985. In accordance with Canadian law, both the CASB and the TSB-C have provided the RCMP with copies of material from our file - excluding, of course, any

information that is privileged under our Act. The information provided includes material that was produced by John Garstang.

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart Blachford of the RCMP in Vancouver. The RCMP have as strong an interest as anyone in establishing what happened to AI Flight 182. I have also forwarded your report to the Director of Air Investigations, the Investigator-in-Charge of our SWR Flight 111 investigation, and the Director of Engineering for their information.

With respect to the brief message in your second e-mail (of 8 May), there is one point that I must clarify in reply. It is correct that the CASB investigators' report never said it was a bomb that caused the explosion; however, the report also never said that it wasn't a bomb. In fact, to my knowledge, there was nobody on the CASB team who didn't consider a bomb to be the most likely explanation. However, the aviation safety investigation conclusion on that point was, appropriately, left to the Kirpal Commission in India.

Thank you again for your messages.

W.T. (Bill) Tucker
Director General,
Investigation Operations

-----Original Message-----

From: John Barry Smith Eudora
[SMTP:Barry@corazon.com]
Sent: Wednesday, May 02, 2001 11:37 PM
To: paulette.delorme@tsb.gc.ca
Subject: Air India Flight 182 Probable Cause

Transportation Safety Board of Canada

Dear Fellow aircraft accident investigators, 2 May 01

I am an independent investigator concentrating specifically on early model Boeing 747s that suffer inadvertent decompressions in flight. After years of research and analysis, my conclusion is that four fatal Boeing 747 accidents were caused by faulty poly-x wiring shorting on the forward cargo door unlatch motor leading to the rupture of one or both of the midspan latches leading to explosive decompression which resulted in amidships breakup for three of the aircraft and a large hole on the right side just forward of the wing on the remaining aircraft. I refer to Air India Flight 182, Pan Am 103, United Airlines Flight 811, and Trans World Airlines Flight

800. UAL 811 is the aircraft that did not come totally apart and landed with its incontrovertible evidence that matches up with the other three in so many significant ways as to imply they all had the same probable cause for the initial event.

Regarding Air India Flight 182, an accident in which Canadian public safety organizations are intimately involved, I have written a report supporting my findings and have quoted extensively from the Canadian Aviation Occurrence Report of 1986 of the Canadian Aviation Safety Bureau.

Please note that the Canadian aviation accident investigators never said it was a bomb that caused the agreed upon explosion in the forward cargo compartment of AI 182. The Canadian aviation accident investigators were absolutely correct in their conclusions of 1986 and only by subsequent similar accidents is the cause of that unexplained explosion now clear.

I am sending by Word file my Smith AAR for AI 182 for your evaluation. Should you find the wiring/cargo door/explosive decompression explanation a plausible, reasonable, alternative explanation with

precedent
for the destruction of AI 182, then the issue of a clear and present
danger
to the Canadian flying public becomes apparent as the cargo door
wiring in
early model Boeing 747s has not been inspected for the tell tale
cracking
that the polyimide insulation shows before shorting.

I invite your queries to me for further details by phone or
email.
Regardless, a supplemental AAR for AI 182 is probably
warranted since TSB
has never actually given its official opinion regarding one the
most
celebrated of all tragic Canadian aviation accidents, equal to the
Arrow
Gander crash and Swiss Air 111.

Swiss Air 111 showed the vulnerability of widebody
airliners to the
faulty Kapton type wiring insulation which I conclude is the
probable cause
for Air India Flight 182. The 1972 DC-10 event over Windsor,
Ontario, when a
cargo door inadvertently opened, presaged the Paris Turkish
Airlines DC-10
cargo door accident. Therefore, when I say that faulty wiring is
causing
cargo doors to inadvertently rupture open in wide body airliners,
I believe
you will say it's possible but did it happen for AI 182 and ask for
the

evidence. That evidence is presented in my report.

Very Respectfully,

John Barry Smith
Independent Aircraft Accident Investigator
barry@corazon.com
www.corazon. <<http://www.corazon.com/>>
com <<http://www.corazon.com/>>831 659 3552
551 Country Club Drive,
Carmel Valley, CA USA 93924

-----Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Tuesday, May 08, 2001 2:00 PM
To: Trans Safety Board Canada
Subject: Mounties now say 'bomb' in aft of Air India
Flight
182

Yes, the Mounties are saying the 'bomb' was in the Aft
compartment
of Air India Flight 182 and want to put three guys in jail for life
for
putting it there.

Ha!

Can you do something about this nonsense?

Cheers,

John Barry Smith

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Supplemental TSB report for Air India Flight 182

Cc:

Bcc:

X-Attachments: :Master:319840:RCMPblachfor16may01.pdf:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker,

24 May 01

Well, sir, thank you very much for your polite and informative email to me regarding the administrative details of the Air India Flight 182 accident. I do call it an 'accident' and not a 'downing' as the RCMP AITF, specifically Sgt Blachford, calls it.

Sgt. Blachford has been in contact with me and requests a meeting and documents, a suggestion I have accepted with the requirement that a TSB aircraft accident investigator be present to interpret the technical details of an aircraft inflight breakup, an occurrence which a policeman would not be expected to understand. I've attached my most recent letter to the RCMP AITF in text and as a PDF file.

First, I must respond that the Transportation Safety Board of Canada (TSB-C) has no mandate to re-open the aviation safety investigation of the AI Flt.182 occurrence.

Well, not yet. Is it not judicious to be prepared for the trial in February when a TSB official will most certainly be called to the witness stand to present the current Canadian aviation accident experts' opinion about Air India Flight 182 for which two men are on trial for their life's freedoms?

Also, my research and conclusions indicate a present danger to the public safety in known faulty wiring again causing the forward cargo door of early model 747s to open in flight leading to fatalities, just like United Airlines Flight 811. Would it not be prudent to check out that startling claim by an experienced and educated aviation person?

When you say "Re-open" you imply the investigation was closed. My understanding is that the Air India Flight 182 investigation in the AITF has been open and ongoing for about 16 years. I would phrase the suggestion as providing a 'supplemental' report to the existing CASB report although later in this email I justify the suggestion for an entirely new AAR on Air India Flight 182 done by TSB alone.

As you may be aware, the TSB-C was not established until 1990, and the Aviation Occurrence Report you referred to was prepared by the Canadian Aviation Safety Board, the predecessor to the TSB-C. More importantly, in accordance with ICAO Annex 13, the investigation of that accident was led by the Government of India; the CASB report was prepared as input to India's investigation.

As I read the CASB aviation occurrence report, it appears to be

selected portions of the Kirpal inquiry with notable omissions, such as the assumptions of 'twinning' being proof positive of a bomb, and most importantly omitting the conclusion of a 'bomb' although the thought was there in everyone's minds.

The Canadians are to be complimented on resisting the intense political pressure at the time to call the cause of the agreed upon explosion in the forward cargo compartment as a bomb explosion. The UK AAIB representative, Mr. Davis, said the cause was not a bomb. The non aircraft investigator judge said it was a bomb, and the Canadian aircraft accident investigators declined to say one way or the other. Who was correct? Well, after 16 years and several similar accidents, it is now clear to me that the UK and the CASB air accident investigators were most correct.

The CASB were cautious, as all good investigators are, and only concluded that which was supported by real evidence of only an explosion in the forward cargo compartment. Period. That wise conclusion was confirmed years later by the event of United Airlines Flight 811 which refuted all of Judge Kirpal's reasons for grasping for a 'bomb' in the face of contradictory evidence such as the sudden loud sound on the CVR which matched a DC 10 explosive decompression sound and not a bomb sound.

Mr. Tucker, I read a lot of accident reports and the CASB occurrence report of 1986 was meticulous, precise, and cautious. They acted as investigators, not prosecutors. Now is the time to supplement that cautious and later proven to be correct report with an update. The update can be used to rule in or rule out the match to the subsequent event of United Airlines Flight 811 which would indicate a present danger to the flying public and prepare some fellow for the cross examination by the defence of

the accused in the February 2002 trial. After all, it was a plane crash, not a bank robbery, and current Canadian officials who know about plane crashes will be called to explain to the Court and jury just how and why a Boeing 747 came apart in the air so long ago.

Please do not wash your hands of Air India Flight 182. It's not done and gone. Accident investigations are based on precedent. We learn what happened now by what happened before. In one sense, a investigation is never complete because more and more is learned as similar accidents in similar circumstances leaving similar evidence occur allowing a refinement of the probable cause.

That said, we certainly have more than a passing interest in the circumstances of the AI Flt. 182 tragedy. We are interested because of the very nature of our chosen careers.

Too right.

We are interested because quite a few TSB staff were working for the CASB at the time (myself included), and many of that group were involved in the AI Flt.182 investigation. Above all, we are interested because of the enormity of the tragedy, the links to Canada and the fact that there has not yet been closure on this matter - almost 16 years after the event.

Very frustrating, I agree. And the way to resolve that frustration

is to confront the mystery again. There can be closure and satisfactory answers with a new supplemental report on the older one which can now examine the amazing significant similarities with United Airlines Flight 811, Trans World Airlines Flight 800, and Pan Am Flight 103. Of course you are interested. I'm miffed because most of the people I talk to don't even recall the tragic event even though it killed so many, many more than the other three.

United Airlines Flight 811 had an original AAR, 90/01, which was later superceded by an entirely new AAR on the same event, AAR 92/02. There is precedent for TSB to write an entirely new AAR with its own conclusions based upon actual examination of the evidence in videotapes and not rely on the Indian judiciary and their interpretations. The confirming proof exists in the videotapes and high quality 35 MM color photographs of the actual Air India Flight 182 wreckage that can now be matched to United Airlines Flight 811. TSB has access to those films via RCMP and specific expertise to properly evaluate that evidence.

TSB is entitled to conduct its own investigation for its own report and not have to refer to a dissolved agency or a foreign judicial official for opinions about a Canadian aviation accident which is still as potent as ever. AITF is after the 'bombers'; let the TSB go after a mechanical explanation based upon the matching event of United Airlines Flight 811, an event not available to CASB for consideration in 1986 but available to you and TSB now.

The match to United Airlines Flight 811 and the other two make Air India Flight 182 even more of a significant aviation investigation other than a 747 that exploded inflight and was thought to be a bomb but was not, just like Trans World Airlines Flight 800 for 17 months. Other AARs can now be updated and a

current safety problem of wiring can be identified and fixed.

May I digress a moment, Mr. Tucker. The Airbus A380 will hold 650 passengers and it has a fatal design flaw, that of outward opening non plug cargo doors. The small sized balloon of Comet burst at a window, the medium balloon of a DC 10 burst at a cargo door of AA 96, the large balloon of a 747 burst at a cargo door of United Airlines Flight 811, and now the huge balloon of the A380 may burst at the same place. The cargo doors must be designed like the passenger doors; plug type. Now is the time for authority to rule in or rule out my conclusion that forward cargo doors of 747s are rupturing open in flight at one or both of the midspan latches. If confirmed, then the A380 and subsequent airliners can correct this major design flaw which is acknowledged in NTSB AAR 92/02, that of outward opening non plug cargo doors.

And do we not agree that Pan Am Flight 103 does not have closure either? Is that event satisfactorily resolved in your mind? Can you really believe a 20 inch shatter zone on the port side of the nose caused by a 'bomb' can cause the nose of 747 to come off in flight even as we know that United Airlines Flight 811 had a ten foot by 15 foot hole in the nose and the plane stayed aloft?

As you are aware, the RCMP have been conducting a criminal investigation into the circumstances of the crash ever since 1985.

In accordance with Canadian law, both the CASB and the TSB-C have provided the RCMP with copies of material from our file - excluding, of course, any information that is privileged under our Act. The information provided

includes material that was produced by John Garstang.

Ahh, Mr. John Garstang.....He emailed me in 1997 with incorrect information. I replied and he called me on the phone later to correct his email report that the door was recovered intact as, in fact, neither cargo door was recovered. And there was not '...other solid evidence indicating a bomb blast had occurred.' Both his statements are misleading and incorrect. And now, 16 years later, he issues a report from the RCMP stating the explosion was a bomb in the aft cargo compartment, completely contradicting the Kirpal Inquiry and the CASB report with no substantive or new evidence for such a bizarre conclusion. Not only does the evidence conclusively show there was no bomb explosion in the aft cargo compartment, it shows there was no explosion of any sort back there and the area was closely examined for such an event because of JAL 123 and the infamous aft pressure bulkhead crack.

The allusion to gambling by betting money on 'experts' in regard to aviation safety is also distressing. Mr. Garstang's poorly substantiated conclusions carry little weight with me. Compare your email which is polite and informative to his factually incorrect, insulting, and bragging statements below and you will see what I mean.

Date: 27 Feb 1997 15:18:35 +0400

From: Securitas <Securitas@bst-tsb.x400.gc.ca>

To: "P=gc+internet; DDA.TYPE=RFC-822;

DDA.VALUE=barry(a)corazon.com" <barry@corazon.com>

Subject: RE: Crash cause of Air India Flight 182

Importance: normal

Autoforwarded: FALSE

Priority: normal

Thank you for your report expressing concern about the opening of cargo doors on B-747 aircraft. During any aircraft crash, investigators examine every piece of evidence, in order to determine cause. In the case of the Air India flight, the cargo door was in fact retrieved from the bottom of the ocean by the investigators. The latches were still in place, and there was no evidence on the edges of the door to indicate in-flight opening of that door.

On the other hand, there was other solid evidence indicating a bomb blast had occurred. Aircraft accident investigators are trained people. Anybody can say anything they want on the Internet. Put your money on the experts; you will win more often.

From: P=gc+internet; DDA.TYPE=RFC-822;
DDA.VALUE=barry(a)corazon.com
To: Securitas
Subject: Crash cause of Air India Flight 182
Date: Saturday, August 31, 1996 9:50PM
<<File Attachment: BDY3.P00>>
DATE: Aug 31 17:50:40 1996 GMT
IPMessageID: 32287B6A.1295(a)corazon.com
FROM: [P=gc+internet; DDA.TYPE=RFC-822;
DDA.VALUE=barry(a)corazon.com]

TO: Securitas
SUBJECT: Crash cause of Air India Flight 182
IMPORTANCE: normal
AUTO FORWARDED: FALSE
PRIORITY:
ATTACHMENTS: c:\BDY3.P00

--

Dear Safety Person, The cause of the Air India flight 182 crash of a Boeing 747-237B from Toronto to London in 1985 was an inadvertent opened forward cargo door which then tore of skin which then tore of nose to destruction of aircraft. Not a bomb. My safety concern to TSB Securitas is that it can happen again. To properly assess the risk to Canadian air passengers, visit the web site at <http://www.corazon.com> for a fully documented presentation of the issue of inadvertently opening cargo doors. Open doors causing destruction in early model Boeing 747s has happened before, it has happened now, and it may happen again. Please assess door opening claim by visiting web site and evaluating documents supporting hypothesis. John Barry Smith

So, Mr. Tucker, you can see I have been at this for years. Steady and solid; the facts are there; and all the while the evidence corroborates the shorted wiring/cargo door rupture/explosive

decompression/inflight breakup explanation for Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. I plead with you to be able to meet and present my evidence to you and other Canadian aircraft accident investigators who respect research and evidence, who are not politically involved, and are not impressed by media hype of exciting myths about conspiracy bombers. There are no conspiracies, only physical laws of nature obeyed in twisted metal and sounds on data recorders. I rely on the reality of evidence for my conclusions not fearful fantasies of evil foreigners plotting to kill.

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart Blachford of the RCMP in Vancouver. The RCMP have as strong an interest as anyone in establishing what happened to AI Flight 182.

You may be right. They seem to have strong bias towards bomb and bombers, but you never know, they may have a real investigator who will consider any explanation that makes sense, has official documentation for support, and has an irrefutable precedent, United Airlines Flight 811.

I have also forwarded your report to the Director of Air Investigations,

Thank you.

the

Investigator-in-Charge of our SWR Flight 111 investigation,

Thank you. I followed closely that investigation and found it to be patient, professional, and thorough.

and the Director
of Engineering for their information.

Thank you.

I am of course available at any time to answer their queries as they arise. The enormity of the implications is breathtaking, but true. I hope they can get past the bias of years of media bomb bomb bomb and look at my research of matching evidence to confirmed mechanical events in United Airlines Flight 811 and Trans World Airlines Flight 800.

With respect to the brief message in your second e-mail (of 8 May), there is one point that I must clarify in reply. It is correct that the CASB investigators' report never said it was a bomb that caused the explosion; however, the report also never said that it wasn't a bomb.

Yes, is the glass half full or half empty. But imagine the pressure on CASB to state it was a bomb. To not conclude it was a bomb shows that they did not just omit it, but really rejected it as a realistic explanation. Even now the RCMP is under intense pressure to allay the public fears and desire for revenge by prosecuting two foreign looking fellows for planting a bomb based on external circumstantial conspiracy evidence, just like

Pan Am Flight 103.

In fact, to my knowledge, there was nobody on the CASB team who didn't consider a bomb to be the most likely explanation.

I understand the 1986 leaning towards bomb for the mystery cause of the explosion in the forward cargo compartment which CASB and Kirpal did agree on; the plane did come apart inflight. This is agreed upon and undeniable, so an explanation had to exist and a bomb explosion could cause that breakup, so, without a reasonable plausible alternative, what to say? Boom, bomb. For CASB to be cautious and reject the hysteria and just say explosion in the forward cargo compartment based on evidence only speaks highly of the mature wisdom of those officials at the time and now they are vindicated by events of a few years later in United Airlines Flight 811 which looked like a bomb, felt like a bomb, called a bomb by the crew, and yet, was not a bomb but an electrical problem with a cargo door.

If the CASB of 1986 had NTSB AAR 92/02 of United Airlines Flight 811 of 1992 to review, with its many significant matching similarities to Air India Flight 182, they would have had that reasonable plausible alternative to bomb and could have countered the 'bomb' explanation espoused by the politically minded Judge Kirpal. It's understandable that in 1986 a bomb explosion could have been the cause of the explosion in the forward cargo compartment since there was no reasonable alternative. There is now and I invite/urge TSB to now use that luxury of hindsight and precedent to issue a supplemental AAR for Air India Flight 182. My Smith AAR report lays out the evidence, analysis, and conclusions to make the match and

declare Air India Flight 182 to have as a probable cause the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation. Please evaluate the explanation on its own merits by experienced TSB investigators. I have high hopes that the gentlemen you forwarded my report to will do just that. Please forward this email to them should you believe it may help in their evaluations.

However, the aviation safety investigation conclusion on that point was, appropriately, left to the Kirpal Commission in India.

Well, Judge Kirpal was not an aircraft accident investigator nor was he a policeman involved with terrorist bombings. He could have relied on his Indian chief aircraft accident investigator, Mr. Khola, for information on why planes crash, and he could have relied on the Indian police force for evidence of bombings. but he did neither. He did the best he could trying to placate many pressures. His inadequate answers are shown by the lack of closure in the case. But again, in 1986 there was no precedent to rely on as United Airlines Flight 811 was about four years in the future. Judge Kirpal did the best he could under the circumstances, just as did CASB and others involved in the case.

The wisest probable cause conclusion based on the best evidence was the CASB one, not surprisingly by professional aircraft accident investigators. Through similar subsequent accidents, that cautious and prudent conclusion can now be refined to satisfactorily explain the cause of the agreed upon explosion in the forward cargo compartment of Air India Flight 182, and it's not a bomb explosion but explosive decompression probably caused by faulty wiring shorting on a door unlatch motor.

AA Flight 96, a DC 10 over Windsor Ontario, in 1972 which had a cargo door inadvertently open in flight, and Swiss Air 111 are two accidents which are relevant to Air India Flight 182 and are well known to CASB and TSB officials. I know that when I say an inadvertently opened cargo door in flight in a wide body airliner is potentially catastrophic and that Kaptonized type Poly X insulation wiring in a wide body airliner is also potentially catastrophic by shorting, you will not look at me in derision but might say, "Could be, Smith, where's your evidence? Show me what you have. And make it snappy."

I have it, sir; please let me present it to you in depth. Endure the impatience and go through it with me, piece by piece, foddled engine by foddled engine, CVR by CVR, FDR by FDR, and leading edge by leading edge. I believe I may persuade you a supplemental TSB investigation into Air India Flight 182 is warranted based upon my presentation of my years of research, analysis, and conclusions based upon actual AARs of similar events and similar facts, data, and evidence. There will be no conspiracy nonsense but just airplanes and more airplanes.

I sense in you, Mr. Tucker, that you are walking a line of being professionally correct as an administrator in your dealings with a member of the public and yet also intrigued as an investigator by the raw data I have presented to you that may indicate that Air India Flight 182 was in fact not a bomb explosion but a mechanical event which has happened before and can happen again. The implications are that a present danger may exist and thus continued discussion is warranted.

Let us have those discussions.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Background:

From Sergeant Blachford, 7 May 2001

"As per your email of April 10th, 2001 you advised you would be contacting me the week of April 16-20th, 2001 and that you would have the requested data for me. Could you please advise when I might receive that data. Thank you and I look forward to meeting you."

For Sergeant Blachford AITF:

Dear Sergeant Blachford, 10 April 2001

Thank you Sergeant Blachford for your recent letter to me of 28 Mar, 2001, file number 85.3196. You stated that prior to our meeting I should send 'as much detail as possible' 'which reflects that faulty wiring on Air India Flight 182 was the cause

of the 'downing". I am preparing that data now for your review. I will be in

Vancouver all next week (the week of 16-20 April) and may be in position to hand

carry it to your 5255 Heather St. address.

Dear Sergeant Blachford, 16 May 2001,

Thank you for your letter of 7 May 2001, file number 85-3196, to which I reply:

To be picky, which is what aircraft accident investigators do, and please don't take this personally,

I did say, "may be in a position to hand carry it to....". I later determined that I was not in a position to hand carry it to you.

In your previous letter, you made the condition that before a meeting you must first receive my research and analysis. I later believed that my research and analysis would not receive the consideration they deserve.

And since I did not receive any acknowledgement from you of my 10 April 2001 email until now, a month later, no rendezvous was set up between us for a meeting in April.

So, you see, we are off on the bad foot of misunderstanding already and that is not conducive to a proper investigation/interview/interrogation of a potential witness with a high likelihood of productive information being gained.

Maybe we can start again:

Smith/Blachford AITF letter 16 May 01

1

I have spent years in researching and analyzing explosive decompression accidents in early model

Boeing 747s. Air India Flight 182 is one of those accidents. My

conclusion, amply supported by official government documents, is that Air India Flight 182 did in fact suffer an explosion in the forward cargo compartment which led to the inflight breakup, as stated in conclusions by the 1986 Canadian Aviation Safety Board Aviation Occurrence Report. The Canadian Aviation Safety Board respectfully submits as follows:

4.1 Cause-Related Findings

1. At 0714 GMT, 23 June 1985, and without warning, Air India Flight 182

was subjected to a sudden event at an altitude of 31,000 feet resulting in its crash into the sea and the death of all on board.

2. The forward and aft cargo compartments ruptured before water impact.

3. The section aft of the wings of the aircraft separated from the forward portion before water impact.

4. There is no evidence to indicate that structural failure of the aircraft was the lead event in this occurrence.

5. There is considerable circumstantial and other evidence to indicate that the initial event was an explosion occurring in the forward cargo compartment. This evidence is not conclusive. However, the evidence does not support any other conclusion.

Based upon my further research, again supported by various government aircraft accident reports (AAR), the explanation for that explosion is not that of a bomb but of an inadvertently ruptured

open, at one or both of the midspan latches, forward cargo door caused by the known faulty Kapton type wiring shorting on the door unlatch motor which caused the explosive decompression which led to the inflight breakup. There is an irrefutable precedent for my conclusions of another early model Boeing 747 involved in the similar type event leaving similar type evidence, United Airlines Flight 811, a precedent not available at the time for the Canadian investigators to consider since it happened years later.

My research, analysis, and conclusions are available in a 117 page document, 'Smith AAR on Air India Flight 182,' with 120 pages of appendices. I can provide that document to you for your evaluation.

You asked to be advised when you might receive that data and you look forward to meeting me:

You may receive that data when we meet. I also look forward to meeting you. Let us now arrange the details.

I suggest my home in Carmel Valley, California, since all my computer data and research materials are located here as well as solving the family problem of my wife working as a Registered Nurse and I'm the parent taking care of our daughter before and after school hours. For me to go back to Vancouver would be a hardship for the Smith family. I understand the AITF is flying to England and India interviewing witnesses so you're welcome down here and fully justified to obtain information from someone who has been working five years on Air India Flight 182 details.

I suggest a time at your convenience and the sooner the better because, as a consequence of my research, the implication is that a clear and present danger exists to the flying public in faulty wiring again causing a cargo door to open in flight causing fatalities in an early model Boeing 747.

The persons to be included in the meeting should consist of you (RCMP AITF), me (independent aircraft accident investigator), and a Transportation Safety Board of Canada aircraft accident

Smith/Blachford AITF letter 16 May 01

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investigator (TSB). I really must insist on this, as my analysis is very technical and detailed and the AITF should have a neutral, objective, aviation expert present to validate or refute my claims to

you. Your trip will be productive when you have an official expert at hand you can trust to

immediately advise you on the spot if what I say technically is nonsense or correct and thus worthy of further examination by the AITF.

I invite John Garstang, of course; however, since he has been seconded to the RCMP since 1988,

he is hardly an objective observer and thus the TSB official is required. I suggest Mr. Vic Gerden

of TSB since he did such an excellent investigation of the Swiss Air 111 accident. A local

Vancouver TSB official would also be satisfactory. If you wish to document the meeting, I suggest

Paul Marquis, Editor, Aviation Safety Letter, Transport Canada, another Canadian government

official who understands why airplanes crash.

I will be referring to the AA Flight 96 DC-10 accident over

Windsor, Ontario, Canada, in 1972 and Swiss Air 111 accident near Peggy's Cove, Canada; two accidents the TSB will be well aware of and which support my shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182. The TSB does not scoff at the suggestion that faulty wiring or an inadvertently opened cargo door on wide body airliners could have occurred in Air India Flight 182 because they know those causes have happened before and could happen again. They will know which questions to ask of me to rule in or rule out the explanation. RCMP and/or AITF understands criminal actions in terrorist bombings and conspiracies; however, the wiring/cargo door/explosive decompression is a non-criminal mechanical event in a plane crash. TSB participation is essential when talking about why the Boeing 747 called Air India Flight 182 came apart in the air. The following is very important: The Canadian aviation authorities were absolutely correct in their conclusions of 1986. Subsequent similar airplane crashes such as United Airlines Flight 811 now allow TSB in 2001 to supplement the earlier conclusions with a clearer explanation of the explosion that caused Air India Flight 182 to breakup in flight amidships. The reason the RCMP and the AITF took so long to make accusations against persons is that there were no criminals to catch. If Air India Flight 182 had been a bombing, I believe the RCMP would have caught the perpetrators immediately and I would hope they would have been

punished to the fullest extent of the law, and it's too bad Canada does not have the death penalty. Let me digress a moment in investigative philosophy: The RCMP has a mandate which is that of an investigative body which conducts interviews, examines evidence, and makes conclusions which are then presented to the Crown for possible prosecution. The prosecutors and the defence attorney then get together in an adversarial relationship during a trial with judge and jury. That is the way it is supposed to work and when it does work that way, much success is had.

However, I have noticed in the past few years that the investigative agencies involved with airplane crashes, specifically, the RCMP, FBI, NTSB, have become prosecutors pressing forward their own case only and omitting contrary evidence which might contradict their opinion. The agencies have become political, which is to say, giving scientific conclusions which please the political appointees of the moment who reflect the popular will of the moment.

The people of Canada believe a bomb blew up Air India Flight 182 and killed 329 men women and children. The people assume a bomb had to be put there by someone and they want that person or persons punished. That is the political conclusion about the probable cause for the Air India Flight 182 tragedy.

Smith/Blachford AITF letter 16 May 01

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If the RCMP and the AITF are conducting the investigation with the bombing conclusion already

made and are now looking for evidence to support that conclusion, I am not the person to talk to because my evidence refutes that conspiracy conclusion and gives a mechanical alternative explanation with precedent that shows that there was no bomb, and thus no criminal, and thus no punishment to be meted out to satisfy the desires of the grieving.

In lieu of the bombing explanation for the explosion in Air India Flight 182, I offer a plausible, reasonable, mechanical explanation with precedent: The shorted wiring/cargo door rupture/explosive decompression/inflight breakup sequence of events as modeled by United Airlines Flight 811.

There are no conspiracies by groups involved with Air India Flight 182 such as Boeing, NTSB, TSB, AAIB, Air India, or the RCMP. Everyone is acting in their own perceived best interest. I am not associated with any of those groups and am motivated by my near death haunting experience of surviving a sudden night fatal jet airplane crash in which my pilot died.

The recent meeting led by the RCMP in which lewd telephone calls are alleged to have been made by the accused is unworthy of an honorable investigation into an Air India airplane crash but indicative of a prosecution tactic to discredit the character of a person on trial to the jury.

Mr. Dave Cross and Mr. Ian Donaldson of the Defence team for the accused, Mr. Ripudamen

Malik, suggested to me that the RCMP and the AITF are not interested in what happened to Air

India Flight 182 but are only interested in what the defence might

use in trial so that the prosecutors would have time to counter the conclusions, and not to confirm them or rule them out by further investigation. The attorneys may be right. Their point of view is that the RCMP is an adversary whereas I might see the RCMP/AITF/TSB as allies once the authorities understood my explanation for Air India Flight 182. (Although I had discussions with the Defence team attorneys, there was a clear understanding that I am an independent person who is free to act as I feel appropriate.)

However, based upon your most recent letter, Sergeant Blachford, I have hopes that quite possibly there is a real investigator amongst you. There may very well be an investigator who does objective research, searched the internet, reviewed my web site at www.corazon.com, read my emails to RCMP, noticed the similarities of Air India Flight 182 to an incontrovertible similar accident, United Airlines Flight 811, and decided to pursue the investigation further to rule in or rule out the intriguing possibility that Air India Flight 182 was a mechanical accident and not a heinous crime.

The criminal analogy is that of a serial killer in many jurisdictions, over many years, with random victims, but who always follows the same method of operation leaving a matching clue which links him to the crimes.

For the wiring/cargo door/explosive decompression explanation for four early model Boeing 747 fatal accidents over eleven years, it's the sudden loud sound on the CVR immediately followed by

the abrupt power cut to the FDRs. That sound, Sergeant Blachford, is not that of a bomb, but of an explosive decompression. The killer is wiring; the inadvertent accomplice/bystander is the outward opening non-plug forward cargo door. Someone at AITF, and it may very well be you, Sergeant Blachford, decided to follow up on the previous inquiry you made to me. Someone may be willing to sit down with me accompanied by an objective, neutral, government expert about airplane crashes, and patiently go through the matching evidence of Air India Flight 182 to other similar accidents which left much similar evidence that shows that the similar probable cause to be the initial event for all. The potential confirmation of a present danger to the flying public demands it. Smith/Blachford AITF letter 16 May 01

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So, on that hope. I have reconsidered and agree to provide you with my analysis and conclusions, and meet with at least you and a TSB official in my home to forthrightly and timely answer all your questions regarding my claim to you that Air India Flight 182 was not a bomb event but a mechanical accident with precedent coupled with the urgent implication that a present danger to public safety exists for the Canadian flying public.

To summarize: Meeting:

Documents to be made available: Smith AAR and appendices, and other documents as requested.

Location: 551 Country Club Drive, Carmel Valley, CA, USA

Time: At your convenience and I urge haste.

Participants: Smith, Blachford, Garstang, TSB (Gerden)

Transport Canada (Marquis) and others
as agreed upon.

Agenda: Clarification of the shorted wiring/cargo door rupture/
explosive decompression/inflight
breakup explanation for Air India Flight 182.

That is my message: I know you are interested in the messenger:

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135
certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650
hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

I am not an anonymous caller after midnight with whispered
unsubstantiated accusations about
minority groups.

I am a long time member of my community identifying myself
fully, giving ample communication
channels, and inviting you into my home as well as offering
documentation from authoritative
sources for all my technical conclusions.

If supported by evidence, is the AITF able to deviate from the
conspiracy course at this late stage
and conclude there was no bomb, no criminals involved? Is the
AITF willing to offer an entirely

different explanation for Air India Flight 182 other than the one promoted by the RCMP but consistent with CASB of 15 years ago? Is the AITF willing to accept the advice, counsel, and assistance from a fellow government agency, TSB, regarding this airplane crash?

I well understand the political difficulties involved and the consequences world wide of such a revelation. But, honorable investigators rely on the facts, data, and evidence to reach reasoned conclusions and let the chips fall where they may. Hindsight is valuable and available to us all when we examine subsequent similar airplane crashes. I assert that beyond a reasonable doubt, those realities support the probable cause for Air India Flight 182 as the shorted wiring/cargo door

Smith/Blachford AITF letter 16 May 01

5

rupture/explosive decompression/inflight breakup explanation and refute a bomb explosion.

When you read my lengthy analysis and interview me, you too will be persuaded, if you have an open mind. The AITF can yet crack this case.

Hope springs eternal.

Cheers,

Barry

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,

Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Smith/Blachford AITF letter 16 May 01

6

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Smith AAR Appendices A, B, C, D, E
Cc:
Bcc:
X-Attachments: :Master:319840:Appendix A (WP).pdf: :Master:
319840:Appendix B (WP).pdf: :Master:319840:Appendix C
(WP).pdf: :Master:319840:Appendix D (WP).pdf: :Master:
319840:Appendix E (WP).pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as PDF files are appendices A, B, C, D, E to the Smith
AAR on AI 182.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
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barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>
Subject: Smith AAR Appendix I
Cc:
Bcc:
X-Attachments: :Master:319840:Appendix I (WP).pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as a PDF file is appendix I to the Smith AAR on AI 182.

Sincerely,
Barry

John Barry Smith
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To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Smith AAR Appendices F, G, H, J,
Cc:
Bcc:
X-Attachments: :Master:319840:Appendix F (WP).pdf: :Master:
319840:Appendix G (WP).pdf: :Master:319840:Appendix H
(WP).pdf: :Master:319840:Appendix J Bruntingthorpe.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as PDF files are appendices F, G, H, J, to the Smith
AAR on AI 182.

Sincerely,
Barry
John Barry Smith
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Carmel Valley, CA 93924
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barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Official AI 182 Reports in PDF
Cc:
Bcc:
X-Attachments: :Master:320077:182.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as PDF file is the CASB and Kirpal Inquiry reports.

Sincerely,
Barry
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barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: UAL 811 NTSB AAR in PDF
Cc:
Bcc:
X-Attachments: :Master:320077:81192/02.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Attached as a PDF file is the NTSB AAR 92/02 for United
Airlines Flight 811.

Sincerely,
Barry

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Carmel Valley, CA 93924
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barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Supplemental thoughts
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 May 01

Please permit me to amplify my previous email with additional thoughts:

The current status of opinion for the probable cause of the inflight breakup of Air India Flight 182 in which 329 died is:

The CASB aircraft accident investigators who state it was an explosion of unstated cause in the forward cargo compartment and not the aft cargo compartment....which conflicts with.....

The Indian Judicial authority who states it was a bomb explosion in the forward cargo compartment and not the aft cargo compartment.....which conflicts with...

The AAIB representative who said it was an explosive decompression explosion in the forward cargo compartment and not the aft cargo compartment the cause of which was yet to be determined.....which conflicts with.....

The RCMP AITF police authority who state it was a bomb explosion in the aft cargo compartment and not the forward cargo compartment....which conflicts with....

This independent aircraft accident investigator who states it was an explosion in the forward cargo compartment and not the aft cargo compartment the cause of which is summed by the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation....which conflicts with....

The TSB who remains....silent...reluctant....on the bench...

Mr. Tucker, please, stand up, come forward, put yourself in play and assert your power and authority to sort out this contradictory cacophony of conflicting opinions about a momentous Canadian aviation event.

Your opinion carries the most weight amongst us; it must be heard. What is it? What happened to Air India Flight 182? Why? How?

Any report that exists can be supplemented, or revised, or updated, or upgraded. The Canadian Aviation Safety Board Aviation Occurrence Report regarding Air India Flight 182 can certainly be called Version 1.0 and a Version 1.1 can be an upgrade, to use a computer software analogy.

I personally recommend starting with a clean sheet of paper and treat the accident as you would as if it happened yesterday. Because of the peculiar nature of the accident with most of the wreckage still on the bottom of the ocean and the suddenness in which the event occurred, the evidence upon which the original investigators relied upon to make their conclusions and findings

still exists in a hangar in Bombay and in dozens of videotapes and hundreds of high quality 35 MM color photographs now held by the Gendarmerie royale du Canada.

With the benefit and luxury of hindsight, subsequent similar accidents in similar aircraft under similar circumstances leaving similar evidence can now be evaluated for comparison.

Your TSB report will be the most up to date, the most comprehensive, and the most accurate. It is vitally needed, Mr. Tucker. Your expert opinion is needed by the Crown, by the Defence, by the RCMP AITF, by the manufacturer, by the airlines, and by the worldwide flying public in early model Boeing 747s, of which approximately 1100 are still in service.

To assist, I am sending the PDF of AAR of United Airlines Flight 811 and Air India Flight 182 Kirpal and CASB report. The electronic versions are very valuable for the ability to search quickly through for keywords. Trans World Airlines Flight 800 NTSB AAR 00/03 and Pan Am Flight 103 AAIB 2/90 are very large and can be sent to you if you wish and are available for download at <http://www.nts.gov> and <http://www.aaib.detr.gov.uk/index/index.htm>

I am also sending the Appendices to the Smith AAR for AI 182 in PDF, in case you do not have them; Appendix I is a personal, informal supplement.

These additional research materials may assist your staff which have received my AAR from you for their information. I am available day or night on any day to answer questions they may have and invite a meeting between us at your convenience.

The videotapes and color photographs of the 182 wreckage will

be particularly interesting as there now exists much other real twisted metal to compare with; metal which now resides in hangars in Farnborough and Virginia in addition to Bombay. It's easier to find something if one knows what to look for; in this case it will be matching evidence in and around the forward cargo door to possibly match with Pan Am Flight 103, Trans World Airlines Flight 800, and United Airlines Flight 811, the subsequent incontrovertible accident with its many significant matches:

From Smith AAR:

7.18 Summary of matching evidence between Air India Flight 182 and United Airlines Flight 811 specifically:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. Section 41 retrofit not done
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J . Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud

- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched
- AD. Airworthiness Directive 88-12-04 not

implemented (stronger lock sectors)
AE. Outwardly peeled skin on upper forward fuselage
AF. Rectangular shape of shattered area around forward cargo door
AG. Forward cargo door fractured in two longitudinally
AH. Status of aft cargo door as latched
AI. Passengers suffered decompression type injuries
AJ. At least nine missing and never recovered passenger bodies
AK. Initial official determination of probable cause as bomb explosion.
AL. Initial official determination modified from bomb explosion
AM. Structural failure considered for probable cause
AN. Inadvertently opened forward cargo door considered for probable cause
AO. Takeoff after sunset on fatal flight
AP. Takeoff after scheduled takeoff time on fatal flight
Smith AAR AI 182

The data from the CVR and FDR (the only direct evidence of the events of AI 182) still exist and are as accurate as ever. There now exists similar CVR and FDR tapes to compare with.

Dr. Hill, the pathologist from AAIB in Air India Flight 182 is alive, well, and still practicing in England. I spoke with him by telephone a few months ago and he is as professional as ever. His phone number is 207 407 0378.

I implore you, sir, please, become involved, this is, after all is said and done, a fatal aircraft accident that originated in Canada and killed Canadians. Take a crack at it.

Sincerely,

Barry
John Barry Smith
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barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: PDF of Smith AAR for AI 182
Cc:
Bcc:
X-Attachments: :Master:331906:SmithReportfinalfor.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 30 May 01

Attached is the Smith AAR for AI 182 dated 1 May 01 in PDF and supercedes the earlier Word file which had formatting problems. PDF allows the color photographs to be where they should and keeps the indents in proper order.

Sincerely,

Barry
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barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Sgt Blachford contacted me
Cc:
Bcc:
X-Attachments:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 30 May 01

Sgt Blachford wrote me a letter received today. He confirms he has received my Smith AAR from you, will 'review and digest the contents of this report', will not be available for a meeting with me until mid August, and will be in touch with me in the 'near future'.

My reply to him below.

I have created my original Word file Smith AAR into a PDF file which incorporated the Garstang report of 16 March 01 and an additional appendix which included the Bruntingthorpe event. I trust this is the one you sent to RCMP and your staff.

Anyway, I will send the PDF of my updated report via separate email and will send by snail mail a hard copy of the updated AAR and the appendices to the Head Office in Hull, Quebec, Place de Centre, 4th floor, 200 Promenade du Portage, K1A 1K8, address. If you are located elsewhere, please inform me and I'll send it there.

Sincerely,
Barry

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www.corazon.com
barry@corazon.com

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Dear Sergeant Blachford,
30 May 2001

Thank you for your letter of 24 May 2001, file number 85-3196, to which I reply:

I'm glad that Mr. Tucker of TSB has forwarded my Smith AAR for AI 182 to you. That means that technical aircraft questions can be answered by TSB or me. I shall send the attachments/appendices to you by snail mail to the Heather Street address as well as a hard copy of the actual AAR.

I ask that you take note of Appendix J which is about the Bruntingthorpe bombing of a Boeing 747. Note the photograph that shows a real bomb going off in a real Boeing 747 leaving real evidence. Then note the photograph in my AAR of UAL 811 and the huge hole on the starboard side of the nose which occurs when a real electrical problem causes a real large door to inadvertently open in flight on a real Boeing 747 leaving much real evidence.

Then compare AI 182 to both of those real, incontrovertible and indisputably explained events and you will clearly see that the real bombing evidence of Bruntingthorpe is absent in AI 182 and the real explosive decompression evidence from the ruptured open cargo door of UAL 811 is present in AI 182.

There are actually thousands of pages of accident reports and public docket information on hard copy, electronic memory, and CDs that are relevant to AI 182 and are on file here with me. All four accidents are controversial and have generated much official investigation and reports. I do not refer much to media speculation and rely on official reports for support of my claims.

I appreciate your intent to fully study the Smith AAR as it is dense and full of facts and documentation. At any time please call for any clarifications via email or telephone.

Mid August is fine for a meeting or sooner at your convenience

and I have to add the situation is urgent from a public safety point of view.

I look forward to our meeting in the future. If I call you Sergeant, you might call me Major as I was in the Army or I can call you Bart and you can call me Barry.

Cheers,

Barry

John Barry Smith
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barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: So true...
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Mr. Tucker, 14 June 01

This article below about wiring is so true and supports my shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182.

Also, this is the 34th anniversary night of my ejection from my on fire suddenly jet airplane during training for carrier landings which killed my pilot. This accident is the impetus for my continuing interest in aviation safety and my efforts to prevent what happened to me from happening to others.

May I enquire, sir, as to the progress of my Smith AAR on Air India Flight 182 which you submitted to RCMP, DAI, IcC of SWR 111, and DE for their information? The implications of my report show a present danger to the flying public in faulty wiring causing forward cargo doors to inadvertently open in early model Boeing 747s, in addition to the already known and reported wiring caused fires in the forward cargo compartment.

Mr. Tucker, I am always ready to be interviewed/queried as to the details of my explanation and welcome correspondence.

Sincerely,
Barry

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www.corazon.com
barry@corazon.com

In view of the foregoing, I forwarded a copy of your report to Sgt. Bart Blachford of the RCMP in Vancouver. The RCMP have as

strong an interest as anyone in establishing what happened to AI Flight 182. I have also forwarded your report to the Director of Air Investigations, the Investigator-in-Charge of our SWR Flight 111 investigation, and the Director of Engineering for their information.

The Canadian Transportation Safety Board (TSB), which is now investigating the Swissair crash, and other countries' aviation agencies also received the Danish government accident report but made no recommendations related to Mylar.

TSB spokesman Jim Harris says the agency can't make recommendations based on another country's investigation. He says the TSB investigates accidents and is not a regulatory body like the FAA in the USA and its Canadian counterpart, Transport Canada.

U.S. knew of wiring flaws years before TWA crash 1993 jet fire raised issues, but only after 2 crashes killed 459 did FAA act

By Gary Stoller

USA TODAY

Smoke and a burning electrical smell seeped into the passenger cabin of an arriving SAS jet as it taxied to a terminal in Copenhagen, Denmark. All 110 passengers scrambled out of the plane safely before a raging fire consumed much of the fuselage. For 8 years, that 1993 incident hasn't been reported in U.S. newspapers, although the U.S. government was involved in the accident investigation.

Now USA TODAY has obtained the Danish government's 72-page accident report, and it reveals that:

- * The fire on the SAS McDonnell Douglas MD-87 jet may have been a precursor of two deadly North American crashes -- TWA Flight 800 in 1996 and Swissair Flight 111 in 1998 -- in which investigators believe wiring problems and flammable cabin insulation may have played a role.

- * Two U.S. agencies involved in aviation safety -- the National Transportation Safety Board (NTSB) and the Federal Aviation Administration (FAA) -- assisted the SAS investigation and were aware of wiring and cabin insulation problems years before the North American accidents. Since those accidents, the FAA has issued a series of safety orders regarding inspections and modifications to wiring and the same type of cabin insulation.

- * A type of wire on more than half of the airline jets flying today can be very dangerous when it fails.

A fierce fire

The SAS accident, which occurred on a flight from Barcelona, was caused by electrical wire that short-circuited, igniting flammable cabin insulation. "Continued arcing and sparking resulted in ignition of the cabin sidewall insulation material, which eventually developed into a fierce, uncontrollable fire," Denmark's Aircraft Accident Investigation Board (AAIB) wrote in its 1996 report.

The AAIB investigation found "clearly that the primary ignition

source was that two wires, carrying an electrical load of 28-volt AC and 115-volt AC, respectively, became pinched between the aircraft structure and the recirculation fan duct."

The pinching caused the wires' outer insulation to chafe, exposing their metal conductors, the AAIB says. The bare wires touched one another and an adjacent piece of metal, leading to a short-circuit.

Three years after the SAS fire, NTSB investigators headed to the Atlantic Ocean off Long Island to determine what caused the center wing fuel tank of a TWA Boeing 747 jet to explode, killing all 230 aboard. The NTSB didn't determine a probable cause but said last year that the most likely source of ignition was electrical wiring that short-circuited.

In September 1998, more than 2 years after the Danish report was written -- a high-temperature fire ignited before Swissair Flight 111 crashed near Nova Scotia, killing all 229 people aboard. Canadian investigators, who are still investigating the accident and haven't yet determined a cause, say they found short-circuited wires and burned Mylar cabin insulation on the McDonnell Douglas MD-11 jet.

The Danish accident report reveals that the two wires that short-circuited on the SAS MD-87 had been installed between, and ignited, layers of Mylar insulation.

FAA conducted tests

As part of the investigation, the FAA performed fire tests on materials removed from the jet, according to a 1994 FAA letter in the Danish report.

The tests, conducted at FAA facilities in Atlantic City, N.J., showed that Mylar insulation failed the FAA's flammability requirements and could ignite from short-circuited wiring. Despite those tests, the FAA proposed no regulations to remove Mylar from planes or ban it from new aircraft until after the

Swissair crash. In August 1999, the agency ordered airlines to remove Mylar from MD-11 and MD-80 series jets within 5 years.

When asked about the Danish accident report showing the FAA tested Mylar years earlier, FAA spokeswoman Alison Duquette said the agency accelerated Mylar-related research after the Swissair accident.

"Based on our new test that we developed, we found that Mylar does not meet an acceptable level of safety," she says.

Ed Block, a private expert who inspected aircraft wiring for an FAA subcommittee formed after the TWA accident, says that the FAA should have taken immediate action when it learned about the dangers of Mylar during the Danish accident investigation.

NTSB's participation

The NTSB, which assisted the Danish government in the SAS investigation, also was aware of the dangers of Mylar but made no call to have it removed.

"There are occasions when information developed in foreign investigations leads to Safety Board recommendations," says NTSB spokesman Ted Lopatkiewicz in a written statement. "No NTSB recommendations were issued as a result of the Danish investigation." The board refused further comment on the SAS accident report.

The Canadian Transportation Safety Board (TSB), which is now investigating the Swissair crash, and other countries' aviation agencies also received the Danish government accident report but made no recommendations related to Mylar.

TSB spokesman Jim Harris says the agency can't make recommendations based on another country's investigation. He says the TSB investigates accidents and is not a regulatory body like the FAA in the USA and its Canadian counterpart, Transport Canada.

"Sadly, these agencies are all missing in action," Block says. "They're saying they don't care about the people in their country flying on these planes."

Peter Thulesen, the head of the Danish accident investigation board, declined to be interviewed or to answer written questions about the type of wiring that short-circuited on the SAS jet.

The FAA's letter in the Danish accident report, however, reveals that the wire type was polyimide, which is often called Kapton. Boeing, which acquired McDonnell Douglas after the SAS plane was built, says Kapton is the general-purpose, or most commonly used, wire on MD-87 aircraft.

It is also the type that runs through most Boeing and Airbus jets, including the Swissair MD-11 that crashed. Short-circuited Kapton wires were found by Canadian investigators in their probe of that accident.

Cracked wire's dangers

U.S. Navy and other electrical engineering studies have shown that a crack exposing a Kapton wire's metal conductor can lead to a powerful short-circuit. Such a reaction could result in a 10,000-degree Fahrenheit electric arc jumping out a wire, a flashover and a high-temperature fire.

In October, British government investigators concluded that Kapton wire malfunctioned, triggering an electrical arc that caused a bundle of wires to catch fire on a United Airlines Boeing 767 in 1998.

The lead investigator in that crash told USA TODAY that Kapton should not be installed on new jets and that older planes found to have cracked Kapton wiring should be grounded. Both Boeing and Airbus use Kapton wire on their new planes.

Last March, the Australian airline Qantas issued a memo prohibiting its mechanics from using Kapton as a replacement wire, citing "ongoing incidents across the world involving

Kapton wire." The memo, which was obtained by USA TODAY, calls for purging of all Kapton in inventory.

Officials at FAA headquarters in Washington say there is no evidence of a Kapton problem. Data on planes still being flown don't present serious concerns about Kapton wiring, provided it is carefully installed and maintained, the agency says.

The Danish government accident report, as well as other incidents in commercial and military aviation, provide more than enough evidence of a problem with Kapton, Block says.

"After the SAS fire, FAA officials should have realized they had a problem with Kapton wiring and made some prioritization to deal with Kapton arcing," he says. "They ignored the problem, and it still festers."

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Swiss Air 111 changes

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker, 18 June 01

Below shows the impact of a conscientious effort by investigators to find out what happened in an accident and the good faith efforts of an airline to prevent it from happening again. Good work by TSB and Swiss Air. Not good by reluctance of Boeing to implement the changes for all.

Note the cameras in the cargo holds; that is very good.

I look forward to the opinion of Mr. Vic Gerden to my Smith AAR for Air India Flight 182. I also have concluded wiring is causing problems that were not apparent.

Sincerely,
Barry

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Sunday newspaper, 6-17-2001
Swissair optimizes MD-11-Cockpits with modifications to their electrical system - as a direct consequence of their Flight 111 Crash cause deliberations.

FROM TIM VAN BEVEREN *ZURICH*

Two and a half years later, the consequences of the crash of SR Flight 111 near Halifax N.S. have continued to affect Swissair. Their remaining 19 MD-11 airliners are being radically converted in modifications to the electrical system in the cockpit area. For over one million Swiss Francs per jet: " ...primarily it's the electrical system that is to be significantly improved " according to Swissair documents made available to Sundays newspaper. There in Zurich the crash cause for the 111 and its 229 passengers is being assumed, despite the Canadian TSB Report being anticipated for public release not before the beginning of 2002. Already many family members of Flight 111 victims have been "paid out". So now Swissair no longer wants

to wait for the outcome of the final report of the Canadian accident investigation before implementing the safety fixes that it has identified. "Safety remains our highest priority " claims Swissair speaker Urs Peter Naef regarding the planned changes. " Cost-saving measures never conflict with the required expenditures on flight safety, which underlie our "mode plus" modification program initiative."

In Canada Investigators of the Transportation Safety board (TSB) express themselves reservedly over the planned SR procedure. Investigation leader Vic Gerden: "Swissair's efforts to reduce potential safety deficiencies are well-known to us." As a crash cause, it is so far certain only that an electrical fire in the wiring-bundles was crucially responsible. Because of the fire, important systems in the cockpit failed in quick succession, without which captain Urs Zimmerman and Copilot Stephan Loew could no longer control their machine.

In a few days the technical modifications will begin and they will naturally concentrate on the known SR111 trouble areas: - significant critical wire-bundles are to be separated out and fed, via a routing with greater electrical integrity and individual isolation, into the cockpit. In SR111 these wiring harnesses ran through a single focal point described as a critical node. It was specifically within this area in the ceiling (just forward and aft of the cockpit/cabin bulkhead) that the fire had devastatingly raged. It affected not only the emergency power systems but the "last-ditch" power feeder lines to the batteries as well. Now that these systems are to be split and segregated for greatest integrity, important protections will again be in place - for example the one that controls the emergency power turbine (or ADG - air driven generator). This propeller can be unfolded from a compartment in the fuselage in an emergency and in the airflow produces current - like a hydroelectric direct current generator. In SR111 the Canadian investigators found that this critical emergency

power turbine had given out no energy. Despite the crisis, its control functions had failed to deploy it - probably because, by that time, the associated wiring had been consumed by the fire. Video cameras and smoke detectors are also being installed by this "unique to Swissair" modification program. CCTV Video cameras are being installed everywhere: in the cargo-holds, in the electronics bay under the cockpit floor - as well as behind the cabin linings. allowing the pilots a never before possible view into potential fire zones. The pictures will come up on a small 14-centimeter monitor in the cockpit. In addition more smoke detectors are being strategically positioned. The objective is that crews would no longer be condemned to helpless seated inactivity in the case of fire. Fire extinguishing agents behind the cabin linings can squirt upon any detected fire.

All Swissair aircraft are to receive a new wholly integral emergency flight attitude instrument. It is to be operable from two separate power sources and will function reliably even if all other systems have broken down (as was the case with SR111 in its last few minutes of flight). Altogether the cockpit changes are to cost 20 to 23 million Swiss Francs according to calculations of a Swiss Aviation Expert. The extensive modifications are the result of ongoing Swissair internal investigations into the accident's most likely course of events.

Shortly after the crash on 3 September 1998 a Taskforce under the leadership of retired Swissair Technical Chief Willy Schurter began its work, paralleling that being done by the official Canadian TSB Team. They sought to track down all possible causes of the disaster. The SR MD-11 Electrical Rework is in addition to other earlier measures (such as changes in checklists and procedures) - but is seen as the most important outcome of these investigations. Although latterly consulting and then in close co-operation with the US manufacturing firm Boeing,

Swissair engineers unilaterally sought to analyse all factors of the accident themselves - in order to identify any deficiencies in the original type-certificated design. In a further internal document Swissair explains: "We knew that it needed three prerequisites for the initiation and propagation of a fire: a potential ignition source (e.g. arcing wires), fuel (e.g. thermal/acoustic blankets) and oxygen (i.e. air-conditioning system ventilation or crew oxygen system lines) ". As a consequence of its insights another risk-factors conclusion of the SR Halifax Taskforce presents a frightening new dimension to SR111: "We have clearly concluded that such contributing factors exist in each type of aircraft and that it is not simply a case of being type-specific to the MD-11." These were conclusions also reached by the TSB and sent to the certifying authority (the US FAA). To date the only ramifications of SR111 reaching beyond the MD-11 are the new emergency rules retroactively affecting the STC's (Supplemental Type Certification) of Inflight Entertainment Systems on just about every type of airliner in service today.

Nevertheless, neither manufacturers Boeing nor the American FAA supervisory authority want to even recommend (let alone mandate) the new Swissair safety precautions for all remaining MD-11's. If this was to be done, such a program could then logically expand to include most other types of airline aircraft exhibiting the identical type-certification deficiencies. The first Swissair machine should be converted and ready for return to service at the end of June 2001. Before the SR MD-11 Fleet is permitted to carry passengers following the incorporation of these system safety adjustments, it must pass a strict test flight program in Zurich. Preliminary re-certification assessments would normally be monitored by representatives of the FAA (the American airworthiness regulatory authority). However these were carried out in the spring of 1999 so that these changes could

proceed without delay to SR Flight Services. But because manufacturer Boeing withheld its agreement to these changes for a long time, there have been extensive delays in their implementation. Boeing sees much of the program as "enhancements" and not necessarily as required safety modifications. These new Swissair safety initiatives have now become even more expensive: Three SR MD-11's have only just completed their heavy maintenance checks. But now they must return to the hangar yet again for extensive rework. But it's not necessarily a case of spending a dollar to save a penny. Once you look at the cost of SR111 and its potential for costing the airline industry as a whole, it may well have been the other way round.

X-From_: Bill.Tucker@tsb.gc.ca Wed Jun 20 18:18:46 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Swiss Air 111 changes
Date: Wed, 20 Jun 2001 21:20:48 -0400

Dear Mr. Smith,

This is in reply to your series of e-mails, and to clarify the TSB position in case there is a misunderstanding. I'm sorry I have not been able to reply sooner. I shall be away for the next two work days and I had a reply to you on my "must do" list before leaving tonight.

The TSB is not presently doing further investigation of the Air India 182 accident, nor is it planning to do so. We have limited resources and a

backlog of investigation work-in-process; we do not believe that cargo door or wiring problems were involved in that occurrence; and we are confident that the RCMP are doing a thorough and unbiased investigation. Therefore, we do not believe we would be justified in diverting our resources to that occurrence.

That said, I am not suggesting that your concerns and your analysis are all invalid. In fact, I find that you have raised some interesting points that have potential use for us in our work. To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

>From one of your e-mails, I now also understand the reason for your strong interest in advancing aviation safety, and I respect you for that. If you wish to continue sending material to me, I shall continue to process it, as outlined above, to the best of my ability. However, I cannot

promise
immediate processing and I cannot engage in direct and detailed
dialog on
all the material you send me; I simply have too much other work
to do.

Right now I have over 150 e-mails in my in-box to read and
action; there
will be well over 200 when I return next week. I am not
complaining, I
simply want you to understand my position with respect to your
inputs.

Sincerely,

Bill Tucker.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Monday, June 18, 2001 11:59 AM

> To: Tucker, Bill

> Subject: Swiss Air 111 changes

>

> W.T. (Bill) Tucker

> Director General,

> Investigation Operations

>

> Dear Mr. Tucker, 18 June 01

>

> Below shows the impact of a conscientious effort by
investigators to find

> out what happened in an accident and the good faith efforts of
an airline

> to prevent it from happening again. Good work by TSB and

Swiss Air. Not

> good by reluctance of Boeing to implement the changes for all.

>

> Note the cameras in the cargo holds; that is very good.

>

> I look forward to the opinion of Mr. Vic Gerden to my Smith
AAR for Air

> India Flight 182. I also have concluded wiring is causing
problems that

> were not apparent.

>

> Sincerely,

> Barry

>

> John Barry Smith

> (831) 659-3552 phone

> 551 Country Club Drive,

> Carmel Valley, CA 93924

> www.corazon.com

> barry@corazon.com

>

> Sunday newspaper, 6-17-2001

>

> Swissair optimizes MD-11-Cockpits with modifications to their
electrical

> system - as a direct consequence of their Flight 111 Crash
cause

> deliberations.

>

> FROM TIM VAN BEVEREN ZURICH

>

> Two and a half years later, the consequences of the crash of SR
Flight 111

- > near Halifax N.S. have continued to affect Swissair. Their remaining 19
- > MD-11 airliners are being radically converted in modifications to the
- > electrical system in the cockpit area. For over one million Swiss Francs
- > per jet: " ...primarily it's the electrical system that is to be
- > significantly improved " according to Swissair documents made available to
- > Sundays newspaper. There in Zurich the crash cause for the 111 and its 229
- > passengers is being assumed, despite the Canadian TSB Report being
- > anticipated for public release not before the beginning of 2002. Already
- > many family members of Flight 111 victims have been "paid out". So now
- > Swissair no longer wants to wait for the outcome of the final report of
- > the Canadian accident investigation before implementing the safety fixes
- > that it has identified. "Safety remains our highest priority " claims
- > Swissair speaker Urs Peter Naef regarding the planned changes. "
- > Cost-saving measures never conflict with the required expenditures on
- > flight safety, which underlie our "mode plus" modification program
- > initiative."
- >
- > In Canada Investigators of the Transportation Safety board (TSB) express

> themselves reservedly over the planned SR procedure.

Investigation leader

> Vic Gerden: "Swissair's efforts to reduce potential safety deficiencies

> are well-known to us." As a crash cause, it is so far certain only that an

> electrical fire in the wiring-bundles was crucially responsible.

Because

> of the fire, important systems in the cockpit failed in quick succession,

> without which captain Urs Zimmerman and Copilot Stephan Loew could no

> longer control their machine.

>

> In a few days the technical modifications will begin and they will

> naturally concentrate on the known SR111 trouble areas: - significant

> critical wire-bundles are to be separated out and fed, via a routing with

> greater electrical integrity and individual isolation, into the cockpit.

> In SR111 these wiring harnesses ran through a single focal point described

> as a critical node. It was specifically within this area in the ceiling

> (just forward and aft of the cockpit/cabin bulkhead) that the fire had

> devastatingly raged. It affected not only the emergency power systems but

> the "last-ditch" power feeder lines to the batteries as well. Now that

> these systems are to be split and segregated for greatest

integrity,

> important protections will again be in place - for example the one that

> controls the emergency power turbine (or ADG - air driven generator). This

> propeller can be unfolded from a compartment in the fuselage in an

> emergency and in the airflow produces current - like a hydroelectric

> direct current generator. In SR111 the Canadian investigators found that

> this critical emergency power turbine had given out no energy.

Despite the

> crisis, its control functions had failed to deploy it - probably because,

> by that time, the associated wiring had been consumed by the fire. Video

> cameras and smoke detectors are also being installed by this "unique to

> Swissair" modification program. CCTV Video cameras are being installed

> everywhere: in the cargo-holds, in the electronics bay under the cockpit

> floor - as well as behind the cabin linings. allowing the pilots a never

> before possible view into potential fire zones. The pictures will come up

> on a small 14-centimeter monitor in the cockpit. In addition more smoke

> detectors are being strategically positioned. The objective is that crews

> would no longer be condemned to helpless seated inactivity in the case of

- > fire. Fire extinguishing agents behind the cabin linings can squirt upon
- > any detected fire.
- >
- > All Swissair aircraft are to receive a new wholly integral emergency
- > flight attitude instrument. It is to be operable from two separate power
- > sources and will function reliably even if all other systems have broken
- > down (as was the case with SR111 in its last few minutes of flight).
- > Altogether the cockpit changes are to cost 20 to 23 million Swiss Francs
- > according to calculations of a Swiss Aviation Expert. The extensive
- > modifications are the result of ongoing Swissair internal investigations
- > into the accident's most likely course of events.
- >
- > Shortly after the crash on 3 September 1998 a Taskforce under the
- > leadership of retired Swissair Technical Chief Willy Schurter began its
- > work, paralleling that being done by the official Canadian TSB Team. They
- > sought to track down all possible causes of the disaster. The SR MD-11
- > Electrical Rework is in addition to other earlier measures (such as
- > changes in checklists and procedures) - but is seen as the most important
- > outcome of these investigations. Although latterly consulting

and then in

- > close co-operation with the US manufacturing firm Boeing, Swissair

- > engineers unilaterally sought to analyse all factors of the accident

- > themselves - in order to identify any deficiencies in the original

- > type-certificated design. In a further internal document Swissair

- > explains: "We knew that it needed three prerequisites for the initiation

- > and propagation of a fire: a potential ignition source (e.g. arcing

- > wires), fuel (e.g. thermal/acoustic blankets) and oxygen (i.e.

- > air-conditioning system ventilation or crew oxygen system lines) ". As a

- > consequence of its insights another risk-factors conclusion of the SR

- > Halifax Taskforce presents a frightening new dimension to SR111: "We have

- > clearly concluded that such contributing factors exist in each type of

- > aircraft and that it is not simply a vase of being type-specific to the

- > MD-11." These were conclusions also reached by the TSB and sent to the

- > certifying authority (the US FAA). To date the only ramifications of SR111

- > reaching beyond the MD-11 are the new emergency rules retroactively

- > affecting the STC's (Supplemental Type Certification) of Inflight

- > Entertainment Systems on just about every type of airliner in service

- > today.
- >
- > Nevertheless, neither manufacturers Boeing nor the American FAA
- > supervisory authority want to even recommend (let alone mandate) the new
- > Swissair safety precautions for all remaining MD-11's. If this was to be
- > done, such a program could then logically expand to include most other
- > types of airline aircraft exhibiting the identical type-certification
- > deficiencies. The first Swissair machine should be converted and ready for
- > return to service at the end of June 2001. Before the SR MD-11 Fleet is
- > permitted to carry passengers following the incorporation of these system
- > safety adjustments, it must pass a strict test flight program in Zurich.
- > Preliminary re-certification assessments would normally be monitored by
- > representatives of the FAA (the American airworthiness regulatory
- > authority). However these were carried out in the spring of 1999 so that
- > these changes could proceed without delay to SR Flight Services. But
- > because manufacturer Boeing withheld its agreement to these changes for a
- > long time, there have been extensive delays in their implementation.
- > Boeing sees much of the program as "enhancements" and not

necessarily as
> required safety modifications. These new Swissair safety initiatives have
> now become even more expensive: Three SR MD-11's have only just completed
> their heavy maintenance checks. But now they must return to the hangar yet
> again for extensive rework. But it's not necessarily a case of spending a
> dollar to save a penny. Once you look at the cost of SR111 and its
> potential for costing the airline industry as a whole, it may well have
> been the other way round.

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Sudden loud sound on CVR
Cc:
Bcc:
X-Attachments:
Dear Mr. Tucker, 20 June 01

Well, longest daylight of the year tonight, that's good.

The TSB is not presently doing further investigation of the Air India 182 accident, nor is it planning to do so. We have limited resources and a backlog of investigation work-in-process; we do not believe that cargo door or wiring problems were involved in that occurrence; and we are

confident
that the RCMP are doing a thorough and unbiased investigation.
Therefore,
we do not believe we would be justified in diverting our
resources to that
occurrence.

I understand the way things are now, and of course, subject to
change. There is that pesky trial coming up and the RCMP is
saying bomb in aft cargo compartment and the CASB and Kirpal
stated explosion in forward cargo compartment, not a trifling
conflict. Just where was that bomb?

I find that you have raised some interesting points that
have potential use for us in our work.

Thanks. UAL 811 is a big point.

To that end, I am personally looking
through the material you send and forwarding copies, as I think
appropriate,
to the Dir. of Investigations - Air, the Dir. of Engineering, and the
IIC of
the SWR111 investigation. If you wish, I can also forward copies
to Sgt.
Blachford or the RCMP, but it seems more appropriate for you to
do that
yourself whenever you so choose.

Thanks. More eyeballs (or ears) is always good. I respect your
personal opinion most of all. I can tell an open mind that will put
emphasis on the evidence. A sudden loud sound on the CVR is
the only direct evidence that exists for Air India Flight 182, all

the rest is circumstantial or tangible consequence. The sudden loud sound is everything and it says, 'Not a bomb explosion' but 'Explosive decompression that matches DC 10 cargo door event.' When in doubt, I always come back to the sudden loud sound on the CVR's on all the four early model Boeing 747s that suffered the inflight explosions forward of the wing. The sound is incontrovertible.

>From one of your e-mails, I now also understand the reason for your strong interest in advancing aviation safety, and I respect you for that.

Thanks. I met the sons of my savior pilot years later, three of the five children he left became Navy pilots.

If you wish to continue sending material to me, I shall continue to process it, as outlined above, to the best of my ability.

Thanks, an open mind is all I ask. I would not expect detailed replies, but welcome any queries from you or your staff should they come up.

I simply want you to understand my position with respect to your inputs.

I understand. Thanks again for your reply.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com
Commercial pilot, instrument rated, former FAA Part 135
certificate holder.

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Startle/falling reflex
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,

23 June 01

At 9:20 PM -0400 6/20/01, Tucker, Bill wrote:

If you
wish to continue sending material to me, I shall continue to
process it, as
outlined above, to the best of my ability.

Thank you again for the opportunity to present some of my

research and conclusions for review. I trust your two day trip was successful.

But first: Philosophy. To explain to myself the public's intense interest in aviation safety I go back to the basics. Infants are born with reflexes, two of which are the startle reflex and the grasping reflex. (Sucking is a third.) We are not born with the fear of fire, being crushed or drowning. We are born with the fear of a sudden loud sound and we are very afraid of falling. An infant will react by jerking when startled by a loud sound and the infant will instinctively grasp on to anything when it senses a fall backwards. A baby has to learn to fear fire or being squeezed too tightly and not to breathe underwater. So, being burned in car crash, crushed in a train wreck, or drowning in a ship sinking will always have less of a priority of a plane crash because a plane crash, especially one caused by a loud noise (explosive decompression or bomb explosion), holds two of the most primal of fears, startle and falling.

Because of these innate fears, severe reactions, even hysterical, are seen by X ray machines, sniffing dogs, etc, to try to stop a small percentage of probable causes of aviation accidents; sabotage. The billions of dollars could be better spent on pilot and maintenance training to reduce the crew error and mechanical problems which contribute to most of the accidents. However, the public demands a reduction in the fear of being startled in flight and then falling and a 'bomber' in a plane is terrifying.

That is why our job and in particular your job, sir, is so very very important. We must get it right, and if not exactly right the first time, then better the second time if we have the luxury of time and hindsight.

Second: Politics. A probable cause of an airplane accident which is high profile and involves literally hundreds of millions of dollars, thousands of jobs, and the pride of several countries is an important probable cause. Of course it is political and that means finding an answer which everyone can live with. The problem is that usually probable causes mean someone can't 'live with it.' Accidents are usually complex with no single overriding factor but, human nature being what it is, politics demands simple, quick, and easy answers. Money always enters the picture and changes things too.

I understand all these things. A probable cause of a machine accident should be independent of all those factors and focus on the actual events regardless of culture of pilot, country of origin of the manufacturer, passenger list, or religion of the owner of the airline.

My explanation for four Boeing 747 accidents involves many countries, airlines, and agencies and a lot of money. I did not pick the flight numbers of these 747 accidents, the evidence did. Of the almost 40 747 hull losses in the past 30 years, only four fit my criteria for the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation. All four flight numbers are controversial because the official explanations are incomplete and contradictory.

Because the implications and consequences of the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation for four 747 accidents are profound in a political and economic sense, please do not let that bias the TSB towards or against a particular probable cause; let the evidence speak for itself and there is much of it.

Third: Evidence.

Mr. Tucker, everyone talks about evidence but what is it? I use the legal terms of direct, tangible, and circumstantial; all of which can be very powerful and persuasive. The most is the direct. Direct evidence is the eyewitness, it's the participant, it's the CVR. The CVR was designed for this purpose; to tell us what happened up there, directly. The CVR heard what happened. Let the CVR speak and it says, "I heard a sudden loud sound that does not match a bomb explosion sound but does match an explosive decompression sound in a wide body airliner when the cargo door inadvertently opened in flight." And that is paraphrased from the official CASB and Kirpal report.

Let us assume the CASB and Kirpal report on the CVR sound is correct. The implication is that the probable cause of Air India Flight 182 was not a bomb explosion but something else and that warrants further investigation.

I have done that further investigation. I can match the CVR sudden loud sound, (the only direct incontrovertible evidence,) from the DC-10 to Air India Flight 182 to United Airlines Flight 811 to Trans World Airlines Flight 800 to Pan Am Flight 103.

In addition there are many other significant evidence matches among the four to be discussed later.

Yes, the claim is enormous and runs counter to the conventional wisdom for bombs for all, some for a day and some for years.

Conclusion:

My goal is not to persuade you for certain that Air India Flight 182 was not a bomb explosion, but to persuade you that the mechanical alternative of shorted wiring/cargo door rupture/explosive decompression/inflight breakup warrants further investigation by the TSB because of the direct evidence on the actual accident flight and the matching evidence of later accident flights. The probable cause of AI 182 may be something else other than bomb based on subsequent similar accidents, particularly United Airlines Flight 811, and that probable cause of faulty wiring is still present and unrecognized by authority.

TSB is that authority that can determine or rule out the danger. Can you and your staff spare some time to correspond with me via letter or email regarding Air India Flight 182 and its similarity to United Airlines Flight 811? They can ask rebutting questions which should be easily apparent if my explanation is bogus and I can reply with official documentation to support all my claims.

7.18 Summary of matching evidence between Air India Flight 182 and United Airlines Flight 811 specifically: From Smith AAR for AI 182:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. Section 41 retrofit not done
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in

all parameters

K. Initial event involves hull rupture in or near forward cargo door area

L. Initial event starts with sudden sound

M. Initial event sound is loud

N. Initial event sound is audible to humans

O. Initial event followed immediately by abrupt power cut to data recorders

P. Initial event sound not matched to explosion of bomb sound

Q. Initial event sound is matched to explosive decompression sound in wide body airliner

R. Torn off skin on fuselage above forward cargo door area

S. Evidence of explosion in forward cargo compartment

T. Foreign object damage to engine or cowling of engine number three

U. Foreign object damage to engine or cowling of engine number four

V. Right wing leading edge damaged in flight

W. Vertical stabilizer damaged in flight

X. Right horizontal stabilizer damaged in flight

Y. More severe inflight damage on starboard side than port side

Z. Port side relatively undamaged by inflight debris

AA. Vertical fuselage tear lines just aft or forward of the forward cargo door

AB. Fracture/tear/rupture at a midspan latch of forward cargo door

AC. Midspan latching status of forward cargo door not reported as latched

AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)

AE. Outwardly peeled skin on upper forward fuselage

AF. Rectangular shape of shattered area around forward cargo

door

AG. Forward cargo door fractured in two longitudinally

AH. Status of aft cargo door as latched

AI. Passengers suffered decompression type injuries

AJ. At least nine missing and never recovered passenger bodies

AK. Initial official determination of probable cause as bomb explosion.

AL. Initial official determination modified from bomb explosion

AM. Structural failure considered for probable cause

AN. Inadvertently opened forward cargo door considered for probable cause

AO. Takeoff after sunset on fatal flight

AP. Takeoff after scheduled takeoff time on fatal flight

At 9:20 PM -0400 6/20/01, Tucker, Bill wrote:

To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation.

I appreciate that sir, they are the experts and can quickly discern if my shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation warrants further attention by TSB.

If your staff asks the questions, I will try very hard to provide the answers; I've had twelve years at it.

'Not to know is bad. Not to want to know is worse. Not to hope is

unthinkable. Not to care is unforgivable." - Nigerian saying.

Mr. Tucker, I believe you want to know, you hope to find out, and you care. I do too. Thanks again for listening to me.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: DI-Air, DE, IIC, AITF
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
June 01

23

Well, it's the 16th anniversary of Air India Flight 182 today. After reading and rereading the CASB and Kirpal reports so many

times over the past years I can almost see and hear the Boeing 747s involved as they preflight, taxi, takeoff and land. There was the 747 going to Tokyo, the 747 from Tokyo to Bangkok, the 747 going to Toronto, the 747 going from Toronto to Montreal and thence to London. Four Boeing 747s; all safe except one, Air India Flight 182. All four were supposed to have bombs on them. Add in Pan Am Flight 103 and Trans World Airlines Flight 800 and United Airlines Flight 811 which also were reported to have bombs in them and there were a total of seven Boeing 747s that had or were to have bombs on board at one time or the other. And of course, the bombs never went off when they were supposed to, either too early or too late or not at all or an explosion mistaken for a bomb. All of the four fatal accidents are intertwined with each other with Air India Flight 182 and Pan Am Flight 103 often relying on each other to support the bomb explanation.

Mr. Tucker, this conspiracy nonsense is contradictory, unproductive and non-scientific; I would prefer to leave it to the conspiracy people to play with, conspiracy people meaning the police, RCMP, FBI, and Scotland Yard who are paid to see plots everywhere.

I see singed metal, loud sounds on CVR, paint smears, twisted metal, broken turbine blades, fodded engines, and a forward cargo door frayed and damaged from an outward force lying on the ocean floor after a fall of five nautical miles from an explosion in flight leading to a total breakup, the nightmare come true for all of us pilots.

From CASB report:

All cargo doors were found intact and attached to the fuselage structure, except for the forward cargo door which had some

fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed.

At 9:20 PM -0400 6/20/01, Tucker, Bill wrote:

To that end, I am personally looking through the material you send and forwarding copies, as I think appropriate, to the Dir. of Investigations - Air, the Dir. of Engineering, and the IIC of the SWR111 investigation. If you wish, I can also forward copies to Sgt. Blachford or the RCMP, but it seems more appropriate for you to do that yourself whenever you so choose.

Thank you again, Mr. Tucker, for sending appropriate material to your staff; their opinions carry much weight. I'm curious as to what they are. The RCMP have acknowledged receipt of my Smith AAR for 182 that you sent them. Thank you for that, Mr. Tucker, they were sure to read it since it came from you. Sgt. Blachford has written me that he is taking the time to digest it and the earliest he can meet with me to discuss it is in mid August in California. I welcome all authorities to review my every email and all documents I create.

In regard to the specific departments such as Director of Investigations-Air, Director of Engineering, and the Investigator in Charge of Swiss Air 111, permit me to write as if I were

addressing those gentlemen directly. I assume they have read my Smith AAR for Air India Flight 182 which lays out the premise of the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation and gives the supporting documentation.

Director of Investigations-Air: I can understand the reluctance of become involved with a 16 year old crash. The evidence may be gone or altered, witnesses have moved or died, memories have faded, and who would want to pull a scab off a partially healed wound? However, Air India Flight 182 is unique in that the evidence is as fresh and accurate as ever in videotapes and high quality 35 mm film, the only direct witness is the CVR tape and it's memory is as clear as ever, and the wound is about to be opened in the Canadian court system in February.

My goal is not to persuade the TSB-Air, that faulty wiring caused the forward cargo door of AI 182 to inadvertently open in flight but to persuade TSB that a supplemental/update investigation report is warranted for reasons based on subsequent new evidence in a similar accident, United Airlines Flight 811. The TSB will be called to explain what happened to AI 182 at trial and, most importantly, a danger that existed in 1986 on this very night, still exists today, faulty wiring in early model Boeing 747s involved with the cargo door unlatch motor. Air India Flight 182 is not gone and forgotten; it is in the forefront of aviation safety.

To put it another way: Why is a update supplemental investigation warranted? The original dual investigations of CASB and the Kirpal inquiry of 1986 gave conflicting conclusions which left many questions. A similar accident occurred later which gave a probable cause that was not the same as the Kirpal inquiry finding. Three men are on trial for their

life's freedoms which will require a full explanation of what happened to the airplane they are accused of blowing up and that means the TSB, and probably the Director of Investigations-Air, will be called to give his best accounting of the events. I submit it is prudent, well prepared, and thinking ahead to incorporate the latest aviation safety data into an official opinion about a controversial accident. I call it 'accident' because it certainly is not an 'incident.' Who is the most qualified of all on the planet to give the most respected opinion about the aviation accident of AI 182? The police? A foreign judicial authority? The press? The NTSB? I believe the TSB is and that means Director of Investigations-Air. I would like to know, as many would, what is the current thinking by TSB-Air about Air India Flight 182, it is very important. The still active opinion by CASB is no bomb; has that changed? I respect the CASB opinion of 1986; they refused to be rushed into a probable cause that did not have the scientific support to uphold.

And most importantly, the updated supplemental investigation can rule in or rule out the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation because, if ruled in, then a clear and present danger exists to the flying public in early model Boeing 747s of which approximately 550 are still active.

The original CASB report is correct as far as it went. It made conclusions based solely on the evidence and although many on the team may have believed the cause of the explosion in the forward cargo compartment was bomb caused, the evidence was not there to support that conclusion, so the prudent and cautious conclusion was made of an explosion of undetermined cause, a judgment proven correct years later. The Canadian aviation accident authorities have made no errors of fact and they made

no errors of judgment. There is nothing for the Canadian aviation accident investigators to correct, only supplement and clarify. What was the cause of the explosion in the forward cargo compartment the CASB said caused the inflight breakup? Only now, 16 years later and three similar accidents later is the cause strongly suggested to be explosive decompression by a ruptured open forward cargo door at one or both of the midspan latches probably induced by faulty Poly X wiring.

The shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation is plausible, it is reasonable, it has precedent, and it has actual direct and tangible evidence to support it. How many matches does it take for one aircraft accident to give a suspicion that another had the same probable cause? It depends on the actual matches. Are they trivial or important? Air India Flight 182 and United Airlines Flight 811 have many significant ones, most of which are relevant to the inflight breakup. Both flights were:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. (Intentionally left blank.)
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound

- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched
- AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)
- AE. Outwardly peeled skin on upper forward fuselage
- AF. Rectangular shape of shattered area around forward cargo door
- AG. Forward cargo door fractured in two longitudinally
- AH. Status of aft cargo door as latched
- AI. Passengers suffered decompression type injuries
- AJ. At least nine missing and never recovered passenger

bodies

AK. Initial official determination of probable cause as bomb explosion.

AL. Initial official determination modified from bomb explosion

AM. Structural failure considered for probable cause

AN. Inadvertently opened forward cargo door considered for probable cause

I submit to the Director of Investigations-Air that the above 38 officially documented matches between Air India Flight 182 and United Airlines Flight 811 are enough to say they may have both had the same probable cause for their fatalities after their inflight breakup. Is that a reasonable premise to make? Would that thus warrant an updated supplemental report to the CASB report to explain the mystery cause of the explosion? I assume I would be asked for further proof that what happened to United Airlines Flight 811 actually happened to United Airlines Flight 811. I can do that and invite queries.

United Airlines Flight 811 was incontrovertibly not a bomb explosion, incontrovertibly not a missile hit, incontrovertibly not a center tank explosion, and most incontrovertibly an inadvertently opened forward cargo door in flight probably caused by an electrical fault. United Airlines Flight 811 is the model for Air India Flight 182 except UAL 811 came back to tell what really happened. We must take advantage of that stroke of luck and the luxury of hindsight.

For Investigator in Charge of Swiss Air 111 (I assume Mr. Vic Gerden), I offer a probable cause for Air India Flight 182 of Poly X wiring, in the presence of moisture in the forward cargo hold, shorting on the door unlatch motor. Is that realistic? I believe that

based on Trans World Airlines Flight 800 and Swiss Air 111 the knowledge of the faults of polyimide insulation in aircraft wiring is now well known. Is it realistic to make the supposition that the Kapton type wiring in Air India Flight 182 failed. <http://www.wire.nasa.gov/> is a new site demonstrating that the knowledge learned in Swiss Air is being applied across all aviation related areas, even space.

AA Flight 96 over Windsor Ontario in 1972 showed the potential catastrophic effects of an open cargo door in flight when the DC-10 almost went out of control and crashed when the small aft cargo door opened in flight. That problem was not fixed and it happened again two years later out of Paris and the Turkish airlines DC-10 cargo door opened in flight and the plane augered in killing all.

For me to say an open cargo door in Air India Flight 182 caused the accident is not unrealistic. Is a shorted wiring/cargo door rupture/explosive decompression/inflight breakup a reasonable premise to make? I would assume I would be asked why do I say such a thing and told to show proof. I can do that and invite queries. I would hope I have succeeded in showing that an alternative to the current bomb explosion explanation is plausible, reasonable, has precedent and therefore an update/supplemental report is warranted.

For the Director of Engineering I would offer explosive decompression and the 300 knots IAS and all its power on a weakened airframe with the huge hole in the nose forward of the wing around the forward cargo door as described in text and shown by a drawing in the Kirpal report to explain the inflight breakup.

I know an engineer understands the power of 8.9 PSI differential between inside and outside Air India Flight 182 and the always present 96921 pounds of pressure on the 10890 square inches of the 99 inch by 110 inch cargo door. There are ten latches holding the 99 inch slice of fuselage closed. The bottom eight latches are close together and have additional locking sectors to prevent inadvertent back driving of the cams. The mid span latches are alone and in the middle of the 99 inches and have no locking sectors. The shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation offers the premise and documentation for the ruptures at one or both of the midspan latches of the forward cargo door of Air India Flight 182 which caused the explosive decompression causing the huge 30 foot by 40 foot hole in the nose on the right side as shown in drawings in the CASB report.

I know an engineer understands the power of 300 knots. 300 knots is higher than the highest wind on earth and would tear off or crumple the nose of a weakened airframe after the explosive decompression. Non-aviation oriented persons think that driving a car at 60 MPH and having a door open is a minor event with a little noise and small pressure on eardrums and pull over and close the thing. A Boeing 747 at 31000 feet at 300 knots having a huge door open is another matter with a potential total inflight breakup occurring. Is that a reasonable premise to make? I assume I would be asked to provide documented evidence to demonstrate what I believe the sequence of destruction of Air India Flight 182. I can do that based upon the inflight breakups of two other early model 747s that suffered hull rupture in flight near the forward cargo door, Trans World Airlines Flight 800 and Pan Am Flight 103.

For the Air India Task Force of the RCMP (Sgt Blachford) I

would ask exactly where was this 'bomb explosion' you have accused three men of planting in Air India Flight 182? Is the bomb explosion in the forward cargo compartment as stated by the Kirpal Report? Is it in the aft cargo compartment as stated by John Garstang recently who has been seconded to the RCMP for over a decade? Was the bomb loaded in Vancouver or in Montreal? Why does the RCMP say a bomb explosion anywhere in Air India Flight 182 when the Canadian aviation accident investigation authorities of the time declined to say it was a bomb explosion and would only state an explosion of undermined origin although the AAIB investigator flatly stated the explosion was not a bomb but an explosive decompression of a cause yet to be determined? The RCMP may not believe it is important to state exactly where a 'bomb' exploded on a plane but aviation accident experts know it is very important as even the placement of a few feet of an inflight explosion port or starboard has serious consequences. The aft cargo compartment and the forward cargo compartment are separated by many hundreds of feet and there is no interconnecting tunnel or any way for passengers to get into the cargo compartments in flight.

To say a bomb in the forward cargo compartment means the bomb was not loaded in Vancouver but in Montreal because all the baggage loaded in Vancouver went into the aft cargo compartment and the Montreal baggage went into the forward cargo compartment.

To say a bomb exploded in the aft cargo compartment is to contradict the CASB and Kirpal investigators who flatly said there was no explosion in the aft cargo compartment and they looked very closely for such an event. Is there any new evidence to make such a startling claim?

To say a bomb explosion at all is to second guess the Canadian experts on aviation accidents and side with an Indian judicial official who has no accident investigation experience and was under intense political pressure to declare the cause a bomb, even so far as to dismiss the Indian Aviation Accident Investigator, Mr. Khola, and replace him with Judge Kirpal.

The AITF RCMP position is fraught with contradictions, relies heavily on circumstances of events far away, and not supported by the direct and tangible evidence. I look forward to meeting with Sgt Blachford in mid-August to sort out the confusion. I will say that the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation does satisfactorily answer all the incongruities and resolves all the contradictions listed above. It is the answer to the cause of the accident but may not be the answer they want to hear or believe. I have hopes there will be a real investigator there in the AITF who will follow the factual clues and not the media conjecture or conspiracy fantasies. It's never too late to get it right.

Many disagree with my explanation for Air India Flight 182. Disagreement is not rebuttal. I disagree with the RCMP but offer documentation and interpretation of evidence to rebut their bomb explosion explanation. No one has ever offered evidence to rebut the shorted wiring/cargo door rupture/explosive decompression/inflight breakup explanation although many have offered disagreement. I shrug off disagreement but welcome attempts at factual rebuttal.

June 23rd, it's a date I always remember, just like December 21, July 17, and February 24, dates for early model Boeing 747s that suffered hull ruptures in flight that all gave a sudden loud sound on the CVR and all quickly followed by an abrupt power cut to

the recorders.

Thank you again, sir, for permitting me to present some of my years of research and conclusions for your consideration.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

X-From_: Bill.Tucker@tsb.gc.ca Mon Jun 25 11:04:11 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Sudden loud sound on CVR
Date: Mon, 25 Jun 2001 14:05:37 -0400

Dear Mr. Smith,

Your reponse below prompts a further reply from me. I appreciated the understanding demonstrated in your e-mail. I do have an open mind (or at least I hope and try to), and I will strive to retain it long after I retire from the TSB.

I am now up to date with your correspondence, except for one left to read

that you sent me on 23 June. I have targetted specific elements to specific people (e.g, the Appendix on Wiring to our SWR 111 IIC (Yes, that's Vic Gerden) as well as to Dir of Inv. - Air). I shall forward this to all of them so they can note your addresses and your receptiveness to any follow-up queries they may have

Bill Tucker..

P.S. In one of the things I read, you indicated that John Garstang had been seconded to the RCMP for over a decade. That is not so; John G was loaned or seconded to the RCMP on several occasions (maybe 3 or 4) for short terms of about 1-2 months - most recently this spring. Otherwise, he has continued working as a valued employee in our Engineering Branch.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Wednesday, June 20, 2001 9:43 PM

> To: Tucker, Bill

> Subject: Sudden loud sound on CVR

>

> Dear Mr. Tucker, 20 June 01

>

> Well, longest daylight of the year tonight, that's good.

>
>>
>>The TSB is not presently doing further investigation of the
Air India 182
>>accident, nor is it planning to do so. We have limited
resources and a
>>backlog of investigation work-in-process; we do not believe
that cargo
> door
>>or wiring problems were involved in that occurrence; and we
are confident
>>that the RCMP are doing a thorough and unbiased
investigation.
> Therefore,
>>we do not believe we would be justified in diverting our
resources to
> that
>>occurrence.
>
> I understand the way things are now, and of course, subject to
> change. There is that pesky trial coming up and the RCMP is
saying
> bomb in aft cargo compartment and the CASB and Kirpal
stated
> explosion in forward cargo compartment, not a trifling conflict.
Just
> where was that bomb?
>
>> I find that you have raised some interesting points that
>>have potential use for us in our work.
>
> Thanks. UAL 811 is a big point.
>

>> To that end, I am personally looking
>>through the material you send and forwarding copies, as I
think
> appropriate,
>>to the Dir. of Investigations - Air, the Dir. of Engineering, and
the IIC
> of
>>the SWR111 investigation. If you wish, I can also forward
copies to Sgt.
>>Blachford or the RCMP, but it seems more appropriate for you
to do that
>>yourself whenever you so choose.
>
>
> Thanks. More eyeballs (or ears) is always good. I respect your
> personal opinion most of all. I can tell an open mind that will
put
> emphasis on the evidence. A sudden loud sound on the CVR is
the only
> direct evidence that exists for Air India Flight 182, all the rest
is
> circumstantial or tangible consequence. The sudden loud sound
is
> everything and it says, 'Not a bomb explosion' but 'Explosive
> decompression that matches DC 10 cargo door event.'" When in
doubt, I
> always come back to the sudden loud sound on the CVR's on
all the
> four early model Boeing 747s that suffered the inflight
explosions
> forward of the wing. The sound is incontrovertible.
>
>>

> >>From one of your e-mails, I now also understand the reason
> for your
> strong
> >interest in advancing aviation safety, and I respect you for
> that.
>
> Thanks. I met the sons of my savior pilot years later, three of
> the
> five children he left became Navy pilots.
>
>
> > If you
> >wish to continue sending material to me, I shall continue to
> process it,
> as
> >outlined above, to the best of my ability.
>
>
> Thanks, an open mind is all I ask. I would not expect detailed
> replies, but welcome any queries from you or your staff should
> they
> come up.
>
> > I
> >simply want you to understand my position with respect to
> your inputs.
>
>
> I understand. Thanks again for your reply.
>
> Sincerely,
> Barry
>

> John Barry Smith
> (831) 659-3552 phone
> 551 Country Club Drive,
> Carmel Valley, CA 93924
> www.corazon.com
> barry@corazon.com
> Commercial pilot, instrument rated, former FAA Part 135
certificate
> holder.

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: RE: Sudden loud sound on CVR
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,

25 June 01

I shall forward this to all of
them so they can note your addresses and your receptiveness to
any follow-up
queries they may have

Thank you, sir.

John G was loaned
or seconded to the RCMP on several occasions (maybe 3 or 4)

for short terms
of about 1-2 months - most recently this spring. Otherwise, he
has
continued working as a valued employee in our Engineering
Branch.

Correction noted, my error, thank you.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Part One in PDF file
Cc:
Bcc:
X-Attachments: :Master:6105:tuckerone.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,

2 July

01

Attached is Part One of my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup presentation in PDF format. It is identical to the email just sent. PDF may be easier to forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Consensus on Location of explosion in Air India Flight
182 Part One

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,

2

July 01

Please allow me to present Part One of three parts of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 as if I were

in a conference room with members of the TSB listening to me for a period of time. Part One is to establish a consensus on the location of the explosion in the forward cargo compartment on the right side that led to the inflight breakup. Part Two is to establish a consensus on the cause of the explosion. Part Three is to present conclusions, recommendations, and implications of the explanation.

As in any meeting, the participants can sit there and daydream until it's over and walk out with no comment except muttering under their breath, "Why do I have to put up with this crap?"

Or they can actively engage the speaker by heckling, asking pointed questions, or giving added confirmation to the ideas offered by their personal experiences. I accept all responses and will try to answer them appropriately. May I begin, sir?

Participants:

Mr. Bill Tucker, Director General, Investigation Operations.

Director of Investigations-Air

Director of Engineering

Mr. John Garstang, Engineering Branch

Mr. Vic Gerden, Investigator in Charge, SWR 111.

John Barry Smith, Independent Aircraft Accident Investigator.

Thank you all for allowing me this time to present an explanation for the possible cause of the fatal inflight breakup of Air India Flight 182 on 23 June, 1985. My goal is not to persuade you of the higher standard of 'probable cause' but to persuade in the easier standard of 'possible cause' for the accident. You alone have access to the still accurate evidence of the inflight breakup in high quality film and data recorders which can raise the cause

to 'probable' if applicable.

I would ask the TSB that if my three part presentation persuades that there is a new, possible, plausible, mechanical cause with precedent, then an updated supplemental investigation and report to the 1986 CASB AAR is warranted to rule it in or rule it out.

That is my goal; To have professional aviation safety officials of authority conduct an updated supplemental accident report on Air India Flight 182 to consider a possible cause of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation based upon matching evidence of subsequent similar accidents, in particular, United Airlines Flight 811 of 1989. The goal is to be reached in three parts: Part One is the determination of the location of the explosion and Part Two is the source of that explosion. Part Three is conclusions, recommendations, and implications. This is Part One.

If the new possible cause is correct, a consequence is that a present danger exists to the flying public because the fault of shorting wiring in the cargo door unlatch circuit still exists in the remaining 500 or so early model Boeing 747s still in service which would require airworthiness action to prevent a possible reoccurrence.

Why else to conduct a supplemental investigation into Air India Flight 182 other than imminent safety issues? Well, it happened a long time ago and much has been learned in the meantime that may clarify what exactly happened back then to answer the questions raised by initial reports, such as the unstated cause of the explosion in the forward cargo compartment on the right side. Also, it is one of the most high profile, interesting, tragic, controversial, and mysterious plane crashes in Canadian history,

right up there with the Arrow Gander crash and SWR 111, and current TSB investigators should have an opportunity at explaining it. Also, there are conflicting opinions of the probable cause among the authorities of CASB, AAIB, RCMP, and Indians which should be resolved. Also, there is an upcoming trial which will certainly ask questions of the TSB about what happened that day to that aircraft and having updated opinions on latest news already prepared for testimony would be most prudent.

The Smith AAR for AI 182 with appendices is my major item of reference as it lays out the case, has references, and includes supporting documents. I assume you all have copies of that 116 page report. If not, please tell me at barry@corazon.com and I will email the 1.2 meg PDF file to you. It includes color pictures, drawings, charts, and sketches as well as text which are very important to the understanding of the explanation.

Other documents which are used for support of the wiring/cargo door explanation are: The CASB report and the Kirpal Report for Air India Flight 182, NTSB AAR 90/01 and 92/02 for United Airlines Flight 811, AAIB 2/90 for Pan Am Flight 103, and NTSB AAR 00/03 for Trans World Airlines Flight 800. All are available electronically and can be sent to you by email; please ask and I will provide them to you.

In this first meeting I would like to get us all to reach a consensus on the specific location of the explosion in Air India Flight 182. The sought after consensus is that of an explosion in the forward cargo compartment on the right side of Air India Flight 182 which caused the inflight breakup that led to its destruction.

All opinion agrees there was a sudden explosion in Air India

Flight 182 which led to the inflight breakup. There is some dispute as to where in the aircraft the explosion occurred and what caused it. I will attempt to clarify where and what in these three presentations.

Specific data about Air India Flight 182: Sequence in construction:#330, Construction Number 21473 Date completed: 19 June 78, Type Aircraft: B747-237B Type of wiring: Poly-X (Raychem Corp), accident date: June 23 1985

The CASB, Kirpal Inquiry, the AAIB representative, and this investigator all concluded that the explosion did occur in the forward cargo compartment on the right side and all ruled out any explosion of any cause in the aft cargo compartment. That conclusion of the locus of explosion in the forward cargo compartment on the right side was based upon the physical evidence of shattered and frayed forward cargo door, inflight damage on right side such as the leading edge of right wing and the direct evidence of the CVR sudden loud sound. The ruling out of other locations such as cockpit and passenger cabin was determined by absence of any necessary corroborative evidence.

The possible location of an explosion from any source in the aft cargo compartment was extensively evaluated at the time based upon the subsequent accident of JAL 123 in which the aft pressure bulkhead cracked, caused an explosive decompression which led to loss of control of the Boeing 747 and its destruction. The removal and reinstallation of the aft cargo door stops before the fatal flight of Air India Flight 182 also caused intense examination for any type of explosion in the aft cargo compartment. There was suspicion of a potential problems in the

aft section of Air India Flight 182 and thus the area was extensively examined and evaluated for an explosion by all authorities. Evidence of ruptures were found in both cargo compartments but no evidence of an explosion of any source was found in the aft cargo compartment, only the forward. All of the aft area of Air India Flight 182, especially the aft cargo compartment, was examined by video cameras and 35 MM film and evaluated by all investigators for an explosion but none was found. The unanimous undisputed opinions of all authority was of an explosion in the forward cargo compartment and no explosion in the aft cargo compartment. The evidence against an explosion of any type in the aft cargo compartment can be summed up thusly:

- A. Absence of required corroborative evidence to support the assertion of aft cargo compartment bomb explosion.
- B. Transponder off simultaneously as FDR and CVR
- C. Inflight damage by flying debris to pieces of airframe well forward of the aft cargo compartment such as leading edge of wing and engines.
- D. Overpressures in both cargo compartments, not just the aft.
- E. Intact aft and bulk cargo doors.
- F. Much straight and undamaged fuselage skin in the aft section.
- G. Conclusive evidence of an explosion in the forward cargo compartment to explain the inflight breakup of Air India Flight 182.
- H. General trajectory patterns from wreckage debris locations that match two other early model Boeing 747s, Pan Am Flight 103 and Trans World Airlines Flight 800, that experienced inflight breakups amidships from an explosion in or near the forward cargo compartment, not the aft cargo compartment, as confirmed by the aircraft accident investigation authorities of the UK AAIB, and the USA NTSB.

A quote from the official Air India Flight 182 accident report states clearly:

" 2.11.6.5 Target 47 - Aft Cargo Compartment

This portion of the aft cargo compartment roller floor was located between BS 1600 and BS 1760. Based on the direction of cleat rotation on the skin panel (target 7) and the crossbeam displacement on this structure, target 47 moved aft in relation to the lower skin panel when it was detached from the lower skin. No other significant observation was noted. There was no evidence to indicate characteristics of an explosion emanating from the aft cargo compartment."

Another opinion has recently been offered by Mr. John Garstang, while acting as an independent investigator and assigned and assisting the RCMP AITF, that the explosion took place in the aft compartment and the source was a bomb. His implication is that no explosion of any cause took place in the forward cargo compartment. No new evidence has been presented to refute the earlier Canadian, Indian, British conclusions. If Mr. Garstang has evidence that explains how the Canadians, the British, the Indians, and this investigator got the location of the explosion wrong, then now is the time to present it among fellow investigators and not later on the witness stand during a highly public trial with inquisitive attorneys and incredulous reporters. A rebuttal to the Garstang report of 16 March 2001 with the conclusion of bomb in the aft cargo compartment is presented in the Smith AAR of AI 182 of 1 May 2001.

Since the bomb explosion in the aft cargo compartment explanation comes from the RCMP which is primarily a police agency seeking criminals, an analogy comes to mind:

There was once a bank with two vaults which had no access between them. One was called the forward vault and the other the aft vault. One day it was discovered that all the money was gone from both vaults. Investigators investigated.

One group determined that the missing money was gone from the forward vault because it was stolen by three criminals but the missing money from the aft vault was not stolen.

Another investigator said the missing money from the forward vault was not stolen but disappeared for a reason yet to be determined and the missing money from the aft vault was also not stolen.

Another group said the money was gone from both vaults, no reason was given for the missing money in the forward vault but missing money not stolen from the aft vault.

Years went by as yet another group assumed a crime and sought the thieves of the missing money in the forward vault but did not search for any thieves for the missing money in the aft vault as everyone agreed the missing money in the aft vault was not stolen and therefore there were no thieves to catch.

Another independent investigator came upon the event with research of other similar missing money from banks and matched similar events and concluded the money was missing from the forward vault because of a clerical error which has happened before and the missing money from the aft vault was a side

effect. There were no crimes nor thieves of either vaults.

And then, sixteen years after the event, three men are arrested as thieves for robbing the...the...aft vault!

And the agency with the most expertise about missing money in aft and forward vaults ponders whether to become involved.

I ask that agency to become involved and determine where and why the money went from both vaults to supplement their previous report of no money stolen from the aft vault.

We investigators are all on the same side on this issue of safety and the cause of accidents; we are all well intentioned; and we all want the right answers; honorable disagreement is normal and can usually be resolved by additional interpretation of facts. All factual criticism or rebuttal is welcomed via email or telephone or letter.

Let me show you below what a real bomb explosion looks like when it goes off in the aft cargo compartment of an early model 747. This event did not happen to Air India Flight 182 because this evidence of the Bruntingthorpe real bombing is absent in the wreckage of Air India Flight 182.

The above bomb explosion would have been heard on the CVR, there were not large skin pieces near the explosion, there was explosive residue, the damaged area was very large, and the leading edge of the wing was not damaged. None of that corroborative bomb explosion damage was seen in Air India Flight 182 wreckage.

Then let me show you below what a real electrically caused open forward cargo door in flight does to an early model 747, United Airlines Flight 811:

Above is United Airlines Flight 811 from NTSB AAR ('tremendous explosion' in the forward cargo compartment on the right side, as flightcrew was quoted).

Above is Air India Flight 182 from official AAR and matches United Airlines Flight 811, not the Bruntingthorpe bombing explosion evidence. Note the split longitudinally forward cargo door of Air India Flight 182 which matches exactly the recovered split cargo door of United Airlines Flight 811 picture below from NTSB AAR.

The corroborative real evidence which is present and matches Air India Flight 182 and United Airlines Flight 811 is listed below:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships

- F. (Intentionally left blank.)
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner
- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched

- AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)
- AE. Outwardly peeled skin on upper forward fuselage
- AF. Rectangular shape of shattered area around forward cargo door
- AG. Forward cargo door fractured in two longitudinally
- AH. Status of aft cargo door as latched
- AI. Passengers suffered decompression type injuries
- AJ. At least nine missing and never recovered passenger bodies
- AK. Initial official determination of probable cause as bomb explosion.
- AL. Initial official determination modified from bomb explosion
- AM. Structural failure considered for probable cause
- AN. Inadvertently opened forward cargo door considered for probable cause

Gentlemen, the immediate goal of this meeting is to gain consensus on the specific location of the explosion in Air India Flight 182 which caused the inflight breakup. Can we all agree at this time that the location was not the cockpit, the passenger cabin, the center fuel tank or the aft cargo compartment, all possible locations but ruled out by lack of corroborative evidence? Can we agree at this time, for the purposes of discussion, that the Canadians, the British, the Indians, and this independent investigator were correct and that the location of the explosion was in the forward cargo compartment on the right side based upon the physical evidence?

Assuming we do agree on the location of the explosion, what was the cause?

Well, that is the question isn't it? Here's some choices of explosion source: Bomb, center fuel tank, missile hit, midair collision, and explosive decompression from hull rupture from metal fatigue of open window or cargo door.

If it is determined that the cause of the explosion was a bomb explosion, then I will be glad to stand around the water cooler and swap conspiracy tales of spies, anonymous informants, bribes for testimony, knocked off witnesses, sabotage in suitcases, x-ray machines that don't work and sniffing dogs that can't smell, explosions in airports far away, army assaults on temples, and bombs that never seem to go off when and where they are supposed to when set by incompetent terrorists who do happen to sneak two bombs onto two Boeing 747s on the same day at the same large metropolitan airport.

Until then, I shall stick to the physical evidence in airplane crashes because, after all, Air India Flight 182 was an airplane crash, not a bank robbery or an assassination or a truck hijacking; all crimes which might include the above ingredients for a good action adventure movie.

Let me end my Part One presentation at this time by assuming, for the purposes of further discussion to Part Two, a consensus has been reached that the specific location of the explosion in Air India Flight 182 which led to its inflight breakup was in the forward cargo compartment on the right side. Unless rebuttal or criticism is offered, Part One is therefore completed.

The presentation will continue for Part Two in a few days via email for the determination of the cause of the explosion in Air India Flight 182. Let us use all the tools available to us in 2001 to find out the previously unstated cause of that powerful explosion

and clear up that mystery presented by the CASB. I welcome all criticism, contrary opinion, or comment on data and conclusions presented so far.

After a meeting, there are usually informal talks among the participants and the presenter, commonly about personal stuff. The possible abrasive personality and lack of people skills of this discoverer are irrelevant to the determination of the correct probable cause of Air India Flight 182 but the style and demeanor of the messenger is always looked at and questioned. People like me who offer contrary perceptions to conventional wisdom are seldom charmers as we realize our egos are not important, only the facts, data, and evidence and the conclusions that they imply so we bluntly present the facts and implications with little regard for etiquette. Forgive any rudeness from me, please.

Anyway, here's my aviation history:

Commercial pilot, instrument rated, former FAA Part 135 certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650 hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

And here's my story. My life was saved in 1967 when my pilot thought of me during stress and told me to eject from our on-fire two seat carrier jet during night landing practice. We both ejected; I lived and he died. My chute opened two seconds before I landed but he did not have those two seconds to open and he

died of multiple traumatic injuries when he hit the ground. I became interested in aviation safety. When Pan Am Flight 103 occurred I immediately suspected explosive decompression from a hull rupture and could not shake that belief based on news reports. A few months later United Airlines Flight 811 happened and I immediately made the match. I continued to investigate although authorities had quickly called Pan Am Flight 103 a bomb and United Airlines Flight 811 an improperly latched forward cargo door. My cargo door explanation for both accidents was published in Flying magazine in 1992 but nothing came of it. In 1995 the internet allowed me to do more research and I obtained AARs for 103 and 811. I tried to refute the open cargo door explanation but could not because the evidence was not there; in fact the reports made it even clearer. During this time I was writing to authorities of my alarm at the potential risk from the cargo door event happening again. It did. On July 17, 1996, Trans World Airlines Flight 800 suffered an inflight breakup that left all the similar evidence of United Airlines Flight 811 and Pan Am Flight 103. I made the immediate UAL 811 match and informed the authorities. Again Trans World Airlines Flight 800 was called a bomb; a probable cause which remained primary for a year and a half. Right after the Trans World Airlines Flight 800 event and again using the internet search abilities, I was able to research all the hull losses of Boeing 747s and sadly Air India Flight 182 jumped right out as another possible shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup event because of all the similarities of evidence to the other three, in particular United Airlines Flight 811, the incontrovertible cargo door caused event and incontrovertibly not a bomb explosion, although it was initially thought to be a bomb.

The evidence picks the flight numbers, not me, and if you know

of any more early model Boeing 747s that have experienced a hull rupture in flight from an internal explosion forward of the wing which leaves a sudden loud sound on the CVR followed abruptly by a power cut to the recorders, a foddred engine number three, inflight damage to right wing and right horizontal stabilizer, missing midspan latches and a shattered forward cargo door, please tell me so I can add that flight to the list of four, as all of them have most of this matching evidence.

They all had an inflight explosion near the forward edge of the wing and they were all thought to be bomb explosions but now have differing official explanations: Unstated and bomb for Air India Flight 182, bomb for Pan Am Flight 103, center tank explosion for Trans World Airlines Flight 800, and electrically caused open cargo door for United Airlines Flight 811. My common explanation for the common evidence is the common cause which unifies all, the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

However, that conclusion for all four 747s is for later; at this time there is but one tree under examination in this forest of four, Air India Flight 182. Based solely on the evidence of that aircraft wreckage and without comparing others, it was difficult to determine a probable cause for the explosion in 1986. All the investigators at the time did the best they could since they did not have the benefit of hindsight as we do. Explosive decompression caused by an inadvertently opened forward cargo door mimics a bomb explosion; the crew of United Airlines Flight 811 even reported to the tower they had a bomb go off after hearing the noise and looking at the damage. It's understandable to call the cause of Air India Flight 182 a bomb explosion at first blush.

I must emphasize that the Canadian investigators in 1986 have

made no errors of fact or judgment. There is nothing for the Canadians to correct or apologize for; they were right as far as they went. Their caution in stating the cause of the explosion as unknown was warranted, justified by lack of corroborative evidence, and proven correct these many years later. It is now possible to further clarify that earlier CASB report to state the cause of the explosion by a TSB supplemental report based on the similar accidents of the ensuing 16 years. There is still no official Canadian aviation authority modification to the unstated cause for the explosion and therefore the CASB report must be considered the current Canadian aviation authority opinion.

Why me as discoverer? I am able to be objective because I am not: An airline employee, an attorney, work for Boeing, work for government, not a police officer, and not a family member of a victim. It is that objectivity plus my experience of 40 years in aviation and living through an aircraft accident that lets me face the unpleasant truth that Boeing airliners have a fatal design flaw of outward opening nonplug cargo doors and faulty Poly-X wiring which have caused four early model Boeing 747 accidents. My job or reputation or welfare of my family is not on the line and I am able to speak frankly. I well understand the profound implications of the wiring/cargo door explanation for these controversial accidents. So be it. Safety is the priority and let the chips fall where they may.

I am able to pursue my belief in aviation safety, specifically hull ruptures in early model Boeing 747s, because I: Personally have been in a sudden night fiery jet fatal airplane crash, retired on a fixed income which gives me the time for research, and love a good mystery. Airplane crashes are always a mystery, sometimes hard to solve and sometimes easy. They are never supposed to happen but do; that's the mystery.

As accident investigators we all have a strong sense of justice and abhor injustice; in our case, the injustice of infants, children, and adult men and women who die in accidents that we know are preventable if we can only find out the causes so that they can be fixed and further deaths be prevented. We also know that if we get the probable cause wrong, then further injustice may occur; in this case, men imprisoned unjustly and reoccurring wiring problems in early model Boeing 747s.

We all have the common interest in solving those mysteries. You gentlemen have devoted your lives, your education, and your careers to the task; I respect you for that and thus offer my years of research, analysis, and conclusions to you for consideration and possible action.

Thank you for reading.

Please contact me at any time for any queries or discussion by phone, letter, or email at

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sincerely,
Barry

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>

Subject: Consensus on Cause of explosion in Air India Flight 182

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker,

5

July 01

Please allow me to present Part Two of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 as if I were in a conference room with members of the TSB listening to me for a period of time. Part Two is to establish a consensus on the cause of the explosion in the forward cargo compartment on the right side that led to the inflight breakup. May I begin, sir?

Participants:

Mr. Bill Tucker, Director General, Investigation Operations.

Director of Investigations-Air

Director of Engineering

Mr. John Garstang, Engineering Branch

Mr. Vic Gerden, Investigator in Charge, SWR 111.

John Barry Smith, Independent Aircraft Accident Investigator.

Thank you all for allowing me this second time to present an explanation for the possible cause of the fatal inflight breakup of Air India Flight 182 on 23 June, 1985. My goal is to persuade that there is a new possible, plausible, mechanical cause with precedent that exists for Air India Flight 182 and therefore an updated supplemental investigation and report to the 1986 CASB

AAR is warranted.

References:

Smith AAR for AI 182 with appendices, CASB report and the Kirpal Report for Air India Flight 182, NTSB AAR 90/01 and 92/02 for United Airlines Flight 811, AAIB 2/90 for Pan Am Flight 103, and NTSB AAR 00/03 for Trans World Airlines Flight 800. All are available electronically and can be sent to you by email; please ask and I will provide them to you.

Part Two: Consensus on Cause of explosion in Air India Flight 182

Assuming that we agree for purposes of discussion that the location of the explosion which caused the total inflight breakup of Air India Flight 182 was in the forward cargo compartment on the right side, what was the cause of that explosion?

Well, that is the key question, because once we determine the probable cause, it can be corrected so that it does not reoccur. What were the opinions of other investigators? As it turns out, there is conflict, contradiction, and confusion among all.

The Canadian aviation accident investigators in the CASB in 1985/86 determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side but declined to state the cause of that explosion although under much pressure to declare it a bomb explosion. Their conclusions are understandable based upon the physical evidence for the location of the explosion and the lack of evidence to determine the cause. The later similar event of United Airlines Flight 811 did not happen until four years later. Explosive decompression by hull rupture leaves no residue, or

timer, or metal casing of a bomb, or causes burns; all evidence lacking in Air India Flight 182 to support a bomb explosion explanation and therefore the bomb cause was not stated by the prudent Canadian investigators.

The British representative from the AAIB determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side and stated the cause of that explosion was not a bomb explosion but of an explosive decompression from a cause yet to be determined. Those conclusions are understandable based upon the physical evidence for the location of the explosion and the direct evidence of the sudden loud sound of the CVR which ruled out a bomb explosion and ruled in an explosive decompression by hull rupture of unknown cause based on what was known about wiring and cargo doors in 1985/86.

The Indian judicial investigating authority, Judge Kirpal, in the Kirpal Report determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side and stated the cause of that explosion to have been a bomb explosion. His findings are understandable based upon the physical evidence for the location of the explosion and the circumstantial evidence to deduce the cause as a bomb. In addition, the three assumptions upon which Judge Kirpal based his finding of a bomb explosion may have been valid in 1985 but were later shown to be incorrect in 1989 by a similar accident. The original aviation accident investigator, Mr. Khola, was replaced within days of the accident by a judicial officer of the Court, Judge Kirpal, and therefore the aircraft accident report became a legal inquiry which was denied the priority inputs of

aviation accident expert investigators who might have been expected to be less political and more prudent in stating the cause of the mystery explosion.

The recent declaration by a TSB investigator assigned to the RCMP, and at the behest of the AITF, that the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the aft cargo compartment and stated the cause of that explosion to have been a bomb explosion is not understandable because of the lack of new evidence or any reasoning which refutes the previous conclusions and findings of the Canadian, British, and Indian investigating authorities. This unsubstantiated conclusion of a bomb explosion in the aft cargo compartment also concludes there was no explosion of any cause in the forward cargo compartment which directly contradicts the tangible evidence of such an explosion and the opinions of the other accident investigators.

The conclusions reached by this independent aviation accident investigator that determined the location of the explosion which caused the inflight breakup which led to the destruction of Air India Flight 182 to have been in the forward cargo compartment on the right side and stated the cause of that explosion was not a bomb explosion but of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup sequence of events is understandable based upon his personal experiences in a sudden fatal jet airplane accident, the new research tool of the internet, the objectivity of not being connected to any of the parties and the luxury of hindsight. The conclusions of the location and cause of the explosion were based on the physical evidence, the data from recorders, the facts of previous preliminary and final reports from NTSB, TSB, and AAIB, and

the many significant matching similarities between other wide body airliner fatal accidents such as SWR 111, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. This independent investigator agrees with the Canadian, British and Indian accident investigators' conclusions of 1985/1986 regarding the location and consequences of the explosion and agrees with the British investigator as to the cause being explosive decompression and supplements that cause as a ruptured open forward cargo door inflight at one or both of the midspan latches probably from faulty wiring in the door unlatch motor circuit.

Summary of offered old and new opinions: Some investigators say the explosion was in the forward cargo compartment and not in the aft while one says explosion the aft cargo compartment and not the forward; one investigative agency declines to state the cause of that explosion, one says definitely not a bomb, one say a bomb in forward, another says bomb in aft, and another says wiring caused a forward cargo door to rupture open in flight causing explosive decompression which mimicked a bomb explosion.

The pondering, reluctance, and silence by the most authoritative and knowledgeable aviation safety accident agency for Air India Flight 182, the Transportation Safety Board of Canada, which also has close jurisdiction, is bewildering. There is a clear need for that aviation authority to step in and resolve all the conflicts, contradictions, and confusion as to what happened to Air India Flight 182 from an aviation accident investigation point of view, and not as a police action, a political event, or a judicial litigation. If the new cause of faulty wiring is correct, a present danger exists to the flying public. A TSB supplemental report of the earlier CASB report is urgently needed and clarifications

required that uses hindsight of the similar aviation events of the past 16 years in relation to Air India Flight 182.

Until then, let us look at the choices for the cause of the explosion in the forward cargo compartment on the right side:

Based upon precedent in all airliners who have suffered inflight breakups which caused a sudden loud sound on the cockpit voice recorder while proceeding normally, a possibility could be that of a bomb explosion, a gunshot, an explosive decompression by an inadvertently opened window or cargo door, turbulence, lightning strike, fuel tank explosion, or other explanation which might become apparent in years to come.

Many potential causes have been considered, evaluated, and ruled out: Lightning and turbulence were not in the vicinity of Air India Flight 182 and the flight recorders showed no unusual maneuvers prior to breakup. A gunshot or open window would be unlikely to cause the size hole necessary for the breakup since the 747 is designed to withstand a several foot wide hole in the fuselage (a safety aspect learned from the Comet hull rupture/explosive decompression/inflight breakups). A fuel tank explosion was unlikely because of the lack of fire damaged wreckage with only a few pieces of wreckage burnt. That leaves bomb explosion or the inadvertent opening of a very large section of pressurized hull for a reasonable explanation for the sudden inflight breakup of Air India Flight 182

Is there a precedent for either alternative? There is an official probable cause of a bomb explosion in an early model Boeing 747 in the forward cargo compartment causing an inflight breakup but that bomb was alleged to have been on the left side, not the right side. That event was Pan Am Flight 103. It also has

many other similarities such as the sudden loud sound on the CVR followed by an abrupt power cut to the recorders.

There is an official probable cause of an inadvertent opening of a very large section of pressurized hull in the forward cargo compartment causing a partial inflight breakup and that opening was on the right side. That event was United Airlines Flight 811. It also has many other similarities such as the sudden loud sound on the CVR followed by an abrupt power cut to the recorders. The closest official match to the events of Air India Flight 182 with its inflight breakup from an explosion in the forward cargo compartment on the right side is the inadvertent opening of a very large section of pressurized hull at the right side forward cargo door as shown by United Airlines Flight 811 below and Air India Flight 182 under it.

What caused the forward cargo door of United Airlines Flight 811 to inadvertently open in flight causing the explosive decompression and the partial inflight breakup? At first it was thought to have been a bomb explosion as reported by the flight crew who heard the explosion and saw the damage. After landing and ruling out a bomb, it was then thought to have been an improperly latched forward cargo door. An AAR was written with that probable cause made, NTSB AAR 90/01. That explanation was modified years later when the cargo door was retrieved from the ocean floor and found to have been properly latched but the wiring was frayed to bare wire and a switch may have been faulty so the probable cause of the inadvertently opened forward cargo door was changed to electrical wiring or

switch and a new, supplemental AAR was written, NTSB AAR 92/02, excerpt below:

"EXECUTIVE SUMMARY

On February 24, 1989, United Airlines flight 811, a Boeing 747-122, experienced an explosive decompression as it was climbing between 22,000 and 23,000 feet after taking off from Honolulu, Hawaii, en route to Sydney, Australia with 3 flightcrew, 15 flight attendants, and 337 passengers aboard. The airplane made a successful emergency landing at Honolulu and the occupants evacuated the airplane. Examination of the airplane revealed that the forward lower lobe cargo door had separated in flight and had caused extensive damage to the fuselage and cabin structure adjacent to the door. Nine of the passengers had been ejected from the airplane and lost at sea. A year after the accident, the Safety Board was uncertain that the cargo door would be located and recovered from the Pacific Ocean. The Safety Board decided to proceed with a final report based on the available evidence without the benefit of an actual examination of the door mechanism. The original report was adopted by the Safety Board on April 16, 1990, as NTSB/AAR-90/01.

Subsequently, on July 22, 1990, a search and recovery operation was begun by the U.S. Navy with the cost shared by the Safety Board, the Federal Aviation Administration, Boeing Aircraft Company, and United Airlines. The search and recovery effort was supported by Navy radar data on the separated cargo door, underwater sonar equipment, and a manned submersible vehicle. The effort was successful, and the cargo door was recovered in two pieces from the ocean floor at a depth of 14,200 feet on September 26 and October 1, 1990.

Before the recovery of the cargo door, the Safety Board believed that the door locking mechanisms had sustained damage in

service prior to the accident flight to the extent that the door could have been closed and appeared to have been locked, when in fact the door was not fully latched. This belief was expressed in the report and was supported by the evidence available at the time. However, upon examination of the door, the damage to the locking mechanism did not support this hypothesis. Rather, the evidence indicated that the latch cams had been backdriven from the closed position into a nearly open position after the door had been closed and locked. The latch cams had been driven into the lock sectors that deformed so that they failed to prevent the back-driving.

Thus, as a result of the recovery and examination of the cargo door, the Safety Board's original analysis and probable cause have been modified. This report incorporates these changes and supersedes NTSB/AAR-90/01.

The issues in this investigation centered around the design and certification of the B-747 cargo doors, the operation and maintenance to assure the continuing airworthiness of the doors, cabin safety, and emergency response.

The National Transportation Safety Board determines that the probable cause of this accident was the sudden opening of the forward lower lobe cargo door in flight and the subsequent explosive decompression. The door opening was attributed to a faulty switch or wiring in the door control system which permitted electrical actuation of the door latches toward the unlatched position after initial door closure and before takeoff. Contributing to the cause of the accident was a deficiency in the design of the cargo door locking mechanisms, which made them susceptible to deformation, allowing the door to become unlatched after being properly latched and locked. Also contributing to the accident was a lack of timely corrective actions by Boeing and the FAA following a 1987 cargo door opening incident on a Pan Am B-747.

As a result of this investigation, the Safety Board issued safety recommendations concerning cargo doors and other nonplug doors on pressurized transport category airplanes, cabin safety, and emergency response."

Below from CASB AAR for Air India Flight 182:

"All cargo doors were found intact and attached to the fuselage structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed. Because the damage appeared to be different than that seen on other wreckage pieces, an attempt to recover the door was made by CCGS John Cabot. Shortly after the wreckage broke clear of the water, the area of the door to which the lift cable was attached broke free from the cargo door, and the wreckage settled back onto the sea bed. An attempt to relocate the door was unsuccessful."

Years later, with Trans World Airlines Flight 800 and SWR 111 occurring, the terrible aging characteristics of Kaptonized type wiring became apparent in commercial airliners while having been known to military aircraft.. The wiring/cargo door probable cause for Air India Flight 182 includes events, evidence, and faults which are well documented and have precedents such as the catastrophic consequences of an inadvertently open cargo door in flight with the DC-10 and Boeing 747 aircraft and faulty wiring causing causing problems in MD-11 and Boeing 747 aircraft.

This investigator further refines the cause of the explosive

decompression by the inadvertently opened forward cargo door of United Airlines Flight 811 to be faulty wiring and the initial location of the failure of the forward cargo door to be the rupture at one or both of the midspan latches.

I offer the same explanation for Air India Flight 182: Faulty wiring causing the rupture of one or both of the midspan latches of the forward cargo door causing the explosive decompression which caused the inflight breakup.

Further evidence which matches the incontrovertible open cargo door explanation for United Airlines Flight 811 exists in the evidence matches between Air India Flight 182 and United Airlines Flight 811 below, presented in Part 1 and the Smith AAR for AI 182 and repeated here:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. (Intentionally left blank.)
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to

data recorders

P. Initial event sound not matched to explosion of bomb sound

Q. Initial event sound is matched to explosive decompression sound in wide body airliner

R. Torn off skin on fuselage above forward cargo door area

S. Evidence of explosion in forward cargo compartment

T. Foreign object damage to engine or cowling of engine number three

U. Foreign object damage to engine or cowling of engine number four

V. Right wing leading edge damaged in flight

W. Vertical stabilizer damaged in flight

X. Right horizontal stabilizer damaged in flight

Y. More severe inflight damage on starboard side than port side

Z. Port side relatively undamaged by inflight debris

AA. Vertical fuselage tear lines just aft or forward of the forward cargo door

AB. Fracture/tear/rupture at a midspan latch of forward cargo door

AC. Midspan latching status of forward cargo door not reported as latched

AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)

AE. Outwardly peeled skin on upper forward fuselage

AF. Rectangular shape of shattered area around forward cargo door

AG. Forward cargo door fractured in two longitudinally

AH. Status of aft cargo door as latched

AI. Passengers suffered decompression type injuries

AJ. At least nine missing and never recovered passenger bodies

AK. Initial official determination of probable cause as bomb explosion.

AL. Initial official determination modified from bomb explosion

AM. Structural failure considered for probable cause

AN. Inadvertently opened forward cargo door considered for probable cause

The bomb explanation opinion for the explosion in the forward cargo compartment of Air India Flight 182 is only stated by one of the four authorities investigating which was the Indians in its Kirpal report, written by a judge, not an aviation accident investigator, and was based on assumptions later proven to be incorrect. The Indian Judge stated the cause was a bomb possibly because there was no other reasonable alternative offered to him in 1985/1986. He also based the choice of bomb explosion cause on premises that were later proven to be unreliable which were explosive decompression by structural failure could not cause an abrupt power cut to the flight recorders and it can, twinning could not be produced by an explosive decompression and it can, and floor panels can appear to be broken upwards when in fact the floor beams were broken downward. He also could not have been aware of the several airworthiness directives issued to correct faults in the cargo doors that only became apparent in the ensuing years.

Summary of evidence for a bomb explosion in Air India Flight 182:

A. Blackened erosion on some seat cushions.

B. Cabinet had dent in it.

C. Minor fire and explosive damage in cabin.

D. Sudden and massive structural failure.

E. The lining in one suitcase was severely tattered;

F. Although the wooden spares box was burned, this could have happened after the occurrence;

G. Although pieces of an overhead locker were damaged by fire, it is not known if the burning happened at the time of the

occurrence;

H. Although the pieces of U-section alloy clearly indicated evidence of an explosion, it is quite possible that these pieces were not associated with the aircraft;

I. The bottoms of some seat cushions show indications of a possible explosion;

J. The inside of the right wing root fillet appears to have been scorched; and

K. The deformation of the floor of the upper deck storage cabinet might have been caused by an explosive shock wave generated below the cabin floor and inboard from the cabinet.

L. Damage to the floor station and the presence of the fragments.

M. Targets 362/396 and 399 which contain some evidence that an explosion emanated from the forward cargo compartment.

N. Curling, cork-screwing, and saw tooth edges may also be indicative of an explosion though such fractures by themselves may not be conclusive evidence that an explosion was involved.

O. The bang could have been caused by a rapid decompression but it could also have been caused by an explosive device.

P. Marked similarities between the spectra of Indian Airlines 737 and Air India's Kanishka CVR.

Q. Twinning on fragments of wreckage.

Summary of evidence against a bomb explosion for Air India Flight 182:

R. Wooden boxes were found broken apart exhibiting no burn marks.

S. An electronic device was found among some floating wreckage and was not modified as a detonating device.

T. There was no evidence to indicate characteristics of an explosion emanating from the aft cargo compartment.

U. No part of an explosive device, its detonator or timing

mechanism was recovered.

V. Certain characteristics of the noise indicate the possibility that the noise was the result of an explosive decompression.

W. From the examination of the wreckage recovered and wreckage on the bottom, there is no indication that a fire or explosion emanated from the cabin or flight deck areas.

X. The medical examination of the bodies also showed no fire or explosion type injuries.

Y. A portion of the aft cargo compartment roller floor shows no indications characteristic of an explosion emanating from the aft cargo compartment.

Z. No evidence of fire burns or explosive material could be found.

AA. The floating wreckage recovered and showed there was no evidence of fire internal or external.

AB. Examination of clothing from the bodies did not show any explosive fractures or any signs of burning.

AC. The seat cushions and head cushions also did not show any explosive characteristics.

AD. A number of lavatory doors and structure also did not show any damage consistent with explosion. The flight deck door showed no explosion damage inside or outside.

AE. There was no significant fire or explosion in the flight deck, first and tourist passenger cabin including several lavatories and the rear bulk cargo hold.

AF. The bang could have been caused by a rapid decompression and no sound of a 'bomb' preceded the bang.

AG. The only conclusion which can, however, be arrived at by the Court is that the aircraft had broken in midair and that there has been a rapid decompression in the aircraft.

AH. Twinning evidence is unreliable because of poor examining conditions and a powerful explosive decompression can be the cause of it.

To sum up the only two reasonable explanations for the cause of the explosion in the forward cargo compartment on the right side that caused the inflight breakup of Air India Flight 182 which are bomb explosion or inadvertently opened forward cargo door in flight:

1. Bomb explosion explanation has no exact precedent, the available supporting evidence is weak with alternative benign explanations for its presence, the required necessary corroborative evidence of a bomb explosion is absent, and the basis for the only authoritative opinion in 1986 of a bomb explosion has now been shown to be faulty by a subsequent accident and the bomb opinion finding was made by a non-aviation accident investigator.

2. Wiring/cargo door explanation has a very close precedent which has many significant evidence matches to Air India Flight 182, and subsequent accidents have confirmed the strong suspicions that faulty wiring is the initial cause, and the bomb conclusion was unstated by Canadian aircraft accident investigators and ruled out by the British.

Air India Flight 182 did explode in flight; there has to be an explanation for the explosion. The two most likely possibilities are bomb explosion and hull rupture causing explosive decompression. Based upon the above reasoning, this investigator submits that the most likely cause to be that of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup sequence of events and not that of a bomb explosion although the first understandable false impression for Air India Flight 182 was that of a bomb by the noise, the damage, and political circumstances at the time of the explosion.

An analogy comes to mind:

A man is found lying dead in the street with blood coming from his head. There is a foreign man nearby who has a gun in his pants and is a known enemy of the dead man. The authorities blame the man with the gun and prefer not to check into the health records of the dead man nor examine the slippery pavement with the high curb in a favorite shopping mall. Years later, the man with the gun is charged with the crime based on the circumstantial evidence of the presence of the gun, the bleeding from the head of the dead man and the loss of blood that led to the death although the gun had not been fired and the gash in the dead man's head was too small for a gunshot wound. An independent investigator presents evidence that the dead man had had a history of aneurysms in his brain and probably slipped on the pavement as he was falling and hit his head on the curb causing the bloody gash. The artery had burst in the dead man's head and the ensuing internal loss of blood led to his death. And it had happened again years later to members of the dead man's family which had a genetic weakness in their brain arteries causing them to burst when they shouldn't. The dead man and his family are beloved and people did not want to think there was an inherent flaw in the lineage but preferred to blame the foreigner with a gun.

I submit to you gentlemen that the obvious and most satisfying explanation for a complex accident is not always the correct one. Aviation accidents are extremely complex and hindsight is a rare luxury. Please use that luxury and issue a supplemental report on the extremely complex aviation accident of Air India Flight 182 which indicates there may be an inherent flaw in early model Boeing 747s in the wiring and non plug cargo doors.

If there is consensus for the possible cause of the explosion in the forward cargo compartment on the right side that led to the inflight breakup of Air India Flight 182 to be faulty wiring causing a cargo door rupture, then Part Three will be presented which presents conclusions, recommendations, and implications of that mechanical explanation.

Thank you for reading.

Please contact me at any time for any queries or discussion by phone, letter, or email at

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Sincerely,

Barry

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: PDF Consensus on Cause of explosion in Air India Flight 182

Cc:

Bcc:

X-Attachments: :Master:341462:tuckertwo.pdf:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker,

6 July

01

Attached is Part Two of my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup presentation in PDF format. It is identical to the email just sent. PDF may be easier to forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: PDF of Conclusions, Recommendations, and
Implications of wiring/cargo door explanation, Part Three
Cc:
Bcc:
X-Attachments: :Master:341462:tuckerthree.pdf:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
01

6 July

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rupture/explosive decompression/inflight breakup presentation in PDF format. It is identical to the email just sent. PDF may be easier to forward as the pictures and text are in one file.

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To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Conclusions, Recommendations, and Implications of wiring/cargo door explanation, Part Three
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
July 01

4

Please allow me to present Part Three of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 as if I were in a conference room with members of the TSB listening to me for a period of time. Part Three is to present the conclusions,

recommendations, and implications of the explanation for Air India Flight 182. May I begin, sir?

Participants:

Mr. Bill Tucker, Director General, Investigation Operations.

Director of Investigations-Air

Director of Engineering

Mr. John Garstang, Engineering Branch

Mr. Vic Gerden, Investigator in Charge, SWR 111.

John Barry Smith, Independent Aircraft Accident Investigator.

Thank you all for allowing me this third time to present an explanation for the possible cause of the fatal inflight breakup of Air India Flight 182 on 23 June, 1985. Part Three is to present the conclusions, recommendations, and implications of the explanation.

References:

Smith AAR for AI 182 with appendices, CASB report and the Kirpal Report for Air India Flight 182, NTSB AAR 90/01 and 92/02 for United Airlines Flight 811, AAIB 2/90 for Pan Am Flight 103, and NTSB AAR 00/03 for Trans World Airlines Flight 800. All are available electronically and can be sent to you by email; please ask and I will provide them to you.

An analogy comes to mind:

Galileo was an amateur astronomer and announced that based upon his years of research and analysis of visual evidence of the skies that, counter to intuition, the earth in fact revolves around the sun and not the other way around. He was told no, he's wrong, he's crazy, he's ignored, he's told to shut up, but he kept on reviewing his evidence, realized his conclusions were still

correct, understood the profound implications of his discovery, and kept on talking and publishing his findings.

He said to the authorities and the public, "Come over here, look through this telescope, see with your own eyes the moons of Jupiter which go around the planet and see how the planet goes around the sun, just like us. There is precedent for a moon going round a planet and a planet going round the sun, just like us. I conclude we go round the sun, not the other way around.

The authorities and the public said, "We don't need no stinking telescopes, we can stand in our front yard and see the sun go round us. You're wrong and we are ignoring you." No scientific rebuttal evidence was ever presented to refute the earth goes round the sun explanation, only common opinions from non astronomers who held positions of power and silence from other astronomers.

He continued presenting his evidence which was irrefutable that the earth goes round the sun. The authorities held a meeting. They asked of themselves, "What can we live with? Can we live with the sun going round the earth?" They all agreed that they can live with that since that's the way it was for years and everything seemed to be OK. They asked, "Can we live with the earth going round the sun?" They all agreed that they could not live with that because books would have to be revised and rewritten; reputations would be tarnished; and the people would be uneasy. The authorities concluded the sun goes round the earth because that was the most satisfactory answer that most of the people could live with, and what the heck, what difference did it make?

Galileo spent the rest of his life under house arrest, no new

support was given to the earth round the sun explanation, and all the while the moon still went round the earth and the earth still went round the sun.

I am asking the authorities to look through the telescope of the internet at these official government AARs for Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800, SWR 111, as well as my own report, the Smith AAR for AI 182, to see the precedent and the evidence matches and similarities among all events which indicate they are just like United Airlines Flight 811 which contrary to intuition and first official reports, was not a bomb explosion but was a electrical/cargo door rupture explosive decompression.

The machine killed the humans, not the other way around.

Assuming for the purposes of this discussion:

The CASB, the British AAIB representative, the Indian Kirpal Inquiry, and this independent accident investigator are correct in stating that the location of the explosion which caused the inflight breakup of Air India Flight 182 which led to its destruction was in the forward cargo compartment on the right side; and,

This independent investigator is correct in stating the cause of that explosion is explosive decompression when the forward cargo door ruptures open in flight at one or both of the midspan latches caused by faulty wiring shorting on the door unlatch motor;

What are the implications of such a conclusion?

1. There exists a present danger to the flying public of the wiring again failing and turning the unlatch cams to the open position which could reproduce the fatal events of United Airlines Flight 811 in the 500 active early model Boeing 747s.
2. The Canadians were correct in 1985/86 in their CASB report in their location of the explosion and prudent in their caution for declining to state the cause.
3. There was no bomb explosion which means no crime which means no criminals which means the three on trial for the 'bombing' are innocent of that particular crime.
4. The Indian Kirpal Inquiry was correct on the location of the explosion but incorrect on the cause of it which is understandable based upon what was known about wiring and cargo doors in 1985/86.
5. The British AAIB representative was correct in location of the explosion and the cause as non-bomb and of a cause yet to be determined.
6. Outward opening nonplug doors will find a way to open inadvertently in flight regardless of AD 'fixes' and should be modified to plug type doors.
7. Poly-X Kaptonized type wiring is faulty and should be replaced in all airliners that have it installed.
8. The shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup probable cause may have also occurred in Pan Am Flight 103.
9. The shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup probable cause may have also occurred in Trans World Airlines Flight 800 and therefore the center fuel tank explosion was not the initial event but secondary.

I ask that the TSB advance the safety of the aviation transportation mode by conducting an independent supplemental investigation, including, when necessary, a public inquiry into

the transportation occurrence of Air India Flight 182 in order to make findings as to the causes and contributing factors;

- * - identifying safety deficiencies as evidenced by transportation occurrences such as Pan Am Flight 103, United Airlines Flight 811, Trans World Airlines Flight 800, and SWR 111,
- * - making recommendations designed to eliminate or reduce any such safety deficiencies, such as faulty wiring and non plug cargo doors; and
- * - reporting publicly on its investigations and on the findings in relation thereto in a supplemental, modified report of the 1986 CASB AAR.

Forgive my presumptuousness in suggesting a way to proceed but I realize you are the only ones with the authority and means of access to determine once and for all the cause of the Air India Flight 182 destruction:

1. Contact NTSB, AAIB, RCMP, and FAA, and state intentions to rule in or rule out the possible mechanical cause of wiring for Air India Flight 182 and request assistance. Many of the investigators that worked on the original AAR are still active and can provide first hand corroboration of new suspicions. These gentlemen below from US FAA and NTSB are fully aware of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation and may assist:

Robert Francis II
Vice Chairman
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Thomas E. Haueter
Chief, Major Investigations Division
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

John B. Drake
Division Chief
Aviation Engineering Division
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Al Dickinson,
Lead Investigator, TWA 800
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

James F. Wildey II
National Resource Specialist
National Transportation Safety Board
490 L'Enfant Plaza East, SW.
Washington, DC 20594

Thomas McSweeney
Director, Aircraft Certification Service
FAA National Headquarters
800 Independence Avenue, S.W
Washington D.C 20591

Lyle Streeter
FAA AAI

Aircraft Accident Investigator
FAA National Headquarters
800 Independence Avenue, S.W
Building FOB 10A, Room 838,
Washington D.C 20591

Ron Wojnar,
Manager
Federal Aviation Administration
Transport Airplane Directorate
1601 Lind Ave. S.W.
Renton, WA 98055-4056

Neil Schalekamp
Manager, Propulsion & Mechanical Systems and Cabin Safety
Branch
Transport Standards Staff
Transport Airplane Directorate, ANM-100
1601 Lind Ave. S.W.
Renton, WA 98055-4056

Bob Breneman,
Aerospace Engineer,
Federal Aviation Administration
Transport Airplane Directorate, ANM-100
1601 Lind Ave. S.W.
Renton, WA 98055-4056

2. Obtain evidence from respective agencies in their countries.

Air India Flight 182:

1. Copies of all videotapes, photographs, interview notes, and

sketches now held by the RCMP, TSB, NTSB, AAIB, and BARC to include about 50 video tapes and nearly 3000 still photographs taken.

2. Access to all hard evidence of the wreckage which was retrieved from ocean now in Bombay.
3. Interviews with TSB, AAIB, and NTSB investigators who contributed to the AI 182 report through deposition or voluntary meeting.
4. Autopsy reports now held by Indian authorities.
5. Wreckage database and plots held by TSB
6. Passenger and cargo manifests held by TSB.
7. CVR and FDR printouts held by TSB.
8. All picture albums made of the wreckage, albums now held by TSB.

United Airlines Flight 811:

1. Copies of all videotapes, photographs, interview notes, and sketches now held by the NTSB.
2. Access to any existing wreckage.
3. Interviews with NTSB metallurgists, explosive expert and American law enforcement involved with the investigation.
4. Autopsy reports.
5. Wreckage database and plots.
6. Passenger and cargo manifests.
7. CVR and FDR printouts.

Pan Am Flight 103:

1. Interviews with NTSB metallurgists and Boeing explosive expert and British law enforcement involved with the

investigation.

2. Copies of all videotapes, photographs, interview notes, and sketches now held by the AAIB and Scotland Yard.
3. Access inside the hangar at Farnborough of the Pan Am 103 wreckage.
4. Autopsy reports.
5. Wreckage database and plots.
6. Passenger and cargo manifests.
7. CVR and FDR printouts.

Trans World Airlines Flight 800

1. Access to the hangar where the wreckage of TWA 800 is stored for at least 40 hours (five days at 8 hours a day) by at least five of your team.
2. Copies of all photographs, videotapes, interviews about TWA 800 now held by FBI and NTSB.
3. Interviews with NTSB metallurgists, explosive expert and American law enforcement involved with the investigation.
4. Autopsy reports.
5. Wreckage database and plots.
6. Passenger and cargo manifests.
7. CVR and FDR printouts.

Manufacturer:

1. Copies of all memos, data, and information about cargo doors and cargo holds on Boeing 747s.
2. Copies of all memos, data, and information about cargo doors and cargo holds on DC-10, MD-11, and MD-12.

Airlines:

Pan Am, TWA, Air India, United Airlines:

1. Copies of all videotapes, photographs, interview notes, and sketches regarding PA 103, AI 182, TWA 800, and UAL 811
2. Access to any existing wreckage held by them.
3. Interviews with airline staff involved with the accidents.
4. Maintenance logs for the accident aircraft long before and just before the fatal flights.

Miscellaneous:

1. Copies of all data about Canadian Pacific Air Flight 003, another Boeing 747 supposed to have a bomb on board.
2. Copies of all Data about Airworthiness Directives about cargo door on commercial airliners held by FAA and NTSB data banks.
3. Examine closely the actual wreckage in hangars or evidence on videotape and 35 mm color film for matching clues of United Airlines Flight 811 in the midspan latch area, the bottom latch area and all around the forward cargo door which has been implicated in all four events.

From Kirpal Report:

- 3.2.9.1 All wreckage sighted was recorded on video tapes and all major items were recorded on 35 mm positive film.
- 3.2.10.12 After detailed macro photography of the recovered wreckage, the experts group mentioned in section 1.5.16 prepared a detailed factual report after carefully inspecting each of the targets recovered.

Recommendations:

1. Inspect all cargo door wiring for exposed bare wire in early model (-100 and -200 series) Boeing 747s.
2. Replace known faulty aromatic polyimide wiring in airliners.
3. Modify non-plug cargo doors into plug type doors.

The implications of the wiring/cargo door explanation are profound, controversial, and have great consequences for the flying public all over the world. The countries of USA, Canada, India, UK, New Zealand, Libya, and India are all directly involved by their investigations of years and millions of dollars and the loss of hundreds of their citizens as victims in the air and on the ground. Police type investigative agencies such as CIA, FBI, Scotland Yard, CSIS, RCMP, will have their procedures and findings reexamined. Aviation agencies such as NTSB, FAA, AAIB and TSB will have their probable causes modified. Lawsuits will proliferate as hundreds of millions of dollars will change hands. Insurance companies will readjust their premiums to reflect the real risks of mechanical failure and the lesser risks of sabotage. Careers will be enhanced or diminished. Reputations will be made or damaged. And on and on....

But, after all is said and done, after the new probable cause is determined, recommendations are made and implemented, flying will be a little safer, the risk of dying will be a little less, the people of the world will be a little bit less afraid of their fellow citizens. And those are good things.

Thank you for reading.

Please contact me at any time for any queries or discussion by phone, letter, or email at
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sincerely,
Barry

Quotes about evidence for Air India Flight 182 Reports:

FEBRUARY 26, 1986 3.2.6.5 To facilitate identification of the wreckage located by Scarab it was necessary to position aircraft maintenance personnel on board the ship. As the aircraft structure was badly torn, mutilated and distorted, serious difficulty was anticipated in identification of small pieces of structure. It was therefore essential that these maintenance personnel were provided with aircraft photographs, manufacturing drawings, parts catalogue, wiring diagram manuals and maintenance manuals.

3.2.9.1 All wreckage sighted was recorded on video tapes and all major items were recorded on 35 mm positive film.

3.2.10.1 During recovery operation the video tapes as well as photographs of the wreckage to be recovered, were supplied to the personnel on board the ship for facilitating identification and recovery of correct targets.

All the personnel involved in the recovery operation were shown the slides and photographs of the targets which were chosen for recovery on priority basis. The method and procedure of the recovery operation was discussed in detail and finalised. Another meeting was convened on 6.10.85

to clarify the doubts and to present the picture albums containing various photographs of targets to be recovered.

3.2.10.12 After detailed macro photography of the recovered wreckage, the experts group mentioned in section 1.5.16 prepared a detailed factual report after carefully inspecting each of the targets recovered. It was decided to send the wreckage to Bombay for which necessary crates were then prepared and the

large pieces of wreckage were cut along the lines indicated by the experts group to facilitate their packing.

3.2.10.15 Efforts were made to repair Scarab so that the ship John Cabot could sail again in order to salvage as many pieces as possible. It was fortunate that the weather had not deteriorated. Some of the important but small pieces which had to be recovered had been placed in a basket at the bottom of the ocean. The ship sailed out again after Scarab had been repaired. The basket was sought to be lifted, but, unfortunately, when it reached near the surface of the sea it overturned and the contents of the basket spilled and were never traced again.

3.2.1.5 Next phase was the task of :

- (a) Locating hundreds of pieces of wreckage by the combined use of sonar and video monitors.
- (b) Video and still photography of the pieces of wreckage.
- (c) Plotting the distribution of the wreckage.

All this was to be carried out under the directions of the Court.

3.2.2.1 The means (vehicles/equipment) proposed to be used in the locating, mapping and video photography of the wreckage were the CCGS John Cabot and SCARAB II.

3.2.2.4 The SCARAB II is a state-of-the-art system designed and built for tethered unmanned work at ocean depths of upto 6000 feet. Scarab's standard equipment are :

A complete optical suite.

3.2.2.5 The manipulators have a choice of grippers/claws/cutters etc. of any required description and size. The Scarab has three TV cameras mounted on separate pan/tilt mechanism to allow real time observation and video tape documentation. A 35 mm still camera was also installed and used in the present work. There was a choice of quartz-iodide flood lights to provide illumination.

3.2.2.7 The Scarab was equipped with a 360° high resolution Sonar with a range of 1000 meters. The Sonar was also capable of interrogating and detecting 37 KHz and 27 KHz pingers. It can function independently of the ship's facilities and is equipped with power generators and semiautomatic handling equipment.

3.2.5.1 The Scarab provided video tapes and still photographs. In the initial stages (upto 9.8.1985) the John Cabot was operating in peripheral areas and therefore few targets were found. Hence the output of videotapes was small. In fact upto 9.8.85, only about 10 targets were found and only 3 video tapes were used up. But later, when John Cabot came close to and into the crucial areas, video tapes were recorded at a fast rate. Further, still photography facility on the Scarab was activated at about this time. Therefore, arrangements were made periodically to obtain the video tapes and films from John Cabot. Video tapes and still photographs (these required to be processed) were transported from John Cabot to Cork Control Centre.

3.2.5.2 About 50 video tapes and nearly 3000 still photographs (positives and transparencies) provided the visual information on the targets.

Arrangements had to be made at Cork for such viewing and study of the video tapes and still photographs. Video equipment (TV monitor plus VCR) suitable for viewing the video tapes had to be arranged.

3.2.5.3 The still photography used special professional quality colour film (35 mm), each roll having 800 frames. The film was diapositive. These had to be developed and transparencies obtained from them. Thereafter negatives and prints had to be made. Special equipment for viewing the transparencies had to be provided for continuous work. The video tapes, transparencies and prints provided the principal means of monitoring of the results of the operation

3.2.6.5 To facilitate identification of the wreckage located by

Scarab it was necessary to position aircraft maintenance personnel on board the ship. As the aircraft structure was badly torn, mutilated and distorted, serious difficulty was anticipated in identification of small pieces of structure. It was therefore essential that these maintenance personnel were provided with aircraft photographs, manufacturing drawings, parts catalogue, wiring diagram manuals and maintenance manuals. Since carriage of such voluminous literature was not practicable, 3M micro film reader printer machines with micro film cassettes of the above literature were produced and installed on the ship. In case of difficulty of locating any particular information, the engineers were advised to contact Cork Search Centre by telex or telephone who, in turn, could seek the desired information from the manufacturers.

3.2.9 Extent of Damage

Photographic and Video Interpretation of Wreckage

Photographic Interpretation

3.2.9.1 All wreckage sighted was recorded on video tapes and all major items were recorded on 35 mm positive film. During the course of the investigation, several members of the investigation team had the opportunity to view the tapes and photographs. Subsequently, when some items were recovered, it became apparent that the optical image presented on video and still film had some limitation with respect to identification of damage or damage pattern. For example, the sine wave bending of target 7 appeared in the video and photographs as a sine wave fracture, and some of the buckling on target 35 was not evident in either the video or photographs. The interpretation of damage through photographic/video evidence without the physical evidence might be misleading, and any interpretation should take this into account.

3.2.10.1 During recovery operation the video tapes as well as photographs of the wreckage to be recovered, were supplied to the personnel on board the ship for facilitating identification and recovery of correct targets.

3.2.10.8 A meeting was held at 1400 hrs. on 4.10.85 on board CCGS John Cabot to establish/clarify the priorities for the wreckage recovery operation and coordination between John Cabot, Kreuzturm and Cork Search Centre. All the personnel involved in the recovery operation were shown the slides and photographs of the targets which were chosen for recovery on priority basis. The method and procedure of the recovery operation was discussed in detail and finalised. Another meeting was convened on 6.10.85 to clarify the doubts and to present the picture albums containing various photographs of targets to be recovered.

3.2.10.9 A detail log of the activities of the ships John Cabot and Kreuzturm which started the recovery operation of 10.10.85, reveals the following :

(a) The Scarab working independently recovered the following

- (1) Basket at target 192 containing copilot's chair, 2 suitcases and radar antenna (12.10.85)
- (2) Target 8 - Lower fuselage skin of aft cargo compartment. (11.10.85).
- (3) Target 245 - Forward belly skin just aft of radome (16.10.85).
- (4) Target 350 - Economy class seats and carpet (23.10.85).
- (5) Target 296 - Piece of aft pressure bulkhead.

(b) The Scarab after attaching the grippers, bridal cable and lift line to the targets buoyed off the same to Kreuzturm which recovered the following targets :

- (1) Target 362/396 - Forward cargo fuselage skin from station 700 to 840 and STR 41L to 43R. (16.10.85).

- (2) Target 193 - Fuselage skin from station 720 to 860 and passenger door 2L (17.10.85)
- (3) Target 223 - Nose landing gear pressure deck web and stiffeners, container pieces (station 260-340)(19.10.85).
- (4) Target 181 - Wing skin with forward cargo compartment SLIPPED OFF WITH GRIPPERS (21.10.85) AND WAS LOST.
- (5) Target 399/358 - Fuselage skin from station 780 to 940 and STR 7R to 35R with 2R door (25.10.85). A body entrapped in target 399/358 was recovered. Another body which came up to surface with the wreckage fell off into sea and was lost while hauling the wreckage on board. The recovered body was identified as of Dr. Mathew Alexander, a Canadian passenger and was brought to Cork by Fisherman's vessel "Orion" at 0130 hrs. on 28.10.85 and was sent for Post Mortem etc.
- (6) Target 7 - Aft cargo compartment fuselage skin from station 1480 to 1860 (26.10.85).
- (7) Target 47/50 - Aft cargo floor structure with roller tracks, frames, latch etc. from station 1600 to 1760 (27.10.85).
- (8) Target 117 - Three rows of coach class seats with passenger cabin floor boards, broken floor beam (28.10.85).
- (9) Target 35 - Aft Pressure Bulkhead piece (30.10.85).

3.2.10.12 After detailed macro photography of the recovered wreckage, the experts group mentioned in section 1.5.16 prepared a detailed factual report after carefully inspecting each of the targets recovered. It was decided to send the wreckage to Bombay for which necessary crates were then prepared and the large pieces of wreckage were cut along the lines indicated by the experts group to facilitate their packing.

Act provides the legal framework governing the TSB's activities. Basically, the TSB has a mandate to advance safety in the marine, pipeline, rail, and aviation modes of transportation by:

- * - conducting independent investigations, including, when necessary, public inquiries, into selected transportation occurrences in order to make findings as to their causes and contributing factors;
- * - identifying safety deficiencies as evidenced by transportation occurrences;
- * - making recommendations designed to eliminate or reduce any such safety deficiencies; and
- * - reporting publicly on its investigations and on the findings in relation thereto.

INDEPENDENCE

To enable the public to have confidence in the transportation accident investigation process, it is essential that the investigating agency be, and be seen to be, independent and free from any conflicts of interest when it investigates accidents, identifies safety deficiencies and makes safety recommendations. Independence is a key feature of the TSB. The board reports to Parliament through the President of the Queen's Privy Council for Canada and is separate from the other government agencies and departments. Its independence enables it to be fully objective in arriving at its conclusions and recommendations.

X-From_: Bill.Tucker@tsb.gc.ca Fri Jul 13 17:36:16 2001

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

To: "John Barry Smith" <barry@corazon.com>

Subject: RE: Consensus on Cause of explosion in Air India Flight 182

Date: Fri, 13 Jul 2001 20:38:37 -0400

Dear Mr. Smith,

Thanks. I was able to open the first file you sent (both formats), but I'll have to close a few applications before I can open the pictures. I am about to go on holidays, but I have printed your "conference room" text to read while I am away.

Sincerely,

Bill T..

---Original Message-----

From: John Barry Smith [SMTP:barry@corazon.com]
Sent: Thursday, July 05, 2001 11:17 PM
To: Tucker, Bill
Subject: PDF Consensus on Cause of explosion in Air
India
Flight 182

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker,
6 July 01

Attached is Part Two of my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup presentation

in PDF

format. It is identical to the email just sent. PDF may be easier to

forward as the pictures and text are in one file.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924

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> Sent: Thursday, July 05, 2001 11:17 PM

> To: Tucker, Bill

> Subject: Consensus on Cause of explosion in Air India Flight
182

>

> << Message: Untitled Attachment >> << File:
811nosetogether.jpg >> <<

> File: 182nosetogether.jpg >>

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: RE: Consensus on Cause of explosion in Air India
Flight 182

Cc:

Bcc:

X-Attachments:

Dear Mr. Tucker, 13 July 01

Fine, glad to see they were sent and received OK; there were three parts, Location, Cause, and Conclusions.

I hope you have an enjoyable holiday and I await any comments you have when you return.

(I just saw the new movie with Robert De Niro and Marlon Brando, "The Score" filmed on location in Montreal. It reminded me of years ago when my wife and I cycled all through and around the city. It was a very bicycle friendly city.)

Cheers,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Dear Mr. Smith,

Thanks. I was able to open the first file you sent (both formats),

but I'll
have to close a few applications before I can open the pictures. I
am about
to go on holidays, but I have printed your "conference room" text
to read
while I am away.

Sincerely,
Bill T..

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Sincerely,
Bill T..

X-From_: Bill.Tucker@tsb.gc.ca Fri Jul 13 18:55:38 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Consensus on Cause of explosion in Air India Flight 182

Date: Fri, 13 Jul 2001 21:58:00 -0400

Dear Mr. Smith.

Re: >>> I hope you have an enjoyable holiday and I await any comments you have when you return

Thanks very much.

Bill T..

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Friday, July 13, 2001 9:16 PM

> To: Tucker, Bill

> Subject: RE: Consensus on Cause of explosion in Air India Flight 182

>

>

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>

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>

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> >Sincerely,

> >

> >Bill T..

> >

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>
Subject: Startling SDR
Cc:
Bcc:
X-Attachments:
W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 22 July 2001,

Hope you had a good holiday and welcome back.

I just did research this evening and found this startling SDR in the FAA database: Capitals in original.

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
Engine Group : 4056

Engine Model : PW4056
Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29
A/C N Number : 199UA
Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

Mr. Tucker, this is very very scary knowing what we know about forward cargo doors opening in flight from electrical causes. If that CB had been pushed in (why was it out) during flight, that forward cargo door would have ruptured/opened with known catastrophic results. What is a 'controller' and what 'malfunctioned'? UAL, above incident airline and well familiar with UAL 811, had habit of pulling door CB out and were told to stop, order 8300.10 below. They are apparently still pulling the door CB and it may have saved their ass.

Sir, I hope you have decided to proceed with a supplemental report on Air India Flight 182 based on subsequent similar events such as United Airlines Flight 811 and for certain because of incidents like the above.

Please do something.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

ORDER: 8300.10

APPENDIX: 4

BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
for Airworthiness (FSAW)

BULLETIN NUMBER: FSAW 93-50

BULLETIN TITLE: Inappropriate Use of Circuit Breakers
During B-747 Lower Lobe Cargo Door Operation

EFFECTIVE DATE: 06-02-94

1. SUBJECT. This FSIB informs inspectors of unsafe
procedures
being used by some operators to close and lock the lower

lobe
cargo doors of the Boeing 747 (B-747) series aircraft.

2. BACKGROUND.

A. This bulletin was developed after an inquiry by a foreign airworthiness authority into the special procedures used by a specific operator to close and lock the lower lobe cargo doors of B-747 series aircraft. The special procedure included in the operator's maintenance manual called for manual tripping of the cargo door control circuit breakers and the section 2 ground handling bus circuit breaker in order to further remove the possibility of power being applied accidentally to the cargo door control circuitry.

B. The manual tripping of the circuit breakers in special cargo door lock procedures is unnecessary and decreases the reliability of the circuit breakers to perform their intended function. Frequent switching of the breakers could cause them to trip before the point of rated voltage or not to trip at all. Both cases could have adverse effects (such as the following) in

relation to the safe operation of the cargo doors:

(1) Circuit breakers that trip before the point of rated voltage would cause increased manual operation of the cargo doors.

(2) Manual operation could introduce additional failure conditions, such as out-of-sequence operation and overdriving of the cargo door mechanisms.

(3) Service history has shown that manual operation of the cargo doors is more prone to cause damage; for example, the failure of a breaker to trip at the point of rated voltage could lead to failed components and fire.

2

C. The revision to the B-747 cargo door lock sectors warning system, in airplanes compliant with Airworthiness Directive (AD) 90-09-06, provides an increased level of integrity so that manual tripping of the circuit breakers is not necessary to prevent the possibility of an uncommanded opening of the cargo

doors.

Furthermore, power to the cargo door is automatically removed by the Master Latch Lock System upon first motion of the Master Latch Lock Switch away from the fully unlocked position.

3. ACTION. Principal maintenance inspectors (PMI) having certificate management responsibilities for operators of Boeing 747 series aircraft should ensure that this information is brought to the attention of their respective operators. Any operators using this procedure should be discouraged from its continued use.

4. INQUIRIES. This FSIB was developed by SEA.AEG. Any questions regarding this information should be directed to AFS-510 at (703) 661-0333, extension 5018.

5. EXPIRATION. This FSIB will expire on 05-31-95.

/s/

Edgar C. Fell

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Two matched events of uncommanded cargo door openings, old and new

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 22 July 2001,

Below are two events (both UAL) which support the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for four other Boeing 747 accidents.

The alarming part of the recently discovered SDR about the uncommanded forward cargo door opening is that it occurred in a 747-400 which is supposed to have fixed the faulty PolyX/Kapton wiring situation.

The electrical fault which causes the cargo door to open when it shouldn't is still present. If event happens in flight, catastrophe ensues.

Please follow up somehow on this precursor event. Please open supplemental investigation into Air India Flight 182 which shall examine an alternative mechanical explanation with precedent and now continuing problems which support the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

Please have specialized staff contact me for further clarification.

I've notified AAIB, NTSB, and FAA of my findings but have heard nothing back yet.

The problem is intermittent which is the most difficult to resolve. It needs heavy horsepower to find and fix.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

New Service Difficulty Report SDR:

Difficulty Date : 10/11/00
Operator Type : Air Carrier
ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
Engine Group : 4056
Engine Model : PW4056
Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier

Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29
A/C N Number : 199UA
Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

From AAR 92/02 United Airlines Flight 811

1.17.6 Uncommanded Cargo Door Opening--UAL B-747, JFK Airport

On June 13, 1991, UAL maintenance personnel were unable to electrically open the aft cargo door on a Boeing 747-222B, N152UA, at JFK Airport, Jamaica, New York. The airplane was one of two used exclusively on nonstop flights between Narita, Japan, and JFK. This particular airplane had accumulated 19,053 hours and 1,547 cycles at the time of the occurrence.

The airplane was being prepared for flight at the UAL maintenance hangar when an inspection of the circuit breaker panel revealed that the C-288 (aft cargo door) circuit breaker had popped. The circuit breaker, located in the electrical equipment bay just forward of the forward cargo compartment, was reset, and it popped again a few seconds later. A decision was made to defer further

work until the airplane was repositioned at the gate for the flight. The airplane was then taxied to the gate, and work on the door resumed.

The aft cargo door was cranked open manually, the C-288 circuit breaker was reset, and it stayed in place. The door was then closed electrically and cycled a couple of times without incident. With the door closed, one of the two "cannon plug" (multiple pin) connectors was removed from the J-4 junction box located on the upper portion of the interior of the door. The wiring bundle from the junction box to the fuselage was then manipulated while readings were taken on the cannon plug pins using a volt/ohmmeter. Fluctuations in electrical resistance were noted. When the plug was reattached to the J-4 junction box, the door began to open with no activation of the electrical door open switches. The C-288 circuit breaker was pulled, and the door operation ceased. When the circuit breaker was reset, the door continued to the full open position, and the lift actuator motor continued to run for several seconds until the circuit breaker was again pulled. At this time, a flexible conduit, which covered a portion of the wiring bundle, was slid along the bundle toward the J-4 junction box, revealing several wires with insulation breaches and damage.

UAL personnel notified the Safety Board of the occurrence, and the airplane was examined at JFK by representatives of the Safety Board, United Airlines, and Boeing. After the wires in the damaged area were electrically isolated, electrical operation of the door was normal when the door was unlocked. When the door was locked (master latch lock handle closed), activation of the door control switches had no effect on the door. This indicated that the S2 master latch lock switch was operating as expected (removing power from the door when it was locked). After the on-site examinations, the wiring bundle was cut from the airplane and taken to the Safety Board's materials laboratory

for further examination.

The wiring bundle with the damaged wires contained all electric control wires (28 volt DC) and power wires (115 volt AC) that pass between the fuselage and the aft cargo door. From the forward side of the J-4 junction box, the bundle progresses in the forward direction, just above the forward pressure relief door, then upward, following the forward lift actuator arms. The bundle then enters an empty space between two floor beams, where the bundle has an approximate 180-degree bend when the door is closed. From this location, the wiring bundle progresses inboard, through a fore-to-aft intercostal between two floor beams. The wiring bundle then splits, with wires going in several directions.

The bundle is covered by the flexible conduit approximately from the lower end of the lift actuator arms to the fore-to-aft intercostal between the floor beams.

The conduit covering the wiring bundle is intended to prevent the wire bundle from being damaged during opening and closing of the door and during cargo handling operations. The conduit is a sealed flexible interconnector consisting of a convoluted helical brass innercore covered by a bronze braid. The innercore is soldered at every other convolute, and should be capable of withstanding pressures exceeding 1,000 pounds per square inch (psi). Boeing has indicated that the conduit is an evolutionary improvement and that it has been installed on all B-747 airplanes produced since 1981 (from line number 489 on). Airplane N152UA was delivered in April 1987.

Airplanes produced prior to 1981, including N4713U, used a bungee retraction system, to retract the cargo door wire bundle. Guidelines for the replacement of the bungee system with the flexible conduit were covered in Boeing Service Bulletin 747-752-2170, dated August 1981. The service bulletin was prompted by reports that the wire bundle bungee retraction

system had not retracted the wire bundle sufficiently to prevent trapping the bundle between the cargo door and the door frame. UAL did not perform the retrofit on N4713U, which was line number 89, nor was the company required to do so.

Examination of the wires in the damaged area on the wiring bundle revealed that four of the wires were similar in appearance, with insulation breaches that progressed through to the underlying conductor. Adjacent to the breach on these four wires, the insulation was blackened, as if it had been burned. Another wire contained an extensive breach but no evidence of burned insulation. The damaged area was located on the bundle at a position approximately corresponding to a conduit support bracket and attached standoff pin on the upper arm of the forward lift actuator mechanism. This support bracket was found bent in the forward direction. In addition, mechanical damage was noted on adjacent components in this area.

A second damaged area was noted on the wiring bundle at a position approximately corresponding to the conduit swivel clamp at the elbow between the two arms of the forward lift actuator mechanism. Wires in this area were missing portions of their exterior coating, but no breaches to the underlying conductors were noted.

The exterior braid on the conduit contained minor rub marks and was slightly kinked at a position corresponding to the area on the wires with breached insulation. Additional examinations revealed that the innercore of the conduit contained multiple circumferential cracks in the areas corresponding to the damage areas on the wires. The cracks were in the convoluted innercore directly adjacent to the inside diameter of the conduit.

The lock sectors, latch cams, and latch pins from the aft cargo door were examined on the incident airplane and were generally in excellent condition. There was no evidence to suggest that the cams had ever been electrically (or manually) driven into or

through the lock sectors.

Boeing also informed the Safety Board that, in May of 1991, a B-747 operated by Qantas was found to have chafing of the wires in the wire bundle to the aft cargo door. This airplane also had a flexible conduit protecting the wires, and the chafing was located approximately at the standoff pin on the bracket at the upper arm of the forward lift actuator.

The Safety Board determined that the chafing of the wires on the airplane involved in the JFK occurrence was caused by, or was greatly accelerated by, the circumferential cracks in the conduit and that the cracks in the conduit were caused either by repeated flexing of the conduit as the cargo door opens and shuts or by unusual stresses on the conduit generated concurrently with damage to the conduit guide bracket and attached standoff pin on the upper end of the forward lift actuator upper arm.

A portion of the wire bundle for the forward cargo door on many B-747 airplanes is also covered by a flexible conduit that is very similar to the conduit for the aft cargo door. However, there are substantial differences between the orientation of the flexible conduits for the two doors, and the Safety Board has not become aware of problems associated with the flexible conduit for the forward door.

Nevertheless, because of the concerns about the chafed wires and possible electrical short circuits, on August 28, 1991, the Safety Board recommended that the FAA:

Issue an Airworthiness Directive applicable to all Boeing 747 airplanes with a flexible conduit protecting the wiring bundle between the fuselage and aft cargo door to require an expedited inspection of:

- (1) the wiring bundle in the area normally covered by the conduit for the presence of damaged insulation (using either an electrical test method or visual examination);
- (2) the conduit support bracket and attached standoff pin on the

upper arm of the forward lift actuator mechanism;

(3) the flexible conduit for the presence of cracking in the convoluted innercore.

Wires with damaged insulation should be repaired before further service. Damage to the flexible conduit, conduit support bracket and standoff pin should result in an immediate replacement of the conduit as well as the damaged parts. The inspection should be repeated at an appropriate cyclic interval. (Class II, Priority Action) (A-91-83)

Evaluate the design, installation, and operation of the forward cargo door flexible conduits on Boeing 747 airplanes so equipped and issue, if warranted, an Airworthiness Directive for inspection and repair of the flexible conduit and underlying wiring bundle, similar to the provisions recommended in A-91-83. (Class II, Priority Action) (A-91-84)

The FAA responded to these safety recommendations on November 1, 1991, stating that it agreed with the intent of the recommendations and that the issuance of an NPRM was being considered to address the issues in the safety recommendations. The Safety Board replied on November 27, 1991, classifying each of the recommendations as "Open--Acceptable Response," pending the completion of the rulemaking process. Since that exchange of correspondence, the FAA has published an NPRM which is now being reviewed by the Safety Board. Safety Recommendations A-91-83 and -84 will continue to be classified as "Open--Acceptable Response" until an acceptable final rule is published.

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Electrical cause of uncommanded forward cargo door opening initiated by civilians.

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 26 July 01

Below is back story to United Airlines Flight 811 and how civilians were able to get the door retrieved and the proper cause of it opening determined as electrical and not improperly latched.

Sometimes worthy information can come from the public, especially ones who are directly involved such as family member or crewmember of victim. Kevin and Susan Campbell lost their son and I lost my pilot.

Please note comments below relating directly to Air India Flight 182.

Please start supplemental investigation into Air India Flight 182.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: SMANDKJC@aol.com
Date: Sun, 22 Aug 1999 22:39:33 EDT
Subject: From Kevin Campbell
To: barry@corazon.com
CC: rocketman@hawaii.rr.com

Dear Barry , Steve emailed on your reply , Thank you for your kind comments about our work. As you know we live in NZ but we own an apt here in Waikiki and usually spend from may till end sept here .This year we were late arriving as our first grandchild was due early may , He did not arrive until the 19th and we stayed to help out our daughter until the 1st june . Our son in law gave us a computer so they could email pictures of the new baby . I have resisted getting a computer as I cant type but seem to be managing OK . Anyway as soon as I got on line the first search I did was 811 and got your site , it all sounded very familiar to me and I could tell you had obviously done your homework . Steve had visited us in NZ in Feb just as we moved into our new apt there after selling our family home so I asked Steve if he had been in contact with you and what spurred your interest in cargo doors { I should have explored your site a bit more and I would have found the reason

myself but I was just starting searching the web and only hit the one page]
Steve did not know what your motives were so I thought I would contact you
myself , however I had bought a lot of my documents over with me this trip as
I had to fly on to Seattle to do an interview with the BBC Panorama program
for a documentary on aircraft wiring problems following the release to the
media of the Swissair wreckage , the doco is cofunded by the Discovery
Channel and may show [Or a USA version of it] on TLC depending on wether
they want to upset Boeing or not . The request to do this doco followed a
very good doco done by Channel 9 Sydney on their Sunday program titled "Fire
in the Sky" also about Kapton wire in Feb of this year .I had lent BBC some
of my documents including my submission to the NTSB on the cause of 811 and
also a document I had written in 1989 I called "Countdown to Disaster"
detailing the sequence of events leading up to and beyond the 811 disaster .
I still have not had them returned but Steve can email them to you if you
have never seen them.
As you are probably aware we did an investigation on 811 and have appeared in
the media many times . We had many stories about our efforts in NZ newspapers

,magazines and TVNZ followed us on one visit to the USA and did a Documentry on our investigation { the email from the guy in NZ that you sent Steve was from one of the team that was to do a computer simulation of my theory compared to the NTSB theory as soon as they tried to program the NTSB theory they could see it did not compute and it was then they realised I had to be correct and were behind me 100%. the same people did the Americas Cup simulations] The WALL STREET JOURNAL did a front page article on our efforts on 24th feb 1990 and I have done several articles with Byron Acihido of the Seattle Times among others . In all we took 7 trips to the USA investigating 811and they started with a look at the aircraft at Hickam AFB were we took many pictures of the damage and I was able to rule out corosion as the cause . We attended the NTSB hearing at Seattle and managed to steal all of the documents from the NTSB metalurgists seat after the hearing ended . Initially they would only give us the list of witness`s but after complaining to the media at the first recess they gave us a press set and said we could have anything off the press table when the hearing ended two days later . At the end of proceedings we gave an

interview to The Honolulu Advertiser and when it finished we went back in to get the stuff off the press table, as I was looking at it my wife Susan walked up to the top table and yelled out there was a good set of stuff here , we grabbed a box loaded it in and took off just as the NTSB guys were coming back in with a trolley to load it up . We hailed a taxi and were off . It took months to look at it and absorb it all but the result was " Countdown to Disaster" We have stayed with both Dave Cronin and Al Slader many times .On one visit to the NTSB we got copies of all the passenger safety statements and wrote to everyone that had replyd to the Questionair . Mainly they were First and Business class passengers with a few coach as well . We visited everyone who replyd to us , Flying in to Seattle and driving to Denver New York Florida San Diego San Francisco Lake Tahoe and back up to Seattle . Boeing would never talk to us directly only through their legal people [Perkins Coie] and initially United would not talk to us either but a year after the accident when United had gone from the most popular to the carrier of last resort for NZ passengers we got an invitation to visit the United maintenance base in

San Francisco . they were just going to do a PR job on us but it did not work out that way and we got stuck into each of the VP`s and told them were they had failed , when one broke down we knew we had them and it ended up with the Senior VP United Joe O Gorman giving us a personal escort around the base and getting answers to everything we wanted to know . We stood in the cargo bay of a 747 while they operated the door and I pointed to the Conduit at the top of the door and said that that was were I thought the Arc had originated from. as we walked back across the tarmac I spotted a newly painted 747with a number I did not recognise , when we got back to the motel I checked my records and there was no N4724U . so asked the next day if it was N4713U renumbered and they had to admit it was .

We were in Hawaii for the search for the cargo door and I tried every avenue to be on that sub or even the recovery boat without sucess. I was phoned within an hour of the recovery of the door and told that they had a contingency plan , if the door revealed the NTSB were correct the door was to be released to the media in Hawaii ,if the door showed that the Campbells were correct the door was going straight to Boeing . He said that the door is

going straight to Boeing . We flew to Seattle but were told we could not see the door , we drove to Washington to see the NTSB and as we entered the office we were told they could spare us 5 minutes,about 3 hours later we held a set of the recovered C locks and Lock sectors and they admitted we were correct , that they would ensure that the aircraft would be fixed but not to hold our breath waiting for a new report ever to be released . After lunch with them I asked " in light of what we now know on 811 do you still think that Air India was a bomb ?" The reply was that we never thought that Air India was a bomb in fact the video shows a cargo door exactly the same as 811. I wrote to both Air India and the Canadian Safety Board with my findings on 811 but did not even have the courtesy of a reply . I was very upset to read your theory on TWA 800 as I thought we had the problem beat but it had never occurred to me that if the pull in hooks opened that the door could break in half , this is of course exactly what 811` s did but I had put it down to the fact that it struck the side of the fuselage as it opened and levered out the hinge and the section above it . Fate intervened on 811 and the door opened on the 747 at JFK and they could no longer withhold the revised report on 811 . The new report

however still
does not admit that 811 got the signal to open right there at
23000 ft
insisting it happened before takeoff . This is a much less scary
scenario for
Boeing and the NTSB as they still believe that other safeguards
preclude it
from getting a signal after shutdown of the APU and the ground
switch which I
believe is a load of baloney .Are you aware that the original door
design for
the 747 called for a warning light that would have advised the
cockpit of a
S2 switch failure and the fact that power was still available to the
door
latch actuators? I had the document that showed this system
deleted by
whiteout and no one would ever answer my question wether the
aircraft was
certified with this system or not as it never made it into
production . I
lobbied very hard for this system to be reinstated but it wasnt ,I
guess that
would have opened up liability problems for Boeing I lent the
document to a
journalist and have never got it back either . You probably have
plenty of
questions for me but I will run through the ones you asked Stuart
Mc Clure
and answer any that I can .
Dave Cronin PO Box 4263 Incline Village NV 89451-8320 Tel
702 831 7746 Fax
702 831 3615 . Dave was flying the plane manually getting the

last bit of
pleasure before he retired , as it blew he just let it go and it went
up and
sideways about 50 ft { I have the engine readouts and you can
see that
airflow was cut over the engine intakes] Dave and I both believe
that had it
been on autopilot it would have broken the nose off at the 41
section joint
which is a known weak point { This is what happened to Pan Am
103 and TWA
800] all of the beams in the business section were broken and I
actually
stood in the cargo hold of N4713U at Hickam and lifted the floor
off the
temporary struts with one hand , the floor was only held up by
the cargo
containers after the door went . Actually the only bit of solid
floor left in
business class was where our son sat in 12H But the shock wave
went from the
back past Lee moving the toilets beside him { forward of the
hole] forward
12" it bounced off the front of the plane came back and broke
his seat
off its legs or mountings , it also blew the eardrums of most of
the first
class passengers and in some cases blew up their teeth if they had
air
cavities in them Dave is a very experienced glider pilot and
called on all
his skills to get the plane back but it was dropping at 1000 ft p/m
it was at

22000 ft 22 minutes out and at METO speed it crashed to a perfect landing at Honolulu International Airport it could never have gone around for another attempt { I have the CVR printout and it makes chilling reading } What was heard ? The CVR has a thump followed 1.8 seconds later by a loud explosion { I failed in my bid to listen to the actual tape ,I only wanted to actually hear the sound myself but was denied }Talking to the passengers some off them heard a hiss followed by an explosion described as being like "A thousand handclaps " no one saw the passengers go . One passenger in first class {with a Ph D in physics } nearest to the door said he heard something start up immediately prior to the thump . the NTSB never interviewed him and dismissed this as being the elevator to the galley but the steward was already in the galley at the time of the explosion and I dont think the elevator was moving . So the sequence was a whir a thump a hiss and then 1.8 seconds later the explosion . Dave had time to say " what the # was that " and Al replied "I don't know "between the thump and the explosion The CVR's power was then off for 21.4 seconds I have the all the NTSB photos and my own of the door frame area,the side

frames and the sills are in perfect condition ,the 8 bottom pins are all
goughed but otherwise OK the forward mid span pin is also
goughed and the
mtg bracket had moved outward on its bolts , the rear mid span
pin was
goughed and the bracket was held by one bolt the other 3 had
broken . It
takes 1.5 seconds for the 8 C Locks on the bottom of the door to
open
followed by the opening of the pull in hooks , with the 1.8
second time gap
when the hiss was heard I take that to be the time that the door
had blown
off the 8 C Locks and it was held by the pull in hooks until they
also opened
sufficiently for the door to blow off them as well . Something had
to be
different to PAN AM 10 out of London where the door was
closed by the
slipstream and they got back safely.

At least one passenger was ingested by engine no 3 . I have the
Coroners
report on what they found and I have seen what they removed
from the engine
apart from the body bits . It was not our son as we had to give a
DNA sample
and the result was negative Steve recently spoke to someone
who inspected
the engine the day it happened and thought the red on the turbine
was seat
material until he touched it and realised what it was They told us
that they

gave the aircraft parts a Hawaiian burial at sea but I doubt it ,
they
certainly did not give us the seat parts that we could have used in
an action
against the seat manufacturer [Weber Aircraft Co]
We have photos of damage to the wings , the top of the aircraft
and to the
vertical stabiliser , we hope that one of these killed our son as we
know he
could have survived the fall to the sea 22000 ft and over 4
minutes below .
parts were still falling out of the sky after 811 was back on the
ground in
Honolulu. We have the reports from all the services that attended
the
accident . We found they knew Lee was missing by about 4 AM
local time but it
was not till about 12 Hrs later that they phoned us from Chicago
and said he
was missing presumed dead .The damage to No3 engine was
caused by a body or
bodies , luggage and aircraft parts . Damage to No 4 was mainly
by luggage .
N4713U did not have the lock sectors strengthened by aluminium
{the first
fix]but I would think that PAN AM 103 would have as PAN AM
did not wait for
Boeing to supply the steel kits but made their own and fitted
them to their
fleet after the London incident , as they realised the implications
of not
doing so . As detailed in "Countdown " Boeing devised a one
time test to

check the integrity of the cargo door locking system , they told the airlines to hit the door open switch to see what happened , a day later they stopped the test as operators were calling to say it was damaging the planes , obviously lots of aircraft had failed S2 switches and the actuators were live just waiting for a stray arc to doom the plane and the passengers and the FAA still gave up to 2 years to replace the lock sectors with steel ones .

Regards Kevin and Susan Campbell

X-From_: Bill.Tucker@tsb.gc.ca Fri Aug 3 15:25:09 2001
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Startling SDR
Date: Fri, 3 Aug 2001 18:24:11 -0400

Dear Mr. Smith,

Thanks. I'm back as of Monday (though have one more week to look forward to in late Aug) and am catching up on e-mail again. During my holiday, I enjoyed reading two of the bigger docs you had sent me.

Re the info. below, I was not aware of that. I found it of interest and have forwarded it to 3 or 4 other people.

Re your closing para about a supplemental report on Air India 182, I don't think we can contemplate doing so in view of present workload and the fact of the very extensive RCMP investigation and the upcoming trial. We would at least want to see what the latter generates. Also, if we were to suggest

re-consideration of the Govt of India safety investigation report, I believe we should do so to the Govt of India.

Bill Tucker.

> -----Original Message-----

> From: John Barry Smith [SMTP:barry@corazon.com]

> Sent: Sunday, July 22, 2001 11:18 PM

> To: Tucker, Bill

> Subject: Startling SDR

>

> W.T. (Bill) Tucker

> Director General,

> Investigation Operations

>

> Dear Mr. Tucker, 22 July 2001,

>

> Hope you had a good holiday and welcome back.

>

> I just did research this evening and found this startling SDR in the FAA

> database: Capitals in original.

>
> Difficulty Date : 10/11/00
> Operator Type : Air Carrier
> ATA Code : 5210
> Part Name : CONTROLLER
> Aircraft Manufacturer : BOEING
> Aircraft Group : 747
> Aircraft Model : 747422
> Engine Manufacturer : PWA
> Engine Group : 4056
> Engine Model : PW4056
> Part/Defect Location : CARGO DOOR
> Part Condition : MALFUNCTIONED
> Submitter Code : Carrier
> Operator Desig. : UALA
> Precautionary Procedure : NONE
> Nature : OTHER
> Stage of Flight : INSP/MAINT
> District Office Region : Western/Pacific US office #29
> A/C N Number : 199UA
> Aircraft Serial No. : 28717
>
> Discrepancy/Corrective Action:FWD CARGO DOOR
OPENED BY ITSELF WHEN CB
> PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE
PUSHED IN, WHEN PRESSURE
> RELIEF DOOR HANDLE WAS OPENED THE DOOR
LATCHES OPENED AND THEN THE DOOR
> OPENED ON ITS OWN. COULD NOT DUPLICATE
PROBLEM AFTER INITIAL OPENING.
>
> Mr. Tucker, this is very very scary knowing what we know
about forward

> cargo doors opening in flight from electrical causes. If that CB had been
> pushed in (why was it out) during flight, that forward cargo door would
> have ruptured/opened with known catastrophic results. What is a
> 'controller' and what 'malfunctioned'? UAL, above incident airline and
> well familiar with UAL 811, had habit of pulling door CB out and were told
> to stop, order 8300.10 below. They are apparently still pulling the door
> CB and it may have saved their ass.
>
> Sir, I hope you have decided to proceed with a supplemental report on Air
> India Flight 182 based on subsequent similar events such as United
> Airlines Flight 811 and for certain because of incidents like the above.
>
> Please do something.
>
> Sincerely,
> Barry
>
> John Barry Smith
> (831) 659-3552 phone
> 551 Country Club Drive,
> Carmel Valley, CA 93924
> www.corazon.com
> barry@corazon.com
>

> ORDER: 8300.10
>
> APPENDIX: 4
>
> BULLETIN TYPE: Flight Standards Information Bulletin
(FSIB)
> for Airworthiness (FSAW)
>
> BULLETIN NUMBER: FSAW 93-50
>
> BULLETIN TITLE: Inappropriate Use of Circuit Breakers
> During B-747 Lower Lobe Cargo Door Operation
>
> EFFECTIVE DATE: 06-02-94
> -----
> 1. SUBJECT. This FSIB informs inspectors of unsafe
procedures
> being used by some operators to close and lock the lower lobe
> cargo doors of the Boeing 747 (B-747) series aircraft.
>
> 2. BACKGROUND.
>
> A. This bulletin was developed after an inquiry by a foreign
> airworthiness authority into the special procedures used by a
> specific operator to close and lock the lower lobe cargo doors
of
> B-747 series aircraft. The special procedure included in the
> operator's maintenance manual called for manual tripping of
the
> cargo door control circuit breakers and the section 2 ground
> handling bus circuit breaker in order to further remove the
> possibility of power being applied accidentally to the cargo
door

- > control circuitry.
- >
- > B. The manual tripping of the circuit breakers in special cargo
- > door lock procedures is unnecessary and decreases the
- reliability
- > of the circuit breakers to perform their intended function.
- > Frequent switching of the breakers could cause them to trip
- > before the point of rated voltage or not to trip at all. Both
- > cases could have adverse effects (such as the following) in
- > relation to the safe operation of the cargo doors:
- >
- > (1) Circuit breakers that trip before the point of rated voltage
- > would cause increased manual operation of the cargo doors.
- >
- > (2) Manual operation could introduce additional failure
- > conditions, such as out-of-sequence operation and overdriving
- of
- > the cargo door mechanisms.
- >
- > (3) Service history has shown that manual operation of the
- cargo
- > doors is more prone to cause damage; for example, the failure
- of
- > a breaker to trip at the point of rated voltage could lead to
- > failed components and fire.
- >
- >
- >
- > C. The revision to the B-747 cargo door lock sectors warning
- > system, in airplanes compliant with Airworthiness Directive
- (AD)
- > 90-09-06, provides an increased level of integrity so that
- manual

> tripping of the circuit breakers is not necessary to prevent the
> possibility of an uncommanded opening of the cargo doors.
> Furthermore, power to the cargo door is automatically removed
by
> the Master Latch Lock System upon first motion of the Master
> Latch Lock Switch away from the fully unlocked position.

>
> 3. ACTION. Principal maintenance inspectors (PMI) having
> certificate management responsibilities for operators of Boeing
> 747 series aircraft should ensure that this information is
> brought to the attention of their respective operators. Any
> operators using this procedure should be discouraged from its
> continued use.

>
> 4. INQUIRIES. This FSIB was developed by SEA.AEG. Any
> questions regarding this information should be directed to
> AFS-510 at (703) 661-0333, extension 5018.

>
> 5. EXPIRATION. This FSIB will expire on 05-31-95.

>

>

>

> /s/

> Edgar C. Fell

>

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

From: John Barry Smith <barry@corazon.com>

Subject: Government of India reconsideration of Air India Flight
182

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,
Investigation Operations
Dear Mr. Tucker, 2 Aug 2001

Thank you for reply and for reading two of the three
'cybermeeting' docs.

Also thanks for forwarding the SDR of another forward cargo door opening on its own by electrical cause. Let us hope that does not happen in the air or that the FE or copilot does not push in that CB in the air and start that catastrophic sequence. I'm interested in the opinions of the 3 or 4 other people you sent it to. I'm also interested in the opinions of the other listed in the 'cybermeeting' about this issue. They must be concerned as I am.

I am of course disappointed that TSB does not contemplate a supplemental report on Air India Flight 182 but understand workload, budget, and staff limitations. But, I realize that that choice can change in a minute with more incidents like the SDR above. I believe there are already enough warnings by these faulty wiring caused open doors to launch a supplemental but....I shall keep you informed of any new discoveries and I hope they stay only incidents.

The RCMP are doing an investigation but their conclusions do not make sense and contradict the realities of aircraft accidents. They are not aircraft accident investigators but police and this is an airplane crash not a bank robbery. Sgt Blachford of RCMP AITF said in his last mail to me that he would meet with me in Mid August but I have not heard from him since. If we do meet, I can show him the false thinking in his 'bomb' explanation for Air India Flight 182 in the aft cargo compartment or the forward.

Also noted is your figurative 'open door' to a supplemental report depending on what the RCMP or the upcoming trial generates. If the RCMP investigation or the trial shows that expert TSB technical advice and opinion is required, would the TSB then provide that information? I feel quite sure both circumstances will do that eventually.

Regarding a suggestion of a re-consideration of the Govt of India safety investigation report, you state you should do so the the Govt of India. Great idea, Mr. Tucker. I stayed out of the political arena, but that may be the way to go. The aviation authorities of India may wish to get a crack at explaining Air India Flight 182 as they were quickly excluded from the original investigation and replaced by a judicial judge. Would you do that? A request to the Director General of Civil Aviation, New Delhi, India to reconsider Air India Flight 182 based upon similar subsequent accidents that suggest an alternative explanation exists of a mechanical cause with a precedent? Mr. H.S. Khola, Director of Air Safety, Civil Aviation Department, New Delhi may still be there and receptive to your suggestion to become involved.

The below excerpt from the Kirpal report does state that India has the authority to investigate the accident.

"INITIAL ACTION TAKEN BY THE GOVERNMENT OF INDIA

1.2.1 Initial intimation of the accident was received by Air India who, in turn, communicated the same to Mr. H.S. Khola, Director of Air Safety, Civil Aviation Department, New Delhi. The Accident Investigation Branch of United Kingdom also sent information to the Director General of Civil Aviation, New Delhi to the effect that the accident had taken place on international waters and as such it was India which was the authority to

investigate the accident in accordance with the provisions of ICAO Annex 13.

1.2.2 Thereupon Order No. AV.15013/8/85-AS dated 23rd June, 1985 was issued by the Director General of Civil Aviation whereby Mr. H.S.Khola was appointed Inspector of Accidents for the purpose of carrying out the investigation into the aforesaid air accident. This appointment was made under Rule 71 of the Aircraft Rules, 1937."

Thanks again, Mr. Tucker, for replying and sending on the SDR to others for opinion and trust your working holiday was successful. My wife and daughter are in Hawaii as I type and here I am at home. They are having a great time visiting relatives and swimming.

Sincerely,
Barry

John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Dear Mr. Smith,

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Bill Tucker.

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> Sent: Sunday, July 22, 2001 11:18 PM
> To: Tucker, Bill
> Subject: Startling SDR
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> Director General,
> Investigation Operations
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> Precautionary Procedure : NONE
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> A/C N Number : 199UA
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United

> Airlines Flight 811 and for certain because of incidents like the
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> Please do something.

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> John Barry Smith

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> ORDER: 8300.10
>
> APPENDIX: 4
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(FSIB)
> for Airworthiness (FSAW)
>
> BULLETIN NUMBER: FSAW 93-50
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> During B-747 Lower Lobe Cargo Door Operation
>
> EFFECTIVE DATE: 06-02-94
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> operator's maintenance manual called for manual tripping of

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- > cargo door control circuit breakers and the section 2 ground
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- > possibility of power being applied accidentally to the cargo door
- > control circuitry.

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- > B. The manual tripping of the circuit breakers in special cargo door lock procedures is unnecessary and decreases the reliability

> of the circuit breakers to perform their intended function.

> Frequent switching of the breakers could cause them to trip

> before the point of rated voltage or not to trip at all. Both

> cases could have adverse effects (such as the following) in

> relation to the safe operation of the cargo doors:

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> (3) Service history has shown that manual operation of the cargo

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> a breaker to trip at the point of rated voltage could lead to

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>

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> C. The revision to the B-747 cargo door lock sectors warning
> system, in airplanes compliant with Airworthiness Directive
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>
>
> /s/
> Edgar C. Fell
>

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
From: John Barry Smith <barry@corazon.com>

Subject: Warning/Alert/Interview me/Placentia

Cc:

Bcc:

X-Attachments:

W.T. (Bill) Tucker

Director General,

Investigation Operations

Dear Mr. Tucker, 9 Aug 2001

I just read about the RCMP taking over a ship collision investigation. Hmmmm. You have indicated the TSB will stand aside as the RCMP does the aircraft accident re-investigation (which now has the bomb going off in the aft cargo compartment contrary to earlier official conclusions.)

Please, Mr. Tucker, do not let this Air India Flight 182 event pass by. I have presented evidence that shows there is a strong possibility the forward cargo door opened in flight and a good possibility that the cause was wiring. The loyalty is to the living and the problem which occurred in 1985 exists to this day in 2001. Potentially catastrophic hull ruptures in Boeing 747s caused by an inadvertently ruptured open cargo door have occurred by official count in 1987, 1989, 1991, and 2000, in the air and on the ground. By my count after twelve years of research the count is 1985 with Air India Flight 182, 1987 with Pan Am 125, 1988 with Pan Am Flight 103, 1989 with United Airlines Flight 811, 1991 with UAL preflight, 1996 with Trans World Airlines Flight 800, and 2000 with UAL post flight. Seven events in Boeing 747 that have killed nine officially and 838 by my count.

You did not tell me I was wrong. You gave no rebuttal nor any effort at refutation. I know why. It can't be done using facts, data,

and evidence. I have tried myself for years to prove it is a wrong explanation, but the evidence always supports the wiring/cargo door sequence starting with the sudden loud sound on the CVR which is present on all four fatal aircraft.

Please do not ignore the warning that is presented by this identified person with official documents and who has experience in these matters. The eighth time of wiring causing the door unlatch motor to turn on when it shouldn't can happen again, as it has in the far past, the past, and the near past, October, 2000, only ten months ago. (Capitals in original report from US FAA SDR. Note it was a 747-400)

Difficulty Date : 10/11/00
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ATA Code : 5210
Part Name : CONTROLLER
Aircraft Manufacturer : BOEING
Aircraft Group : 747
Aircraft Model : 747422
Engine Manufacturer : PWA
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Part/Defect Location : CARGO DOOR
Part Condition : MALFUNCTIONED
Submitter Code : Carrier
Operator Desig. : UALA
Precautionary Procedure : NONE
Nature : OTHER
Stage of Flight : INSP/MAINT
District Office Region : Western/Pacific US office #29
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Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

What were the opinions of your staff of aviation accident investigators regarding my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for four Boeing 747 fatal events?

Director of Investigations-Air

Director of Engineering

Mr. John Garstang, Engineering Branch

Mr. Vic Gerden, Investigator in Charge, SWR 111.

Do they offer any rebuttal? Offering an alternative such as bomb or missile or fuel tank explosion is not rebuttal but disagreement.

The seriousness of this alert/warning is such that either it is worthy of preventive action or it is not, but to do nothing is not right. Some warnings can be ignored and some can't without further investigation. I believe based upon the evidence of Air India Flight 182 and evidence of other fatal accidents, that this warning about faulty wiring causing cargo doors to open when they shouldn't is a warning that can not be prudently ignored but must have further investigation to rule it in or rule it out. A warning about a potential explosive decompression caused by compressed air occurring on a Boeing 747 is just as serious about a warning about an explosive decompression caused by chemical means.

Have your staff interview me so they can either rule in or rule out the mechanical explanation. Let me enter into an email dialogue with them; we can talk as pilot to pilot.

I am not a drunk on a phone late at night saying check some airplanes because of some horrid plot afoot. (That might get a response sadly). I am experienced, I offer incontrovertible evidence, I am identified, I invite interviews, I plead for consideration and inspections of the wiring for cargo doors in Boeing 747s as well as a supplemental investigation into Canada's largest mystery aviation accident.

Has any professional contact been made with Indian Transportation Safety officials? Can you give me an contacts to email to with the results of my research?

What would the attorneys for the trial have to do or ask for TSB to become involved with Air India Flight 182?

Mr. Tucker, it seems that the conspiracy minded people are everywhere (That's a joke) and are in charge, such as FBI and RCMP (That's not a joke.)

Please consider Air India Flight 182 an airplane crash first (As CASB did years ago) requiring transport safety officials to evaluate or re-evaluate and not a bank robbery for which the police can take a 'lead role.'

By the way, paint smears are very important clues to United Airlines Flight 811, Pan Am Flight 103, and Trans World Airlines Flight 800 which support the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

Video examination of Air India Flight 182 may very well show important matching paint smears. It's another example of how subsequent accidents can be used to review the past and clarify some issues. It's learning from experience.

Please do not let this Air India Flight 182 event go by. It's an active issue legally and reveals a potential public safety issue to Canadian citizens in wiring and cargo doors in Boeing 747s. Please have your staff contact me for further discussions. Please ask the Indians to become involved in an updated report.

(Regarding Placentia Bay below: I was in the Navy as an enlisted aircrewmember flying P2V Neptune ASW patrol aircraft with VP-10 out of Naval Air Station Argentia Newfoundland in 1962. I walked around Placentia. Ah, the rain, ah the rocks, as, the wind, ah the cold, ah, the fog...it was very tough flying out of there for our 12 hour patrols but I look back and loved it. Every flight was an adventure of subs, or liners, or ice or mechanical problems and electronic problems to overcome on those aging WW II designed planes. I was 18 and remember Argentia and Placentia so vividly.)

Sincerely,

Barry

John Barry Smith

(831) 659-3552 phone

551 Country Club Drive,

Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

RCMP to take lead role in investigation of fatal high-seas

collision

Updated: Thu, Aug 09 1:13 PM EDT

The bow of the tanker Virgo remains moored at the Come By Chance oil refinery in Placentia Bay, Nfld. (CP/St. John's Telegram/Gary Hebbard) (CP)COME BY CHANCE, Nfld. (CP) - The RCMP are taking over from Transport Canada as the lead agency in investigating a recent collision on the high seas that killed three American fishermen.

The change, announced Thursday by Transport Canada, raises the possibility that the investigation of the tanker Virgo - now anchored in Newfoundland's Placentia Bay - will turn to criminal matters. But a spokesman for Transport Canada declined to explain the significance of the change.

The Mounties were scheduled to hold a news conference in nearby Clarenville, Nfld., to clear up the confusion.

Meanwhile, the U.S. Coast Guard "will continue to play an active role," said Transport Canada spokesman Paul Doucet.

An investigator from the U.S. Coast Guard spent Thursday inspecting the 180-metre Virgo, which was one of several ships in the area when the trawler Starbound was hit by another ship Sunday and sank.

Joseph Marcantonio, the captain of the 28-metre Starbound, was the only survivor.

The tanker's log books were seized and the crew told to stay on board after it arrived at an oil refinery near Come by Chance, Nfld., early Tuesday.

Since the collision occurred in U.S. waters - about 210 kilometres off Cape Ann, Mass. - the U.S. Coast Guard took the lead role in the investigation.

The oil tanker, owned by Russian-based Primorsk Shipping, was built in 1995. It displays the usual assortment of dents and scratches found on tankers, which normally require the aid of tug boats when docking.

But local fishermen have pointed to fresh scratches etched in green paint near the Virgo's protruding bow.

The Starbound was painted green.

"I saw the (scratches) when we got right along side of her this morning," Walter Brinston said Wednesday as he manoeuvred his heaving, 10-metre fishing boat in the shadow of the hulking tanker. "But it's just paint. Who knows what it means?"

Still, there were no obvious signs of a violent crash earlier in the day during an informal inspection of the 38,000-tonne tanker.

The skipper of a tugboat, who has been pushing tankers around Placentia Bay for eight years, said he didn't notice anything unusual about the ship after a brief sailpast with reporters on board.

Several divers also inspected Virgo on Wednesday, but the dive leader refused to say what they found or who the team was working for.

The divers spent more than an hour inspecting the underside of

the ship's hull, close to the stern, on one side.

It's at that point where there are some larger dents near the high-water line, though none of them appear to be new.

The company has said the ship's captain, Vladimir Ivanov, had no knowledge of a collision.

X-From_: Bill.Tucker@tsb.gc.ca Fri Sep 7 16:11:01 2001

From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

To: "'John Barry Smith'" <barry@corazon.com>

Subject: RE: Defence team contact

Date: Fri, 7 Sep 2001 19:11:26 -0400

Dear Mr. Smith

In answer to your question, you may certainly forward the e-mail.

I'm sorry to be so late in responding. As I said before, I'll do my best to

review your e-mails and forward relevant material to other TSB staff, but I

can't undertake to deal with them promptly. There is just too much

information from you and too much other work for me to undertake to do

otherwise.

Bill T..

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Request from RCMP AITF

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Mr. Tucker, 14 Nov 01

Below in a scan is a request from RCMP AITF Sgt Blachford to

come to California to meet and discuss my Air India Flight 182 report in some detail, taking at least a day to do so. He is asking when and where I would prefer to meet.

I am going to reply back soon that in my home office is a good place and the sooner the better. Would you or your representative like to join us? Note below that Mr. J. Garstang 'is not available and will not be available in the foreseeable future.'

Is there any way possible that a TSB aviation accident investigator can spare a few hours for discussion of my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 with me and a representative of the RCMP AITF? It will be most fruitful. What dates and times or place would be convenient?

I'll meet you or your representative at the Monterey Airport, or, if you drive, as I did in March to Vancouver, call me and I'll set you up with lodging. An alternative meeting place is possible.

I've also invited an attorney from the defence assigned by the Crown, Mr. Keith Hamilton, to join us.

It seems the mood has changed in the past few days after AA 587 and now the first speculation of a cause of an airliner crash is mechanical failure instead of a terrorist act (such as believed in 1985). It looks like facts, data, and evidence, are taking priority now and that is good. There are lots of those for support of a mechanical cause for Air India Flight 182 and I would look forward to laying them out for you or your representative.

The poignant emails below between us were just prior to the WTC attacks in which obvious terrorist acts in airliners took

place. It was a different world then for aviation security and I understand the added workload and budget expenditures the TSB now has.

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

X-From_: Bill.Tucker@tsb.gc.ca Fri Sep 7 16:11:01 2001
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I'm sorry to be so late in responding. As I said before, I'll do my best to review your e-mails and forward relevant material to other TSB staff, but I can't undertake to deal with them promptly. There is just too much information from you and too much other work for me to undertake to do

otherwise.
Bill T..

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Mr. Tucker, 10 Sep 01

Thank you for permission to forward copies of our emails during these past few months. I believe this will show the defence team that the TSB is patient, objective, and will listen to reason.

I may have sent too much information for prompt evaluation; my only explanation is that I feel a sense of urgency.

I'm standing by for any queries from your staff. It can't hurt to ask questions, now can it?

Sincerely,
Barry
John Barry Smith
(831) 659-3552 phone
551 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **More info for meeting:**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 14 Nov 01

Below is blow up of RCMP AITF letter for reference as well as email and snail mail addresses should you wish to consult with the gentlemen prior to any meeting.

Cheers,

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Email for Mr. Keith Hamilton:
Defense Counsel assigned by the Crown for Mr. Bagri

keithrh@telus.net

Address and phone for Sgt Blachford:

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6
604 264 2249

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@TSB.GC.CA>
Subject: **December 5 fine for meeting.**

Dear Mr. Smith,

This is just an interim reply. In a nutshell: I may be able to attend.

I am certainly willing to do so if you and Sgt. Blachford feel I could be of assistance. It would be much better for John Garstang to be there - as my knowledge of the subject is "orders of magnitude" below his. However, he simply can not be made available given the amount of time he has already

contributed to the Air India 182 investigation and the magnitude and urgency of the work on his plate for our investigation of the Swissair 111 accident.

I must emphasize that my contribution would be essentially to attend as a detached third party with a strong functional interest in the subject matter, but no vested interest in the outcome.

I look forward to hearing from you. Meanwhile, I shall follow up with Sgt Blachford re his views, possible date, etc.
Bill T..

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Mr. Tucker, 20 Nov 01

Thank you for the above email and I'm very glad to see that you may/will attend the meeting with Sgt Blachford. He called me today and I called back and confirmed that 4 and 5 December are fine for the meeting in my home office. I will have all the documents, photos, and analysis available for review and discussion.

I understand your position as a detached third party and that is exactly what we need, an objective point of view. It shall be just the three of us with no defence present.

Sgt Blachford indicated you two may fly to San Francisco and drive down to Monterey and Carmel Valley on Tuesday and meet on Wednesday the fifth. I live about 12 miles inland from Carmel. If I can assist with any lodging arrangements or otherwise, please let me know and I can do it.

This is a most important meeting as I consider it a life and death issue as the hazard from my point of view is still out there.

Hope to see you soon, Mr. Tucker,

Cheers,
Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: RE: Confirming 4/5+December meeting

Dear Mr. Smith,

This is to confirm receipt of your e-mail and to thank you for the thorough directions. I shall be meeting Sgt Blachford at the Car Rental Desk at the airport, and I am expecting to be the Navigator - so your

directions will
come in handy.

I look forward to meeting you. I'll call you if any glitches arise.
Bill Tucker.

Dear Mr. Tucker,

Roger. If there is any layover time at Monterey Airport before meeting Sgt Blachford, give me a call and we can have a cup of coffee in the terminal and chat as we wait. I'm a tall man with short beard and hair.

Rained yesterday, clear and sunny today, cloudy and may rain in the next few days.

Cheers,
Barry Smith
831 659 3552

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: The End of the Day

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Mr. Tucker, 11 Dec 01

Well, it's been a week and it's all I've been thinking about; our

meeting and all the things I should have said and didn't. I can't think of anything I said and shouldn't, just omissions and clarifications.

Thank you for your email of today; my mind was certainly broadened. I've taken your suggestions/corrections to my report and made the changes. If I were on your staff at TSB, my report would have been reviewed by other investigators and before it reached you would have been smoothed over. I sometimes regret not working in a committee with its checks and balances and only have myself for proofreading and checking of facts. I appreciated your in depth analysis of my report and wish I had kept a copy of your invaluable corrections to it. 'Official determination' was too strong, and the many matches between Air India Flight 182 and United Airlines Flight 811 were too picky, and 'all at night' was irrelevant.

I've written a letter to Sgt. Bart Blachford laying out my concerns and recommendations; it's at the bottom of this email. I have to send it snail mail so he will not receive it for a few days.

When I asked that a supplemental/updated investigation into Air India Flight 182 be conducted into the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation, I should have realized that that investigation had already begun as shown by your participation, although detached. I really appreciate your contribution of factual data about cargo doors, wiring, and Boeing 747s to Sgt. Blachford. I believe it was a fair and necessary thing for Sgt Blachford to hear from an aviation authority, an official Crown aviation authority, that when I said that wiring and outward opening cargo doors have a history of probable cause of fatal accidents, I was correct. It does not mean it happened to Air India Flight 182 but it does mean to me those mechanical culprits can be considered as

justified suspects and should be ruled in or out.

I've used the analogy of a lineup with Sgt. Blachford in sticking with my criminal metaphors. If Mr. Garstang is going to bring in Pan Am Flight 103, as I believe he did and should, then it is only fair and prudent to bring in the other victims that have similar injuries, United Airlines Flight 811 and Trans World Airlines Flight 800.

The Garstang Report has been scanned and I'm sending a PDF, with scanning errors, via email to you for your consideration. As you read it, see that he has picked and chosen those facts that support his case, as a defense counsel or prosecutor would do, but not a fair investigator. He has not given any new or old evidence to contradict the solid findings of no explosion of any kind in the aft cargo compartment nor that the sudden loud sound on the CVR is not a bomb but in fact matched to the DC 10 cargo door explosive decompression. For his supplemental report on Air India Flight 182 to be given weight, those contradictions must be addressed and answered satisfactorily, and that he has not done.

I guess the big picture, Mr. Tucker, is a global look at aircraft accidents, not just the provincial ones in a certain jurisdiction. Each country has its own aircraft accident investigators which look at its assigned accidents but there is no global agency such as Interpol. I ask that you assume that task in your last six months of service in regard to four Boeing 747 accidents that have many similar evidence matches which occurred off Hawaii, Cork, Long Island and Lockerbie. They all have much evidence of outward ruptures of the fuselage just forward of the wing. They may have had four different causes for those large ruptures but the evidence is there in reconstruction drawings, underwater photographs, a flying aircraft that survived, and wreckage in

hangars of a huge hole appearing at event time on the starboard side forward of the wing in and around the forward cargo door. Could you assume the responsibility to look at all four Boeing 747 accidents at if they had all been assigned to Canadian aviation authority for evaluation and thus fill in a power vacuum? You have access to NTSB, AAIB, and RCMP held evidence that very few have in the world.

Could you ask Mr. Ken Smart of AAIB to quickly rule in or rule out the starboard side rupture of Pan Am Flight 103 as details about that area of the aircraft have been omitted in the AAIB report 2/90? I'm sure that there are Pan Am Flight 103 experts in AAIB who would love to check out one more 'zany' explanation and an hour or so in the Farnborough hangar looking at the actual wreckage pieces around that cargo door to see if they match the United Airlines Flight 811 photographs would quickly rule in or rule out the possibility. If the investigators are as dedicated as you say they are, and I truly hope they are, they will take the extra effort to check out an alternative to bomb explosion, if the hard evidence warrants it, regardless of juries or non aviation judge's opinions. For the evidence to warrant it, it must be examined and that means somebody has to walk into the hangar with the United Airlines Flight 811 AAR and make the matches or rule them out. I would fly to England to do it if invited and allowed access. I would also be glad to correspond with any AAIB investigator who wishes to talk to me about the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Pan Am Flight 103. I know it's a mythic 'bombed' aircraft but I did not pick the flight numbers, the sudden loud sound followed by an abrupt power cut to the FDR did.

Could you ask NTSB to resume 'correspondence' with me about

Trans World Airlines Flight 800? Since you have determined I am no kook could you suggest they check out the message since the messenger does have proper credentials and his research seems to be in order? There has been a political change in the last year and newer NTSB investigators may be willing to examine and discuss the fact that only eight of the ten latches in that forward cargo door have been recovered with two midspan latches missing and the color photographs clearly showing large ruptures at those two midspan latch areas in the forward cargo door of Trans World Airlines Flight 800.

Bombs planted by humans in airplanes which explode implies conspiracy. Mechanical events which fail imply faults which can be corrected. Airplane crashes are overwhelming accidental by crew error, weather, or mechanical failure. When conspiracy takes hold...it strikes deep and into your life it will creep..as the song goes. Conspiracy thinking destroyed the CASB years ago. The Gander crash was most likely ice as one of its causes and there was no bomb involved, but...into life it crept and struck deep, even to this day. Mr. Filotas did a disservice to the Canadian aviation authority by his unorthodox investigative procedures. I suggest that history repeats and TSB is at risk if Mr. Garstang, of the TSB, is allowed to have his conspiracy bomb explosion explanation stand for Air India Flight 182 and it is subsequently shown to be bogus, possibly by another 747 crash which leaves sudden loud sound, abrupt power cut, etc, etc...and was caused by the same fault as United Airlines Flight 811.

Regardless of the twisted administrative titles, Mr. Garstang is and has been employed by TSB for many years, is paid by the Crown, prepared a report for the RCMP, and will be considered to be an expert Canadian government aviation accident expert by the judge, jury, defense, media, and public when he testifies that

a bomb blew up Air India Flight 182 as it was planted in the aft cargo compartment; conclusions that are wholly without substantive supportive evidence and flatly contradicted by evidence and other official aviation opinion and findings. That is not right, sir! It's not fair, it's not scientific, and it's not proper investigative procedure.

Well, Mr. Tucker, thanks again for coming, I'm sure it was worth all your effort and I really enjoyed our chats about other issues as well. Please call upon me at any time for further clarifications or input regarding the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 and other Boeing 747s having similar accident evidence. As a fatal sudden jet plane accident survivor, I do feel an urgency as we both know how quickly aircraft related problems become out of control.

Cheers,
Barry

John Barry Smith
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Significant Direct and Tangible Evidence Obtained for Four
B747 Breakups in Flight

811 TWA 800
Boeing 747
Yes

AI 182 PA103 UAL

Yes Yes Yes

Early model -100 or -200	Yes
Yes Yes Yes	
Polyimide wiring (Poly X type)	Yes
Yes Yes Yes	
Sudden airframe breakup in flight (partial or total)	
Yes Yes Yes Yes	
Breakup occurs amidships	Yes
Yes Yes Yes	
High flight time (over 55,000 flight hours)	No
Yes Yes Yes	
Aged airframe (over 18 years of service)	No
Yes Yes Yes	
Previous maintenance problems with forward cargo door	
Yes Maybe Yes Maybe	
Initial event within an hour after takeoff	No
Yes Yes Yes	
Initial event at about 300 knots	
while proceeding normally in all parameters	
Yes Yes Yes Yes	
Initial event has unusual radar contacts	
Maybe Yes Yes Yes	
Initial event involves hull rupture in or near forward cargo door area	
Yes Yes Yes Yes	
Initial event starts with sudden sound	
Yes Yes Yes Yes	
Initial event sound is loud	Yes Yes
Yes Yes	
Initial event sound is audible to humans	Yes
Yes Yes Yes	
Initial event followed immediately by abrupt power cut to data recorders	
Yes Yes Yes Yes	
Initial event sound matched to explosion of bomb sound	
No No No No	

Initial event sound matched to explosive decompression sound in wide body airliner	Yes	Yes	Yes	Yes
Torn off skin on fuselage above forward cargo door area	Yes	Yes	Yes	Yes
Unusual paint smears on and above forward cargo door	Maybe	Maybe	Yes	Yes
Evidence of explosion in forward cargo compartment	Yes	Yes	Yes	Yes
Foreign object damage to engine or cowling of engine number three	Yes	Yes	Yes	Yes
Fire/soot in engine number three	Yes	Yes	Yes	Maybe
Foreign object damage to engine or cowling of engine number four	Yes	Yes	Yes	Yes
Right wing leading edge damaged in flight	Yes	Maybe	Yes	Maybe
Vertical stabilizer damaged in flight	Yes	Yes	Maybe	Yes
Right horizontal stabilizer damaged in flight	Yes	Yes	Yes	Yes
More severe inflight damage on starboard side than port side	Yes	Yes	Yes	Yes
Port side relatively undamaged by inflight debris	Yes	Yes	Yes	Yes
Vertical fuselage tear lines just aft or forward of the forward cargo door	Yes	Yes	Yes	Yes
Fracture/tear/rupture at a midspan latch of forward cargo door	Maybe	Yes	Yes	Yes
Midspan latching status of forward cargo door reported as latched	No	No	No	No
Airworthiness Directive 88-12-04 implemented (stronger lock sectors)	No	No	No	Yes

Outwardly peeled skin on upper forward fuselage
 Yes Yes Yes Yes

Rectangular shape of shattered area around forward cargo door
 Yes Yes Yes Yes

Forward cargo door fractured in two longitudinally
 Yes Yes Yes Maybe

Status of aft cargo door as intact and latched
 Yes Yes Yes Maybe

Passengers suffered decompression type injuries
 Yes Yes Yes Yes

At least nine missing and never recovered passenger bodies
 Yes Yes Yes Yes

Wreckage debris field in two main areas, forward and aft sections of aircraft
 Yes No Yes Yes

Initial unofficial speculation of probable cause as bomb explosion.
 Yes Yes Yes Yes

Initial unofficial speculation modified from bomb explosion
 Yes Yes Yes Yes

Structural failure considered for probable cause
 Yes Yes Yes Yes

Inadvertently opened forward cargo door considered for probable cause
 Yes No Yes Yes

Unofficial probable cause as bomb explosion
 Yes Yes No No

Official probable cause as 'improvised explosive device'
 No Yes No No

Official probable cause as explosion by unstated cause
 Yes No No No

Official probable cause as explosion in center fuel tank with unknown ignition source
 No Yes No No

Official probable cause as improper latching of forward cargo

door No No Yes No

Official probable cause as switch /wiring
inadvertently opening forward cargo door

No No Yes No

"Bomb' allegedly loaded two flights previous to detonation
flight Yes Yes N/A N/A

"Bomb' allegedly loaded one flight previous to detonation
flight N/A N/A N/A Yes

"Bomb' allegedly goes off on ground after a flight
N/A N/A N/A N/A

Significant Direct and Tangible Evidence Obtained for Four
B747 Breakups in Flight

AI 182 PA103 UAL

811 TWA 800

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Dear Sgt. Bart Blachford, 11 Dec 01

Thank you again for taking the time and effort to fly down here to my home from Vancouver. I trust you had a pleasant and safe flight home. Thank you for the RCMP badges you gave to my daughter, Laura Ashley; she treasures those very ornate and detailed emblems, so royal. I'm sending by separate post some of the documents I had prepared for you but neglected to give for your further review; they are mainly matching aircraft accident reports.

I've had a week to think about and digest our conversations

regarding my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182 and other Boeing 747s. Here are my thoughts:

1. You have not been on a wild goose chase these last six years, Sergeant. You said to me, "If I had thought that I has wasted these last six years..." and then trailed off. I took that to mean that for the first time, something I said led you to believe that actually the accused were not guilty and that all your investigative efforts to prove them guilty were for naught. Not true, sir! Your efforts have been fruitful. You have discovered the culprit. It's not human but then many villains are not; some are bacteria, some are lightning, and some are frayed wiring. If you consider yourself a prosecutor whose purpose is to convict three men, then you have been on a wild goose chase, but that is not your job, that is the Crown's prosecutor attorneys; your mandate is to find out the cause of a terrible event, regardless if human or not, and that you have done. You said words to the effect, "At the end of the day, you believe you can convince a jury that the three accused planted a bomb on Air India Flight 182." So what? You speak like a lawyer advising his client we can win because of your persuasive power to fellow humans, in this case the jury which will have all aviation experienced personnel rejected, only ignorant laypersons will be accepted. Their opinion about human nature is requested and valuable, but their opinion about why an airplane crashed is worthless. Please raise your investigative goal to include all causes for Air India Flight 182, not just evil humans.

2. Please continue your investigation into the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation as I now realize you have already started. You have received my report, you have interviewed me, you said when you left you 'had work to do', and I ask that you continue to

evaluate my comments such as this letter.

3. I believe you to be a fair and determined public safety police officer, Sgt. Blachford. Your determination has been proven by your trip down here and your review of my documents. To be fair, please consider all possible suspects. To be fair, if you include Pan Am Flight 103 as a match to Air India Flight 182, as your 'expert' does, then please be fair and include other similar events, United Airlines Flight 811 and Trans World Airlines Flight 800. After using the analogy of a partial fingerprint of United Airlines Flight 811 that matches Air India Flight 182 and others, let me use the analogy of the line up. The AITF has said the probable cause of the event was a bomb explosion inside a Boeing 747 and uses two aircraft in the line up to see if they match: Air India Flight 182 and Pan Am Flight 103. Fine. They do match in evidence. We agree. I say to be fair, let's bring in the other suspected victims of the 'bomb' explosion: United Airlines Flight 811 and Trans World Airlines Flight 800, both also thought to have been bomb explosions for days to over a year. Based upon Trans World Airlines Flight 800, a center fuel tank explosion needs to be considered and ruled in or out for Air India Flight 182. I rule it out based on the evidence and lack of same to support a center fuel tank explosion as an initial event. The burned and sooted pieces of wreckage do not support a finding of center tank explosion for Air India Flight 182 but the possibility needs to be considered and evaluated by professional aircraft accident investigators specializing in fuel/air explosions because of its similarity to Air India Flight 182. Then to United Airlines Flight 811 to see if it fits to Air India Flight 182. I believe you will find it does if given the same degree of attention as was given to match Pan Am Flight 103 to Air India Flight 182. To be fair all four similar events of Boeing 747s suffering fuselage breakup in flight leaving a sudden loud sound on the cockpit

voice recorder and an abrupt power cut to the flight data recorders must be considered equally. To only pick and choose those events which support your/AITF explanation of bomb explosion is not fair and is a prosecutorial or defense type action, not investigative. Prosecutors and defense counsel are not supposed to be fair, they are supposed to be biased and one sided; investigators are not one sided, they are fair and investigate all stories of all potential victims or suspects. Please give consideration of a match to Air India Flight 182 from United Airlines Flight 811 and Trans World Airlines Flight 800 as well as your current match of Pan Am Flight 103.

4. Your questions were mainly of a 'check out the messenger' type; who was I, what was my research based on, etc. You agreed I 'was not a kook'. The messenger checked out; now to check out the message: Air India Flight 182 was not a criminal offense but a mechanical event with precedent; shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation which matches United Airlines Flight 811.

5. Specific items to check out: (These are ones I recall we discussed, I think you wrote down several more.)

- a. Have bomb expert evaluate if bomb explosion or midspan latch ruptures caused the outward force which frayed the forward cargo door of Air India Flight 182 as stated in the CASB and Kirpal reports. Are the torque tubes twisted or just blown away? Is there bluing on the latch pins which indicate rupture force similar to United Airlines Flight 811? These questions can be answered by close examination of the high quality 35 MM film and video of the forward cargo door area in RCMP custody.
- b. Have bomb expert evaluate the finding of Mr. Garstang, not a bomb expert, that there was an explosion (not an overpressure) in the aft cargo compartment and that that explosion was caused by

a bomb. When bombs explode they leave telltale signs, some of which should be present, such as pitting, gas washing, cratering, residue, etc. As far as my research goes, none of the required bomb explosion corroborating evidence was present in the aft area of Air India Flight 182 and it was closely examined for same, but a bomb expert should provide an opinion.

c. Find evidence to counter the specific findings in the previous reports based upon evidence that the sudden loud sound on the CVR was not a bomb sound but was in fact matched to the explosive decompression sound of another wide body airliner when its cargo door inadvertently opened in flight.

c. Find evidence to counter the specific finding in the previous reports based upon evidence that there was no explosion of any kind in the aft cargo compartment.

d. Find evidence to counter the specific and undisputed finding that Pan Am Flight 103 suffered an explosion in the forward cargo compartment but has been matched to Air India Flight 182 by Mr. Garstang, who incredulously states that that aircraft suffered an explosion in the aft cargo compartment, an event, which if it had occurred, would have left much different evidence such as a debris pattern which would have differentiated it from Pan Am Flight 103.

e. Consult with engineers to evaluate possibility that normal overpressures from a broken up fuselage in flight can cause the evidence that exists for the aft section of Air India Flight 182 which would be a reasonable alternative explanation for the overpressures other than a bomb explosion.

f. Examine high quality photo and video to see if there are paint smears above forward cargo door which would indicate ruptured open and not exploded open and would match United Airlines Flight 811 and Trans World Airlines Flight 800, two non bomb events.

g. Ask Boeing to conduct computer simulations to evaluate what

happens when various sized holes suddenly appear in the fuselage just forward of the wing; 20 inch hole on port side, nine foot by 15 foot, and 20 feet by 40 feet on the starboard side. Does the nose come off? Does the nose stay on? What noise would appear on the CVR? Would the electrical power shut off abruptly or not for each event? Where would the pieces of ejected debris impact on the aircraft inflight such as leading edges of the wings and horizontal and vertical stabilizers? Which engines would ingest FOD and what effects would occur, such as uncontainment and fire?

I know the specifics are detailed but, Sgt. Blachford, this is an airplane crash, not a bank robbery. First establish a crime, then find the criminals. In 1986 the CASB declined to describe Air India Flight 182 as a crime. You have engineers and aircraft investigators available for consultation although reluctant. You might check with Scotland Yard for their opinion about the starboard side of Pan Am Flight 103 blowing out first as that area is neglected in the AAIB report. Submit the mechanical explanation for Pan Am Flight 103 for their opinion, they may have one.

I have offered up other accident victims and accused the culprits, electrical systems, faulty wiring, and a design flaw of outward opening nonplug cargo doors in a pressurized hull. (That cargo door has only one latch per nine foot slice of fuselage and it has no locking sector to prevent inadvertent opening inflight.) All of my accused have been found to have killed before in other similar aviation events. They are not above suspicion; they are dirty. As you heard from Mr. Tucker, wiring in early model Boeing 747s (and other airliners) has been found to be faulty, the electrical system has failed and killed before, and outward opening cargo doors are a design shortcoming that has killed

many in DC 10 and Boeing 747 as well as other models such as DC-9.

Prosecutors have accused humans who may or may not have committed other crimes but I know they did not cause Air India Flight 182 because 'nobody' did; it was a mechanical event with its accused culprits who have committed other tragedies as well as Air India Flight 182: wiring, electrical system, and outward opening nonplug cargo doors.

Please look beyond your one tree (AI 182) in the forest of four Boeing 747 accidents (AI 182, PA 103, TWA 800, and UAL 811). Consider yourself not only a Canadian investigator but a world investigator. Include all four of the Boeing 747 events which are so often matched together because of their similarities: Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. As you have delved so diligently into the three Sikh accused lives, delve with equal fervor into the other three: Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. Their histories are available as aircraft accident reports, and although not as spicy as human histories, still tell a fascinating tale of human life and death.

As always, Sgt. Blachford, I remain available anytime for further discussion and consultation to you and your fellow investigators as I consider this a life and death issue as the hazards I have identified remain today as they did sixteen years ago. Come down again and if it's my turn to come up and meet your staff, I certainly will try.

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

7.18 Summary of matching evidence between Air India Flight 182 and United Airlines Flight 811 specifically:

- A. Boeing 747
- B. Early model -100 or -200
- C. Polyimide wiring (Poly X type)
- D. Sudden airframe breakup in flight (partial or total)
- E. Breakup occurs amidships
- F. Section 41 retrofit not done
- G. At least medium flight time
- H. At least medium aged airframe
- I. Previous maintenance problems with forward cargo door
- J. Initial event at about 300 knots while proceeding normally in all parameters
- K. Initial event involves hull rupture in or near forward cargo door area
- L. Initial event starts with sudden sound
- M. Initial event sound is loud
- N. Initial event sound is audible to humans
- O. Initial event followed immediately by abrupt power cut to data recorders
- P. Initial event sound not matched to explosion of bomb sound
- Q. Initial event sound is matched to explosive decompression sound in wide body airliner

- R. Torn off skin on fuselage above forward cargo door area
- S. Evidence of explosion in forward cargo compartment
- T. Foreign object damage to engine or cowling of engine number three
- U. Foreign object damage to engine or cowling of engine number four
- V. Right wing leading edge damaged in flight
- W. Vertical stabilizer damaged in flight
- X. Right horizontal stabilizer damaged in flight
- Y. More severe inflight damage on starboard side than port side
- Z. Port side relatively undamaged by inflight debris
- AA. Vertical fuselage tear lines just aft or forward of the forward cargo door
- AB. Fracture/tear/rupture at a midspan latch of forward cargo door
- AC. Midspan latching status of forward cargo door not reported as latched
- AD. Airworthiness Directive 88-12-04 not implemented (stronger lock sectors)
- AE. Outwardly peeled skin on upper forward fuselage
- AF. Rectangular shape of shattered area around forward cargo door
- AG. Forward cargo door fractured in two longitudinally
- AH. Status of aft cargo door as latched
- AI. Passengers suffered decompression type injuries
- AJ. At least nine missing and never recovered passenger bodies
- AK. Initial unofficial speculation of probable cause as bomb explosion.
- AL. Initial unofficial speculation modified from bomb explosion
- AM. Structural failure considered for probable cause
- AN. Inadvertently opened forward cargo door considered for

probable cause

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Sixteen years ago today...**

Accident description - Status:Final

Date: 12 DEC 1985
Time: 06.46
Type: [McDonnell Douglas DC- 8-63CF](#)
Operator: Arrow Air
Registration: N950JW
C/n: 46058/433
Year built: 1969
Total airframe hrs: 50861 hours
Crew: 8 fatalities / 8 on board
Passengers: 248 fatalities / 248 on board
Total: 256 fatalities / 256 on board
Location: Gander ([Canada](#))
Phase: Initial Climb
Nature: Non Scheduled Passenger
Flight: Gander IAP - Fort Campbell, KY (Flightnumber 1285R) **Remarks:**
Crashed shortly after take-off from Runway 22. PROBABLE CAUSE: "The Canadian Aviation Safety Board was unable to determine the exact sequence of events which led to this accident. The Board believes, however, that the weight of evidence supports the conclusion that, shortly after lift-off, the aircraft experienced an increase in drag and reduction in lift which resulted in a stall at low altitude from which recovery was not possible. The most probable cause of the stall was determined to be ice contamination on the leading edge and upper surface of the wing. Other possible factors such as a loss of thrust from the number four engine and inappropriate take-off reference speeds may have compounded the effects of

the contamination."

Source: (also check out [sources](#) used for every accident)

AW&ST 19.12.88 (107), 20.3.89 (267), 27.3.89 (33)3.4.89 (67), 3.7.89 (66-67) ,
31.7.89 (29), 1.7.1991 (29) + FI 21-28.12.1985 (2) + ICAO Adrep Summary 1/89
(29)

[Gander: the untold story](#)

[\[legenda\]](#) [\[disclaimer\]](#)

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[Aviation Safety Network](#); updated 5 August 2001

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:11 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: **Small world..**

Noted, thanks. In fact, I rec'd another e-mail today on the same topic. It was from Ron Schleede - formerly of the NTSB who retired last year and who was heavily involved in the CASB investigation of the Arrow Air accident.

Bill T.

Dear Bill,

Small world, Ron Schleede and I had a short correspondence

regarding TWA 800 as detailed below. Note that I presented the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation only days after the event because I knew what I was looking for starting with sudden loud sound on the CVR and an abrupt power cut to the FDR, two rare occurrences.

Mr. Schleede has based his belief in ruling out the cargo door opening in flight on the bottom eight latches being latched and locked; however, it's the two midspan latches that show the huge rupture holes and which were never recovered. He also refers to the cargo door as if it were in one piece when in fact it was shattered into many pieces.

Photo above, nose to right, forward cargo door in shattered pieces with ruptures at aft midspan latch and red paint smears on white fuselage apparent.

Below is entire finding of the NTSB "investigation" into the forward cargo door area of Trans World Airlines Flight 800:

22 April, 1997. Mr. James Wildey II signs report No. 97-82 of Docket No. SA-516, Exhibit 15C, Section 41/42, Forward Cargo Door, dated 22 April 1997, with Mr. Al Dickinson, AS-10, listed as investigator. Report states, "Examination of the lower lobe forward cargo door showed that all eight of the door latching cams remain attached (along with pieces of the door itself) to the pins along the lower door sill."

Well, the point is, Mr. Schleede knows United Airlines Flight 811 and did not apply the similarities to Trans World Airlines Flight 800 and ruled out the same probable cause on incomplete information; another opportunity lost.

However, NTSB has said wiring probably precipitated the destruction of Trans World Airlines Flight 800, after eighteen months as bomb conspiracy caused, and on that we agree.

By the way, that cause statement below is verbatim correct, and, in my view, also correct in the sense of an appropriate conclusion to a thorough and unbiased investigation. It is quite different from what some people think (or say) that the Board said.

Regarding Arrow Gander accident above, I was going to add that common sense prevailed and the bomb conspiracy theory is relegated to the fringe people. I hope the bomb conspiracy theory is again rejected in preference to common sense for Air India Flight 182.

Cheers,
Barry

From: Schleede Ron <SCHLEDR@ntsb.gov>
To: barry <barry@corazon.com>
Subject: RE: TWA crash cause ATTN Robert Francis
Date: Mon, 29 Jul 1996 15:24:00 -0400
Encoding: 17 TEXT
Status:

Be assured that we are checking that. I was the investigator in charge of the UAL flight 811 case and fully knowledgeable in its causes

and factors.

Thanks for the interest.

From: barry

To: schledr

Subject: TWA crash cause ATTN Robert Francis

Date: Sunday, July 28, 1996 9:58AM

Mr. Francis. The reasonable cause of the TWA crash is the inadvertent opening of the forward cargo door. That is the mechanical cause that must be ruled out. Compare to United Flight 811 of Feb 1989.

From: Schleede Ron <SCHLEDR@ntsb.gov>

To: barry <barry@corazon.com>

Subject: RE: TWA crash cause

Date: Sun, 11 Aug 1996 11:39:00 -0400

Encoding: 13 TEXT

Status:

I have examined the cargo door from twa 800--it is locked and latched!

From: barry

To: SCHLEDR

Subject: TWA crash cause

Date: Tuesday, 30 July, 1996 01:48

<http://www.corazon.com/TWA800PA103UA811.html> is my website for cargo door crash theory.

From: Schleede Ron <SCHLEDR@NTSB.gov>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: What is 'backup theory'?
Date: Mon, 19 May 1997 13:51:11 -0400
Encoding: 135 TEXT

As I have told you before, the cargo door was locked and latched at impact. ron

>-----

>From: John Barry Smith[SMTP:barry@corazon.com]
>Sent: Tuesday, May 13, 1997 11:55 PM
>To: Schleede Ron
>Subject: What is 'backup theory'?

>

>Mr. Schleede, is the backup theory door opening by metal fatigue or

>inadvertent unlatching? Please tell me.

>Sincerely, John Barry Smith barry@corazon.com

>

>

>> Robert Hager

>>>

>>>Discusses the lead

>>>

>>>theory on the crash

>>>

>>>Talks about the
>>>
>>>backup theory on the
>>>
>>>disaster
>
>>Reconstructing TWA Flight 800
>>
>>NBC NEWS
>>
>> Ten months after TWA Flight 800
>>
>>exploded in midair and plummeted into the
>>
>>Atlantic Ocean, investigators are still piecing
>>
>>together the plane in hopes of finding what may
>>
>>have caused the tragedy that killed all 230 on
>>
>>board.
>>
>>
>>Robert Hager
>>
>>Discusses the lead
>>
>>theory on the crash
>>
>>Talks about the
>>
>>backup theory on the
>>

>>disaster

>>

>>

>> On Monday, the National Transportation

>>

>>Safety Board let members of the media tour the

>>

>>hangar where the plane is being re-assembled as

>>

>>a giant jigsaw puzzle. Workers have so far

>>

>>logged 10,000 hours putting together 725 pieces

>>

>>of debris fished out of the ocean. TWA Flight

>>

>>800 stands 27 feet tall with pieces as small as a

>>

>>thumbnail. The reconstruction so far has cost

>>

>>\$500,000. While FBI investigators are not ready

>>

>>to announce exactly how the plane blew up, they

>>

>>have said it was generally caused by

>>

>>"catastrophic mechanical failure" rather than

>>

>>sabotage.

>>

>> "Nothing indicates a bomb blast took

>>

>>place and nothing indicates a missile penetrated

>>

>>this plane," said NBC aviation correspondent

>>

>>Robert Hager.

>>

>>

>>TWA Homepage

>>

>>Families of TWA Flight

>>

>>800

>>

>>TWA Flight 800

>>

>>Memorial

>>

>>

>> Although no date has been set, the FBI

>>

>>criminal investigation is expected to be wrapped

>>

>>up in a few weeks. Then the investigation moves

>>

>>to the lab for a more microscopic look at what

>>

>>happened.

>>

>> With 5 percent of the plane still missing,

>>

>>investigators hope that won't keep them from

>>

>>finding the answers they are looking for.

>>

>> In July, the families of the victims will

>>
>>be allowed to tour the reconstruction during
>>
>>events to mark the first anniversary of the
>>
>>disaster.
>
>
>
>Email: barry@corazon.com
>Page: <http://www.corazon.com/>
>
>
>
>

The below information is from the NTSB investigator who helped locate the forward cargo door of UAL 811 in 1990:

Date: Sat, 17 Aug 1996 12:52:15 -0700
From: wmor@ix.netcom.com (William M. O'Rourke)
Subject: UAL811
To: barry@corazon.com
Status:

JBS:

I'll try to answer your questions here re. UAL811 but the answers may not be the ones you're looking for.

1. Ron Schleede was the Chief of the Accident Investigation

Division at the time of the accident and oversaw much of the on-scene investigation. He is highly experienced and a reliable investigator. He started his career with the NTSB at the Denver Field Office after flying F-100's with the USAF.

2. I never saw the actual door but was informed that it was in two pieces versus the single (entire) door we based our calculations on. I learned that the USN utilized our estimate of impact point & time and applied their detailed knowledge of under water current data. The result was that they drew a 5 NM box around a point they calculated would have been the resting place of the door. Their ship then entered at the NW corner of the box steaming on a track towards the SE corner. At about the half-way point, on the first run, they located the debris field on the ocean floor in approximately 14,000 feet of water.

3. I DID NOT SEE ANY BLIPS! What I did see was a computer printout of FAA and USN FACSFAC ground based radars which listed all primary & secondary (transponder) returns covering the area we specified in our data reduction request.

Since the Navy's FACSFAC processor (computer) was more state-of-the-art than the FAA system, plus it had more feeds, we utilized the USN data for the most accurate data presentation.

From the data in the printout, we could not tell which target was the door or which was debris. Further, we had no way of telling which was which. What the printout did tell us was whether it was a long-run length or short-run length target.

Generally, you could say that a long-run target is a strong target while the short-run length was a weak target. However, the difference twixt the two is actually more of radar cross section of a target. As an example, picture a billboard of 15 feet high, 30 feet wide and 6 inches thick. If you look at the billboard staright on, you see its full 15x30 foot area or an object with a surface area of 450 sq. feet. However, when you view the same billboard from end-on, you see an object with a total area of 7.5 square feet. Hence, an excellent example of the primary difference between a long & short run length target.

With respect to the UAL811 incident, we were very lucky in that while the flight was climbing out of HNL, a WX ballon was also on its way up. This gave use very accurate winds which enabled us to validate winds aloft info recorded on the DFDR. The largest problem I had was to coorelate the various timing involved from all of the data sets. Since the most accurate timing source was the FAA's ARTCC tapes, we had to adjust FAA & USN radar data, CVR, DFDR, NWS, and FAA tower tapes to one single time base.

The above are the same techniques we used in reconstruction of flight tracks of accident incident aircraft as well as the Shuttle Challenger accident.

Although my primary job was as an ATC investigator at the NTSB, I got stuck with doing radar data since I had a radar background going back to 1957 as a GCI controller, a brief stint on RC-121D's, TDY to a DDR and DER as well as TDY to VP-26 while at NQX (ASP-20).

If you give me your snail-mail address, I send you a copy of the Factual Report - Radar Reconstruction, that I completed on this case. I think I still have a copy of it around here somewhere.

I retired from NTSB in May 1991 after 34-years and do not even have a copy of the amended UAL811 report. I do know that they had to amend the report based on the information the recovered door revealed.

Mike O'Rourke
wmor@ix.netcom.com

Below letter discusses the efforts to get door examined.

From: Chris Hinch <chris@dcc.govt.nz>
To: "barry@corazon.com" <barry@corazon.com>
Subject: Cargo Doors & UAL 811
Date: Thu, 22 Aug 96 22:29:00 NZT
Encoding: 90 TEXT
Status:

Barry

Hang in there.

I was on a computer graphics team that developed computer

animation sequences for a documentary about UAL811. The animation sequences showed how the door latching mechanisms work for the cargo door in question.

At that time, the official story was that a ground handler had damaged the latching mechanism and/or not closed the door properly. The father of a New Zealand teenager killed on the flight argued against this, and as a result, the TVNZ documentary was commissioned, presenting his theory that an electrical failure initiated the door opening sequence with the 'L' shape of the locking latches making them susceptible to deformation.

In order to create the animation sequences, we had to study and understand the issues involved. We then predicted that if the door was found, what the relative positions of the cams and interlocks would be, and that the L locking bars would be deformed by the backdriven cams.

The documentary was rebuffed by United, who said that that they were aware, prior to the accident, that the L locks could be deformed by initiating the door open sequence while locked, and that a modification had been issued to strengthen them. As that modification had *apparently* been fitted to 811, we were "therefore" wrong. In addition, local airlines said that a special 'strengthening' modification had been fitted to their fleet of B747's, "therefore" it was okay to keep flying.

But when the door was retrieved, the locks were deformed as predicted, and the cams were in the positions we predicted. Obviously, if fitted, the modification was not strong enough. This meant that it could happen again, and I was approached by TVNZ to say so on camera. I did so but did not realise the personal and professional cost that would occur as a result.

I was not aware that the NTSB had changed their position, and I cannot tell you the personal feeling of relief, vindication and resolution that I felt reading their revised executive summary at your web site. Thank you very, very much.

But now, the horrifying feeling that our words will continue to go unheeded, and that more people will die - especially when we hear airlines continuing to say that they are "okay" because they have fitted the "special" strengthening mod.

Can you confirm if 811 had the rivetted L plates modification added? Did 800? 103? Can you confirm or determine if any one has actually initiated the opening sequence on the ground, with the door fully closed, with the L plates modification fitted? Can Boeing/NTSB categorically demonstrate that the mod fitted will prevent deformation when the cams are backdriven?

I wish you the very very best of luck. Remain focused, persistent and rational in your arguments, and they cannot argue.

By the way - check 811's pilot statement (on record I believe) that the only reason the aircraft didn't come apart underneath him was that he had just taken it off AP and let go of the controls at the point of event - he felt that fighting the aircraft (or trying to keep it straight, as the AP would have done) would have resulted in catastrophic failure.

In the other accidents, were they on AP?

Cheers

Chris Hinch

chris@dcc.govt.nz

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:11 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Recent forward cargo door crunch on Boeing 747 at Heathrow, AAIB bulletin:

Dear Bill, 15 December 01

Below excerpts show cargo door area for Boeing 747s is still ripe for damage. The recent AAIB report eerily resembles the Air India Flight 182 event a year before its crash. The new crunch looks innocent unless compared to other similar events. Crunches may accelerate any nearby wiring damage. Hamburg implies German air carrier.

Reports like these give urgency; I'm now hoping that Sergeant Blachford can persuade his superiors at AITF to invite me up there for a full scale presentation of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182. To do nothing is not right. To act is prudent.

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924

Air India Flight 182 Below from Kirpal Report:

(I) On 13th July, 1984 at Dubai -- flight AI-868 The aircraft returned after aborting take off due to no rise in the EPR and N1 on No.1 engine (Sl.No. 695612). The engine front and rear were checked and found OK. Slight wetness was noticed in the bleed outlets. No external oil leak was noticed. Oil quantity was topped up. The chip detectors and oil filter were found OK. EVC Ph filter was found

OK. EVC linkage was exercised. The engine was run up and its operation was found satisfactory. The snag was suspected to be due to lack of pressurising air at low N1.

(ii) On 18th July, 1984 at Delhi -- flight AI-105 The right hand side fuselage skin between stations 480 and 500 in line with lower portion of forward cargo door cut-out was damaged by high lift. The same was repaired at Delhi. Permanent repair was carried out at Bombay. The repairs were accomplished using guidelines given in the Boeing Structural Repair Manual.

Below from AAIB recently:

United Kingdom
Air Accidents Investigation Branch
Bulletins (December 2001)

AAIB Bulletin No: 12/2001 Ref: EW/G2001/08/27 Category:
1.1 INCIDENT Aircraft Type and Registration:
Boeing 747-186B, EP-IAM No & Type of Engines: 4 Pratt &
Whitney JT9D-7A Date & Time (UTC): 30 August 2001 at

1645 hrs **Location:** Stand L31 at London Heathrow Airport
Type of Flight: Scheduled Public Transport **Persons on Board:** Crew - None Passengers - None **Injuries:** Crew - None Passengers - N/A **Nature of Damage:** Buckled cargo door
Information Source: Aircraft Accident Report Form
The forward cargo hold of a Boeing 747 parked on Stand L31 at London Heathrow Airport had been loaded using a 'high loader'. On completion of loading, the handling agent activated the door closing mechanism with the 'high loader' still in position adjacent to the door. As the aircraft's cargo door approached the closed position the aft corner of the door struck a guide rail on the 'high loader' causing the door to buckle. The aircraft was removed from service and ferried to Hamburg for repair.

Published 6 December 2001

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Previously reported below:

Difficulty Date : 10/11/00

Operator Type : Air Carrier

ATA Code : 5210

Part Name : CONTROLLER

Aircraft Manufacturer : BOEING

Aircraft Group : 747

Aircraft Model : 747422

Engine Manufacturer : PWA

Engine Group : 4056

Engine Model : PW4056

Part/Defect Location : CARGO DOOR

Part Condition : MALFUNCTIONED

Submitter Code : Carrier

Operator Desig. : UALA

Precautionary Procedure : NONE

Nature : OTHER

Stage of Flight : INSP/MAINT

District Office Region : Western/Pacific US office #29

A/C N Number : 199UA

Aircraft Serial No. : 28717

Discrepancy/Corrective Action:FWD CARGO DOOR OPENED BY ITSELF WHEN CB PUSHED IN. ON ARRIVAL, CIRCUIT BREAKERS WERE PUSHED IN, WHEN PRESSURE RELIEF DOOR HANDLE WAS OPENED THE DOOR LATCHES OPENED AND THEN THE DOOR OPENED ON ITS OWN. COULD NOT DUPLICATE PROBLEM AFTER INITIAL OPENING.

From NTSB AAR 92/02 United Airlines Flight 811

1.17.6 Uncommanded Cargo Door Opening--UAL B-747, JFK Airport

On June 13, 1991, UAL maintenance personnel were unable to electrically open the aft cargo door on a Boeing 747-222B, N152UA, at JFK Airport, Jamaica, New York. The airplane was one of two used exclusively on nonstop flights between Narita, Japan, and JFK. This particular airplane had accumulated 19,053 hours and 1,547 cycles at the time of the occurrence.

The airplane was being prepared for flight at the UAL maintenance hangar when an inspection of the circuit breaker panel revealed that the C-288 (aft cargo door) circuit breaker had popped. The circuit breaker, located in the electrical equipment bay just forward of the forward cargo compartment, was reset, and it popped again a few seconds later. A decision was made to defer further work until the airplane was repositioned at the gate for the flight. The airplane was then taxied to the gate, and work on the door resumed.

The aft cargo door was cranked open manually, the C-288 circuit breaker was reset, and it stayed in place. The door was then closed electrically and cycled a couple of times without incident. With the door closed, one of the two "cannon plug" (multiple pin) connectors was removed from the J-4 junction box located on the upper portion of the interior of the door. The wiring bundle from the junction box to the fuselage was then manipulated while readings were taken on the cannon plug pins using a volt/ohmmeter. Fluctuations in electrical resistance were noted. When the plug was reattached to the J-4 junction box, the door began to open with no activation of the electrical door open switches. The C-288 circuit breaker was pulled, and the door operation ceased. When the circuit breaker was reset, the door continued to the full open position, and the lift actuator motor continued to run for several seconds until the circuit breaker was

again pulled. At this time, a flexible conduit, which covered a portion of the wiring bundle, was slid along the bundle toward the J-4 junction box, revealing several wires with insulation breaches and damage.

ORDER: 8300.10

APPENDIX: 4

BULLETIN TYPE: Flight Standards Information Bulletin (FSIB)

for Airworthiness (FSAW)

BULLETIN NUMBER: FSAW 93-50

BULLETIN TITLE: Inappropriate Use of Circuit Breakers
During B-747 Lower Lobe Cargo Door Operation

EFFECTIVE DATE: 06-02-94

1. SUBJECT. This FSIB informs inspectors of unsafe procedures being used by some operators to close and lock the lower lobe cargo doors of the Boeing 747 (B-747) series aircraft.

2. BACKGROUND.

A. This bulletin was developed after an inquiry by a foreign airworthiness authority into the special procedures used by a

specific operator to close and lock the lower lobe cargo doors of B-747 series aircraft. The special procedure included in the operator's maintenance manual called for manual tripping of the cargo door control circuit breakers and the section 2 ground handling bus circuit breaker in order to further remove the possibility of power being applied accidentally to the cargo door control circuitry.

B. The manual tripping of the circuit breakers in special cargo door lock procedures is unnecessary and decreases the reliability of the circuit breakers to perform their intended function. Frequent switching of the breakers could cause them to trip before the point of rated voltage or not to trip at all. Both cases could have adverse effects (such as the following) in relation to the safe operation of the cargo doors:

(1) Circuit breakers that trip before the point of rated voltage would cause increased manual operation of the cargo doors.

(2) Manual operation could introduce additional failure conditions, such as out-of-sequence operation and

overdriving of
the cargo door mechanisms.

(3) Service history has shown that manual operation of the cargo doors is more prone to cause damage; for example, the failure of a breaker to trip at the point of rated voltage could lead to failed components and fire.

2

C. The revision to the B-747 cargo door lock sectors warning system, in airplanes compliant with Airworthiness Directive (AD) 90-09-06, provides an increased level of integrity so that manual tripping of the circuit breakers is not necessary to prevent the possibility of an uncommanded opening of the cargo doors. Furthermore, power to the cargo door is automatically removed by the Master Latch Lock System upon first motion of the

Master

Latch Lock Switch away from the fully unlocked position.

3. ACTION. Principal maintenance inspectors (PMI) having certificate management responsibilities for operators of Boeing 747 series aircraft should ensure that this information is brought to the attention of their respective operators. Any operators using this procedure should be discouraged from its continued use.

4. INQUIRIES. This FSIB was developed by SEA.AEG. Any questions regarding this information should be directed to AFS-510 at (703) 661-0333, extension 5018.

5. EXPIRATION. This FSIB will expire on 05-31-95.

/s/

Edgar C. Fell

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:11 PM PDT

To: Bill.Tucker@tsb.gc.ca

Subject: Analysis of PA 103 cargo door pictures

W.T. (Bill) Tucker

Director General,
Investigation Operations
30 Jan 02

Dear Bill, thank you so very much with getting back in touch with me and also for following up with AAIB about the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Pan Am Flight 103. I got chill bumps when I opened your email and saw the pictures of the shy starboard side of that fuselage. It corroborated most of what I had deduced by looking at the reconstruction drawings and interpreting the text of AAIB 2/90. The consequences in metal of an open cargo door in flight for Pan Am Flight 103 are evident as the wiring/cargo door explanation implies. The pictures are a 'bombshell', pun intended, as they solidly support a shattered open cargo door in flight as reasoned below.

Let me be specific about the pictures of Pan Am Flight 103 forward cargo door area wreckage reconstruction:

1. The starboard side forward of the wing is a tangled mess of twisted metal when compared with the baby butt smooth port side. The port side is the 'bomb' side and reveals a 20 inch diameter hole purported to be the 'bomb' blast hole. The starboard side is the cargo door side and reveals many square yards of fuselage skin peeled outward. The fact of the relatively smooth port side and the shattered starboard side of Pan Am Flight 103 matches the other two 747s in question, Air India Flight 182 and Trans World Airlines Flight 800 which in turn matches the model, United Airlines Flight 811.
2. There is a huge hole in the forward cargo door of approximately six feet by four feet with petaled adjacent skin pushed outward. This hole of missing metal is almost the entire bottom half of the door itself. It is easy to see that those expelled

pieces of skin were ingested into nearby engine number three in flight causing the fire and early separation from the wing, the only engine to do so.

The investigators were able to find fingernail sized pieces of wreckage on the land yet were unable to find 24 square feet of metal, pull in hooks, latch power unit, locking sectors, torque tubes, inspections windows and apparently the bottom eight latches of the door. Where are the missing metal pieces, tubes, hooks, power unit, sectors, windows, and latches for Pan Am Flight 103? The fact of the missing pieces and parts of the broken door of Pan Am Flight 103 matches the other two 747s in question, Air India Flight 182 and Trans World Airlines Flight 800 which in turn matches the model, United Airlines Flight 811.

3. The pictures show a broken door which seals off a cargo hold which is purported to have contained a 'bomb' powerful enough to blow the nose off a 747 in flight but which only made a 20 inch diameter hole 25 inches from the 'bomb' explosion on the port side; yet the actual evidence contradicts that conclusion as stated in the AAIB report: "8. Analysis With the two container reconstructions placed together it became apparent that a relatively mild blast had exited container 4041 through the rear lower face to the left of the curtain and impinged at an angle on the forward face of container 7511. This had punched a hole, Figure F-10, approximately 8 inches square some 10 inches up from its base and removed the surface of this face inboard from the hole for some 50 inches. Radiating out from the hole were areas of sooting, and other black deposits, extending to the top of the container. No signs were present of any similar damage on other external or internal faces of container 7511 or the immediately adjacent containers 14R and 21R." And, "1.16 Tests and research Calculations suggest that a charge standoff distance of approximately 25 inches would result in a shattered region approximately 18 to 20 inches in diameter, comparable to the

size of the shattered region evident in the wreckage." And, "1.12.2.1 Fuselage Where these panels formed the boundary of the shatter zone, the metal in the immediate locality was ragged, heavily distorted, and the inner surfaces were pitted and sooted - rather as if a very large shotgun had been fired at the inner surface of the fuselage at close range."

There was no bomb. There was a shotgun type discharge that occurred after the tremendous explosive decompression when door ruptured open inflight, possibly from a weapon or flare gun in the baggage in the hold.

4. There is classic upwards tearing of the structure above the hinge, contrary to Mr. Smart's inexplicable opinion, as seen by the vertical lines of metal tearing above as well as fore and aft of the door. This vertical tearing is corroborated by the reconstruction drawings that show the telling rectangular shape of the fuselage rupture area in and around the forward cargo door. The vertical tearing of the fuselage skin above, fore, and aft of the forward cargo door of Pan Am Flight 103 as well as the rectangular shape of the tear out zone matches the other two 747s in question, Air India Flight 182 and Trans World Airlines Flight 800 which in turn matches the model, United Airlines Flight 811.

The reconstruction colored drawings showing the relative disintegration sequence has the top half of the door departing the aircraft at the initial event time (sudden loud sound on CVR) and more departing skin than port side. Photos and drawings below from AAIB and NTSB AAR.

A split second later the shatter area on the cargo door side is still larger than the shatter zone on the port side. The characteristic rectangular shape of the shatter zone when the cargo door opens in flight is now apparent which matches the United Airlines

Flight 811 rectangular shape.

Pan Am Flight 103 Above showing the classic upwards tearing of the structure above the hinge and classic rectangular shape of torn off skin; this cargo door opened in flight.

United Airlines Flight 811 Above showing classic upwards tearing of the structure above the hinge and classic rectangular shape of torn off skin; this cargo door opened in flight.

3. The latching status of the forward cargo door of Pan Am Flight 103 is omitted in the AAIB report although the locked status is given for the identical aft cargo door and the bulk cargo door. The latching status is crucial in ruling in or ruling out the inadvertent opening of the door in flight so a working assumption must be made. Since the status of the two other cargo door was given as latched and the status of the forward was omitted, the assumption must be made that if the forward cargo door were latched, it would have been reported as such, but since it was not reported, the assumption must be that it was unlatched. Upon viewing the pictures it is clear to see why the status was unstated as the bottom eight latches along the lower sill appear to be missing as well as the aft midspan latch. The fact of the apparently missing latches of the forward cargo door of Pan Am Flight 103 matches the other two 747s in question, Air India Flight 182 and Trans World Airlines Flight 800 which in turn matches the model, United Airlines Flight 811. What is the latch status of that forward cargo door of Pan Am Flight 103? Were all ten recovered? If so, is there bluing on the latch pins which shows the tremendous pressure exerted on them to open in flight when the latch cams inadvertently move to the open position?

4. The upper hinge appears to be intact along its entire length. This fact of intact upper hinge of Pan Am Flight 103 matches the other two 747s in question, Air India Flight 182 and Trans World Airlines Flight 800 which in turn matches the model, United Airlines Flight 811.

5. There is apparently no blue paint transfer from the upper fuselage onto the door. It is possible but unlikely that some paint transfer took place but on the missing lower half of the door. This apparent fact of no paint transfer for Pan Am Flight 103 does not match Trans World Airlines Flight 800 which in turn matches the model of United Airlines Flight 811. Any paint transfer match for Air India Flight 182 is unknown at this time.

Mr. Tucker, I look at these pictures in amazement as the story they tell is so clear to me after all these years of matching the four Boeing 747s to each other. The outward petalling of the skin in and around the door has never been described nor viewed before in any media or the AAIB report but is now revealed. The expected damage from the wiring/cargo door explanation is present. It matches the other three 747s and is clearly indicative of a large outward force which could cause the nose to come off in flight. What caused this large outward force? An honest 'bomb' theorist would say the bomb did it; and honest missile theorist would say a missile did it; an honest center tank explosion theorist would say the fuel tank explosion did it; an honest wiring theorist would say the wiring caused the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup sequence. A wishful thinking or prosecuting bomb, missile, or center tank theorist would ignore these pictures, denigrate them, stifle them, dismiss them; actions which are not consistent with a proper aircraft investigation untainted by political influence.

An important step is to admit that this cargo door for Pan Am

Flight 103 and the others of course, did open in flight and created the subsequent twisted metal, outward petalled skin, sudden loud sound on the CVR, inflight damage to right wing leading edge, FOD in number three engine and all the rest of the matching evidence. I contend that conclusion of open cargo door in flight is proven.

Next is to determine why these forward cargo doors are opening in flight. As you said to me, the cause for all four ruptured open cargo doors could be four different reasons and I agree. It could be four different reasons and even reasons not discussed such as cargo shift.

Each proponent must be given a chance in front of experienced, specialized aviation accident professionals to present the case. The bomb, missile, and center tank theorists have all been given much time while the wiring/cargo door person, me, has not been given that full chance. The short time we had together has borne this fruit of corroborating photographs.

Let me have that chance. Let me stand up in person to a team made up of professional accident investigators such as TSB has on staff and present my case, let me withstand any criticism, let the team look at all my evidence culled from years of research, let the evidence such as these very valuable pictures you have obtained have an opportunity to be seen and evaluated in light of all the other matching evidence. The validity of the wiring/cargo door explanation for any and all of those fatal accidents will become clear to all soon enough. Bogus explanations which sound good but have no basis in reality will be quickly ferreted out while any strong and potentially correct explanation will be out in the open. Each government agency is looking at its tree of a 747 but no one except me, and now you, sir, are seeing the

forest of the four 747s. It's never too late to put two and two together to get four.

Here is key question:

Forward cargo door opened in flight for four 747s, but why? A key way to find out is your point: Try to determine difference between door blown open by bomb or door ruptured open by torque tubes turning latches to open position. A bomb expert could give advice on that and a structural engineer could give advice on the other.

I would like to go through the AAIB report with an AAIB official and show discrepancies and contradictions when viewed from the 'bomb' explanation but can be explained by the wiring/cargo door explanation. We did not do that thoroughly when you were here because we concentrated on Air India Flight 182. The Trans World Airlines Flight 800 AAR is similarly fraught with contradictions and not realistic conclusions when viewed from a center tank explosion as the initial event but which make sense when seen from the wiring/cargo door event followed by the center tank explosion as the aircraft fell and disintegrated as on fire engine number three ignited the fuel vapors from compromised center fuel tank. We already do know about the contradictions for Air India Flight 182 reports between the Canadians and the Indians such as unstated cause of the explosion, the location of the explosion, and the source of the sudden loud sound on the CVR. (A sound in all four 747 accidents that is not a bomb sound, according to the AARs.)

What to do? And who does it? And why? Well, why is easy, it's because we want to prevent death from airplane crashes, simple as that. Who includes me, you, and Sgt Blachford as we have all pursued this so far; I would like to add other technical experts in

structures, explosives, sound, and metallurgy.

What to do is more complex; I suggest:

1. The videotapes and high quality 35 MM film of Air India Flight 182 should be examined to match the forward cargo door area to Pan Am Flight 103 and the other two. That means TSB and RCMP have to do the work. I would love to assist.

2. The forward cargo door area of Pan Am Flight 103 now needs to be examined closely for torque tube damage, latch damage, locking sector breaking, or as much close examination as possible with the recovered pieces of wreckage so close to the explosion. That means AAIB needs to do the work. I would love to assist.

3. The CVR sudden loud sound analysis for United Airlines Flight 811 and other data regarding the latches must be retrieved from the vaults and offered for comparison to the other three aircraft. That means NTSB must do the work. I would love to assist.

4. The entire forward cargo door area of Trans World Airlines Flight 800 should be given the same degree of examination and evaluation that was given to United Airlines Flight 811. Giving one sentence about the bottom eight latches being latched is woefully inadequate. That means NTSB will do the work. I would love to assist.

5. All the existing evidence still available for Air India Flight 182 held by the Indians should be made available for evaluation from an open cargo door point of view. That means the Indian aviation authorities should do the work. I would love to assist.

I know Pan Am Flight 103 is sensitive as the appeal process is going on right now. I know AAIB may feel they may be beating a dead horse. My only hope is that true aircraft accident investigators will always keep an ear or eye open to new explanations about old crashes based on evidence of new crashes and evaluate and investigate the old ones because the cause may have relevance for the present.

Bill, thank you very much again for your efforts with Mr. Ken Smart of the AAIB, I have thought of our meeting in December every day for seven weeks, wondering what I omitted or what I should not have said. I have not heard a peep from SGT Blachford although, very eerie, the trial was delayed at the request of the Crown for another eight months right after our meeting. I would hope he's checking the videotapes of the door area of Air India Flight 182.

The pictures of Air India Flight 182 door area would probably look very close to those of Pan Am Flight 103 door area, as the description of the door area in the CASB and Kirpal report matches very closely for both:

From the Kirpal report:

"2.11.4.6 All cargo doors were found intact and attached to the fuselage structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed."

I have to repeat my goal: It's not to prove one way or the other to the experts that the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup is the correct explanation for four fatal 747 accidents; the goal is to persuade that enough evidence exists that warrants a supplemental/updated investigation into the four accidents based on subsequent similar accidents leaving similar evidence. All of the current explanations of bomb, bomb, electrical, and center fuel tank explosion are plausible yet there may be one common cause for all: faulty Poly X wiring. If so, then the fault and dangerous hazard exists to this day and must be corrected somehow before there is a fifth fatal in flight breakup.

Can you think of anything that I should be doing to rule in or rule out the wiring/cargo door problem for Boeing 747s? I am willing to do it. I will travel to meet with aviation officials to present the case at length. I will email, talk on phone, draw pictures, (anything but fax(. What can I do?

>Dear Barry,

>

>As per our discussion last month, I contacted Ken Smart, the "Chief

>inspector of Air Accidents" in the U.K. (the head of the AAIB).

Thank you.

>He obtained

>and forwarded four photos of the Lockerbie B747 showing the forwr d cargo

>door, which I am now forwarding to you.

Very kind of him.

>

>Ken was quite familiar with the issue of cargo door failures.

His team are

>positive that was not at play in the Lockerbie occurrence -
either as a lead

>event or as a consequential one.

Of course he is positive, he has not understood the contrary explanation nor evaluated all the matching evidence of subsequent accidents yet has heard thirteen years of bomb bomb bomb. He would change his mind, I would hope, once he sees and understands the forest of four 747s and not just his tree of one.

But when he states 'I hope that it can be clearly seen that there is none of the classic upwards tearing of the structure above the hinges,' and that he believes the forward cargo door did not open as the initial event nor in flight at all, I despair. The pictures refute both assertions. The vertical skin is torn above and around door; I can see it; the skin in and around door is petalled outward from pressurized force in flight, not inward from ground impact; I can see it. We can see it.

What to do?

Best regards,
Barry

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barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Analysis of PA 103 cargo door photo Part II**

W.T. (Bill) Tucker
Director General,
Investigation Operations
30 Jan 02

Dear Bill, I've put some captions over the areas in the photos of Pan Am Flight 103 discussed in previous email. A conclusion that can be made based upon the observations below is that there is a significant match of evidence to United Airlines Flight 811 which thus warrants an evaluation that Pan Am Flight 103 and United Airlines Flight 811 had the same common cause instead of two different ones and the hazard exists to the present day.

I believe that if the high quality Air India Flight 182 pictures were compared to these Pan Am Flight 103 pictures in the same area, they would generally match also. We do have Trans World Airlines Flight 800 high quality photos of the area which show a similar tale; shattered, twisted, and outwardly peeled skin plus the missing parts and pieces of the forward cargo door, even after extensive recovery efforts. Those photos are very valuable, none were published in the Kirpal or CASB reports and all we have is the text of the door area which generally matches all of the other three aircraft.

Analogy: Wherever a tire blows or a balloon pops, the hole is shattered and torn, elsewhere, the tire or balloon is smooth. All

four of these 747s have relatively smooth port side and shattered starboard sides. That is the area of initial explosive decompression and its right at the location of the forward cargo door, a door that has failed before, a door with weak locking sectors for Air India Flight 182 and Pan Am Flight 103, and no locking sectors for the midspan latches on all.

We can see, for the first time, the locus of initial damage to Pan Am Flight 103 and it's that vacant hole in the lower half of the forward cargo door outlined with outwardly peeled skin. That's the blowout hole and it's the same area for Trans World Airlines Flight 800 and United Airlines Flight 811 as seen in photographs. Photos for Air India Flight 182 hopefully to follow.

To return again: What caused the blowout at the shattered starboard side? I present one cause, wiring/cargo door, which has not been thoroughly investigated and evaluated while others have presented theirs, bomb, missile, and center tank explosion, which have been thoroughly evaluated resulting in much disagreement, contradictions, and questions.

Let's give the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation a thorough chance, somehow, someday.

(By the way, the 'explosive residue' which was supposed to 'prove' a bomb for Pan Am Flight 103 and Trans World Airlines Flight 800 has benign explanations as suggested by an event today at the San Francisco Airport:: 'Thousands of people have been evacuated from a domestic terminal at San Francisco International Airport after a man disappeared when traces of explosives were found on his shoes. Officials have pointed out that there could be an innocent explanation for the explosives

residue. It could, for example, come from a certain type of heart medicine or exposure to fireworks or gunpowder.')

Cheers,
Barry

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Pan Am Flight 103 Starboard side above nose to right

Pan Am Flight 103 Port side above nose to left

Trans World Airlines Flight 800 Starboard side above nose to right

Trans World Airlines Flight 800 port side above nose to left

For Air India Flight 182, text from the Kirpal report:

"2.11.4.6 All cargo doors were found intact and attached to the fuselage structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the

cargo door appeared to have been badly frayed."

Wednesday, 30 January, 2002, 17:57 GMT
Alert at San Francisco airport

Thousands were cleared from the terminal
Thousands of people have been evacuated from a domestic terminal at San Francisco International Airport after a man disappeared when traces of explosives were found on his shoes. Officials shut some 30 gates at the airport early on Wednesday after security guards detected the residue. All outgoing flights from that part of the airport were held.

The man, who was checking in for a United Airlines flight, vanished into a crowd before guards could question him.

The terminal has now been reopened after being given the all-clear, but massive flight delays are expected as a result of the scare.

Police and airport staff fail to find the man, who was described as a white male in his 40s.

False alert?

Officials have pointed out that there could be an innocent explanation for the explosives residue.
It could, for example, come from a certain type of heart medicine or exposure to fireworks or gunpowder.

When they went to stop him, he didn't stop

Airport spokesman Mike McCarron

The alert began as passengers were being checked through

security at the beginning of the morning rush at the airport.

A random test for explosives discovered a possible residue on the trainers of a male passenger.

The man told the staff it could have come from fireworks and then vanished, Fox News reported.

It is unclear why he was allowed to put his shoes back on, a spokesman said.

"When they went to stop him, he didn't stop," airport spokesman Mike McCarron said. "Given the confusion he may not even know they wanted to ask him questions."

Checks for explosives in passengers' shoes have been introduced after Briton Richard Reid's alleged attempt to blow up a flight from Paris to Miami on 22 December 2001 using a bomb hidden in his trainers.

Passengers are randomly asked to remove their shoes for inspection and soles are swabbed with wipes that can detect explosive residue.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:11 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Analysis of PA 103 cargo door photo Part III

W.T. (Bill) Tucker
Director General,
Investigation Operations
1 Feb 02

Dear Bill,

I've done further consideration of the Pan Am Flight 103 photographs after cleaning the dark one up digitally:

1. The earlier conclusion about intact hinges is wrong. The hinges from the door to the fuselage have separated cleanly. The top of the door is intact. This intact top door and split skin below matches for Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800, and may for Air India Flight 182 if photographs are made available. An important clue in the hinges is that of overtravel. The hinges for United Airlines Flight 811 showed evidence of opening up and outward over the allowable limits. This clue can be investigated for Pan Am Flight 103 and Air India Flight 182 and would further support the opening of the door in flight. Below is text for United Airlines Flight 811 (N4713U) which matches somewhat Pan Am Flight 103 hinge area and may match precisely if investigated further.

From NTSB AAR 92/02: '1.16.1.2 After Recovery of the Door 1. Door Structure: The hinge that attaches the cargo door to the fuselage is comprised of several hinge sections--those attached along the upper edge of the cargo door and those along the fuselage just above the cargo door cutout--interconnected with hinge pins. The hinge pins and all hinge sections from N4713U's forward cargo door were intact; all hinge sections rotated relatively easily. All attach bolts from the hinge sections on the door remained attached; conversely, no bolts remained attached to the hinge sections on the fuselage. Several areas on the hinge sections, such as the fuselage hinge sections, showed evidence of contact from the door during overtravel. In addition, the fuselage forward hinge sections were slightly bent. The upper flange of

the door, to which the door hinges are attached, was not deformed. The forward cargo door can rotate open 143 degrees before the hinge would deform, permitting the door to contact the fuselage above.'

2. The area above the door is somewhat curious. There is mud which is to be expected for landing in December on the ground. But above the door between the windows appears to be some bare metal spots which might have been caused by the below door slamming upward and rubbing the paint off. The area of the door which would then have the transferred blue paint is missing or unclear in the photographs. That clue of transferred blue paint to door or bare metal between windows can be evaluated by a person using close visual examination, an opportunity not available to us using these photographs.

3. There is an area on the door skin itself which is lighter in color. This may be a photograph artifact or mud but is worth checking out as it is the same color as the bare skin between windows and equidistant from hinge line.

4. The vertical tears above and around the door and corroborated by reconstruction drawings are very clearly seen. (If Mr. Ken Smart is using vertical tear lines above a cargo door as evidence of an open door in flight, he has his confirmation. A more thorough closeup visual examination of that door area, hinges, latches, torque tubes, etc, is required before any valid ruling in or out.)

5. The area just aft of the door is interesting in that it shows the best example of outward petalling and curling of the metal as from an inside cargo hold explosion. This large hole matches closely with the large hole of the lower half of the door and puts

the aft midspan latch in the center of two large outward opening holes in the fuselage, events which took place at the initial event time of the sudden loud sound, according to the reconstruction drawings.

It comes back to the conclusion that the starboard side of Pan Am Flight 103 suffered an outward explosion from within the forward cargo hold around the forward cargo door but why? Some might say a bomb, or missile, or center tank explosion or wiring causing the inadvertent opening of the forward cargo door in flight. And then it comes back to United Airlines Flight 811, as it always does.

Matches between 811 to 103 which were both:
aged

non Section 41 retrofit

high flight time

early model-100

poly x wired

Boeing 747

experienced hull rupture forward of the wing on right side in cargo door area

shape of hull rupture forward of the wing on the right side is rectangle with specific rectangular shape.

fodded number three engine

on fire number three engine.

sudden sound on CVR

loud sound on the CVR

short duration sound on the CVR

abrupt power cut to FDR

outward peeled skin in cargo door area

longitudinal break at midline of the forward cargo door at midspan latch,

more severe inflight damage on starboard side
at least nine never recovered bodies
vertical fuselage tear lines forward of the wing and aft of cargo
door
torn off skin in forward cargo door area on starboard side,
outward peeled skin on upper forward fuselage,
destruction initially thought to be have been caused by a bomb.

Regarding United Airlines Flight 811 from NTSB AAR 92/02 to
explain the above evidence:

'The National Transportation Safety Board determines that the probable cause of this accident was the sudden opening of the forward lower lobe cargo door in flight and the subsequent explosive decompression. The door opening was attributed to a faulty switch or wiring in the door control system which permitted electrical actuation of the door latches toward the unlatched position after initial door closure and before takeoff. Contributing to the cause of the accident was a deficiency in the design of the cargo door locking mechanisms, which made them susceptible to deformation, allowing the door to become unlatched after being properly latched and locked.'

Above photo of United Airlines Flight 811 showing vertical tears of skin and outwardly peeled skin. The skin above the door was never recovered; the door halves were as shown below revealing the aft midspan latch rupture.

To conclude: The pattern is there, Bill, torn and outwardly shattered fuselage forward of the wing on the right side around the forward cargo door for four Boeing 747s. But why? The

answers are in front of us and available in other photographs taken and kept for the very reason of further evaluations.

I've sent copies of the Pan Am Flight 103 photos as well as my analyses to you, sir, to Sgt. Bart Blachford for his consideration. I hope and hope he is examining the photographs of Air India Flight 182 cargo door area to detect the same clues that are evident on the long ago Pan Am Flight 103 photographs.

Best Regards,
Barry

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Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Dear Sgt. Bart Blachford, 1 Feb 02

Mr. Tucker of TSB has obtained very valuable photographs of the forward cargo door area of Pan Am Flight 103 which show clearly upward tearing of skin above the door, outwardly shattered and twisted metal skin in, above, and fore and aft of the door, and the general tangled mess of the fuselage forward of the

wing on the right side. This photographic evidence of massive fuselage depressurization matches the photographic evidence of Trans World Airlines Flight 800 and United Airlines Flight 811 and the text of Air India Flight 182.

High quality photographs of that forward cargo door area of Air India Flight 182 exist under RCMP control; can you obtain them, view them, evaluate them to see if they match the same area with the same damage for Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800?

At this time I am convinced more than ever for Air India Flight 182 that there was no bomb explosion in the forward or the aft compartment. There was a huge explosion of decompression in the forward cargo hold at the door area probably caused by now known faulty Poly X wiring.

I've enclosed my analysis in three parts of the photographs for Pan Am Flight 103 to Mr. Tucker as well as my two letters to you after after meeting.

I have not heard back from you and worry that you did not get my follow up post meeting letters. I note that the Air India Flight 182 trial has been delayed for many months at the request of the Crown. Is that related to our meeting?

The photographs of the forward cargo door area of Pan Am Flight 103 could have ruled out the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation but only corroborated it. The same can be said for the photographs and video for Air India Flight 182, but one way or the other, the possibility should and must be evaluated, in my humble opinion.

Cheers,
Barry

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From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: Bill.Tucker@tsb.gc.ca
Subject: **Analysis of PA 103 cargo door photo Part IV**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 6 Feb 02

At 6:30 PM -0500 2/1/02, Tucker, Bill wrote:

>Thanks Barry, I'll try to go through your last two e-mail on the weekend.

>

>Bill T..

I've also reviewed those pictures for further analysis. A cropped one is below.

What does it say? It's not a normal looking forward cargo door. It

is raw data subject to interpretation but absent of bias in itself. The metal is twisted, petalled, torn, shattered, the ribs are bent and missing, the door edge is bent and distorted, the door is split, the hinges have separated, and the manual locking external handle is missing as well as most of the lower half of the door which contains latches and locking sectors.

What to make of this raw evidence now visually seen for the first time?

Previous deductions in the last seven years about this heretofore unseen vision of the starboard side of Pan Am Flight 103 led me to conclude the door was split in two; there was vertical tearing of skin above and around the door; there was a rectangular shape to the blow out area; the time of blow out was at the initial event time; and the damage on starboard side was more severe on the port side. All that was based on the color coded reconstruction drawings and the text descriptions in AAIB 02/90.

What I could not have known and did not know, but do now, thanks to your efforts and cooperation by Mr. Smart, is the telling match of the peeled back door skin away from the mid span latch, a proof of door rupture in flight that matches the peeled back door skin away from the mid span latch of United Airlines Flight 811.

Above picture shows Pan Am Flight 103 cargo door bottom half which is mostly missing; however, the peeled back door skin is seen which, if unpeeled, would stretch back to the aft midspan latch at top left and the top half of split door.

Above picture shows United Airlines Flight 811 forward cargo door bottom half on right and aft midspan latch toward viewer in center. The photo reveals the peeled back door skin which, if unpeeled, would stretch back to the aft midspan latch and the top half of split door. The door above was found in two pieces on the ocean bottom and slid back together for the photograph.

The size of the Pan Am Flight 103 hole/rupture/skin peel back is larger than the corresponding pattern on United Airlines Flight 811 which, I believe, is because the internal pressure differential of United Airlines Flight 811 was less because the pull in hooks held for 1.5 seconds to allow a partial decompression which caused a smaller rupture at aft midspan latch and the smaller rectangular blow out shape and, most importantly, allowed the forward section of United Airlines Flight 811 to stay on while the forward section of Pan Am Flight 103 separated in flight after the larger door rupture hole of the thirty foot by forty foot rectangular blow out hole caused such a severe fuselage structural compromise that it failed and separated when subjected to the 300 knots of air force.

Above shows United Airlines Flight 811 forward cargo door hole, peeled back skin, and smaller rectangular blow out hole.

Above reconstruction drawing of Pan Am Flight 103 shows lower half of cargo door hole and larger rectangular blow out hole.

Above reconstruction drawing shows Air India Flight 182 and

the rectangular shape, the vertical tearing, and the split forward cargo door.

From the Kirpal report:

"2.11.4.6 All cargo doors were found intact and attached to the fuselage structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed."

Mr. Tucker, the new pictures shown that there is a further significant match of Pan Am Flight 103 to United Airlines Flight 811; the peeled back door skin from the aft midspan latch. The text of Air India Flight 182 door matches the photos of the door area of Pan Am Flight 103. The link is United Airlines Flight 811 to Pan Am Flight 103 to Air India Flight 182.

Furthermore, the conclusion that the cargo door had nothing to do with Pan Am Flight 103 is a flawed one because it is incomplete. To accurately say a door was latched until ground impact, certain things must be checked for status, just like landing gear handle, throttle position, flaps, etc for a collision with terrain accident. For a suspected open forward cargo door in flight, the manual locking handle, all ten of the latching cams, eight locking sectors, as well as the overpressure relief doors, torque tubes, and bellcranks need to be recovered, examined, and evaluated. For Pan Am Flight 103, that was not done, and it may be that the task is impossible because the relevant parts are still missing, a finding which supports the blow out in flight of that door, not a finding that supports that the door was latched and closed until ground impact. Since most of the bottom half of the

door is missing and the locking mechanism has not been evaluated as being closed and locked, the assumption must be that it opened in flight since if the latches and handles and locking sectors were there and were locked, it could be said that the door was latched and locked until ground impact, but that can not be said accurately. It can be said that the door ruptured open in flight at the aft midspan latch and the skin peeled back. The cause of that rupture may have been a bomb, missile, center fuel tank, or electrical. I offer United Airlines Flight 811 as the model for the electrical explanation.

Regardless, the small 20 inch hole on the port side is a result of a relatively mild directed blast that could have been a 'shotgun' type discharge, but not a powerful spherical bomb.

Can Mr. Smart know of my four analyses? May I enter into some sort of dialogue with AAIB officials?

May I see photos of the Air India Flight 182 forward cargo door area? Thank goodness the wreckage of Pan Am Flight 103 and Trans World Airlines Flight 800 have been preserved, and photos exist of Air India Flight 182 and United Airlines Flight 811. This subsequent revealing analysis is exactly why that evidence was preserved.

Let us not forget the link that binds them all, the sudden loud sound on the CVR at initial event time which is not a bomb sound.

Above from Kirpal report for Air India Flight 182.

Above chart from NTSB for Trans World Airlines Flight 800 public docket linking the four Boeing 747s together.

A point of this analysis number IV is the match of peeled back skin from the aft midspan latch for Pan Am Flight 103 and United Airlines Flight 811, a very significant match showing the location of the initial hull rupture and not evaluated until now.

I believe that all this matching evidence warrants a further supplemental/updated investigation into the alternative mechanical explanation for Air India Flight 182 and Pan Am Flight 103 other than the conspiracy explanation of bombs. The shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation is plausible and has much forensic evidence to support it. In addition to correcting an error of history, the fault which still exists can be addressed and hopefully corrected before history repeats itself.

Who to lead the international effort to coordinate the TSB, the NTSB, and the AAIB? I suggest you, Mr. Tucker. The TSB has access to the RCMP, FBI, and Scotland Yard photos of the wreckages, is most objective, cautious, and prudent, although not the richest. I would like to think this aviation safety issue is above money being the number one priority.

Based upon these Pan Am Flight 103 photos and their telling match to United Airlines Flight 811, I would hope the new match rules in checking the Air India Flight 182 photos for a similar match of peeled back skin from the aft midspan latch. In addition, I would hope that the visual match of the Pan Am Flight 103 door to United Airlines Flight 811 means that all the latching and locking mechanisms for the Pan Am Flight 103 must now be physically examined and evaluated to rule in or rule out the door

rupturing open in flight. The evidence is there; it just needs an investigator to look at it.

My worry is apathy; nothing gets done because there is no great political push to get it done. That is my fear, things sort of go along in spurts waiting for the next one. It's a worry all aviation accident investigators have too, I imagine. The wheels they do turn slowly. It's been thirteen years for me and counting. I am willing to do whatever you suggest, Mr. Tucker to speed things along. Examining for analysis the photos of Air India Flight 182 forward fuselage would be very helpful, I think.

(By the way, the preposterous premise of a bomb in the aft cargo compartment for Air India Flight 182 is still laying out there. All the evidence, including this new visual evidence of a shattered and large blow out hole on the starboard side forward of the wing of Pan Am Flight 103 and the old evidence of the non shattered and absent blow out hole in the aft compartment of Air India Flight 182, {two aircraft which Mr. Garstang says are matched,} should put that stinking red herring of aft bomb for Air India Flight 182 into the garbage.)

Looking forward to the next move...

Best Regards,
Barry

John Barry Smith
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Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **PA 103 analysis: Note to Sgt. Blachford**

Dear Bill, just sent by snail mail the below letter to Sgt. Bart Blachford,

Cheers,
Barry

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Dear Sgt. Bart Blachford, 10 Feb 02
Enclosed is analysis of PA 103 cargo door photo Part IV and recently sent to Mr. Tucker of TSB; Parts I, II, and III previously sent to you on February 1, 2002.

The key point here, Sgt. Blachford, is the visual irrefutable match in official photographs of the peeled back skin away from the aft midspan latch of United Airlines Flight 811 forward cargo door to the Pan Am Flight 103 forward cargo door. The photographs of Trans World Airlines Flight 800 also show this peeled back skin at the aft midspan latch. Air India Flight 182 states the, "damage to the door and the fuselage skin near the door appeared to have been caused by an outward force," but needs confirmation or ruling out by examination of the photographs preserved all these years. You have access to these high quality 35 MM film and video for an opportunity to examine that area visually.

Can you do that, Sgt. Blachford? Can you match Air India Flight 182 forward cargo door area to Pan Am Flight 103 and to United Airlines Flight 811 to Trans World Airlines Flight 800 using photographs to examine closely the area around the latches to see if they do in fact match? Can I see the photographs for evaluation since I have been studying this area on Boeing 747 for over a decade and can assist in your conclusions? Can Mr. Tucker see the photographs of Air India Flight 182 forward cargo door area and have his professional accident investigators evaluate them?

Boeing 747 forward cargo door above in normal closed position.

Pan Am Flight 103 forward cargo door above show peeled back skin and hole at aft midspan latch in upper left of photo.

United Airlines Flight 811 forward cargo door above showing peeled back skin and hole at aft midspan latch forward center of photo.

Trans World Airlines Flight 800 forward cargo door aft midspan latch above with rupture hole shown at 'x'.

From the Kirpal report below, (need pictures to properly evaluate):

"2.11.4.6 All cargo doors were found intact and attached to the fuselage structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed."

Sgt. Blachford, I believe you are willing to give equal time to all plausible explanations for the destruction of Air India Flight 182 in addition to the one your team has been pursuing all these years: Bomb! Please give equal time to another plausible explanation: Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup. This mechanical explanation keeps on being confirmed as the investigation into it continues. It has not been refuted; in fact it has gained support and credibility.

Please look at the forward cargo doors of the three accident

aircraft, read the text of another, and then compare all with the normal forward cargo door of a Boeing 747. All four accident aircraft had ruptures in and around the lower half of that known failure prone cargo door activated by now known faulty wiring. And we know why it happened for sure to only one of them, United Airlines Flight 811, the one that came back to tell its tale of why a sudden loud sound appeared on the cockpit voice recorder which was quickly followed by an abrupt power cut to the recorders.

Please take advantage of your opportunity to conduct further evaluation of Air India Flight 182 forward cargo door area in photos and video you have access to. Please avail yourself of the talent in aviation agencies you have access to. First and foremost; this was an airplane accident. It may not have been criminal although at first blush, it may appear to have been; just like Trans World Airlines Flight 800, just like United Airlines Flight 811, just like Pan Am Flight 103, and just like the Boeing 747 that brought us to meet, Air India Flight 182.

Sincerely,

Barry Smith

John Barry Smith
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www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Despair**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 15 Feb 02

Enclosed is a recent letter from Sgt B. Blachford of the RCMP regarding my recent letters to him which included my recent letters to you regarding the 'smoking gun' Pan Am Flight 103 forward cargo door pictures. (A smoking gun in that they are proof of open door in flight, but not the cause of it.)

He is unimpressed, apparently. It appears that he is 'passing' on the whole shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation as a source for further investigation.

A curious note is that he refers to "investigators at TSB", and I wonder who they are. Is he referring to you? Mr. Garstang? If not, may I correspond with them? They can not reach any conclusion that is valid without speaking with the proponent, I would imagine.

Based upon photographic evidence of three forward cargo doors of Boeing 747s that suffered inflight breakups which show many significant similarities in metal twisting, peeling back skin, locus of rupture, missing essential latching items, missing skin, and vertical tears above the door, and text of another Boeing 747 that suffered an inflight breakup that matches the photographs of the

three, I believe it is absolutely, unequivocally, irrefutably necessary to: 1. Closely examine all photographs and video of the Air India Flight 182 cargo door area for matches to the three other aircraft door areas. 2. Closely examine physically the forward cargo door area of Pan Am Flight 103 for hinge overtravel, missing latches in database, paint transfers from door to fuselage or vice versa, and any loosed pieces of wreckage around the door which were not mounted and not visible in photos.

Number 1 is within Canadian purview, I believe, with RCMP or TSB holding the photos and videos.

Number 2 is within AAIB purview, I believe, with Mr. Smart having access to the hangar at Farnborough, UK.

It seems now that you alone are the only official with a still open mind, Mr. Tucker. I think it's because you evaluate evidence objectively with less concern for appearances. Sgt. Blachford is running a prosecution, not an investigation. He wants and stated that at the end of the day he thinks that he can get a conviction at trial. Well, as we know, airplanes don't care much about what humans or juries think, they obey natural laws of pressure differential, voltage differential, and lift over the wings.

When the cargo door unlatch motor chafed wiring shorts on in the presence of moisture, the latches have to try to unlatch, the 92000 pounds of pressure differential have to rupture that door at the aft midspan latch which has no locking sector, the non plug door has to open outward and upward, the fuselage has to crumple into the huge hole where the door and skin used to be, the nose has to come off when confronted with that 300 knots on it, the aircraft has to fall and disintegrate in a specific pattern and item location, and of course, when that large door ruptures in

flight, it makes a 'tremendous explosion' which is picked up and recorded on the CVR as a sudden loud sound.

A sudden loud sound which is not a bomb sound, linked to an explosive decompression sound when a cargo door opens, and a sound which Air India Flight 182 had, Pan Am Flight 103 had, United Airlines Flight 811 had, and Trans World Airlines Flight 800 had.

So, Bill, my despair in dealing with RCMP is that they are not an investigative agency asking questions, they are prosecutors making statements. They are not curious or inquisitive but closed and immobile.

I dread every airplane crash I hear about in case it starts out with a 747 that went off the radar screen suddenly, bomb suspected, (and believed in these circumstances,) sudden loud sound on CVR and abrupt power cut to FDR, and then all the other evidence matches culminating with the reconstruction photo of a forward cargo door with peeled back skin from aft midspan latch, missing latches and other locking items, and vertical tears above door. Then I will know it happened for the fifth time as the above has happened four times already.

Regards,
Barry

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541 Country Club Drive,
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www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Retirement, Not!

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 16 Feb 02

Permit me to talk a little philosophy. It's about people our age, late 50's, who think about the past and what we have accomplished and what is left to accomplish.

I was thinking about Dave Cronin, the pilot of United Airlines Flight 811, as the anniversary of 24 Feb 89 is coming up. He was 59 and a half and faced forced retirement at age 60. And he was challenged like no other, least expecting it, never practiced such a thing, and he faced up to it and survived and left a legacy of evidence about that ruptured open cargo door.

Below is email from the Campbells, the couple who lost a son overboard in United Airlines Flight 811. It was through their civilian efforts that the door was retrieved to tell its true cause of inflight rupture, electrical wiring or switch and not an improperly latched cargo door, as NTSB has first concluded; and not a bomb, as the flight crew had first concluded.

I've asked the Campbells for their high quality photos of United

Airlines Flight 811 so I can compare them with the high quality Air India Flight 182 photos if I ever get to see them as well as any new photos of the Pan Am Flight 103 cargo door from different angles and closeups.

I was a little down earlier reading Sgt Blachford's letter because it looks like he has no more interest in the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation even though the evidence continues to support it, even the brand new stuff.

But, the evidence is there in photos for all four aircraft and it can be reviewed sooner or later. So, I'm feeling upbeat again.

And sometimes when we think we've almost made it in our long trip, or our long time in our career, that there are no more surprises and therefore no great effort is needed, along comes something that is very very big. This wiring/cargo door thing and not a bomb for Air India Flight 182 and others is your unexpected surprise, Bill. It's up to you, you are the pilot on this one. Let's land it safely.

Regards,
Barry

Dave Cronin PO Box 4263 Incline Village NV 89451-8320 Tel
702 831 7746 Fax
702 831 3615 . Dave was flying the plane manually getting the
last bit of
pleasure before he retired , as it blew he just let it go and it went
up and

sideways about 50 ft { I have the engine readouts and you can see that airflow was cut over the engine intakes] Dave and I both believe that had it been on autopilot it would have broken the nose off at the 41 section joint which is a known weak point { This is what happened to Pan Am 103 and TWA 800] all of the beams in the business section were broken and I actually stood in the cargo hold of N4713U at Hickam and lifted the floor off the temporary struts with one hand , the floor was only held up by the cargo containers after the door went . Actually the only bit of solid floor left in business class was where our son sat in 12H But the shock wave went from the back past Lee moving the toilets beside him { forward of the hole] forward 12" it bounced off the front of the plane came back and broke his seat off its legs or mountings , it also blew the eardrums of most of the first class passengers and in some cases blew up their teeth if they had air cavities in them Dave is a very experienced glider pilot and called on all his skills to get the plane back but it was dropping at 1000 ft p/m it was at 22000 ft 22 minutes out and at METO speed it crashed to a perfect landing at Honolulu International Airport it could never have gone around

for another
attempt

To: SMANDKJC@aol.com
From: John Barry Smith <barry@corazon.com>
Subject: United Airlines Flight 811
Cc:
Bcc:
X-Attachments:

Dear Kevin and Susan Campbell, 16 Feb 02

Nearing 24 Feb I know.

I've been rereading your email to me after recently I received pictures of the Pan Am Flight 103 cargo door area. They are from an unimpeachable source. They have never been seen before except by the AAIB investigators. There are no pictures of the starboard side of Pan Am Flight 103 in any of the reports, including AAIB 2/90.

It is very similar to United Airlines Flight 811 cargo door. It's below:

I got goose bumps when I got it a few weeks ago. I have four long emails of analysis of this picture. The analyses are yours on request. Note peeled back skin emanating from aft midspan latch rupture, missing bottom half of door, vertical tear lines above door, and distorted forward midspan latch area.

In NTSB AAR 92/02, there are scant black and white photos of the crucial door area of United Airlines Flight 811. If I had better quality pictures of United Airlines Flight 811, I could better match it to others such as Air India Flight 182, Pan Am Flight 103, and Trans World Airlines Flight 800.

Would you find it in you to send me the pictures referred to below? I will pay postage to and from an address of your choice, Mr. and Mrs. Campbell. Of specific interest are the hinges, the midspan latches, the bottom latches and any torque tubes and locking sectors of the door, and the vertical tears in the skin above it.

In Dec 01, an official from TSB and a mountie from the RCMP visited me from Canada in my home in Carmel Valley, CA. The high official from TSB went back to Ottawa and contacted AAIB for the photos, got them, and sent them to me. Their purpose for the visit was to investigate my tale of Air India Flight 182 being not a bomb but shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup.

If I had higher quality photos of my model to which I match others, United Airlines Flight 811, it would make it clearer for all to see the similarities and thus the possible similar cause, electrical wiring or switch as the NTSB finally stated, after your valiant efforts.

At 10:39 PM -0400 8/22/99, SMANDKJC@aol.com wrote:

>I have the all the NTSB photos and my own of the door frame area,the side

>frames and the sills are in perfect condition ,the 8 bottom pins are all

>goughed but otherwise OK the forward mid span pin is also
goughed and the
>mtg bracket had moved outward on its bolts , the rear mid span
pin was
>goughed and the bracket was held by one bolt the other 3 had
broken .

At 10:39 PM -0400 8/22/99, SMANDKJC@aol.com wrote:
The reply was that we never thought that Air India was a bomb in
fact the
video shows a cargo door exactly the same as 811.

There is no picture of the cargo door area of Air India Flight 182,
only text:

From the Kirpal report:

"2.11.4.6 All cargo doors were found intact and attached to the
fuselage structure except for the forward cargo door which had
some fuselage and cargo floor attached. This door, located on the
forward right side of the aircraft, was broken horizontally about
one-quarter of the distance above the lower frame. The damage
to the door and the fuselage skin near the door appeared to have
been caused by an outward force. The fractured surface of the
cargo door appeared to have been badly frayed."

If I had high quality United Airlines Flight 811 photos to match
against the photos of Pan Am Flight 103 and Trans World
Airlines Flight 800, then I may be able to get the still existing
high quality photos of Air India Flight 182 which are in vault at
TSB or RCMP.

Your efforts on United Airlines Flight 811 are still bearing fruit

all these years later. Let's pick some.

Cheers,

Barry

John Barry Smith

(831) 659 3552

541 Country Club Drive,

Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

From: SMANDKJC@aol.com

Date: Sun, 22 Aug 1999 22:39:33 EDT

Subject: From Kevin Campbell

To: barry@corazon.com

CC: rocketman@hawaii.rr.com

Dear Barry , Steve emailed on your reply , Thank you for your kind comments about our work. As you know we live in NZ but we own an apt here in Waikiki and usually spend from may till end sept here .This year we were late arriving as our first grandchild was due early may , He did not arrive until the 19th and we stayed to help out our daughter until the 1st june . Our son

in law gave us a computer so they could email pictures of the new baby . I have resisted getting a computer as I cant type but seem to be managing OK .

Anyway as soon as I got on line the first search I did was 811 and got your site , it all sounded very familiar to me and I could tell you had obviously done your homework . Steve had visited us in NZ in Feb just as we moved into our new apt there after selling our family home so I asked Steve if he had been in contact with you and what spurred your interest in cargo doors { I should have explored your site a bit more and I would have found the reason myself but I was just starting searching the web and only hit the one page]

Steve did not know what your motives were so I thought I would contact you myself , however I had bought a lot of my documents over with me this trip as I had to fly on to Seattle to do an interview with the BBC Panorama program for a documentary on aircraft wiring problems following the release to the media of the Swissair wreckage , the doco is cofunded by the Discovery Channel and may show [Or a USA version of it] on TLC depending on wether they want to upset Boeing or not . The request to do this doco followed a very good doco done by Channel 9 Sydney on their Sunday

program titled "Fire
in the Sky" also about Kapton wire in Feb of this year .I had lent
BBC some
of my documents including my submission to the NTSB on the
cause of 811 and
also a document I had written in 1989 I called "Countdown to
Disaster"
detailing the sequence of events leading up to and beyond the
811 disaster .
I still have not had them returned but Steve can email them to
you if you
have never seen them.
As you are probably aware we did an investigation on 811 and
have appeared in
the media many times . We had many stories about our efforts in
NZ newspapers
,magazines and TVNZ followed us on one visit to the USA and
did a Documentry
on our investigation { the email from the guy in NZ that you sent
Steve was
from one of the team that was to do a computer simulation of my
theory
compared to the NTSB theory as soon as they tried to program
the NTSB theory
they could see it did not compute and it was then they realised I
had to be
correct and were behind me 100%. the same people did the
Americas Cup
simulations] The WALL STREET JOURNAL did a front page
article on our efforts
on 24th feb 1990 and I have done several articles with Byron
Acihido of the
Seattle Times among others .

In all we took 7 trips to the USA investigating 811 and they started with a look at the aircraft at Hickam AFB where we took many pictures of the damage and I was able to rule out corrosion as the cause. We attended the NTSB hearing at Seattle and managed to steal all of the documents from the NTSB metallurgists seat after the hearing ended. Initially they would only give us the list of witness's but after complaining to the media at the first recess they gave us a press set and said we could have anything off the press table when the hearing ended two days later. At the end of proceedings we gave an interview to The Honolulu Advertiser and when it finished we went back in to get the stuff off the press table, as I was looking at it my wife Susan walked up to the top table and yelled out there was a good set of stuff here, we grabbed a box loaded it in and took off just as the NTSB guys were coming back in with a trolley to load it up. We hailed a taxi and were off. It took months to look at it and absorb it all but the result was "Countdown to Disaster" We have stayed with both Dave Cronin and Al Slader many times. On one visit to the NTSB we got copies of all the passenger safety statements and wrote to

everyone that had replied to the Questionair . Mainly they were First and Business class passengers with a few coach as well . We visited everyone who replied to us , Flying in to Seattle and driving to Denver New York Florida San Diego San Francisco Lake Tahoe and back up to Seattle . Boeing would never talk to us directly only through their legal people [Perkins Coie] and initially United would not talk to us either but a year after the accident when United had gone from the most popular to the carrier of last resort for NZ passengers we got an invitation to visit the United maintenance base in San Francisco . they were just going to do a PR job on us but it did not work out that way and we got stuck into each of the VP`s and told them were they had failed , when one broke down we knew we had them and it ended up with the Senior VP United Joe O Gorman giving us a personal escort around the base and getting answers to everything we wanted to know . We stood in the cargo bay of a 747 while they operated the door and I pointed to the Conduit at the top of the door and said that that was were I thought the Arc had originated from. as we walked back across the tarmac I spotted a newly painted 747with a number I did not recognise , when we got back to the motel I

checked my records and there was no N4724U . so asked the next day if it was N4713U renumbered and they had to admit it was .

We were in Hawaii for the search for the cargo door and I tried every avenue

to be on that sub or even the recovery boat without success. I was phoned

within an hour of the recovery of the door and told that they had a

contingency plan , if the door revealed the NTSB were correct the door was to

be released to the media in Hawaii ,if the door showed that the Campbells

were correct the door was going straight to Boeing . He said that the door is

going straight to Boeing . We flew to Seattle but were told we could not see

the door , we drove to Washington to see the NTSB and as we entered the

office we were told they could spare us 5 minutes,about 3 hours later we held

a set of the recovered C locks and Lock sectors and they admitted we were

correct , that they would ensure that the aircraft would be fixed but not to

hold our breath waiting for a new report ever to be released .

After lunch

with them I asked " in light of what we now know on 811 do you still think

that Air India was a bomb ?"

The reply was that we never thought that Air India was a bomb in fact the

video shows a cargo door exactly the same as 811.

I wrote to both Air India and the Canadian Safety Board with my findings on

811 but did not even have the courtesy of a reply .

I was very upset to read your theory on TWA 800 as I thought we had the

problem beat but it had never occurred to me that if the pull in hooks opened

that the door could break in half , this is of course exactly what 811`s did

but I had put it down to the fact that it struck the side of the fuselage as

it opened and levered out the hinge and the section above it .

Fate intervened on 811 and the door opened on the 747 at JFK and they could

no longer withhold the revised report on 811 . The new report however still

does not admit that 811 got the signal to open right there at 23000 ft

insisting it happened before takeoff . This is a much less scary scenario for

Boeing and the NTSB as they still believe that other safeguards preclude it

from getting a signal after shutdown of the APU and the ground switch which I

believe is a load of baloney .Are you aware that the original door design for

the 747 called for a warning light that would have advised the cockpit of a

S2 switch failure and the fact that power was still available to the door

latch actuators? I had the document that showed this system deleted by

whiteout and no one would ever answer my question whether the aircraft was certified with this system or not as it never made it into production . I lobbied very hard for this system to be reinstated but it wasn't , I guess that would have opened up liability problems for Boeing I lent the document to a journalist and have never got it back either . You probably have plenty of questions for me but I will run through the ones you asked Stuart Mc Clure and answer any that I can .

Dave Cronin PO Box 4263 Incline Village NV 89451-8320 Tel 702 831 7746 Fax 702 831 3615 . Dave was flying the plane manually getting the last bit of pleasure before he retired , as it blew he just let it go and it went up and sideways about 50 ft { I have the engine readouts and you can see that airflow was cut over the engine intakes } Dave and I both believe that had it been on autopilot it would have broken the nose off at the 41 section joint which is a known weak point { This is what happened to Pan Am 103 and TWA 800} all of the beams in the business section were broken and I actually stood in the cargo hold of N4713U at Hickam and lifted the floor off the temporary struts with one hand , the floor was only held up by the cargo

containers after the door went . Actually the only bit of solid floor left in business class was where our son sat in 12H But the shock wave went from the back past Lee moving the toilets beside him { forward of the hole] forward 12" it the bounced off the front of the plane came back and broke his seat off its legs or mountings , it also blew the eardrums of most of the first class passengers and in some cases blew up their teeth if they had air cavities in them Dave is a very experienced glider pilot and called on all his skills to get the plane back but it was dropping at 1000 ft p/m it was at 22000 ft 22 minutes out and at METO speed it crashed to a perfect landing at Honolulu International Airport it could never have gone around for another attempt { I have the CVR printout and it makes chilling reading } What was heard ? The CVR has a thump followed 1.8 seconds later by a loud explosion { I failed in my bid to listen to the actual tape ,I only wanted to actually hear the sound myself but was denied }Talking to the passengers some off them heard a hiss followed by an explosion described as being like "A thousand handclaps " no one saw the passengers go . One passenger in first class {with a Ph D in physics } nearest to the door said he heard something

start up
immediately prior to the thump . the NTSB never interviewed
him and dismissed
this as being the elevator to the galley but the steward was
already in the
galley at the time of the explosion and I dont think the elevator
was moving
. So the sequence was a whir a thump a hiss and then 1.8
seconds later the
explosion . Dave had time to say " what the # was that " and Al
replied "I
don't know "between the thump and the explosion The CVR's
power was then off
for 21.4 seconds
I have the all the NTSB photos and my own of the door frame
area,the side
frames and the sills are in perfect condition ,the 8 bottom pins are
all
goughed but otherwise OK the forward mid span pin is also
goughed and the
mtg bracket had moved outward on its bolts , the rear mid span
pin was
goughed and the bracket was held by one bolt the other 3 had
broken . It
takes 1.5 seconds for the 8 C Locks on the bottom of the door to
open
followed by the opening of the pull in hooks , with the 1.8
second time gap
when the hiss was heard I take that to be the time that the door
had blown
off the 8 C Locks and it was held by the pull in hooks until they
also opened
sufficiently for the door to blow off them as well . Something had

to be
different to PAN AM 10 out of London where the door was
closed by the
slipstream and they got back safely.

At least one passenger was ingested by engine no 3 . I have the
Coroners
report on what they found and I have seen what they removed
from the engine
apart from the body bits . It was not our son as we had to give a
DNA sample
and the result was negative Steve recently spoke to someone
who inspected
the engine the day it happened and thought the red on the turbine
was seat
material until he touched it and realised what it was They told us
that they
gave the aircraft parts a Hawaiian burial at sea but I doubt it ,
they
certainly did not give us the seat parts that we could have used in
an action
against the seat manufacturer [Weber Aircraft Co]
We have photos of damage to the wings , the top of the aircraft
and to the
vertical stabiliser , we hope that one of these killed our son as we
know he
could have survived the fall to the sea 22000 ft and over 4
minutes below .
parts were still falling out of the sky after 811 was back on the
ground in
Honolulu. We have the reports from all the services that attended
the
accident . We found they knew Lee was missing by about 4 AM
local time but it

was not till about 12 Hrs later that they phoned us from Chicago and said he was missing presumed dead .The damage to No3 engine was caused by a body or bodies , luggage and aircraft parts . Damage to No 4 was mainly by luggage . N4713U did not have the lock sectors strengthed by aluminium {the first fix]but I would think that PAN AM 103 would have as PAN AM did not wait for Boeing to supply the steel kits but made their own and fitted them to their fleet after the London incident , as they realised the implications of not doing so . As detailed in "Countdown " Boeing devised a one time test to check the integrity of the cargo door locking system , they told the airlines to hit the door open switch to see what happened , a day later they stopped the test as operators were calling to say it was damaging the planes , obviously lots of aircraft had failed S2 switches and the actuators were live just waiting for a stray arc to doom the plane and the passengers and the FAA still gave up to 2 years to replace the lock sectors with steel ones .
Regards Kevin and Susan Campbell

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Got UAL 811 photos**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Bill, 22 Feb 02

Mr. and Mrs Campbell have sent me United Airlines Flight 811 photos. Kevin and Susan Campbell are the parents of Lee Campbell, one of the nine lost passengers in United Airlines Flight 811. They are the ones that persevered and got that cargo door retrieved from the ocean by NTSB and the US Navy. We have been in intermittent correspondence for a few years. After I received the Pan Am Flight 103 door photos I asked them for the United Airlines Flight 811 photos. I shall send them all separately and include a few in this email.

The eventual goal is to fix the wiring and make the doors plug type. To do that the hazards must be proven to exist. To do that several fatal accidents must be attributed to the hazards. To do that the evidence needs to be evaluated that matches all four accidents to a common cause. To do that the photographs of the hull rupture area need to be compared. To do that all cargo door area photographs of all four aircraft need to be received.

I have closeup color photographs of the cargo door area of three of the aircraft, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. All were from special sources. TSB/AAIB for 103, family for 811, and a family member for 800. Air India Flight 182 is missing and the RCMP have those.

The near goal is to evaluate those Air India Flight 182

photographs which we know are high quality color 35 MM and color video, have been maintained and protected and are in RCMP custody.

Mr. Tucker, can you ask RCMP for those photographs of the Air India Flight 182 cargo door area? Among you and your staff, and me and Mr. Campbell, we will be able to tell right away if the Air India Flight 182 cargo door evidence matches the others. If it does, and the text description leads us to believe it will, the conclusion will be that the forward cargo door opened in flight without stating why. The forward cargo door of Air India Flight 182 opening in flight is not a surprise since the 'bomb' according to the Indians, was in the forward cargo hold on the right side, the cargo door side, and, according to CASB, the unstated explosion occurred in the forward cargo hold on the right side.

Once it is concluded that the forward cargo door ruptured open on all four aircraft in flight, the investigation can be conducted into why and all theorists can have a chance to present their findings and conclusions. I, of course, would present the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

For United Airlines Flight 811:

News photo above of bottom half of United Airlines Flight 811 forward cargo door, bottom of door to upper left. Note bent away torn skin at aft midspan latch area bottom left of picture. Note broken ribs and loose wiring.

United Airlines Flight 811 above showing broken floor beams and loose wiring.

Above United Airlines Flight 811 midspan latch pins.

United Airlines Flight 811 above shows floor damage.

Bill, the photos above are only important if compared to the other aircraft in the same location. There exists wreckage reconstructions and photos for that purpose. It is possible to conclusively determine if those cargo doors opened in flight; the evidence is there and just needs to be retrieved and evaluated. The model of United Airlines Flight 811 is much more complete now.

I keep coming back to what you said about a door blown open by a bomb is different than a door blown open by air pressure and why? Hinge overtravel is a good clue. United Airlines Flight 811 had it. All the upper cargo door hinges for Air India Flight 182, Pan Am Flight 103, and Trans World Airlines Flight 800 need to be examined for this important clue to open cargo door in flight. That can be done and has not been done. Bent torque tubes, damage to pins, broken ribs, outward petalled skin, while absence of residue, cratering, and other bomb evidence is important too.

In my mind, all these matching photographs give corroboration to my earlier research but to others, these photographs may mean the first step towards understanding what happened.

The retrieval of the Air India Flight 182 cargo door pictures may already be underway so pardon my persistence in this. I feel sure that since you got the Pan Am Flight 103 cargo door photos, getting the Air India Flight 182 should be a piece of cake, but I don't know much on the relationship between RCMP and TSB and the Indians in this regard. Good luck.

On another matter, could you forward a letter from me to Mr. Ken Smart of AAIB? With comments if you feel they are needed of course. I would like to present my case to him and possibly establish some dialogue regarding Pan Am Flight 103 not being a bomb but a mechanical event with precedent. I will also request more detailed photos of the Pan Am Flight 103 cargo door area from different angles and ask that certain things be checked such as hinge overtravel and paint smears.

I'll forward in a series of emails other United Airlines Flight 811 pictures provided by Kevin Campbell. We do not know which photos are important and which are not because we have not yet compared the ones from Air India Flight 182.

And if the latches and pins and locking handle and torque tubes and hinges are missing for Air India Flight 182, let us not assume the door was all latched and tight until water impact, let us assume the explosive decompression in flight blew all those items to Kingdom Come and that's why they are not found or reported on.

If those items are found for Air India Flight 182 and Pan Am

Flight 103, let's see if they exhibit the characteristics of an open cargo door in flight caused by an electrical problem such as the specific type damage on the midspan latch pins as shown above in photos of United Airlines Flight 811.

Regards,
Barry

John Barry Smith
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From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 811 pix 5

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 811 pix 4

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **811 pix 3**

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **811 pix 2**

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **811 pix 1**

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **811 pix 10**

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 811 pix 9

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 811 pix 8

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 811 pix 7

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 811 pix 6

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 811 pix 12

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 811 pix 11

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 811 pix from inside/missing seats/floor damage

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Bill, 27 Feb 02

Last weekend I was in email contact with the Campbells during the 13th anniversary of their son's death on 24 Feb 89 in United Airlines Flight 811. He sent me many more photos which I will send via separate emails and an incident report. I don't know which are important and which not since I don't have clear photos of Air India Flight 182 or Pan Am Flight 103 or Trans World Airlines Flight 800 in the cargo door areas to match with the new photos of United Airlines Flight 811. But others do have those clear photos and can compare for a match to supplement the many matches of door area damage already evident. A few are relevant right now.

The above picture shows why engine number three is always

involved in all the four Boeing 747 fatal accidents (total four engines) attributed by me to the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation: The cargo door ruptures outward and upward tearing skin away with it, the contents of the cargo compartment and the passenger compartment are sucked out and into engine number three which becomes Fodded, catches on fire, and on occasion throws blades out. The right wing leading edge is always affected also which is seen in photo as in directly line of compartment contents as they are sucked into the airstream. It can also be deduced that the debris from inside the airplane which is spewed out would and does impact the right horizontal stabilizer.

None of the other three engines on the four aircraft (total 12 engines) show fire and blade loss which rules against a 'bomb' on the port side or a 'center' fuel tank spontaneous explosion. None of the four aircraft show the inflight damage on the port side as severe on the starboard side or the starboard horizontal stabilizer which mitigates again initial damage starting from the port side or the center.

Above photo from inside United Airlines Flight 811 shows the severe damage an explosive decompression can cause. This photo can be matched to the damage in the same are for Air India Flight 182 and Pan Am Flight 103 for a match.

Above photo from United Airlines Flight 811 shows downward sucked floor panels and other damage from the explosive

decompression. The seats are also missing in this area and that clue can be matched to the other 747s. Some seats from the catastrophic losses would have been dislodged by water or ground impact but some would have been sucked out in flight and that can probably be determined by metallurgical analysis. A bomb explosion on the port side of Pan Am Flight 103 should not have caused seats on the starboard side to have been sucked out, and if they were, that is evidence of initial hole on starboard side, in the cargo door area.

The key thing, Bill, is the raw data and evidence of the actual aircraft such as Air India Flight 182 and Pan Am Flight 103. I don't have that and Sgt. Blachford is not forthcoming and I have little hope that Mr. Garstang will be either. I'm trying to help aviation safety here and the lack of cooperation from them is discouraging when asking for public safety data which is proven relevant and available in storage somewhere. That is why I am so thankful for your objective help. The accuracy of the explanation, either bomb or wiring/cargo door, will become evident by the actual photographs, not by guesses or wishful thinking on anyone's part.

But the actual photos need to be examined, not guessed at. If I could see the actual photos from inside Pan Am Flight 103 and Air India Flight 182 in the cargo door area, I would be better able to match them up or rule them out.

There is so much to evaluate, from hinge overtravel, bent torque tubes, bluing on latch pins, to twisted metal patterns of damage. I will of course help in any way I can, and I think Mr. and Mrs. Campbell would be too, as we know more than most about why forward cargo doors on Boeing 747s open inadvertently in flight. His Incident Report is comprehensive and impressive when

considered that it was written before the door was retrieved and subsequently proved him right.

I've written a note to Sgt. Blachford, attached below.

Best Regards,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Dear Sgt. Bart Blachford, 27 Feb 02

Thank you for your letter of 18 Feb 02, file 85-3196 in which you state you have forwarded my previous correspondence to Mr. Garstang ('Our aviation investigator') for his consideration.

You further state that he has the photographs and film footage need to conduct any further follow up deemed necessary. Well, that's fine. As you know, I had no way of knowing that the forward cargo door of PA 103 would match so carefully that of the forward cargo door of United Airlines Flight 811 with the

peeled away skin from the aft midspan latch because those photos had never before been released to the public. That match alone is enough for Mr. Gartstang, who compared and matched Air India Flight 182 to Pan Am Flight 103 previously in his March 2001 supplemental Air India Flight 182 report, to conduct further follow up by comparing the Air India Flight 182 forward cargo door photographs, to which he has access, to United Airlines Flight 811 and others.

In addition, I have been in contact with the Campbells of New Zealand whose son died in United Airlines Flight 811. They were instrumental in getting the door retrieved from the ocean which allowed the authorities to correctly state the cause of its opening in flight: electrical and not bomb or improper latching as previously thought. They have sent me many pictures of the door area of United Airlines Flight 811 which match the text of the door area of Air India Flight 182. I make these photos available to you and Mr. Gartstang upon request to compare to the photos of Air India Flight 182 which you and Mr. Garstang have access to. I would send them via email but you nor Mr. Garstang have given me an email address.

As always I am available to Mr. Garstang and yourself for any follow up you may have as you continue your investigation into Air India Flight 182 as part of the Air India Task Force.

Cheers,
John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Door of 182 like door of 811**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 3 Mar 02

Well, Sgt. Blachford requests that I "deal directly with Mr. Tucker of TSB." That is very satisfying and I prefer it, thank you very much.

He then directly asks me about the provocative statement you queried me on during our meeting; the statement that NTSB said the Air India Flight 182 forward cargo door looks exactly like the forward cargo door or United Airlines Flight 811.

I've replied at length to Sgt. Blachford and will repeat the details here for the record.

First item below is from Kirpal Report on Air India Flight 182 which describes a Group (A Committee of Experts) which had access to all photos and film and, indeed, was specifically asked to evaluate same. Mr. James F. Wildey II, of NTSB was present in that Air India Flight 182 group. Also note that Mr. Wildey is

predominantly included in the Trans World Airlines Flight 800 investigation and includes on his resume his work for the NTSB in the Pan Am Flight 103 investigation. He is still active in the NTSB, knows about cargo doors and is available for interview. Would you like his email?

"1.5.16 In order that there should be no undue delay the Court decided that a Group be constituted consisting of expert representatives of all the participants and also the nominees of the Court. This group was asked to carry out metallurgical and other examination of some of the critical pieces salvaged and give its report to the Court. The group constituted as a 'Committee of Experts' was as under :-

- a. Mr. A.J.W. Melson, Canadian Aviation Safety Board, Canada.
- b. Mr. R.K. Phillips, Canadian Pacific Air, Canada.
- c. Mr. T. Swift, Federal Aviation, Administration, USA.
- d. Mr. R.Q. Taylor, Boeing Commercial Airplane Co., USA.
- e. Mr. J.P. Tryzl, Boeing Commercial Airplane Co., USA.
- f. Mr. J.F. Wildey II, National Transportation Safety Board USA.
- g. Mr. S.N. Seshadri, Bhabha Atomic Research Centre, India (Coordinator)."

Below is excerpt from an email sent to me from Mr. and Mrs. Campbell whose son was killed in United Airlines Flight 811 and who know more about why forward cargo doors open inadvertently in flight than most people on earth. They are experts in this matter and must be highly respected for their perseverance, research, and conclusions. He has been awarded high honors by the New Zealand government for his efforts in aviation safety. Mr. Campbell connected Air India Flight 182 to United Airlines Flight 811 in 1991 as excerpt shows below. They are available for interview and currently live in New Zealand.

(Full email attached at end.)

The points to be made here are: The Campbells are unimpeachable witnesses regarding who they spoke to and what they said, and, NTSB had access to the film and photos so their opinion about the forward cargo door of Air India Flight 182 is first hand. If NTSB said the Air India Flight 182 forward cargo door looks exactly like the forward cargo door of United Airlines Flight 811, that conclusion is based on personal viewing of the film and photos by an 'Expert'. Of course the dozens of words of text of the Kirpal report already describes a door that matches the United Airlines Flight 811 door but a picture tells a thousand words. The pictures are available for analysis and confirmation of the text.

"From: SMANDKJC@aol.com
Date: Sun, 22 Aug 1999 22:39:33 EDT
Subject: From Kevin Campbell
To: barry@corazon.com

We were in Hawaii for the search for the cargo door and I tried every avenue to be on that sub or even the recovery boat without success. I was phoned within an hour of the recovery of the door and told that they had a contingency plan , if the door revealed the NTSB were correct the door was to be released to the media in Hawaii ,if the door showed that the Campbells were correct the door was going straight to Boeing . He said that the door is going straight to Boeing . We flew to Seattle but were told we

could not see
the door , we drove to Washington to see the NTSB and as we
entered the
office we were told they could spare us 5 minutes,about 3 hours
later we held
a set of the recovered C locks and Lock sectors and they
admitted we were
correct , that they would ensure that the aircraft would be fixed
but not to
hold our breath waiting for a new report ever to be released .
After lunch
with them I asked " in light of what we now know on 811 do you
still think
that Air India was a bomb ?"
The reply was that we never thought that Air India was a bomb in
fact the
video shows a cargo door exactly the same as 811.
I wrote to both Air India and the Canadian Safety Board with my
findings on
811 but did not even have the courtesy of a reply ."

Mr. Tucker, who is going to bite the bullet and look at the Air
India Flight 182 door area photos and film and state the obvious:
they look as if the same cause as United Airlines Flight 811
occurred to AI 182 to give the same metallurgical evidence
which indicates it may have had the same initial event....and it
was not a bomb although thought so earlier in both cases. It looks
like a hot potato; from RCMP to TSB to Mr. Gartstang and here I
am willing and able to examine them, as is Mr. and Mrs.
Campbell.

Will you put on some gloves and handle this issue? This shorted
wiring/forward cargo door rupture/explosive decompression/

inflight breakup explanation for Air India Flight 182 keeps on withstanding criticism against it and keeps on receiving evidence support as we dig deeper.

Best Regards,
Barry

John Barry Smith
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www.corazon.com
barry@corazon.com

Sgt. B. Blachford
Air India Task Force
5255 Heather St.
Vancouver, B. C.
V5Z 1K6

Dear Sgt. Bart Blachford, 3 Mar 02

Thank you for your letter of 26 Feb 02, file 85E-6410 tip 3196, in which you request I deal directly with Mr. Tucker of TSB. You then ask me to deal directly with you. My pleasure, Sergeant, and tip 3196 is the one that caught your culprit: Electrical, not human. The Mounties always get their man, even if it is a woman or parts of a machine.

I have no correspondence from the NTSB which states they said the forward cargo door of Air India Flight 182 was exactly like

the door of United Airlines Flight 811 but I do have the correspondence from the actual person who met the actual NTSB official who said the actual words you are asking about.

Explained below:

First item below is from Kirpal Report on Air India Flight 182 which describes a Group (A Committee of Experts) which had access to all photos and film and, indeed, was specifically asked to evaluate same. Mr. James F. Wildey II, of NTSB was present in that Air India Flight 182 group. Also note that Mr. Wildey is predominantly included in the Trans World Airlines Flight 800 investigation and includes on his resume his work for the NTSB in the Pan Am Flight 103 investigation. He is still active in the NTSB, knows about cargo doors and is available for interview. Would you like his email?

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office we were told they could spare us 5 minutes, about 3 hours later we held a set of the recovered C locks and Lock sectors and they admitted we were correct, that they would ensure that the aircraft would be fixed but not to hold our breath waiting for a new report ever to be released. After lunch with them I asked "in light of what we now know on 811 do you still think that Air India was a bomb?" The reply was that we never thought that Air India was a bomb in fact the video shows a cargo door exactly the same as 811. I wrote to both Air India and the Canadian Safety Board with my findings on 811 but did not even have the courtesy of a reply."

Sergeant Blachford, the points to be made here are: The Campbells are unimpeachable witnesses regarding who they spoke to and what they said, and, NTSB had access to the film and photos so their opinion about the forward cargo door of Air India Flight 182 is first hand. If NTSB said the Air India Flight 182 forward cargo door looks exactly like the forward cargo door of United Airlines Flight 811, that conclusion is based on personal viewing of the film and photos by an 'Expert'. Of course the dozens of words of text of the Kirpal report already describes a door that matches the United Airlines Flight 811 door but a picture tells a thousand words. The pictures are available to you for analysis and confirmation of the text.

Kirpal Report Excerpt below about forward cargo door which matches in text that of the picture of United Airlines Flight 811:

"2.11.4.6 Section 42

All cargo doors were found intact and attached to the fuselage structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed. Because the damage appeared to be different than that seen on other wreckage pieces, an attempt to recover the door was made by CCGS John Cabot. Shortly after the wreckage broke clear of the water, the area of the door to which the lift cable was attached broke free from the cargo door, and the wreckage settled back onto the sea bed. An attempt to relocate the door was unsuccessful."

To sum up past and current official opinion about Air India Flight 182:

CASB, forward cargo hold explosion on right side, unstated cause.

AAIB, forward cargo hold explosion on right side, not a bomb but cause yet to be determined.

Kirpal, forward cargo hold explosion on right side, cause a bomb.

NTSB, not a bomb and cargo door looks exactly like a door on a matching model aircraft which had an explosion in the forward cargo hold on the right side, not a bomb.

RCMP, aft cargo hold explosion, cause a bomb.

This private investigator agrees with the CASB, the AAIB, the NTSB and further refines the determined cause of the ruptured

opening of the forward cargo door of Air India Flight 182 to be that of electrical, either known faulty Poly X wiring or Switch S2.

Are you not curious, Sgt. Blachford? Don't your detective skills cry out to see the actual evidence? Would you not like to see a pattern of cause and effect? You have the authority, access, and should have the motive to examine those photographs which have been kept these many years just for the purpose of someone of your character and position to examine for analysis and conclusions based upon similar subsequent events. United Airlines Flight 811 was a subsequent event.

By the way, all your questions to me are of the "Check out the messenger," type and not of the 'Check out the message,' type. You are not asking about the door but what people are saying about the door. I must repeat, Air India Flight 182 was an airplane crash, first and foremost. Ask airplane crash type questions.

Cheers,

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: SMANDKJC@aol.com
Date: Sun, 22 Aug 1999 22:39:33 EDT

Subject: From Kevin Campbell
To: barry@corazon.com
CC: rocketman@hawaii.rr.com

Dear Barry , Steve emailed on your reply , Thank you for your kind comments about our work. As you know we live in NZ but we own an apt here in Waikiki and usually spend from may till end sept here .This year we were late arriving as our first grandchild was due early may , He did not arrive until the 19th and we stayed to help out our daughter until the 1st june . Our son in law gave us a computer so they could email pictures of the new baby . I have resisted getting a computer as I cant type but seem to be managing OK . Anyway as soon as I got on line the first search I did was 811 and got your site , it all sounded very familiar to me and I could tell you had obviously done your homework . Steve had visited us in NZ in Feb just as we moved into our new apt there after selling our family home so I asked Steve if he had been in contact with you and what spurred your interest in cargo doors { I should have explored your site a bit more and I would have found the reason myself but I was just starting searching the web and only hit the one page] Steve did not know what your motives were so I thought I would

contact you
myself , however I had bought a lot of my documents over with
me this trip as
I had to fly on to Seattle to do an interview with the BBC
Panorama program
for a documentry on aircraft wiring problems following the
release to the
media of the Swissair wreckage , the doco is cofunded by the
Discovery
Channel and may show [Or a USA version of it] on TLC
depending on wether
they want to upset Boeing or not . The request to do this doco
followed a
very good doco done by Channel 9 Sydney on their Sunday
program titled "Fire
in the Sky" also about Kapton wire in Feb of this year .I had lent
BBC some
of my documents including my submission to the NTSB on the
cause of 811 and
also a document I had written in 1989 I called "Countdown to
Disaster"
detailing the sequence of events leading up to and beyond the
811 disaster .
I still have not had them returned but Steve can email them to
you if you
have never seen them.
As you are probably aware we did an investigation on 811 and
have appeared in
the media many times . We had many stories about our efforts in
NZ newspapers
,magazines and TVNZ followed us on one visit to the USA and
did a Documentry
on our investigation { the email from the guy in NZ that you sent

Steve was
from one of the team that was to do a computer simulation of my
theory
compared to the NTSB theory as soon as they tried to program
the NTSB theory
they could see it did not compute and it was then they realised I
had to be
correct and were behind me 100%. the same people did the
Americas Cup
simulations] The WALL STREET JOURNAL did a front page
article on our efforts
on 24th feb 1990 and I have done several articles with Byron
Acihido of the
Seattle Times among others .
In all we took 7 trips to the USA investigating 811 and they
started with a
look at the aircraft at Hickam AFB where we took many pictures
of the damage
and I was able to rule out corrosion as the cause . We attended the
NTSB
hearing at Seattle and managed to steal all of the documents from
the NTSB
metalurgists seat after the hearing ended . Initially they would
only give us
the list of witness`s but after complaining to the media at the first
recess
they gave us a press set and said we could have anything off the
press table
when the hearing ended two days later . At the end of
proceedings we gave an
interview to The Honolulu Advertiser and when it finished we
went back in to
get the stuff off the press table, as I was looking at it my wife

Susan

walked up to the top table and yelled out there was a good set of stuff here

, we grabbed a box loaded it in and took off just as the NTSB guys were

coming back in with a trolley to load it up . We hailed a taxi and were off .

It took months to look at it and absorb it all but the result was "

Countdown

to Disaster"

We have stayed with both Dave Cronin and Al Slader many times .On one visit

to the NTSB we got copies of all the passenger safety statements and wrote to

everyone that had replyd to the Questionair . Mainly they were First and

Business class passengers with a few coach as well . We visited everyone who

replyed to us , Flying in to Seattle and driving to Denver New York Florida

San Diego San Francisco Lake Tahoe and back up to Seattle .

Boeing would

never talk to us directly only through their legal people [Perkins Coie] and

initially United would not talk to us either but a year after the accident

when United had gone from the most popular to the carrier of last resort for

NZ passengers we got an invitation to visit the United maintenance base in

San Francisco . they were just going to do a PR job on us but it did not work

out that way and we got stuck into each of the VP`s and told

them were they
had failed , when one broke down we knew we had them and it
ended up with the
Senior VP United Joe O Gorman giving us a personal escort
around the base
and getting answers to everything we wanted to know . We stood
in the cargo
bay of a 747 while they operated the door and I pointed to the
Conduit at the
top of the door and said that that was were I thought the Arc had
originated
from. as we walked back across the tarmac I spotted a newly
painted 747with a
number I did not recognise , when we got back to the motel I
checked my
records and there was no N4724U . so asked the next day if it
was N4713U
renumbered and they had to admit it was .

We were in Hawaii for the search for the cargo door and I tried
every avenue
to be on that sub or even the recovery boat without sucess. I was
phoned
within an hour of the recovery of the door and told that they had
a
contingency plan , if the door revealed the NTSB were correct
the door was to
be released to the media in Hawaii ,if the door showed that the
Campbells
were correct the door was going straight to Boeing . He said that
the door is
going straight to Boeing . We flew to Seattle but were told we
could not see
the door , we drove to Washington to see the NTSB and as we

entered the office we were told they could spare us 5 minutes, about 3 hours later we held a set of the recovered C locks and Lock sectors and they admitted we were correct, that they would ensure that the aircraft would be fixed but not to hold our breath waiting for a new report ever to be released. After lunch with them I asked "in light of what we now know on 811 do you still think that Air India was a bomb?" The reply was that we never thought that Air India was a bomb in fact the video shows a cargo door exactly the same as 811. I wrote to both Air India and the Canadian Safety Board with my findings on 811 but did not even have the courtesy of a reply. I was very upset to read your theory on TWA 800 as I thought we had the problem beat but it had never occurred to me that if the pull in hooks opened that the door could break in half, this is of course exactly what 811's did but I had put it down to the fact that it struck the side of the fuselage as it opened and levered out the hinge and the section above it. Fate intervened on 811 and the door opened on the 747 at JFK and they could no longer withhold the revised report on 811. The new report however still does not admit that 811 got the signal to open right there at 23000 ft

insisting it happened before takeoff . This is a much less scary scenario for Boeing and the NTSB as they still believe that other safeguards preclude it from getting a signal after shutdown of the APU and the ground switch which I believe is a load of baloney .Are you aware that the original door design for the 747 called for a warning light that would have advised the cockpit of a S2 switch failure and the fact that power was still available to the door latch actuators? I had the document that showed this system deleted by whiteout and no one would ever answer my question wether the aircraft was certified with this system or not as it never made it into production . I lobbied very hard for this system to be reinstated but it wasnt ,I guess that would have opened up liability problems for Boeing I lent the document to a journalist and have never got it back either . You probably have plenty of questions for me but I will run through the ones you asked Stuart Mc Clure and answer any that I can .
Dave Cronin PO Box 4263 Incline Village NV 89451-8320 Tel 702 831 7746 Fax 702 831 3615 . Dave was flying the plane manually getting the last bit of pleasure before he retired , as it blew he just let it go and it went up and

sideways about 50 ft { I have the engine readouts and you can see that airflow was cut over the engine intakes] Dave and I both believe that had it been on autopilot it would have broken the nose off at the 41 section joint which is a known weak point { This is what happened to Pan Am 103 and TWA 800] all of the beams in the business section were broken and I actually stood in the cargo hold of N4713U at Hickam and lifted the floor off the temporary struts with one hand , the floor was only held up by the cargo containers after the door went . Actually the only bit of solid floor left in business class was where our son sat in 12H But the shock wave went from the back past Lee moving the toilets beside him { forward of the hole] forward 12" it bounced off the front of the plane came back and broke his seat off its legs or mountings , it also blew the eardrums of most of the first class passengers and in some cases blew up their teeth if they had air cavities in them Dave is a very experienced glider pilot and called on all his skills to get the plane back but it was dropping at 1000 ft p/m it was at 22000 ft 22 minutes out and at METO speed it crashed to a perfect landing at Honolulu International Airport it could never have gone around

for another
attempt { I have the CVR printout and it makes chilling
reading } What was
heard ? The CVR has a thump followed 1.8 seconds later by a
loud explosion {
I failed in my bid to listen to the actual tape ,I only wanted to
actually
hear the sound myself but was denied }Talking to the passengers
some off them
heard a hiss followed by an explosion described as being like "A
thousand
handclaps " no one saw the passengers go . One passenger in first
class {with
a Ph D in physics } nearest to the door said he heard something
start up
immediately prior to the thump . the NTSB never interviewed
him and dismissed
this as being the elevator to the galley but the steward was
already in the
galley at the time of the explosion and I dont think the elevator
was moving
. So the sequence was a whir a thump a hiss and then 1.8
seconds later the
explosion . Dave had time to say " what the # was that " and Al
replied "I
don't know "between the thump and the explosion The CVR's
power was then off
for 21.4 seconds
I have the all the NTSB photos and my own of the door frame
area,the side
frames and the sills are in perfect condition ,the 8 bottom pins are
all
goughed but otherwise OK the forward mid span pin is also

goughed and the
mtg bracket had moved outward on its bolts , the rear mid span
pin was
goughed and the bracket was held by one bolt the other 3 had
broken . It
takes 1.5 seconds for the 8 C Locks on the bottom of the door to
open
followed by the opening of the pull in hooks , with the 1.8
second time gap
when the hiss was heard I take that to be the time that the door
had blown
off the 8 C Locks and it was held by the pull in hooks until they
also opened
sufficiently for the door to blow off them as well . Something had
to be
different to PAN AM 10 out of London where the door was
closed by the
slipstream and they got back safely.

At least one passenger was ingested by engine no 3 . I have the
Coroners
report on what they found and I have seen what they removed
from the engine
apart from the body bits . It was not our son as we had to give a
DNA sample
and the result was negative Steve recently spoke to someone
who inspected
the engine the day it happened and thought the red on the turbine
was seat
material until he touched it and realised what it was They told us
that they
gave the aircraft parts a Hawaiian burial at sea but I doubt it ,
they
certainly did not give us the seat parts that we could have used in

an action
against the seat manufacturer [Weber Aircraft Co]
We have photos of damage to the wings , the top of the aircraft
and to the
vertical stabiliser , we hope that one of these killed our son as we
know he
could have survived the fall to the sea 22000 ft and over 4
minutes below .
parts were still falling out of the sky after 811 was back on the
ground in
Honolulu. We have the reports from all the services that attended
the
accident . We found they knew Lee was missing by about 4 AM
local time but it
was not till about 12 Hrs later that they phoned us from Chicago
and said he
was missing presumed dead .The damage to No3 engine was
caused by a body or
bodies , luggage and aircraft parts . Damage to No 4 was mainly
by luggage .
N4713U did not have the lock sectors strengthened by aluminium
{the first
fix]but I would think that PAN AM 103 would have as PAN AM
did not wait for
Boeing to supply the steel kits but made their own and fitted
them to their
fleet after the London incident , as they realised the implications
of not
doing so . As detailed in "Countdown " Boeing devised a one
time test to
check the integrity of the cargo door locking system , they told
the airlines
to hit the door open switch to see what happened , a day later

they stopped
the test as operators were calling to say it was damaging the
planes ,
obviously lots of aircraft had failed S2 switches and the actuators
were live
just waiting for a stray arc to doom the plane and the passengers
and the
FAA still gave up to 2 years to replace the lock sectors with steel
ones .
Regards Kevin and Susan Campbell

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:11 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Door overview and closeups**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Dear Bill, 24 Mar 02

6:52 PM -0500 3/22/02, Tucker, Bill wrote:

>Hi Barry,

>

>Thanks. By the way, I took with me much of the mat'l you had
sent me and

>perused it during my time away. Now I have some selective
forwarding to do.

>I'll get back to you, but will not likely be able before at least
next

>Thursday.

>

>Bill T..

Well, as usual, your email has sent me into a paroxysm of activity.

I've been thinking about your phrase, "selective forwarding," and how I may help.

I assume you mean to AAIB and NTSB to further check out Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800. Or even to some of your own staff for Air India Flight 182.

I assume your purpose is to gather further forensic evidence to rule in or rule out the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

Well, pictures are so powerful and the recent exchanges have been stimulated by the revealing, even startling, ones of the cargo door area of Pan Am Flight 103.

Let me condense it down to the core of the issue: All four forward cargo doors show evidence of outward shattering as would occur from an explosive decompression in flight. The port side forward of the wing of these aircraft is relatively smooth compared to the starboard side. The ruptured open in flight needs to be established and then the cause of that decompression can be debated. That's my two step process. First ruptured open in flight, there's the photographs on the table. Second, the probable cause is in these texts on the table, and everyone gets to bring their own theory to the table.

I hope the photos below may whet the appetites for other investigators to examine the higher resolution photos for their specific aircraft.

Cheers,
Barry

Above normal Boeing 747 door showing square overpressure relief doors near top hinge.

Below: The United Airlines Flight 811 forward cargo door, the irrefutable model, the truth, the reality, the poor door from the miracle aircraft which has its poor Poly X wiring only discovered after years of use. This forward cargo door shows the peeled back skin from the midspan latch and longitudinal split which is less severe than the others because the pressure differential was less and the fuselage skin was less torn.

Above is United Airlines Flight 811 forward cargo door. Then the Pan Am Flight 103 forward cargo door below, opposite the 'bomb' side. This forward cargo door shows the peeled back skin from the midspan latch and longitudinal split.

Above is Pan Am Flight 103 forward cargo door. Below is reconstruction drawing of Air India Flight 182 showing longitudinal split of forward cargo door. Door is said to look exactly like the door of United Airlines Flight 811 by NTSB officials who have seen both. No photos of this door area have been released to public.

Above is Air India Flight 182 reconstruction drawing.

Below is Trans World Airlines Flight 800 forward cargo door area. Aft part of door is left picture; forward part of door is right picture. This forward cargo door shows the peeled back skin from the midspan latches.

Above is Trans World Airlines Flight 800 forward cargo door.

Now for closeups of the peeled back skin from the aft midspan latch of all aircraft.

United Airlines Flight 811 below:

United Airlines Flight 811 above showing closeup of peeled back skin at aft midspan latch.

Pan Am Flight 103 below showing closeup of peeled back skin at aft midspan latch.

Pan Am Flight 103 above showing closeup of peeled back skin at aft midspan latch.

Below Air India Flight 182 closeup of longitudinal split at aft midspan latch which may have peeled back skin.

Above Air India Flight 182 closeup of longitudinal split at aft midspan latch which may have peeled back skin and was said to look exactly like United Airlines Flight 811 door above.

Below Trans World Airlines Flight 800 closeup of forward cargo door peeled back skin at aft and forward midspan latch.

Above Trans World Airlines Flight 800 closeup of forward cargo door peeled back skin at aft and forward midspan latch.

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Campbell page 4**

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Campbell page 3**

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Campbell page 2**

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Campbell page 1 Significance**

W.T. (Bill) Tucker
Director General,

Investigation Operations

Dear Bill, 23 Mar 02

Got an email from Mr. Campbell discussing the comment by NTSB about Air India Flight 182 and United Airlines Flight 811 being exactly alike.

At 11:07 AM +1300 3/4/02, Kevin & Susan Campbell wrote:

>X-From_: smandkjc@internet.co.nz Sun Mar 3 14:08:39 2002

>From: "Kevin & Susan Campbell" <smandkjc@internet.co.nz>

>To: "John Barry Smith" <barry@corazon.com>

>Subject: Re: 182 door exactly like 811 door

>Date: Mon, 4 Mar 2002 11:07:55 +1300

>X-Priority: 3

>

>Hi! The main guy we visited at the NTSB that day was Ron Schleede but there were at least 2 others involved in the meeting and lunch. Fairly sure it was Ron who made the comment but he may well deny it. Michael Marx was the Chief of the Materials Lab on 811 Jim Wildey was Senior Metallurgist but Susan recalls it was Ron and Michael we had lunch with.

>I have found a letter I wrote to Ron Schleede and Michael Marx after our meeting making reference to our discussion about AI 182 and will email that as well.

>Regards Kevin

It also brings Ron Schleede into the picture again. Small world. Apparently it was Ron Schleede who matched the 182 door to the United Airlines Flight 811 door and he is able to be contacted to confirm that. So, Mr. Schleede is important in this door issue of 182 and 811.

The four page letter from Mr. Campbell to Mr. Schleede in 1990 confirms even indirectly that the NTSB told Mr. Campbell that

the Air India Flight 182 and the United Airlines Flight 811 forward cargo doors looked exactly the same. This must give motive for them to reexamine the actual photos themselves to rule in or rule out that fact, because, if true, and I believe it to be true, then Air India Flight 182 is more likely to have suffered the same probable cause as United Airlines Flight 811 and it was not a bomb.

This four page letter also confirms that Mr. Campbell knows a lot about forward cargo doors on Boeing 747s. His expertise is invaluable and he is available for interview also.
smandkjc@internet.co.nz

I'll be sending a multi part letter via PDF email soon, it's called door story and it has lots of pictures. It attempts to show visually the matches of the doors to each other. The goal of course is to get the supplemental investigation to reexamine the photographs and film to confirm the 182 door and the United Airlines Flight 811 door match.

Cheers,
Barry

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Copy of letter to Sgt Blachford AITF, 22 Mar 02**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 24 Mar 02

Below is letter to Sgt Blachford and AITF personnel sent by snail mail. It's a desperate effort to keep them in the hunt. I've said that they are the ones to continue the investigation into Air India Flight 182 because they have the staff and budget but my hopes are with the TSB.

Cheers,

Barry

Sgt. B. Blachford

Air India Task Force

5255 Heather St.

Vancouver, B. C.

V5Z 1K6

Dear Sgt. Bart Blachford, Mr. Schneider, and all Air India Task Force personnel, 22 March 2002

This is a follow up letter to Sgt. Blachford's letter requesting information about the NTSB statement that the United Airlines Flight 811 forward cargo door looks exactly like the Air India Flight 182 forward cargo door with the implication being that if the shattered cargo door of one plane looks like the shattered cargo door of another, the cause may be the same, and the irrefutable truth of one is that it was caused by an electrical problem, not a bomb, so that both may be electrical.

John Barry Smith wrote:

Below is excerpt from an email sent to me from Mr. and Mrs. Campbell whose son was killed in United Airlines Flight 811 and who know more about why forward cargo doors open inadvertently in flight than most people on earth. They are experts in this matter and must be highly respected for their

perseverance, research, and conclusions. He has been awarded high honors by the New Zealand government for his efforts in aviation safety. Mr. Campbell connected Air India Flight 182 to United Airlines Flight 811 in 1991 as excerpt shows below. They are available for interview and currently live in New Zealand.

"From: SMANDKJC@aol.com
Date: Sun, 22 Aug 1999 22:39:33 EDT
Subject: From Kevin Campbell
To: barry@corazon.com

After lunch with them I asked " in light of what we now know on 811 do you still think that Air India was a bomb ?"
The reply was that we never thought that Air India was a bomb in fact the video shows a cargo door exactly the same as 811. I wrote to both Air India and the Canadian Safety Board with my findings on 811 but did not even have the courtesy of a reply ."

At 11:07 AM +1300 3/4/02, Kevin & Susan Campbell wrote:
>X-From_: smandkjc@internet.co.nz Sun Mar 3 14:08:39 2002
>From: "Kevin & Susan Campbell" <smandkjc@internet.co.nz>
>To: "John Barry Smith" <barry@corazon.com>
>Subject: Re: 182 door exactly like 811 door
>Date: Mon, 4 Mar 2002 11:07:55 +1300
>X-Priority: 3
>

>Hi! The main guy we visited at the NTSB that day was Ron Schleede but there were at least 2 others involved in the meeting and lunch. Fairly sure it was Ron who made the comment but he may well deny it. Michael Marx was the Chief of the Materials Lab on 811 Jim Wildey was Senior Metallurgist but Susan recalls it was Ron and Michael we had lunch with.
>I have found a letter I wrote to Ron Schleede and Michael Marx

after our meeting making reference to our discussion about AI 182 and will email that as well.

>Regards Kevin

Sgt. Blachford, in the letter referenced above there is a paragraph 4 which is referred to below:

At 5:38 PM -0800 3/3/02, John Barry Smith wrote:

>Ok, very very good, Kevin, thank you. Now Ron Schleede emailed me early on during the Trans World Airlines Flight 800 investigation to assure me that the cargo door was latched until water impact, weeks before the wreckage was recovered and months before it was hung on the reconstruction which showed the large outward opening petal shaped ruptures at the aft midspan latches. Mr. Schleede is known to Mr. Tucker and they are on recent speaking terms even though Mr. Schleede retired some time ago. But, Mr. Schleede is still available for interview to confirm it was him or Marx who made the comment.

>

>Now, regarding top paragraph of page 4:

>

>"With further regard to the Air India 747..." That implies you had earlier discussion about Air India 747. Was this in reference to the 'both doors looked alike statement? This confirms that your earlier conversation took place.

>

>"Is the video footage showing the two pieces of that cargo door in the possession of the N.T.S.B?" How did you know the Air India Flight 182 forward cargo door was in two pieces? Because of your earlier conversation? This confirms you had the conversation and that they (NTSB) said it was in two pieces.

At 10:02 AM +1300 3/5/02, Kevin & Susan Campbell wrote:

>> Now, regarding top paragraph of page 4:

>>

>> "With further regard to the Air India 747..." That implies you had earlier

>discussion about Air India 747. Was this in reference to the 'both doors

>looked alike statement? This confirms that your earlier conversation took

>place.

>YES

>> "Is the video footage showing the two pieces of that cargo door in the

>possession of the N.T.S.B.?" How did you know the Air India Flight 182

>forward cargo door was in two pieces? Because of your earlier conversation?

>This confirms you had the conversation and that they (NTSB) said it was in

>two pieces.

>YES

>Regards Kevin

To summarize:

The United Airlines Flight 811 forward cargo door looks like it does with its peeled back skin from the aft midspan latch and longitudinal split because an explosive decompression occurred at that point caused by faulty wiring or switch that tried to unlatch to door in flight.

Concur: NTSB, Smith.

Do not concur: None.

The Pan Am Flight 103 forward cargo door looks like it does with its peeled back skin from the aft midspan latch and longitudinal split because a bomb exploded on the other side of the cargo compartment.

Concur: NTSB, AAIB, Garstang, RCMP, FBI, CIA, and Scotland Yard.

Do not concur: Smith.

The Air India Flight 182 forward cargo door looks like it does with its peeled back skin from the aft midspan latch and longitudinal split because a bomb exploded on the starboard side of the cargo compartment.

Concur:

Indian Kirpal Report

Do not concur: CASB, AAIB, NTSB, Garstang, Smith, and RCMP.

The Trans World Airlines Flight 800 forward cargo door looks like it does with its peeled back skin from the aft midspan latch and longitudinal split because of a spontaneous fuel air explosion in the center fuel tank with unknown ignition source.

Concur: NTSB

Do not concur: Smith

Sgt. Blachford and members of the Air India Task Force of the Royal Canadian Mounted Police: What is going on? Are you detectives? Or are you politicians, bureaucrats, aircraft accident investigators, or attorneys?

When viewing the matching facts, data, and evidence of the four aircraft, Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800 each would have

a response:

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

	AI 182	PA103	UAL 811	TWA 800		
Boeing 747	Yes	Yes	Yes	Yes		
Early model -100 or -200		Yes	Yes	Yes	Yes	
Polyimide wiring (Poly X type)		Yes	Yes	Yes	Yes	
Sudden airframe breakup in flight (partial or total)		Yes	Yes	Yes	Yes	Yes
Breakup occurs amidships		Yes	Yes	Yes	Yes	
High flight time (over 55,000 flight hours)		No	Yes	Yes	Yes	
Aged airframe (over 18 years of service)		No	Yes	Yes	Yes	
Previous maintenance problems with forward cargo door	Yes	Maybe	Yes	Maybe		
Initial event within an hour after takeoff	No	Yes	Yes	Yes	Yes	
Initial event at about 300 knots while proceeding normally in all parameters		Yes	Yes	Yes	Yes	Yes
Initial event has unusual radar contacts		Maybe	Yes	Yes	Yes	Yes
Initial event involves hull rupture in or near forward cargo door area	Yes	Yes	Yes	Yes	Yes	
Initial event starts with sudden sound	Yes	Yes	Yes	Yes	Yes	
Initial event sound is loud	Yes	Yes	Yes	Yes	Yes	
Initial event sound is audible to humans		Yes	Yes	Yes	Yes	Yes
Initial event followed immediately by abrupt power cut to data recorders		Yes	Yes	Yes	Yes	Yes
Initial event sound matched to explosion of bomb sound	No	No	No	No		
Initial event sound matched to explosive decompression sound in wide body airliner		Yes	Yes	Yes	Yes	Yes
Torn off skin on fuselage above forward cargo door area	Yes	Yes	Yes	Yes	Yes	
Unusual paint smears on and above forward cargo door	Maybe	Maybe	Yes	Yes		
Evidence of explosion in forward cargo compartment	Yes	Yes	Yes	Yes		
Foreign object damage to engine or cowling of engine number three		Yes	Yes	Yes	Yes	Yes
Fire/soot in engine number three		Maybe	Yes	Yes	Yes	Yes
Foreign object damage to engine or cowling of engine number four	Yes	Yes	Yes	Yes	Yes	
Right wing leading edge damaged in flight		Yes	Maybe	Yes	Maybe	
Vertical stabilizer damaged in flight		Yes	Yes	Yes	Maybe	
Right horizontal stabilizer damaged in flight		Yes	Yes	Yes	Yes	

More severe inflight damage on starboard side than port side	Yes	Yes	Yes	Yes		
Port side relatively undamaged by inflight debris			Yes	Yes	Yes	Yes
Vertical fuselage tear lines just aft or forward of the forward cargo door		Yes	Yes	Yes	Yes	
Fracture/tear/rupture at a midspan latch of forward cargo door	Maybe	Yes	Yes	Yes		
Midspan latching status of forward cargo door reported as latched	No	No	No	No		
Airworthiness Directive 88-12-04 implemented (stronger lock sectors)		No	No	No	Yes	
Outwardly peeled skin on upper forward fuselage	Yes	Yes	Yes	Yes	Yes	
Rectangular shape of shattered area around forward cargo door	Yes	Yes	Yes	Yes		
Forward cargo door fractured in two longitudinally	Yes	Yes	Yes	Yes	Maybe	
Status of aft cargo door as intact and latched	Yes	Yes	Yes	Maybe		
Passengers suffered decompression type injuries	Yes	Yes	Yes	Yes		
At least nine missing and never recovered passenger bodies	Yes	Yes	Yes	Yes		
Wreckage debris field in two main areas, forward and aft sections of aircraft	Yes	Yes	No	Yes		
Initial official opinion of probable cause as bomb explosion.	Yes	Yes	Yes	Yes		
Initial official determination modified from bomb explosion	Yes	Yes	Yes	Yes		
Structural failure considered for probable cause			Yes	Yes	Yes	Yes
Inadvertently opened forward cargo door considered for probable cause		Yes	No	Yes	Yes	
Official probable cause as bomb explosion		Yes	Yes	No	No	
Official probable cause as 'improvised explosive device'	No	Yes	No	No		
Official probable cause as explosion by unstated cause	Yes	No	No	No		
Official probable cause as explosion in center fuel tank						
with unknown ignition source	No	No	No	Yes		
Official probable cause as improper latching of forward cargo door	No	No	Yes	No		
Official probable cause as switch /wiring inadvertently opening forward cargo door	No	No	Yes	No		
Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight						

A politician would look at all the matching evidence among the four Boeing 747s and say to me, "It's obviously evil conspiracy plots by our enemies who managed to plant bombs in the cargo compartments of our planes and kill our innocent women children and it's not our fault for authorizing defectively wired aircraft with design flawed cargo doors that are nonplug and open outward. Give us more money to fight these evil monsters."

A bureaucrat would say to me, "This message may be monitored for quality control purposes. Don't talk to me. Go talk to that guy over there. I'm busy; my department has no budget, we need money, we are understaffed, and you may leave a message on my voice mail after the beep and I'll get back to you sooner or later."

An aircraft accident investigator would say to me and recently did, "What do you have, Smith; show me your evidence; why do you make the conclusions you make? Here's some photographs I have obtained for you of one of the aircraft in question; what do you think of the photos of the cargo door area of Pan Am Flight 103?"

An attorney would say, "We got convictions against a bomber already and we'll get convictions from a jury on this one and my fee is four hundred dollars an hour."

Now, what would a detective say? I don't know but I can only assume that a detective would say all of the above and add, "Who told you this, where did you get this information, who are you, why do you say these things," and then start asking the real questions based upon several premises starting with the credibility of the messenger/tipster and once he is confirmed as credible, getting into the facts of the case.

Sgt. Blachford, you came down here to my house, met my family, looked at my personal documents and confirmed I have no ulterior motive for saying Air India Flight 182 was not a bomb but mechanical, that I am a rational adult married man and homeowner who retired from the US military and who also has thousands of flight hours as well as having a solid motive for aviation safety since I am a survivor of a sudden fiery fatal jet airplane crash and I'm talking about a sudden fiery fatal jet airplane crash.

This messenger/tipster checks out. Now to check out the message. Here is proof in pictures, drawings and text that the site of initial damage to Air India Flight 182 is the same as the initial site in three other Boeing 747s including the one key aircraft that did not totally destruction and was conclusively not a bomb, United Airlines Flight 811, thus warranting a further examination into the cause of Air India Flight 182 by examining and evaluating the photographs and film of the wreckage to confirm or rule out the match.

The modus operandi of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup sequence is the same for the four aircraft. The forensic evidence the event leaves is real and matching to other cases. The events happen over a period of years in different jurisdictions, apparently randomly to different airlines in different countries, and the symptom is always blamed first, not the underlying cause. It's the classic case of a serial killer who is getting away with it. There is no central authority to put all the trees in order to see the forest. AITF can be that authority. Four airplane crashes with similar evidence. You are investigating one; check out the others.

Appearance of forward cargo door of the four Boeing 747s:

Above photo is normal forward cargo door in closed position.

Above photo from NTSB: The United Airlines Flight 811 forward cargo door looks like it does with its peeled back skin from the aft midspan latch and longitudinal split because an explosive decompression occurred at that point caused by faulty wiring or switch that tried to unlatch to door in flight.

Above photo from AAIB: The Pan Am Flight 103 forward cargo door with its peeled back skin from the aft midspan latch and longitudinal split.

Above drawing from CASB report: The Air India Flight 182 forward cargo door looks like it does with its peeled back skin from the aft midspan latch and longitudinal split. Door is reported to look exactly like the United Airlines Flight 811 forward cargo door by NTSB officials who had access to all the photographs and film of Air India Flight 182 forward cargo door area.

From the Kirpal report about door above:

"2.11.4.6 All cargo doors were found intact and attached to the fuselage structure except for the forward cargo door which had some fuselage and cargo floor attached. This door, located on the forward right side of the aircraft, was broken horizontally about one-quarter of the distance above the lower frame. The damage to the door and the fuselage skin near the door appeared to have been caused by an outward force. The fractured surface of the cargo door appeared to have been badly frayed."

Above photo from NTSB: The Trans World Airlines Flight 800 forward cargo door with its peeled back skin from the aft midspan latch and longitudinal split.

Note that the port side of these aircraft, on the opposite side of the fuselage of these shattered areas, is relatively smooth and undamaged except for small areas of disruption.

So, Sgt. Blachford, what does all this mean? It means that one initial event probably caused all four similar consequences and should be the first working assumption, not the last. That cause may be a bomb, or missile, or center tank explosion or space debris or the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. Regardless, for so many similar consequences to occur the most likely reason is the same for all, but not many different reasons such as center tank fuel explosion with unknown ignition source, bomb in aft cargo compartment, bomb in forward cargo compartment on port side, bomb in forward cargo compartment on starboard side, missile, improperly latched cargo door, or wiring or switch turning on the door unlatch motor inadvertently.

My vote for the similar cause for the similar evidence is the mechanical explanation with precedent, the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

What is your primary duty? What are you dedicated to? What are you educated for, paid for, and sworn for? What is your professional goal in life?

What is the mandate of the AITF? To catch bad guys or to

investigate the cause of a national tragedy and then catch the villains if a crime is confirmed? I know you know the case against the three accused is flawed, flimsy, and subject to criticism because I know no crime has been committed and thus no criminals. I know you figure it's the best you can do with what you have. It is the best you can do when you are searching for the ghosts of invisible killers with nonexistent bombs. But when you go after solid things like facts, data, and evidence, the solution is clear and confirmable; it's mechanical and can be confirmed by forensic examination of photo and film examination, by reality, not shadowy elusive conspiracy plots. I think about tipster 3195...who was he/she? A person leaving an anonymous note saying they overheard a drunken conversation in a bar about men with turbans talking about revenge? What is the quality of your tips? Are they from experienced aviation pilots who give you quotes and photos from government accident investigations which check out every time you check them out?

What are you trying to do? That is a simple question with a complex answer when dealing with an internationally important event which has resulted in the deaths of hundreds of innocents.

I have tried to be objective, scientific, and calm during these 13 years of my research into explosive decompression events in Boeing 747s and interacting with government officials in my own country as well as others. I have believed that science and facts, data, evidence will eventually prevail as to determining the probable cause of these accidents/tragedies/crashes, but never crimes.

Well, it hasn't worked. One man is in jail for the rest of his life and his appeal was just rejected. Three men will be on trial for their life's freedoms in November. Lawsuits will be litigated

against fuel tank manufacturers in amounts of hundreds of millions of dollars. I'm saying the Emperor Boeing has no clothes on and no authority wants to admit it because of the perceived dire consequences to their careers, reputations, and honor. Well, I'm saying it again to you, Boeing has made aircraft with now known faulty wiring which inadvertently ruptures open the design flawed outward opening non plug cargo door at the midspan latches which have no locking sectors. It's happened before with United Airlines Flight 811 with the again reluctance at the time by authorities to admit the Emperor had no clothes on so blamed an improperly latched forward cargo door by a poor ground crew guy instead of the electrical system. It took the examination of the actual retrieved door for the authorities to finally see the truth; it was not a bomb or improperly latched door as previously thought, but electrical wiring or switch. And all hell temporarily broke loose; everyone was castigated by the investigating authority; the airline, the manufacturer, and the government oversight agency all were assessed some degree of blame. So be it. The safety of the citizen had the priority. I hope it still does because the hazard was not fixed; it still exists and is unacknowledged.

During these long years, as I have attempted to persuade the authorities to conduct a supplemental investigation into the cause from the point of view of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation, the facts, data, and evidence as shown above in my chart have been given short thrift because the implications are so profound. I understand the reluctance of authorities to disturb the wishful thinking of the senior officials and the desire for blood lust revenge by the populace. I might do the same if my job were on the line and the finances and security of my family were at stake. But they are not and that objectivity and detachment allows me

to have perhaps a clearer and unbiased interpretation of the evidence.

No one was curious: Except Sgt. Blachford of RCMP AITF and Mr. Tucker of TSB. They have asked questions. They have read my material. They have visited me in my home. They have asked follow up questions. The last question from Sgt. Blachford was why do I say the forward cargo door of Air India Flight 182 looks exactly like the forward cargo door of United Airlines Flight 811? I say it because the NTSB said it, that's why. And they had access to photos of the cargo doors of both events.

I appeal to the AITF to consider an alternative to conspiracy theories from this tipster 3196: I ask you to use your detective skills to rule in or rule out this intriguing possibility: Not a bomb, but something that sounds like, looks like, and smells like a bomb but isn't. It's called explosive decompression caused by accidental hull rupture in flight.

It's a plane crash, it's mechanical, it has happened before June 1985, and it's happened since; it's bad wiring specifically and it's already agreed that that type of wiring (Poly X) is bad generally. It's not bombs planted by strange foreign men with funny hats and accents. It's an accepted mechanical problem in a machine that has experienced it before and since.

I know the implications are profound, I know careers are affected, I know emotions run wild by all living person connected to the four fatal events, and I know the wishful thinking is always that it is not the good guys' fault, but the bad guys' fault.

That's politics. To me that mean finding what can we all agree on

that is satisfactory so we can get on with the business of our lives. Politics has nothing to do with truth, or right or wrong, or even justice, but is trying to keep the peace and avoiding conflicts. If the sun has to go round the earth to keep the status quo, then the sun goes round the earth and you can see it move with your own eyes, so what's the problem?

Politics has no place in aircraft accident investigations, (nor criminal investigations for that matter,) but we know politics intrudes in all aspects of life so we have to accommodate as best we can while staying true to our principles and ideals.

Investigations by their very nature step on people's feet, ruffle feathers, rock the boat, make waves, rub the wrong way, and generally cause havoc. That's why there is so much political pressure to come to satisfying conclusions that keep everything running smoothly. The Kirpal Report was a political report as it cleared Air India of responsibility and the conclusion of bomb was wrong as to the cause which resulted in later accidents which killed hundreds. The Canadians were more cautious and non political, they reported what they discovered which was explosion in forward cargo compartment of unstated cause, and they were right. The Canadians at the time did not offer wishful thinking conjecture. Time has proven the Canadians of 1986 correct in their appraisal of the cause of Air India Flight 182. Time has refined their findings with United Airlines Flight 811 in 1989 showing the cause of the explosion in the forward cargo compartment of Air India Flight 182 to be electrical.

The RCMP is an investigative agency; the Crown prosecutors are the ones to prosecute, get convictions, and rebuff appeals, not the detectives who are charged with an objective, neutral investigation. It appears to me, and this is controversial nontechnical opinion which may be wrong, that the AITF has

become political in that the conclusions determined by it are known to be consistent with the wishful thinking of the politicians in India, USA, and Canada but inconsistent with the facts, data, evidence. It appears that the AITF is agreeing with the senior officers of RCMP by seeking prosecution of three men who are considered to be unfavorable by thirteen years of being labeled terrorists for blowing up an aircraft by planting a bomb in the...in the, well, just exactly where was that bomb on Air India Flight 182 and where was it loaded?

If you are saying the bomb was in the aft cargo compartment, as your lone aviation expert does, then you are refuting without evidence the conclusions of dozens and dozens of investigators from the Kirpal Commission, the AAIB, the NTSB, and the Canadian Aviation Safety Board who said an explosion occurred in the forward cargo compartment and definitely not in the aft cargo compartment. It appears that the bizarre conclusion that the 'bomb' was in the aft cargo compartment is to allow the 'bomb' to be loaded in Vancouver since all that baggage went into the aft cargo compartment and an explosion in the forward cargo compartment, which is agreed to by all government agencies, would rule out Vancouver as the loading point. In addition, and this is more serious, frivolously claiming, with no actual evidence such as photographs or data recorder information for support, that there was a powerful bomb in the aft cargo compartment, location unstated, is to take United Airlines Flight 811 out of consideration since that event happened in the forward cargo compartment.

But I digressed into facts, data, evidence again, as is my wont. Sorry, back to the subjective discussions which I have avoided for years but are now necessary in an attempt to break through this low wall of indifference that AITF has thrown up around the

shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182. Please continue your investigation into the explanation and do not pass me off to another agency. You are the right agency, you are the Air India Task Force. You have the staff, budget, access, mandate, and authority to investigate. You have the means, opportunity, and motive to do the investigation right.

Are you investigators or are you prosecutors? The AITF and the RCMP appear to be doing a prosecutor's job such as giving pre trial press conferences to malign the accused as dirty phone callers, previously convicted bombers, and generally undesirable persons capable of blowing up an airplane full of crying women and children. That strategy is unworthy of the Gendarmerie royale du Canada.

Are you detectives? I think you think you are. I want to believe you are. Are you going for convictions at all costs or satisfying truth of an investigation leaving no stone unturned and then let the courts take over? The accused may or may not be terrible human beings but they did not put a bomb on Air India Flight 182 in any location because nobody did. There was no bomb. There was an explosive decompression which mimics a bomb.

detective adj 1 : fitted or used for detection 2 : of or relating to detectives

detect vb : to discover the nature, existence, presence, or fact of
~ detectable adj detection \- detector \-"

To discover the nature, existence, presence or fact of...

Are you doing that with Air India Flight 182? Are you treating

that as a plane crash or a bank robbery? Have you learned why planes crash and in particular why a huge airliner would suddenly come apart in the air? Like the Comet or DC-10 from years ago? Do you know why lightning strikes, why balloons pop and why your hand moves backwards when you stick it out the window of a car? If you do know those three basic things, and I think you do, then you will know why Air India Flight 182 exploded in flight.

I know you know the evil that lurks in men's hearts but do you know about lift, drag, and thrust? Do you know about the weight of air and the immense pressure exerted when compressed? Did you know that there was about 100000 pounds of pressure on that large eight foot by nine foot forward cargo door at 31000 feet? That's a lot of weight exerted on two midspan latches that each hold together an eight foot slice of fuselage....and they have no locking sectors as the bottom eight latches do which are there specifically to prevent an inadvertent opening in flight.

Sgt. Blachford has confirmed the facts of the sudden loud sound on the CVR which matches that of three other Boeing 747s. He has confirmed the presence of photographs and film of Air India Flight 182 which exist in vaults and available to be examined and evaluated for further matches to United Airlines Flight 811 which is the model, the victim, that just barely made it back to land and tell its tale which refuted the initial bomb explanation given by the flight crew and allowed the investigators to finally conclude it was not a bomb, nor an improperly latched forward cargo door, but faulty wiring or switch which started a sequence of events which caused a rupture at the aft midspan latch and a longitudinal split in that door; visual physical evidence with matches the forward cargo door of Air India Flight 182, according to those government aviation investigators who have

seen photographs and film of both doors.

He has discovered the fact that this private citizen has given a tip number 3196 and this citizen is a homeowner, father, husband, retired military officer, pilot, and survivor of a sudden fiery fatal jet airplane crash. The messenger of the tip checks out as legitimate and now is the time to check out the message: shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup is what caused the destruction of Air India Flight 182.

Every scientist has his tools: Pasteur his microscope, Galileo his telescope, Magellan his ship, and me, my photographs. I risked my life in Vietnam to bring back photos of North Vietnam to my ship as a reconnaissance attack navigator. I was also a photo interpreter and air intelligence officer. I evaluate photographs of wreckage. You have access to additional answers to the mystery of Air India Flight 182 in the detailed, high quality color photographs and film of the wreckage that were taken at great expense and saved for years for this very purpose: Reexamination using hindsight and subsequent similar accidents to give refined evaluations. You have your photographs and I ask that you look at them. Look at the actual evidence to make your deductions, not whispered tapped telephone calls. Look at the forensic evidence of the event, the twisted metal, the gaping holes, the fractured ribs, the sudden loud sound on the cockpit voice recorder which is the best evidence since it is direct, it was there, it heard the initial event, and that sound was not a bomb, but of an explosive decompression which matched another explosive decompression caused by an open cargo door in a widebody airliner. At least that's what the investigating authorities stated in their report.

Above from the CASB report; DC-10 cargo door opened, made sudden loud sound on the CVR and then the aircraft crashed, killing all.

Respect the evidence. Look at it, please do not commit the sin of omission, do not pass the evaluation off to someone else as a bureaucrat would, do not go for emotionally swaying a jury as an attorney, do not dig up dirt as a prosecutor's assistant would, do not give platitudes and puffery as a politician would, but look and evaluate objectively using all the detective and sleuthing skills that you have acquired, been trained for, and I think, long to use.

It is better to be temporarily embarrassed than permanently shamed. It's not too late to get it right. The AITF RCMP did find the culprit for Air India Flight 182 and it was not a person but metal and insulation and latches. For 15 years the RCMP was like a bloodhound relentlessly hunting down a path directed by politicians labelled bomb bomb bomb planted by outsiders, and directed away from a path which may lead to blame towards insiders such as the manufacturer and government oversight agencies. But Sgt. Blachford, probably acting under orders from above, did start down that path when he reviewed my research documents and visited me here at home. Please continue down that investigation path. And the further down the wiring path one goes, the more solid and wider the path gets. The more the photographs are reviewed, the stronger the objective case becomes for wiring/cargo door explanation and weaker and weaker becomes the case for bomb. As investigators, you are neutral to the actual cause as long as it is the most probable; let the prosecutors worry about criminal charges being dismissed or the politicians worry about red faces.

I must give a story that is relevant and told from personal experience as a jet navigator on board ship.

On an aircraft carrier there are about 100 planes and about 150 pilots of all ranks and titles, from an Ensign assistant operations officer to a Commander who is an Air Wing Commander. There is also someone called the LSO, Landing Signal Officer, of which there were about ten on board. These were the elite pilots among the elite pilots in the world. They were usually young Lieutenants or Lieutenant Commanders with several cruises of experience. One of them would always be at the end of the ship, near the arresting wires, and watch every approach and landing of every plane. He would then judge the landing and write down the approach and which wire was caught. The number three wire was best with an OK pass; number one, two, or four wire was poor and risky. After flight operations ceased and all pilots and crews were in the ready rooms debriefing, the LSO would go around to each pilot and give his report on the pilot's performance on landing such as high in groove, low in close, needed power, fair two wire. Every pilot intently listened to this feedback report and remembered it on the next landing. In this way bad habits were caught early and corrected. The point of the story is this: Rank and status made absolutely no difference to the pilots. They were talking reality about life and death in their profession. It was not personal criticism but a professional critique. The junior officer was in effect telling the senior pilot that he made a bad landing and described why. The senior pilot listened and obeyed because they both knew it was not personal but integral to completion of the mission. It was objective and supported by the TV videotape from the camera embedded in the flight deck which monitored every cat shot and every trap.

It's never too late to start all over again. Start with the rare luxury of hindsight, the knowledge of similar subsequent events to the event under investigation and stay strictly with the facts, data, and evidence, and try to ignore wishful thinking suggested from higher ups. Match up the events by looking for the pattern which groups them all: Sudden loud sound on the CVR followed by an abrupt power cut to the recorders, an event so rare it has only happened four times in Boeing 747s in flight, Air India Flight 182, Pan Am Flight 103, United Airlines Flight 811, and Trans World Airlines Flight 800.

Above chart from NTSB public docket for Trans World Airlines Flight 800 matching the sudden loud sound on the CVR to four Boeing 747s and a 737.

Disregard the emotional buzz words of flight numbers and think of them as machine victims with a construction number and in service and accident dates:

Air India Flight 182 was the 330th 747 made, construction number 21473 and entered service on 19 June 1978 and came apart in flight on 23 June 1985.

#15, 19646, B747-121, 25 Jan 70, PA103 event date 21 Dec 88

#89, 19875, B747-122, 20 Oct 70, UAL 811 event date, 23 Feb 89

#153, 20083,, B747-131, 18 Aug 71 TWA 800, event date, 17 July 96

#330, 21473 , B747-237b 19 Jun 78 AI 182 , event date June 23

1985

The evidence dictated the flight numbers, not me. There are no more Boeing 747 accidents with a sudden loud sound on the cockpit voice recorder followed by an abrupt power cut because I've checked all hull losses and serious accidents, but if there were, that construction number, in service date, and emotional flight number would be added to the above list.

Air India Flight 182 was a plane crash, not a bank robbery. One good thing about being a detective is that you get to learn a lot about a lot of things; for instance, in a bank robbery, you get to learn all about bank vaults and those big thick heavy metal doors, how they open, close, and how they come open when they shouldn't. You can do the same for cargo doors in pressurized hulls which keep safe much more important things than colored pieces of paper.

You can learn why the forward cargo door ruptured open when it shouldn't in Air India Flight 182, as the Kirpal Report and the Canadian Aviation Safety Board and the Air Accidents Investigation Board reported but disagreed on why, a mystery that remains to this day and which I contend the AITF has solved, faulty wiring causing the door unlatch motor to turn on.

You have solved the mystery of Air India Flight 182 and although the answer is not what you expected nor sought, you have it right, you got it from a tipster, you checked it out and apparently it needs further checking out by examining evidence you have access to such as photographs to overcome your incredulity at the immense implications of the solution to the mystery since it also solves other mysteries in two other aircraft accidents which have their own immense implications.

It's never too late, until it's too late, and then it's too late.

Respectfully,

Barry Smith

John Barry Smith

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Commercial pilot, instrument rated, former FAA Part 135
certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650
hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Funny but shouldn't be

Dear Bill, this is supposed to have happened in Canada. Thin ice scares me, I hope he/they got out OK.

Barry

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Short landing and takeoff platform...

Pilot reports plane stuck in tree in Cleveland National Forest

Published 12:00 a.m. PST Thursday, April 4, 2002

RIVERSIDE, Calif. (AP) - Two men aboard a small plane told air traffic controllers Wednesday night their aircraft was stuck in a tree in the Cleveland National Forest, officials said.

The unidentified pilot called air traffic controllers in San Diego about 9:05 p.m. to ask for help in getting out of the tree, said Larri Dillard, a Federal Aviation Administration operations officer in Los Angeles.

KNBC-TV reported the pilot of the single-engine Cessna 152 and a passenger were in a tree at about the 3,000-foot level of the forest, which is about 60 miles southeast of Los Angeles. Authorities told the men that darkness and incoming fog would delay a rescue attempt until Thursday morning.

The men said they were not injured and could wait until then.

Meanwhile, the Riverside County Fire Department was trying to locate the aircraft.

Deputies on the ground and aboard a helicopter also were searching late Wednesday night for the plane, said Sgt. Shelley Kennedy-Smith of the Riverside County Sheriff's Department.

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Letter to Mr. Ken Smart enclosed.**

W.T. (Bill) Tucker
Director General,
Investigation Operations

Dear Bill, 17 April 2002

Enclosed is my letter to Mr. Smart of AAIB. I hope to have his office make enquiries to me about the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Pan Am Flight 103. All I want is questions. The answers are in the photographs, data, and evidence.

Cheers,

Barry
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541 Country Club Drive,
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www.corazon.com
barry@corazon.com

Ken Smart
Chief Inspector of Accidents,
Accident Investigations Branch
AAIB
DRA Farnborough
United Kingdom
Dear Mr. Smart, 17 April 2002

It's never too late for safety and I really believe that since I was two seconds from dying in a sudden, night, fiery, fatal jet airplane crash. Mr. Bill Tucker of TSB and I have been in contact for about a year regarding the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Air India Flight 182. I respect Mr. Tucker immensely and value his

opinions.

A few months ago he visited me in my home in Carmel Valley, California to discuss the hypothesis further. We both learned a lot.

Subsequently, I received some photographs of the forward cargo door area of Pan Am Flight 103. They literally sent chills down my back. For the first time I could see the actual start of the hull rupture that caused the explosive decompression that led to the destruction. And the locus was on the shattered starboard side at the aft midspan latch, not on the smoother port, 'bomb', side. The pictures of the cargo door area show that the skin is torn vertically in a characteristic straight line above the forward cargo door and the fuselage skin in and around the door is petalled outward from a suddenly released internal pressurized force in flight, not inward from ground impact. The latched status of the aft and bulk cargo door is given as 'locked' whilst the forward cargo door latching status is unstated which implies it was 'unlocked' and corroborated by the picture below showing much of the door missing, especially the lower half where eight of the ten latches are located.

It is quite evident the forward cargo door opened in flight when compared to another Boeing 747 whose forward cargo door also opened in flight, United Airlines Flight 811, a wiring/cargo door event.

Above two pictures show the shattered forward cargo door area of Pan Am Flight 103 with its characteristic peeled back skin from the aft midspan latch and the vertical tearing of fuselage skin above the leading and trailing edge of the door which

matches United Airlines Flight 811 forward cargo door area.

Above two pictures show the shattered forward cargo door area of United Airlines Flight 811 with its characteristic peeled back skin from the aft midspan latch and the vertical tearing of fuselage skin above the leading and trailing edge of the door which matches Pan Am Flight 103 forward cargo door area.

Please permit me to further explain, Mr. Smart. For reference I have attached a pdf file with pictures and text to demonstrate that what happened to United Airlines Flight 811 happened to Air India Flight 182, Pan Am Flight 103, and Trans World Airlines Flight 800 starting with the sudden loud sound at event time for all four accidents which would occur at a sudden explosive decompression.

Yes, the implications are enormous but please let's stick to facts, data, and evidence. The reason those three aircraft (minus United Airlines Flight 811) are always clumped together is that they do indeed have a common cause because they display common evidence such as an abrupt power cut to the recorders right after the sudden loud sound at event time, a very rare occurrence, and the cause is probably wiring or a switch but could be a bomb, or a center tank explosion, or a missile, or any other event that would cause the explosive decompression in flight for all early model Boeing 747s.

I would ask that Pan Am Flight 103 be revisited one more time and examined from the point of view of an electrical problem causing the forward cargo door to try to unlatch which resulted in a rupture at the aft midspan latch and subsequent explosive

decompression. The sooty and relatively mild directed blast in the baggage container which caused a 20 inch hole on the port side of Pan Am Flight 103 was probably caused by a 'rather large shotgun', as suggested by AAIB Report 2/90, and not a powerful, plastic, spherical, loud bomb. The forward cargo door area of Pan Am Flight 103 now needs to be examined closely for torque tube damage, latch damage, locking sector cracking along with the recovered pieces of wreckage so close to the explosion in the forward cargo compartment.

Regardless of the cause, I submit to you, Mr. Smart, with photographs, charts, and text, proof that the forward cargo door of Pan Am Flight 103 ruptured open in flight at initial event time. The cause of the inadvertent opening may have been bomb, center fuel tank explosion, missile, or electrical and each party may present its case. My belief is the cause was mechanical in that the known faulty Poly X wiring shorted on the door unlatch motor, circumstances very similar to United Airlines Flight 811, which is my model. It all comes back to United Airlines Flight 811, the plane that almost lost its nose, that almost crashed, but didn't, and came back to tell its tale; a tale which was not a bomb, (although the crew thought so and so informed the tower) and not an improperly latched cargo door, (although an NTSB AAR, 90/01, was written stating so) but after reexamination years later by government aviation safety officials proved to be an electrical/cargo door problem which was incorporated into the updated NTSB, AAR for United Airlines Flight 811, 92/02.

I have much further evidence, if given a chance to present, (in addition to these cargo door photographs,) such as charts, text, and documents that support the wiring/cargo door explanation and these analyses are available upon request. Mr. Tucker has them also; as well as the RCMP Air India Task Force. A

summary is below:

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

	AI 182	PA103	UAL 811	TWA 800		
Boeing 747	Yes	Yes	Yes	Yes		
Early model -100 or -200		Yes	Yes	Yes	Yes	
Polyimide wiring (Poly X type)		Yes	Yes	Yes	Yes	
Sudden airframe breakup in flight (partial or total)		Yes	Yes	Yes	Yes	Yes
Breakup occurs amidships		Yes	Yes	Yes	Yes	
High flight time (over 55,000 flight hours)		No	Yes	Yes	Yes	
Aged airframe (over 18 years of service)		No	Yes	Yes	Yes	
Previous maintenance problems						
with forward cargo door	Yes	Maybe	Yes	Maybe		
Initial event within an hour after takeoff		No	Yes	Yes	Yes	
Initial event at about 300 knots						
while proceeding normally in all parameters		Yes	Yes	Yes	Yes	
Initial event has unusual radar contacts		Maybe	Yes	Yes	Yes	
Initial event involves hull rupture in						
or near forward cargo door area	Yes	Yes	Yes	Yes		
Initial event starts with sudden sound	Yes	Yes	Yes	Yes		
Initial event sound is loud	Yes	Yes	Yes	Yes		
Initial event sound is audible to humans		Yes	Yes	Yes	Yes	
Initial event followed immediately by						
abrupt power cut to data recorders		Yes	Yes	Yes	Yes	
Initial event sound matched to						
explosion of bomb sound	No	No	No	No		
Initial event sound matched to explosive						
decompression sound in wide body airliner		Yes	Yes	Yes	Yes	
Torn off skin on fuselage above						
forward cargo door area	Yes	Yes	Yes	Yes		
Unusual paint smears on and above						
forward cargo door	Maybe	Maybe	Yes	Yes		
Evidence of explosion in forward						
cargo compartment	Yes	Yes	Yes	Yes		
Foreign object damage to						
engine or cowling of engine number three		Yes	Yes	Yes	Yes	
Fire/soot in engine number three		Maybe	Yes	Yes	Yes	
Foreign object damage to engine or						
cowling of engine number four	Yes	Yes	Yes	Yes		
Right wing leading edge damaged in flight	Yes	Maybe	Yes	Maybe		
Vertical stabilizer damaged in flight	Yes	Yes	Yes	Maybe		
Right horizontal stabilizer damaged in flight	Yes	Yes	Yes	Yes		
More severe inflight damage on						
starboard side than port side	Yes	Yes	Yes	Yes		

Port side relatively undamaged by inflight debris	Yes	Yes	Yes	Yes
Vertical fuselage tear lines just aft or forward of the forward cargo door	Yes	Yes	Yes	Yes
Fracture/tear/rupture at a midspan latch of forward cargo door	Maybe	Yes	Yes	Yes
Midspan latching status of forward cargo door reported as latched	No	No	No	No
Airworthiness Directive 88-12-04 implemented (stronger lock sectors)	No	No	No	Yes
Outwardly peeled skin on upper forward fuselage	Yes	Yes	Yes	Yes
Rectangular shape of shattered area around forward cargo door	Yes	Yes	Yes	Yes
Forward cargo door fractured in two longitudinally	Yes	Yes	Yes	Maybe
Status of aft cargo door as intact and latched	Yes	Yes	Yes	Maybe
Passengers suffered decompression type injuries	Yes	Yes	Yes	Yes
At least nine missing and never recovered passenger bodies	Yes	Yes	Yes	Yes
Wreckage debris field in two main areas, forward and aft sections of aircraft	Yes	Yes	No	Yes
Initial official opinion of probable cause as bomb explosion.	Yes	Yes	Yes	Yes
Initial official determination modified from bomb explosion	Yes	Yes	Yes	Yes
Structural failure considered for probable cause	Yes	Yes	Yes	Yes
Inadvertently opened forward cargo door considered for probable cause	Yes	No	Yes	Yes
Official probable cause as bomb explosion	Yes	Yes	No	No
Official probable cause as 'improvised explosive device'	No	Yes	No	No
Official probable cause as explosion by unstated cause	Yes	No	No	No
Official probable cause as explosion in center fuel tank with unknown ignition source	No	No	No	Yes
Official probable cause as improper latching of forward cargo door	No	No	Yes	No
Official probable cause as switch /wiring inadvertently opening forward cargo door	No	No	Yes	No

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

AI 182 PA103 UAL 811 TWA 80

Mr. Smart, it's never too late for safety and one implication of the

shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Pan Am Flight 103 is that the hazard of faulty wiring and outward opening nonplug cargo doors still exists. The hazard of potential catastrophic disaster still exists but can be prevented...if the photographs of the Pan Am Flight 103 forward cargo door area persuade you that the door opened in flight and the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation is thus worthy of further investigation.

Please enquire further of me about the wiring/cargo door explanation.

Cheers,

John Barry Smith

(831) 659 3552

541 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135 certificate holder.

US Navy reconnaissance bombardier navigator, RA-5C 650 hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: aaib-dot@dircon.co.uk

Subject: Mr. Bill Tucker/wiring/cargo door for PA 103

Ken Smart

Chief Inspector of Accidents,
Accident Investigations Branch
AAIB

DRA Farnborough
United Kingdom

Dear Mr. Smart, 17 April 2002

It's never too late for safety and I really believe that since I was two seconds from dying in a sudden, night, fiery, fatal jet airplane crash. Mr. Bill Tucker of TSB and I have been in contact for about a year regarding the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Air India Flight 182. I respect Mr. Tucker immensely and value his opinions.

A few months ago he visited me in my home in Carmel Valley, California to discuss the hypothesis further. We both learned a lot.

Subsequently, I received some photographs of the forward cargo door area of Pan Am Flight 103. They literally sent chills down my back. For the first time I could see the actual start of the hull rupture that caused the explosive decompression that led to the destruction. And the locus was on the shattered starboard side at the aft midspan latch, not on the smoother port, 'bomb', side. The pictures of the cargo door area show that the skin is torn vertically in a characteristic straight line above the forward cargo door and the fuselage skin in and around the door is petalled

outward from a suddenly released internal pressurized force in flight, not inward from ground impact. The latched status of the aft and bulk cargo door is given as 'locked' whilst the forward cargo door latching status is unstated which implies it was 'unlocked' and corroborated by the picture below showing much of the door missing, especially the lower half where eight of the ten latches are located.

It is quite evident the forward cargo door opened in flight when compared to another Boeing 747 whose forward cargo door also opened in flight, United Airlines Flight 811, a wiring/cargo door event.

Above two pictures show the shattered forward cargo door area of Pan Am Flight 103 with its characteristic peeled back skin from the aft midspan latch and the vertical tearing of fuselage skin above the leading and trailing edge of the door which matches United Airlines Flight 811 forward cargo door area.

Above two pictures show the shattered forward cargo door area of United Airlines Flight 811 with its characteristic peeled back skin from the aft midspan latch and the vertical tearing of fuselage skin above the leading and trailing edge of the door which matches Pan Am Flight 103 forward cargo door area.

Please permit me to further explain, Mr. Smart. For reference I have attached a pdf file with pictures and text to demonstrate that what happened to United Airlines Flight 811 happened to Air India Flight 182, Pan Am Flight 103, and Trans World Airlines

Flight 800 starting with the sudden loud sound at event time for all four accidents which would occur at a sudden explosive decompression.

Yes, the implications are enormous but please let's stick to facts, data, and evidence. The reason those three aircraft (minus United Airlines Flight 811) are always clumped together is that they do indeed have a common cause because they display common evidence such as an abrupt power cut to the recorders right after the sudden loud sound at event time, a very rare occurrence, and the cause is probably wiring or a switch but could be a bomb, or a center tank explosion, or a missile, or any other event that would cause the explosive decompression in flight for all early model Boeing 747s.

I would ask that Pan Am Flight 103 be revisited one more time and examined from the point of view of an electrical problem causing the forward cargo door to try to unlatch which resulted in a rupture at the aft midspan latch and subsequent explosive decompression. The sooty and relatively mild directed blast in the baggage container which caused a 20 inch hole on the port side of Pan Am Flight 103 was probably caused by a 'rather large shotgun', as suggested by AAIB Report 2/90, and not a powerful, plastic, spherical, loud bomb. The forward cargo door area of Pan Am Flight 103 now needs to be examined closely for torque tube damage, latch damage, locking sector cracking along with the recovered pieces of wreckage so close to the explosion in the forward cargo compartment.

Regardless of the cause, I submit to you, Mr. Smart, with photographs, charts, and text, proof that the forward cargo door of Pan Am Flight 103 ruptured open in flight at initial event time. The cause of the inadvertent opening may have been bomb,

center fuel tank explosion, missile, or electrical and each party may present its case. My belief is the cause was mechanical in that the known faulty Poly X wiring shorted on the door unlatch motor, circumstances very similar to United Airlines Flight 811, which is my model. It all comes back to United Airlines Flight 811, the plane that almost lost its nose, that almost crashed, but didn't, and came back to tell its tale; a tale which was not a bomb, (although the crew thought so and so informed the tower) and not an improperly latched cargo door, (although an NTSB AAR, 90/01, was written stating so) but after reexamination years later by government aviation safety officials proved to be an electrical/cargo door problem which was incorporated into the updated NTSB, AAR for United Airlines Flight 811, 92/02.

I have much further evidence, if given a chance to present, (in addition to these cargo door photographs,) such as charts, text, and documents that support the wiring/cargo door explanation and these analyses are available upon request. Mr. Tucker has them also; as well as the RCMP Air India Task Force. A summary is below:

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

	AI 182	PA103	UAL 811	TWA 800		
Boeing 747	Yes	Yes	Yes	Yes		
Early model -100 or -200		Yes	Yes	Yes	Yes	
Polyimide wiring (Poly X type)		Yes	Yes	Yes	Yes	
Sudden airframe breakup in flight (partial or total)		Yes	Yes	Yes	Yes	Yes
Breakup occurs amidships		Yes	Yes	Yes	Yes	
High flight time (over 55,000 flight hours)		No	Yes	Yes	Yes	
Aged airframe (over 18 years of service)		No	Yes	Yes	Yes	
Previous maintenance problems						
with forward cargo door	Yes	Maybe	Yes	Maybe		
Initial event within an hour after takeoff		No	Yes	Yes	Yes	
Initial event at about 300 knots						
while proceeding normally in all parameters		Yes	Yes	Yes	Yes	
Initial event has unusual radar contacts		Maybe	Yes	Yes	Yes	
Initial event involves hull rupture in						

or near forward cargo door area	Yes	Yes	Yes	Yes
Initial event starts with sudden sound	Yes	Yes	Yes	Yes
Initial event sound is loud	Yes	Yes	Yes	Yes
Initial event sound is audible to humans	Yes	Yes	Yes	Yes
Initial event followed immediately by abrupt power cut to data recorders	Yes	Yes	Yes	Yes
Initial event sound matched to explosion of bomb sound	No	No	No	No
Initial event sound matched to explosive decompression sound in wide body airliner	Yes	Yes	Yes	Yes
Torn off skin on fuselage above forward cargo door area	Yes	Yes	Yes	Yes
Unusual paint smears on and above forward cargo door	Maybe	Maybe	Yes	Yes
Evidence of explosion in forward cargo compartment	Yes	Yes	Yes	Yes
Foreign object damage to engine or cowling of engine number three	Yes	Yes	Yes	Yes
Fire/soot in engine number three	Maybe	Yes	Yes	Yes
Foreign object damage to engine or cowling of engine number four	Yes	Yes	Yes	Yes
Right wing leading edge damaged in flight	Yes	Maybe	Yes	Maybe
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Right horizontal stabilizer damaged in flight	Yes	Yes	Yes	Yes
More severe inflight damage on starboard side than port side	Yes	Yes	Yes	Yes
Port side relatively undamaged by inflight debris	Yes	Yes	Yes	Yes
Vertical fuselage tear lines just aft or forward of the forward cargo door	Yes	Yes	Yes	Yes
Fracture/tear/rupture at a midspan latch of forward cargo door	Maybe	Yes	Yes	Yes
Midspan latching status of forward cargo door reported as latched	No	No	No	No
Airworthiness Directive 88-12-04 implemented (stronger lock sectors)	No	No	No	Yes
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Forward cargo door fractured in two longitudinally	Yes	Yes	Yes	Maybe
Status of aft cargo door as intact and latched	Yes	Yes	Yes	Maybe
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At least nine missing and never recovered passenger bodies	Yes	Yes	Yes	Yes
Wreckage debris field in two main areas,				

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Initial official opinion of probable cause as bomb explosion.	Yes	Yes	Yes	Yes	
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Inadvertently opened forward cargo door considered for probable cause		Yes	No	Yes	Yes
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Official probable cause as 'improvised explosive device'	No	Yes	No	No	
Official probable cause as explosion by unstated cause	Yes	No	No	No	
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Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

AI 182 PA103 UAL 811 TWA 80

Mr. Smart, it's never too late for safety and one implication of the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Pan Am Flight 103 is that the hazard of faulty wiring and outward opening nonplug cargo doors still exists. The hazard of potential catastrophic disaster still exists but can be prevented...if the photographs of the Pan Am Flight 103 forward cargo door area persuade you that the door opened in flight and the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation is thus worthy of further investigation.

Please enquire further of me about the wiring/cargo door explanation.

Cheers,

John Barry Smith

(831) 659 3552

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Commercial pilot, instrument rated, former FAA Part 135
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US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC

Owner Mooney M-20C, 1000 hours.

Survivor of sudden night fiery fatal jet plane crash in RA-5C

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

**Subject: I'm on call for any questions you may have/come
visit**

Barry,

I've sent it to Ken Smart. I'll also be seeing him here in two
weeks and

will follow up then

Bill T..

Dear Bill,

Thank you, sir. I'm available for any questions/discussions via email or phone anytime. And of course, visits would be most welcome. The property you saw in winter has now bloomed in spring.

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: Thank you for email, detailed reply to follow.

Ken Smart
Chief Inspector of Air Accidents

Dear Mr. Smart, 18 April 2002,

Thank you very much for your quick personal response. Please give me time to analyze and reply to your comments. I shall work on it all day today. I shall try to be polite as possible as it is difficult to offer evidence which refutes long held belief without being offensive. I shall use only AAIB, TSB, or NTSB data as support for the shorted wiring/forward cargo door rupture/

explosive decompression/inflight breakup explanation for Pan Am Flight 103 and others.

After a quick scan of your email, the following jumped out at me:

All the specialists involved were satisfied that the fwd. cargo door was correctly latched when the device detonated and that the subsequent structural failures were secondary events.

Sir, this seems to imply that it is accepted by AAIB that the forward cargo door opened in flight (a subsequent structural failure) and the cause was "device detonated."

If so, then we agree on a most important point: Door opened in flight. Then let me address my responsive email to the question of 'how' and 'why' it opened with consideration of 'bomb', 'missile', 'center tank explosion', or 'electrical' as the initial event.

Thank you again for your valued opinions and I'm now off to my research sources and United Airlines Flight 811 for responses.

Cheers,

Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Dear Mr Smith

Thank you for your hypothesis on the immediate cause of the PanAm 103.

During the first five days of the investigation into PanAm 103 the AAIB were pursuing two general lines of inquiry. The first was that the aircraft had suffered a structural failure in-flight as a result of a defect or induced structural overload, the second was that an improvised explosive device was responsible.

When the evidence of an improvised explosive device was found, the investigation nevertheless concentrated on discovering whether there was any evidence that a structural weakness had been exploited. In that respect the fwd. cargo door was the subject of very detailed examination. All the specialists involved were satisfied that the fwd. cargo door was correctly latched when the device detonated and that the subsequent structural failures were secondary events.

All structures by nature of their design have paths of least resistance when subjected to abnormal loading. The structure in the vicinity of large strengthened apertures such as the fwd. cargo door provide very good examples of this. The window belt on pressurised aircraft provides another and similar example. You should not be surprised to find similar patterns of breakup in structural failures that emanate from very different causes. The important differences lie in the detailed examination rather than the macro features.

I'm sorry to be the one to pour cold water on your hypothesis, but the scenario that you suggest was the subject of very considerable examination in the early stages of the Lockerbie

investigation.
Ken Smart
Chief Inspector of Air Accidents

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **Note from Mr. Smart and my response:**

At 5:41 PM +0100 4/18/02, Ken Smart wrote:
X-From_: ksmart@aaib.gov.uk Thu Apr 18 09:41:49 2002
Date: Thu, 18 Apr 2002 17:41:27 +0100
To: John Barry Smith <barry@corazon.com>
From: Ken Smart <ksmart@aaib.gov.uk>
Subject: Mr. Bill Tucker/wiring/cargo door for PA 103 message!
Cc: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Dear Mr Smith

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During the first five days of the investigation into PanAm 103 the AAIB were pursuing two general lines of inquiry. The first was that the aircraft had suffered a structural failure in-flight as a result of a defect or induced structural overload, the second was that an improvised explosive device was responsible.

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Ken Smart
Chief Inspector of Air Accidents

At 10:39 AM -0700 4/18/02, John Barry Smith wrote:
Ken Smart
Chief Inspector of Air Accidents

Dear Mr. Smart, 18 April 2002,

Thank you very much for your quick personal response. Please give me time to analyze and reply to your comments. I shall work on it all day today. I shall try to be polite as possible as it is

difficult to offer evidence which refutes long held belief without being offensive. I shall use only AAIB, TSB, or NTSB data as support for the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Pan Am Flight 103 and others.

After a quick scan of your email, the following jumped out at me:

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Thank you again for your valued opinions and I'm now off to my research sources and United Airlines Flight 811 for responses.

Cheers,

Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924

www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **TWA 800 justification for reconsideration**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Dear Bill, 6 May 2002

As you can imagine, I am very curious as to the outcome of your meetings with Mr. Smart and your opinion of my AAR for Pan Am Flight 103 sent by .PDF. I hope all went well.

I'm left to guess on the progress, so I'm thinking/hoping you are putting together a team of international aviation safety experts to reconsider the probable causes of all Boeing 747s that suffered similar events to United Airlines Flight 811.

The team would be led by you representing Canada and Air India Flight 182, Mr. Smart of UK AAIB for Pan Am Flight 103, and two representatives are needed from NTSB for United Airlines Flight 811 and Trans World Airlines Flight 800.

Regarding Trans World Airlines Flight 800: The rebuttal from NTSB to the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup for Trans World

Airlines Flight 800 rests upon one document, Exhibit 15C, which reported: 'Metallurgist's Factual Report, Exhibit 15C
'Examination of the lower lobe forward cargo door showed that all eight of the door latching cams remain attached (along with pieces of the door itself) to the pins along the lower door sill.'

Bill, there are several things seriously wrong with that conclusion and they are serious enough to justify a reexamination of the entire rejection of the wiring/cargo door explanation:

1. Photographs of the forward cargo door area show the 'door' to be in many pieces with an additional many important pieces missing. There is no 'door' to examine.

2. There are ten, not eight latches in that door. Eight is not enough. Even if the required ten latches had been found (but were not) and had been latched (none reported so), the door could have ruptured open in the middle, inside the latches.

3. The two midspan latches are not in the NTSB wreckage database of recovered wreckage parts.

4. Photographs of the wreckage reconstruction of the forward cargo door area show large rupture holes exactly where the midspan latches used to be.

5. The eight latches reported to be 'attached' make no mention of 'latched' and could in fact be unlatched but attached to pins. There is no status report on the locking sectors, the manual locking handle, the pressure relief doors, the torque tubes, bellcranks, or door wiring.

6. Only one sill was found and it was determined to be the aft cargo door sill. There is no forward cargo door sill in the wreckage database. There are two identical cargo doors on a Boeing 747 and TWA 800 and both have an identical lower door sill. Only one was recovered for Trans World Airlines Flight 800 and it was not the forward cargo door sill. It was the aft cargo door sill. The sill was found in the aft fuselage debris field along

with other items identified as coming from the aft cargo compartment. The area of the forward cargo compartment debris field was spread out far and wide and no forward cargo door sill was found. Conclusion: There is a very real probability that the wrong sill was hung on the wreckage reconstruction and called the forward sill when it is in fact the aft cargo door sill. That aft cargo door sill may have had the bottom eight latches attached as there is no information in the AAR about the aft cargo door.

So, the conclusion that the forward cargo door was latched and locked until water impact is a flawed conclusion. It justifies further examination. There are many other discrepancies/contradictions like the above in areas such as CVR analysis, sequence of disintegration, and engine breakdown report.

Emails below from Mr. Schleede show that he made his conclusion of a latched and locked forward cargo door even before the NTSB wreckage lot shows the pieces and the sill recovered from the ocean: 11 Aug 96 for Mr. Schleede to state he examined the 'door' and 26 August 96 for the aft sill to be recovered. Some of the forward fuselage parts were recovered on the 29th of Aug 96.

If there is a forward cargo door sill recovered, it is not in the official NTSB wreckage database supplied by CD ROM to me from NTSB. (Database enclosed.)

I hope you were able to persuade Mr. Smart to an agreed course of action. I hope my AAR on Pan Am Flight 103 persuades you that a supplemental investigation is warranted. I hope the below can help persuade NTSB that a reconsideration is due for the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Trans World

Airlines Flight 800.

Looking forward to a follow up.

Cheers,
Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

At 6:48 PM -0400 4/16/02, Tucker, Bill wrote:
X-From_: Bill.Tucker@tsb.gc.ca Tue Apr 16 15:47:47 2002
From: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
To: "John Barry Smith" <barry@corazon.com>
Subject: RE: Letter to Mr. Ken Smart enclosed.
Date: Tue, 16 Apr 2002 18:48:14 -0400

Barry,

I've sent it to Ken Smart. I'll also be seeing him here in two weeks and will follow up then
Bill T..

Below excerpts from NTSB wreckage database for Trans World Airlines Flight 800 supplied by NTSB on CD ROM:

8/18/96-6 40 39 47.00 -72 37 27.90 FS XXXX frame 40 39
46.90 -72 37 27.90 aft cargo door - lower sill latches & locks

8/26/96-36 40 39 46.40 -72 37 27.80 FS 1800 RIB 40 39 46.40
-72 37 27.80 FS 1810; outer frame aft cargo door panel stringer
STR 24R-28R (aft upper main cargo door sill)

8/29/96-1 40 39 07.70 -72 38 27.50 metal strap with internal
cargo door switch for forward cargo door; FS 560;
Metallurgist's Factual Report, Exhibit 15C:

'Examination of the lower lobe forward cargo door showed that
all eight of the door latching cams remain attached (along with
pieces of the door itself) to the pins along the lower door sill.

From: Schleede Ron <SCHLEDR@ntsb.gov>

To: barry <barry@corazon.com>

Subject: RE: TWA crash cause ATTN Robert Francis

Date: Mon, 29 Jul 1996 15:24:00 -0400

Encoding: 17 TEXT

Status:

Be assured that we are checking that. I was the investigator in
charge of
the UAL flight 811 case and fully knowledgeable in its causes
and factors.

Thanks for the interest.

From: Schleede Ron <SCHLEDR@ntsb.gov>

To: barry <barry@corazon.com>

Subject: RE: TWA crash cause

Date: Sun, 11 Aug 1996 11:39:00 -0400

Encoding: 13 TEXT

Status:

I have examined the cargo door from twa 800--it is locked and latched!

From: Schleede Ron <SCHLEDR@NTSB.gov>

To: "John Barry Smith" <barry@corazon.com>

Subject: RE: What is 'backup theory'?

Date: Mon, 19 May 1997 13:51:11 -0400

Encoding: 135 TEXT

As I have told you before, the cargo door was locked and latched at impact. ron

Microsoft Word 6.0 Document MSWordDoc

Word.Document.6 C:\WORD6\TEMPLATE

\NORMAL.DOT X5000 Hong tao Hong tao 40 37 34.00
-72 42 38.00 TWA carpet TWA headphone sachel, hair dryer
and misc items 40 39 18.42 -72 40 45.99 plastic cover 6"(4"
beige 40 38 27.29 -72 40 19.15 "levis" T-shirt, red, black,
white 10/02/96-1 40 39 08.06 -72 40 10.92 40 38 51.68 -72 39
54.32 food tray holder; 3 trays w/ food 8/08/96-14 40 38
45.26 -72 39 51.96 front spar RH web LBL 75-115
8/08/96-14 40 39 07.56 -72 39 47.89 nylon bag with cord
9/11/96-4 40 38 46.39 -72 39 47.31 beer shelf; pan, black
plastic 8/16/96-10 40 38 57.30 -72 39 45.38 white plastic
piece 9/27/96-1 40 38 44.44 -72 39 43.97 2 CD's; clothing;
small metal wreckage 40 38 57.00 -72 39 4.200 small piece of
channel (green) 8/19/96-13 40 38 51.48 -72 39 38.58 black
plastic box 8/14/96-11 40 38 43.85 -72 39 37.31 metal
fragments (yellowish-green) 40 38 47.34 -72 39 36.77 ladies
purse 10/02/96-1 40 39 18.03 -72 39 31.78 small piece of

metal 1'(10", shirt 10/08/96-4 40 38 42.99 -72 39 29.48
4'(6"(2" strut 8/14/96-9 40 38 49.80 -72 39 27.50 pack (air
cond) inlet air scoop 8/20/96-15 40 38 56.53 -72 39 26.78
bag of gum 8/14/96-11 40 38 52.50 -72 39 26.60 aspirator
inlet, black circular object with items inside attached to
yellow/silver 8/12/96-4 40 38 46.79 -72 39 25.61 forward
lower cargo bay structure FS 800-840 L/H CW w/ motor
and wheels (cargo floor 4'(3'(2'; ac motor w/brake
8/14/96-9 40 38 53.15 -72 39 25.08 air cycle mach #3 Part #
719238.7, serial # KE10372 8/04/96-66 40 38 51.24 -72 39
24.06 metal tubing; LH front spar 8/15/96-11 40 38 48.50
-72 39 24.00 small clear bottle 8/20/96-15 40 38 51.70 -72 39
23.30 fan inlet diffuser housing for pack #3 8/14/96-11 40
38 51.70 -72 39 23.30 small aluminum box with toggle
switch and red toggle switch safety cover 8/12/96-4 40 38
58.50 -72 39 23.16 black plastic box 8/14/96-11 40 38 36.99
-72 39 22.38 roller on track 8/15/96-11 40 38 42.98 -72 39
21.70 3'(2' green aluminum 8/24/96-7 40 38 58.02 -72 39
21.24 white piece of canvas 40 38 46.46 -72 39 21.01 part of
seat and cord 10/02/96-1 40 38 46.44 -72 39 21.00 seat arm
40 38 35.90 -72 39 20.71 #2 Ram Air duct 40 38 01.40 -72 39
20.64 white plastic piece 9/27/96-1 40 38 47.24 -72 39 20.58
flow control valve S/N SNKB5189-764476-2 P214-9, #3
pack 8/05/96-2 40 38 47.24 -72 39 20.58 A/C unit K3283;
TWA 1848; S/N 910424-separator water; catalytic ozone
converter S/N02089 8/05/96-2 40 38 36.99 -72 39 20.25 ram
air inlet screen 8/19/96-11 40 38 36.39 -72 39 19.99
insulated tubing 1120363320 8/22/96-7 40 38 43.19 -72 39
19.80 forward lower cargo bay structure FS 900-960 L/H
CW w/ motor and wheels, pn 747-5100-5-0 8/03/96-85 40

38 43.10 -72 39 19.80 FS 740-780 stringers 15R-26R with R2 door attached (#5804951 7 on bottom inner door frame)
8/03/96-85 40 38 53.62 -72 39 19.51 row 19 seat 4-5
8/06/96-46 40 38 55.26 -72 39 19.08 projector 8/15/96-11 40
38 34.66 -72 39 18.72 misc. metal 10/17/96-1 40 38 42.10 -72
39 18.53 piping/U shaped 8', # 65B4093-5-1; Bleed Air Tubing, #3 pack ducting, forward end 8/03/96-85 40 38 48.80 -72 39 18.30 blower assembly w/ piping part # 1923; Air Cycle Machine #1. casting P/N 18488, ACM valve turbo bypass; P/N 71 8/05/96-2 40 39 03.06 -72 39 18.00 pants/shorts? tray 10/06/96-3 40 38 53.47 -72 39 17.98 row 19, seat 6-7 8/12/96-4 40 38 54.02 -72 39 17.76 seat parts row 19, seat 4, panel, 8/15/96-11 40 38 48.54 -72 39 17.76 seat track 8/16/96-10 40 38 40.74 -72 39 17.46 victim 40 38 39.30 -72 39 17.22 1) 2.5" (1" (1" BAC27EBY-51 2) 18" (1" (2" metal assy 69B60682-1 8/19/96-11 40 38 41.50 -72 39 17.14 zone multiplexer s/n 0390234 (box 50) Zone B, p/n 51030 8/03/96-85 40 38 43.63 -72 39 16.20 8/16/96-10 40 38 41.47 -72 39 15.82 1(1 alum. and honeycomb side 8/03/96-85 40 39 00.87 -72 39 15.80 6" (2" honey comb insulation 1/4" thick; static cable guide; support bracket assembly #69840527-1 8/05/96-2 40 38 55.30 -72 39 15.60 interior bulkhead 8/16/96-10 40 38 44.90 -72 39 15.49 #3 pos air cycle machine/heat exchanger w/ ducts, dual heat exchanger #3 40 38 44.68 -72 39 15.42 metal strap, 1" wide 8/04/96-66 40 38 45.13 -72 39 15.35 40 38 41.29 -72 39 15.25 FS 760-960; stringer 22R-37R; p/n 6580173 40 38 41.29 -72 39 15.25 keel beam section box; also refer to LF 55D 40 38 41.29 -72 39 15.25 floor beam w/ fiberglass floor panel #101, FS 860-880; RBL 55-76; 9/19/96-1 40 38 41.75 -72 39

15.19 ozone catalytic converter p/n D-19333-2 s/n 02103
8/06/96-1 40 38 43.89 -72 39 15.14 alum/ plastic strut; 3'
long (5" wide 8/04/96-66 40 38 55.00 -72 39 15.00 side and
bottom of meal cart/serving cart 8/16/96-10 40 38 55.00
-72 39 15.00 row 19, seats 8,9,10 40 38 45.00 -72 39 15.00 AC
access panel; right fuselage FS 1112-1170 40 38 39.45 -72 39
15.00 2 coach seats # stenciled on frame 823566404
8/03/96-85 40 38 39.45 -72 39 14.98 black tote bag
8/04/96-66 40 38 52.86 -72 39 14.94 scarf red white and
blue 10/02/96-1 40 38 41.25 -72 39 14.87 possible wing
section, "caution on antenna" 40 38 40.87 -72 39 14.82 first
class galley 40 38 40.87 -72 39 14.82 galley parts (3' (3'
metal piece w/ latch on side) 8/03/96-85 40 38 40.87 -72 39
14.82 alum. door (Plastic + honeycomb piece) 40 38 40.87
-72 39 14.82 6' (2' inner galley room liner 40 38 49.70 -72 39
14.80 gasper air hose 8/26/96-32 40 38 27.80 -72 39 14.80
fuselage stringer, 7' section 8/26/96-32 40 39 05.29 -72 39
14.76 debris 10/06/96-3 40 38 41.99 -72 39 14.67 AC motor
p/n 747-5117-1-0 s/n 1638; 4(4 alum siding 8/06/96-1 40
38 41.99 -72 39 14.67 green metal strut (04366-100)
8/04/96-66 40 38 50.50 -72 39 14.60 oxygen cylinder
8/26/96-32 40 39 00.50 -72 39 14.50 suitcase, baggage #
TW194392 8/14/96-11 40 38 53.40 -72 39 14.30 ram air inlet
to air cycle machine/heat exchanger 8/12/96-4 40 38 54.80
-72 39 14.20 coffee maker 8/26/96-32 40 39 00.20 -72 39
13.90 2 shirts on hangers 8/14/96-11 40 38 47.00 -72 39
13.40 row 18, Seats 4,5,6,7 40 38 37.56 -72 39 13.38 cargo bin
structure, upper track (roller tray), bent twisted metal piece
8/12/96-4 40 38 43.63 -72 39 13.03 zone trim air duct
8/16/96-10 40 38 40.00 -72 39 12.60 row 20, Seats 4,5,6,7

8/3/96-85 FBM11A 40 38 37.29 -72 39 12.46 floor beam with seat track; FS 840-880; RBL 33.99 8/04/96-66 40 38 37.29 -72 39 12.46 floor beam upper chord FS 920, RBL 16-37 40 38 58.90 -72 39 12.00 side of galley cart; galley carrier 8/16/96-10 40 38 44.55 -72 39 11.93 chrome brazing 8/04/96-66 40 38 40.01 -72 39 11.67 outer body fuselage skin fairing, pn 192L 8/04/96-66 40 38 46.70 -72 39 11.60 ice hammer 8/16/96-10 40 38 57.66 -72 39 11.34 one 12"(24" tan fiberglass piece marked "823564-1A" 8/19/96-11 40 38 33.10 -72 39 11.10 Pile of debris: 4' piece of metal tubing; short 6" piece of framing with several screws; interior framing with w/ hydraulics 8/12/96-4 40 38 55.01 -72 39 10.78 black suit case 8/05/96-2 40 38 55.01 -72 39 10.78 blue TWA carpet 15'(5'; ball cap of Florida Marlins; 2-6" (6" dinner trays; 6" (3" aluminum plate with wire coming 8/05/96-2 40 38 54.70 -72 39 10.69 2 misc. pieces; 2 1/2(2 1/2 plastic, 3(2 alum sheet 8/06/96-46 40 38 57.40 -72 39 10.60 food cart w/4 drawers 8/08/96-31 40 39 00.00 -72 39 10.55 levi's jeans size W28 L34 10/02/96-1 40 38 32.87 -72 39 10.47 10' heavy framing 8/19/96-12 40 38 38.64 -72 39 10.44 inlet valve 8/16/96-10 40 38 27.88 -72 39 10.07 metal part GD5340A wire attached 8/16/96-9 40 38 54.80 -72 39 09.90 food service cart 40 38 54.80 -72 39 09.90 Food carts 40 38 54.80 -72 39 09.90 galley "C" frame 40 38 54.80 -72 39 09.90 galley "C" frame 40 38 54.80 -72 39 09.90 galley "C" frame 40 38 54.80 -72 39 09.90 coffee maker 40 38 54.80 -72 39 09.90 galley "C" structure 40 38 54.80 -72 39 09.90 food service cart 40 38 54.80 -72 39 09.90 galley "C" frame 40 38 55.04 -72 39 09.76 4 pieces of alum framing from galley ID on framing. pn 1681001-101 8/06/96-46 40 38 55.04 -72 39

09.76 small plastic trays, broken; armrest 46-5, armrest support 48-3 8/06/96-46 40 38 54.72 -72 39 09.61 about 100 small plastic galley pieces 8/06/96-46 40 38 35.80 -72 39 09.00 fan inlet & diffuser housing for air cycle machine 8/12/96-4 40 38 35.80 -72 39 09.00 Right belly and cargo track between FS 800-940; stringer 37R-44R 8/12/96-4 40 38 35.80 -72 39 09.00 forward lower cargo bay structure FS 800-840 centerline (FS 980 floor beam - LBL 20 to RBL 11. Cargo track (fwd 8/12/96-4 40 38 44.94 -72 39 08.97 wing front spar web LBL 20-70 8/03/96-85 40 38 38.54 -72 39 08.77 front spar RBL 66 - LBL 28; (8(6 frame # 65B1029858 front spare BL O;) CW front spar 40 39 05.98 -72 39 08.64 suitcase 10/06/96-3 40 38 45.08 -72 39 08.48 wire plug DL9404 8/04/96-66 40 38 47.80 -72 39 08.40 front spar; LBL 60-95 8/16/96-10 40 38 52.30 -72 39 08.20 galley piece 8/16/96-10 40 39 06.08 -72 39 07.92 black shoe w/ glass imbedded in heel 10/06/96-3 40 38 36.06 -72 39 07.68 air cond heat exchanger tubing 8/16/96-10 40 39 12.20 -72 39 07.56 tan hat 10/06/96-3 40 38 39.55 -72 39 07.45 plastic travel light 8/04/96-66 40 38 39.55 -72 39 07.45 metal/ wood framing 8' long 8/04/96-66 40 38 39.55 -72 39 07.45 lip stick (Honey Ginger color) 8/04/96-66 40 38 39.55 -72 39 07.45 3' angle iron 8/03/96-85 40 38 39.55 -72 39 07.45 misc. pieces 40 38 39.55 -72 39 07.45 misc. pieces 40 38 39.55 -72 39 07.45 air cycle machine ducting (fan inlet & diffuser housing) 40 38 39.55 -72 39 07.45 misc. pieces 8/03/96-85 40 38 39.55 -72 39 07.45 FS 800-840; stringer 13R-16R with R2 door frame 40 38 41.57 -72 39 07.30 FS 780-920; stringer 23L-37L 8/03/96-85 40 38 53.00 -72 39 07.00 galley debris 8/16/96-10 40 39 06.62 -72 39 06.84 debris 10/06/96-3 40 39

00.63 -72 39 06.83 debris - black plastic 10/02/96-1 40 38
41.77 -72 39 06.83 gear door, 65B10020-574, 8/03/96-85 40
38 41.77 -72 39 06.83 hatch :Part # 65B10020-574, Serial #
000160, MFR Code 82918 40 38 53.20 -72 39 06.80 bottom
side and door to galley cart; serving cart bottom & 2 sides
8/16/96-10 40 38 32.94 -72 39 06.78 5 misc pieces wired
together largest 3' (.5' (2" 8/19/96-11 40 38 47.33 -72 39
06.68 minolta camera, lens on camera & and separate lens
in bag all in zip lock bag sitting on bottom 8/03/96-85 40
38 25.71 -72 39 06.68 Forward lower cargo bay structure FS
820 right hand side 8/17/96-4 40 38 22.77 -72 39 06.67
approx 1' long curved piece of fiberglass 10/02/96-1 40 38
50.80 -72 39 06.50 aluminum tube seat frame; passenger
seat bar 8/16/96-10 40 38 26.58 -72 39 06.48 part of tire
8/16/96-9 40 38 26.58 -72 39 06.48 seat part, tray table piece
8/16/96-9 40 38 24.28 -72 39 06.17 1' (1" broken heavy
metal strut 8/17/96-4 40 39 06.37 -72 39 06.12 10/08/96-2
40 38 46.63 -72 39 06.02 3 lights from interior of plane
10/02/96-1 40 38 33.24 -72 39 05.70 duct work 8/16/96-10
40 38 39.90 -72 39 05.50 small metal piece 8/26/96-32 40 38
31.08 -72 39 05.10 front spar; FS web RBL 66-RBL 45; cw
tank 8/08/96-14 40 38 50.80 -72 39 04.80 O2 cylinder
8/16/96-10 40 38 51.98 -72 39 04.74 TWA M 88801-1 food
cart 8/09/96-37 40 38 51.98 -72 39 04.74 2 food box holders
40 38 51.98 -72 39 04.74 TWA M 88801-1 1068; outer frame
for food carts s/n B972; M.O. 80E41 8/09/96-37 40 38 31.20
-72 39 04.68 FS 980 lower frame Stringer 40L-42R
8/08/96-14 40 38 30.60 -72 39 04.56 wire basket/ rubber
coated 2"(2 1/2"(4"/6"(4" framing/ 2'(1" strut 8/08/96-14
40 38 41.10 -72 39 04.30 panel, wires, 110v outlet (per TWA-

elec. relay panel, fwd cargo bin) p/n 65B40474-22 &
65B40476-10 RA164 8/26/96-32 40 38 30.38 -72 39 04.30 3
piece framing 1 1/2(2 1/2 8/08/96-14 40 38 30.38 -72 39
04.30 alum strut 4' long, circular tubing 18" diam; rubber/
plastic w/ metal strap; assembly 65341207-1 40 39 00.10 -72
39 03.60 black tray 8/14/96-11 40 38 51.50 -72 39 03.60 24"
piece of structure 8/16/96-10 40 38 31.50 -72 39 03.54
telephone 8/16/96-10 40 38 31.50 -72 39 03.54 2' framing
w/ hydraulic hose 8/19/96-11 40 38 51.40 -72 39 03.31 seat
14 (8 9 0) 8/04/96-66 40 39 02.10 -72 39 03.20 plastic grate
8/20/96-15 40 38 33.20 -72 39 03.20 White support
8/24/96-8 40 38 33.59 -72 39 03.15 1/2 black hard side
suitcase with hair dryer and misc items 40 39 01.20 -72 39
03.00 metal strap 3' long 8/20/96-15 40 38 28.11 -72 39 02.61
front spar web and stiffner++ 8/17/96-4 40 38 59.74 -72 39
02.41 2-1/2' (3' piece of wreckage; 3 castor wheels
8/04/96-66 40 38 29.19 -72 39 02.40 #1 heat exchanger ram
air door 8/05/96-2 40 39 00.06 -72 39 02.37 food cart
8/06/96-1 40 38 44.20 -72 39 02.37 seats 19 (123) 40 38 44.20
-72 39 02.37 3 seats; row 19 seats 1,2,3 8/03/96-85 40 38
50.28 -72 39 02.17 fuse box galley complete 6'(3"(2"; galley B
& C 8/08/96-14 40 38 34.80 -72 39 01.90 part of cargo
conveyor system 8/26/96-32 40 39 09.72 -72 39 01.80 shirt,
small piece of plastic 10/08/96-2 40 39 16.67 -72 39 01.63
gray garment bag w/ red plping 10/08/96-2 40 38 34.70
-72 39 01.40 arm rest 8/26/96-32 40 38 26.64 -72 39 01.31
fiberglass rib 3'(1'(3" 8/20/96-15 40 38 59.90 -72 39 01.20
plastic tray 8/14/96-11 40 38 59.90 -72 39 01.20 small metal
framing in bag 8/14/96-11 40 38 39.90 -72 39 01.20 3'(2'
molded metal 8/14/96-11 40 39 01.50 -72 39 01.10 victim 40

38 28.43 -72 39 01.03 9/10/96-4 40 38 30.78 -72 39 00.90 air
plane wreckage? (literal quote from tag) 8/19/96-11 40 38
29.30 -72 39 00.40 connector panel 8/24/96-8 40 38 34.48
-72 39 00.37 FS 800-1000; stringer 40L-40R with forward
lower cargo bay structure w/ rollers attached 8/05/96-2 40
38 34.34 -72 39 00.14 light alum framing; 2' and 3' long; arm
rest Row 17, Seat 8 and 10 8/06/96-1 40 39 00.90 -72 38
59.90 plastic strips 8/22/96-7 40 38 30.66 -72 38 59.76 3
pieces: 1) metal 10"(18"; 2) spring/hinge, small; 3) plastic
cowling 6"(6"(2" 8/20/96-15 40 38 30.66 -72 38 59.76
Forward lower cargo bay structure FS 940 left hand side
8/20/96-15 40 38 54.22 -72 38 59.50 blue seat backing
8/08/96-14 40 38 53.96 -72 38 59.50 black suit case
8/08/96-14 40 38 28.68 -72 38 59.46 clothing 9/10/96-4 40
38 31.20 -72 38 59.30 cargo floor 8/24/96-8 40 38 54.19 -72
38 59.18 row ?? Seats 8,9,10 8/06/96-46 40 38 53.37 -72 38
59.07 row 15 seat 8-9-10 8/06/96-46 40 38 37.30 -72 38 59.00
air filter (galley) 8/26/96-32 40 38 31.03 -72 38 59.00
fiberglass framing 3(3(3 8/06/96-1 40 38 26.76 -72 38 58.74
#1267448 - 65808074-39 Green piece w/ gasket; horizontal
stabilizer fairing 8/17/96-4 40 38 31.09 -72 38 58.69 forward
lower cargo bay structure FS 860-880 left hand cargo floor
8/05/96-2 40 39 13.07 -72 38 58.56 magazine 10/06/96-3 40
39 02.02 -72 38 58.56 shoe headphone volume control,
debris 10/03/96-4 40 38 55.60 -72 38 58.48 row 10; seats 8,9,
10 8/04/96-66 40 38 53.99 -72 38 58.22 umbrella, sweat shirt
8/06/96-46 40 38 45.30 -72 38 58.10 luggage carrier, yellow
blow dryer; AIWA walkman; Boeing p/n 60B40125-10
8/08/96-31 40 38 45.30 -72 38 58.10 right SOB CW rib; web
between SWB 1 and mid spar. Lat/long is in Red field 40

38 45.30 -72 38 58.10 right SOB CW rib; web between R.S.
and SWB 1. 40 38 32.10 -72 38 58.08 same mark, 6' strut;
9302356 8/19/96-11 40 38 32.10 -72 38 58.08 1) fluorescent
light fixture p/n BR6219-401 2) bracket 4" (18" 3) small 3"
piece of plastic 8/19/96-23 40 39 01.90 -72 38 58.00 seat
frame, round tube w/ foot rest 8/20/96-15 40 38 44.17 -72
38 57.89 row 15 seat 4-5-7 8/04/96-66 40 39 00.20 -72 38
57.80 personal effects 8/14/96-11 40 38 59.76 -72 38 57.77
clothing and CD 8/14/96-11 40 38 42.70 -72 38 57.46
lighting strut; red shirt size 44 8/04/96-66 40 38 59.88 -72
38 57.10 row 21, seat 1-2-3 8/08/96-14 40 38 33.80 -72 38
57.00 rib w/ pulley; strut with wheels 8/24/96-8 40 38
59.50 -72 38 56.90 electric part (personal) 8/17/96-2 40 38
59.80 -72 38 56.60 "Star Wars" book 8/08/96-14 40 38 38.00
-72 38 56.50 support rod 8/24/96-8 40 38 44.45 -72 38 56.32
food warmer box 8"(20"(14" plastic TWA 44-0842
8/06/96-46 40 38 31.07 -72 38 56.26 forward lower cargo
bay structure, FS 800 Right hand side 8/06/96-1 40 38 31.07
-72 38 56.26 3 small pieces; 18" long assembly 65B41247-79
8/06/96-1 40 38 30.23 -72 38 56.20 framage curved 40 38
48.23 -72 38 55.86 row 12 seat 10 8/16/96-10 40 39 02.88 -72
38 55.68 luggage 10/03/96-4 40 39 02.12 -72 38 55.68
personal effects, camera 10/03/96-4 40 39 02.12 -72 38 55.68
luggage & rack 10/03/96-4 40 38 32.09 -72 38 55.64
spanwise beam #3; LHS web; LBL 20-83 8/19/96-11 40 38
51.90 -72 38 55.60 nylon bag 40 39 02.88 -72 38 55.6 blue
shirt, 2 pieces plastic debris 10/03/96-4 40 38 59.40 -72 38
55.40 wiring hanging off item, part of seat with audio
cables seat track RBL 33.99; STA 950 to 995 w/ seat leg
attached 8/12/96-4 40 38 25.50 -72 38 55.40 Forward lower

cargo bay structure FS 960 left hand side 8/24/96-8 40 38
31.77 -72 38 55.37 1) metal frame with electric plug & wire
assy "69B71009-1" 2) metal tube 12" assy "65B41247.79"
8/19/96-23 40 38 31.77 -72 38 55.37 1) metal strap 4'(1" p/n
65B41247-5; 2) 4'(2"(11" possible fiberglass 8/20/96-15 40 39
01.94 -72 38 55.32 piece of step 10/06/96-3 40 38 40.51 -72
38 55.05 FS 940 tension tie; 665B09631-57 753 8/05/96-2
FBM11D 40 38 40.51 -72 38 55.05 seat track LBL 33.99 FS
840-880 40 38 46.20 -72 38 55.00 cargo track with cargo
pallet stop 8/12/96-4 8 16 96-10 40 38 40.70 -72 38 55.00
overhead reading light 8/16/96-10 40 38 40.70 -72 38 55.00
forward lower cargo bay structure FS 800 left hand side
8/12/96-4 FMB20D 40 38 40.70 -72 38 55.00 12" floor beam
upper chord STA 800, RBL 55 to RBL 70 8/16/96-10 40 38
40.70 -72 38 55.00 8/16/96-10 40 38 29.80 -72 38 55.00
stringer 8/24/96-8 40 38 45.77 -72 38 54.89 row 18 seat 8 10
8/04/96-66 40 38 48.14 -72 38 54.86 recovered white cable
and a circuit box 10/02/96-1 40 38 45.83 -72 38 54.78
luggage bin 3(2(3 8/05/96-2 40 38 45.83 -72 38 54.78 6"(4
piece 8/05/96-2 40 38 45.83 -72 38 54.78 wire harness
8/05/96-2 40 38 34.20 -72 38 54.50 plastic door 8/24/96-8
40 38 30.70 -72 38 54.50 ducting 900 RH Zone C 8/24/96-8
40 38 31.20 -72 38 54.42 1'(4" alum strut 8/19/96-11 40 38
31.20 -72 38 54.42 body fairing 8/19/96-11 40 38 45.58 -72
38 54.36 blower/fan (air search) #1166735 8/03/96-85 40 38
45.55 -72 38 54.30 stewardess chairs (2) CO2 bottle on side,
side strut, #971E13020-2 Rev E lot #12 2-6-71 A-2 40 38
29.20 -72 38 54.30 forward lower cargo bay structure FS
1000 left hand CW outer skin (canted press bulkhead w/
some body skin) 8/24/96-8 40 38 26.85 -72 38 53.82 Partial

seat arm with green mesh att'd 8/22/96-7 40 38 26.85 -72 38
53.82 8'(2" metal frame 8/16/96-10 40 38 51.80 -72 38 53.80
coffee pot with silver 8/17/96-2 40 37 54.37 -72 38 53.54
15'(10' siding "TR" on side; FS 840-960; stringer 6R-25R
with window frame 8/14/96-11 40 38 32.50 -72 38 53.40
long piece of framing 8/19/96-12 40 38 54.80 -72 38 53.30
seat row 15 seat 2 (do not place in Aircraft Station)
8/17/96-2 40 38 54.80 -72 38 53.30 row 15 seat 1-2-3
8/17/96-2 40 38 54.80 -72 38 53.20 brown luggage with
clothes 8/17/96-2 40 38 51.40 -72 38 53.20 luggage, black
with green insert and gold lettered monogram (American
Tourister) 8/17/96-2 40 38 41.69 -72 38 53.14 framing; alum
light 8/06/96-46 40 38 41.69 -72 38 53.14 row 23 seat 5-6-7;
row 12 seat 8 armrest-A2041 8/06/96-46 40 38 41.69 -72 38
53.14 olympus camera 8/06/96-46 40 38 41.69 -72 38 53.14
seat 12 (8) armrest 40 38 42.18 -72 38 53.04 seat track
8/16/96-10 FBM10B 40 38 32.40 -72 38 53.00 floor beam
lower chord FS 880 LBL 5-25 8/24/96-8 40 38 39.15 -72 38
52.96 SWB #3 RBL 23 to LBL 20; p/n 65B01110 19
8/06/96-46 LW05,LW06 40 38 39.15 -72 38 52.96 LW05
lower wing skin outboard; LW06 upper wing skin
outboard; both are attached to A2018 8/06/96-46 40 39
02.61 -72 38 52.94 plastic drink holders 8/06/96-1 40 38
43.38 -72 38 52.90 1' green light framing 8/06/96-1 40 38
55.00 -72 38 52.80 empty hard side suitcase, gray
(Samsonite) 8/17/96-2 40 38 29.20 -72 38 52.80 white "L"
shaped brace 8/24/96-8 40 38 33.03 -72 38 52.61 2 small
pieces of frame 1"(1"(3' (left leg to seats 17 (1 2 3)
8/04/96-66 40 38 57.70 -72 38 52.50 personal effects
8/15/96-11 40 38 57.70 -72 38 52.50 black carry-on plastic

luggage 8/15/96-11 40 38 57.70 -72 38 52.50 galley
compartment door see A623 8/16/96-10 40 38 57.70 -72 38
52.50 black carry on bag 40 38 57.70 -72 38 52.50 see A623,
galley debris 8/16/96-10 40 39 02.42 -72 38 52.48 food cart
8/06/96-1 40 38 31.93 -72 38 52.42 small frame section with
green rod 8/19/96-11 40 38 57.70 -72 38 52.30 Row 16 Seats
1,2,3 8/15/96-11 40 38 55.00 -72 38 52.30 green fabric
luggage (Olympia) 8/17/96-2 40 38 38.18 -72 38 52.30 FS
780 900; 1'(2' (Possibly a floater) 8/09/96-37 40 39 00.80 -72
38 52.20 victim 40 39 00.80 -72 38 52.20 seat recovered with
victim (a645) numbers on seat 89490-1 & 89493-2 8/17/96-2
40 38 30.10 -72 38 51.96 red seat back w/ frame; fiberglass
round dome 2 1/2' diameter.; seat 16 (10) seat with no back
- from cabin interior d 8/05/96-2 40 38 39.73 -72 38 51.81
row 21, seat 4-5-6 8/14/96-11 40 38 35.58 -72 38 51.54 seat
rail 8/19/96-13 40 39 01.23 -72 38 51.09 row 23, seat 4
8/06/96-1 40 38 31.50 -72 38 51.00 seat piece 8/24/96-8 40
38 59.10 -72 38 50.90 plastic tray / underwear 8/15/96-11
40 38 35.64 -72 38 50.90 right nose gear wheel well door
8/05/96-2 40 38 30.50 -72 38 50.50 metal fragments
8/24/96-8 40 38 35.22 -72 38 50.32 blue towel; underwear;
cosmetic bag 8/29/96-1 40 38 35.22 -72 38 50.32 TWA ID
FBM11C 40 38 42.21 -72 38 50.28 seat track RBL 33-99 FS
800-840, 1 bra 8/06/96-1 40 38 30.84 -72 38 49.80 14" angle
structure; white stringer 40 38 38.79 -72 38 49.77 metal parts
and framing 8/14/96-11 40 38 56.07 -72 38 49.74 suitcase
8/04/96-66 40 38 28.29 -72 38 49.71 structural member w/
holes 8/24/96-8 40 38 38.09 -72 38 49.68 M320001-10 on
plastic O2 holder; air ent lot #057 8/14/96-9 40 38 28.17 -72
38 49.64 clothing - panties 8/22/96-7 40 38 28.17 -72 38

49.64 frame #L220 40 38 28.17 -72 38 49.64 1.5' frame
8/16/96-10 40 38 51.76 -72 38 49.56 clothes hanger
10/06/96-3 40 38 39.24 -72 38 49.50 camera tripod
8/19/96-12 40 38 53.50 -72 38 49.40 suitcase blue with
clothes (Samsonite) 8/17/96-2 40 38 47.80 -72 38 49.20
black carry on with handle top 8/19/96-12 40 38 26.19 -72
38 49.05 galley serving tray container 8/16/96-10 40 38
27.71 -72 38 48.87 forward lower cargo bay structure FS
1000 left hand side 8/22/96-7 40 38 27.71 -72 38 48.87 3'
bent metal # 86-4040 8/22/96-7 40 38 27.71 -72 38 48.87
strut p/n 65B41247-83 & 84 8/16/96-10 40 38 27.21 -72 38
48.87 8' wire, white 8/22/96-7 40 38 36.38 -72 38 48.52
plastic bucket & light 8/19/96-11 40 38 26.08 -72 38 48.49
forward lower cargo bay structure FS 920 left hand side
(Cargo floor beam left hand station 920) 8/17/96-4 40 38
24.53 -72 38 48.31 Arm rest 8/17/96-4 40 38 25.73 -72 38
48.05 floor support 8/17/96-4 40 38 51.72 -72 38 48.02 1/2
suitcase; open with clothing 8/04/96-66 40 38 51.72 -72 38
48.02 fuselage skin w/ red paint 40 38 51.72 -72 38 48.02 FS
300-340 stringer 27R-41R; 8/04/96-66 40 38 51.72 -72 38
48.02 fuselage skin 40 38 51.72 -72 38 48.02 fuselage skin 40
38 54.80 -72 38 47.90 black hand cart luggage (jaguar)
8/17/96-2 40 38 54.80 -72 38 47.90 misc clothing in various
cloth cases 8/17/96-2 40 38 54.80 -72 38 47.90 misc jewelry
in various cloth cases 8/17/96-2 40 39 12.96 -72 38 47.76
debris 10/06/96-3 40 38 31.60 -72 38 47.50 floor beam
upper chord FS 940, RBL 12-33 8/19/96-11 40 38 48.21 -72
38 47.28 blue luggage w/ green trim 8/06/96-1 40 38 22.91
-72 38 46.91 misc. metal 9/28/96-1 40 38 25.67 -72 38 46.82
access door frame 8/17/96-4 40 38 37.80 -72 38 46.70 row

22 Seats 4,5,6 8/05/96-2 40 38 41.52 -72 38 46.61 row 14 seat
4-5-6-7 8/19/96-12 40 38 32.82 -72 38 46.25 four foot piece
of ducting 8/19/96-11 40 38 50.80 -72 38 46.10 12" (12"
black plastic grating 8/17/96-2 40 38 34.80 -72 38 46.00
food galley tray 8/19/96-13 40 38 51.31 -72 38 45.83
luggage cart 8/06/96-1 40 38 30.93 -72 38 45.73 stainless
band with green rod 8/19/96-13 40 38 27.90 -72 38 45.31
12" green metal strut; 6"(2" yellow plastic w/black clip
162-1013-3 8/11/96-1 40 38 41.10 -72 38 45.30 2' long white
framing piece with a flange in the center 8/12/96-4 40 38
38.90 -72 38 45.30 stainless steel band 8/19/96-13 40 38
24.22 -72 38 45.25 piece of wire 8/30/96-5 40 39 12.64 -72 38
45.24 debris 10/06/96-3 40 38 51.45 -72 38 45.21 nail polish,
debris 10/03/96-4 40 38 40.86 -72 38 45.07 yellow glass case
w/ glasses 8/05/96-2 40 38 40.86 -72 38 45 07 L2 door
65B04425-411 8/05/96-2 40 38 40.86 -72 38 45.07 pull latch
assembly, overhead storage piece, 2'(4" honeycomb
8/05/96-2 40 38 35.92 -72 38 44.95 nose gear door/hatch
p/n 65B10019-2; 3'(6'(4" thick; RH nose gear wheel well
door/first 6'; joins A152 8/06/96-46 40 38 55.25 -72 38 44.56
row 14, Seats 1,2,3 8/08/96-14 40 38 51.80 -72 38 44.52
pocket planner 8/06/96-1 40 38 36.01 -72 38 44.44 metal
container appearing to be for food service 8/06/96-22 40 38
24.11 -72 38 44.40 overhead light 8/17/96-4 40 38 51.80 -72
38 44.00 insulation found in the red zone 8/06/96-1 40 38
36.97 -72 38 44.00 seat assembly p/n S403359-402 s/n 1234
Mod 901 8/06/96-1 40 38 34.80 -72 38 44.00 8" piece of
green metal; support 8/24/96-8 40 38 24.57 -72 38 43.94
misc metal 9/28/96-1 40 38 21.80 -72 38 43.80 Structure
Framing 1' (3'; white fiberglass support 40 38 52.35 -72 38

43.68 metal rack w/ wheels 8/04/96-66 40 38 52.35 -72 38
43.68 green suitcase 8/04/96-66 40 38 30.80 -72 38 43.50
metal section marked "FWD Unit No. 284" 8/19/96-13 40
38 54.74 -72 38 43.34 10" (2" fiberglass part with Insulation
40 38 50.49 -72 38 43.30 coat hanger 8/06/96-1 40 38 50.49
-72 38 43.30 bar cart 8/06/96-1 40 38 37.20 -72 38 43.30
frame piece 8/19/96-11 40 38 35.00 -72 38 42.90 white metal
strip with rivets 8/19/96-11 40 38 33.74 -72 38 42.75 plastic
box w/ tubing' rectangular metal tube 3" 8/08/96-31 40 38
33.74 -72 38 42.75 frame FS 820 & 5' Piece of 5/8" O2
Tubing 8/06/96-46 40 38 50.89 -72 38 42.73 suitcase
8/06/96-1 40 38 22.20 -72 38 42.70 2" (4' green frame
8/04/96-66 40 38 46.80 -72 38 42.60 JVC power supply
8/19/96-13 40 38 46.80 -72 38 42.60 frame in shape of cross
with rivets 8/19/96-13 40 38 40.20 -72 38 42.30 circular item
12" to 18" diam. honeycombed 8/19/96-11 FBM10A 40 38
40.20 -72 38 42.30 floor beam lower chord; FS 880; RBL
35-86 40 38 33.55 -72 38 42.25 FS 900-940; stringer 0-6R, 5(3
rounded alum siding; inside p/n 4111-4#158; 7380-2DBLR;
RH fuselage crown skin; 8/06/96-1 40 38 33.80 -72 38 42.06
light framing 2' long 8/06/96-1 40 38 36.07 -72 38 42.01
backpack 8/19/96-13 40 37 42.80 -72 38 42.00 very large net
entangled with debris 9/27/96-1 40 38 37.69 -72 38 41.92
metal strut; green 653B36 48864080 Rh; 2-3' pieces
8/05/96-2 40 38 47.40 -72 38 41.50 small pieces of metal
with light flexible material 8/19/96-12 40 38 48.40 -72 38
41.40 3' long alum trim- 1" wide 8/08/96-14 40 38 56.70 -72
38 41.20 black hard suit case w/ clothes (8/22/96-7 40 38
50.26 -72 38 41.20 jar facial cream 8/08/96-14 40 38 23.77
-72 38 40.56 misc. metal 9/28/96-1 40 38 23.82 -72 38 40.48

"L" shaped plastic piece 10/02/96-1 40 38 53.92 -72 38 40.36
canyas suitcase (green) name tag -personal effects-
8/15/96-11 40 38 53.92 -72 38 40.36 row 2 seats 4-5-6-7
8/15/96-11 40 38 29.17 -72 38 40.13 1.5' (2" strut
8/19/96-23 40 38 29.17 -72 38 40.12 Overhead compartment
8/17/96-4 40 38 33.79 -72 38 40.07 fair lead assembly 3'
8/05/96-2 40 38 24.01 -72 38 40.06 misc. metal 9/28/96-1 40
38 47.88 -72 38 39.91 row 11, Seats 1,2,3 8/06/96-1 40 38
51.85 -72 38 39.75 suitcase 8/06/96-1 40 38 51.59 -72 38
39.75 wire connection; 4"(4" aluminum 8/06/96-1 40 38
29.27 -72 38 39.52 slide compartment 8/17/96-4 40 38 39.20
-72 38 39.50 luggage rack cart 8/22/96-7 40 38 26.42 -72 38
39.48 several small pieces of wire 8/19/96-23 40 38 26.42
-72 38 39.48 FS 920 Body Frame Segment 40 38 58.20 -72 38
39.40 misc pieces 8/19/96-10 40 38 32.85 -72 38 39.36 coiled
white wire; W848-5(38 2 alum pieces 1' long each
8/06/96-46 40 38 32.85 -72 38 39.36 strut 3' long and black
window molding 9/26/96-17 40 38 32.18 -72 38 39.28 18"(4"
strut framing assembly #65B54207-3 8/06/96-46 40 38 45.38
-72 38 39.15 suitcase w/ puller and insulation 8/15/96-11
40 38 32.79 -72 38 38.98 4'(4" light framing w 3" diam hole
through part of framing 8/06/96-1 40 38 32.79 -72 38 38.98
food cart frame, levi's shorts 8/06/96-1 40 38 35.21 -72 38
38.96 plastic holders/ tray 65B60108; 65B0174-1 40 38 37.71
-72 38 38.95 2.5(2.5 fiberglass w/ PBE holder p/n 4566M37-
B-042NM S/N E955016 8/06/96-1 40 38 32.33 -72 38 38.95
framing 3(1 rollers on bottom; cargo floor framing
8/06/96-1 40 38 32.33 -72 38 38.95 pulley bracket FS
960-980 8/06/96-46 40 38 36.39 -72 38 38.91 suitcase
8/05/96-2 40 38 53.10 -72 38 38.90 black, hard side suitcase

containing misc items (sunglasses, books); --Personal Effects- 8/22/96-7 40 38 48.20 -72 38 38.80 2 pair shorts, 1 shirt, 4" tube seat framing 8/08/96-14 40 38 24.40 -72 38 38.59 one blue bottle "Crystal" 8/19/96-11 40 38 24.40 -72 38 38.59 1.5' long framing & various small pieces 8/19/96-11 40 39 19.74 -72 38 38.52 clothing 9/11/96-4 40 38 48.99 -72 38 38.41 forward galley 8/08/96-14 40 38 48.99 -72 38 38.41 T-shirt @W513?? 40 38 32.60 -72 38 38.37 front spar web RBL 76 8/19/96-11 40 38 35.99 -72 38 38.36 arm rest row 15 Seat 4, foot rest bar, 3' alum strut FBM10F 40 38 35.99 -72 38 38.36 STA 880 floor beam lower chord LBL 25-70 40 38 26.56 -72 38 38.30 1) metal 14"(6"(1.5" p/n 65B38600-137; 2) yellow oxygen mask; 3) 2.5' metal pipe 3/4" diameter plus hose and toggl 8/20/96-15 40 38 26.56 -72 38 38.30 small metal piece 3'(2' p/n: 65B08060-12n/c ADCN 1-2-3 7075-T6, s/n: 252 sept 11 1970 40 38 47.50 -72 38 38.10 bottom half of seat no seat or row # 8/08/96-14 40 38 35.99 -72 38 37.89 3(3(6" framing w/ honeycombing; #10-390#112, 114 hand written on honeycomb 8/05/96-2 40 38 35.99 -72 38 37.89 floor beam and frame connection FS 960, LBL 110 to SOB S25-29 8/05/96-2 40 38 32.43 -72 38 37.87 spanwise beam #3 -mid right side; p/n 65B10683 2 8/06/96-46 40 38 57.40 -72 38 37.80 clothing, black 8/15/96-11 40 38 57.40 -72 38 37.80 personal items, small plastic parts, insulation 8/15/96-11 40 38 57.40 -72 38 37.80 row 20, seat 8-9-10 8/15/96-11 40 38 57.40 -72 38 37.80 misc wiring bundle 40 38 57.40 -72 38 37.80 sensor, zone temp 8/19/96-10 40 38 23.71 -72 38 37.78 small metal piece 3"(7"(0.25" metal 40 38 32.48 -72 38 37.73 floor beam upper chord & web FS 920, LBL 102-72 8/06/96-46 40 39 02.30 -72

38 37.50 piece of plastic from interior 8/26/96-31 40 38
39.80 -72 38 37.50 long structure piece w/ crack on one end
8/19/96-11 40 38 33.00 -72 38 37.42 frame 2' long w/ wire
connectors 8/05/96-2 40 38 23.70 -72 38 37.30 4'(1' framing
and wire harness 8/14/96-11 40 38 23.70 -72 38 37.30 seat
track RBL 11.33 FS 940-960 40 38 05.24 -72 38 37.29 large
section of metal (8' (6') changed from Z3453 to X2201 to
match actual debris field (Kurt and Deb) 40 38 05.24 -72 38
37.29 40 38 34.09 -72 38 37.28 mans loafer; assy
#493780-0001A (19) light box; 5"(2" alum angle FS 820
8/08/96-31 40 38 34.10 -72 38 37.25 1) plastic housing
2' (8" (4" assy 493780-0002A" 8/19/96-23 40 38 27.70 -72 38
37.20 2-1/2'(5"(1' framing 40 38 46.20 -72 38 37.00 black
suitcase with strip (american tourister) 8/19/96-12 40 38
46.20 -72 38 37.00 cargo track and rollers 8/12/96-4 40 38
19.90 -72 38 37.00 metal strip w/ rivets; white curtain
attachment 40 38 19.90 -72 38 37.00 3' piece of white metal
w/ holes; overhead support 40 38 37.20 -72 38 36.84 floor
assy STA 760-800 RBL 33 to RBL 72, 3(3 alum framing
possible cargo area 8/05/96-2 40 38 37.20 -72 38 36.84 10'
long 3/8" piping 8/05/96-2 FBM10C 40 38 37.54 -72 38
36.75 floor beam lower chord FS 880 LBL 70-121 (SOB)
8/19/96-13 40 38 34.61 -72 38 36.68 tea can 3(3(4 8/05/96-2
40 38 32.68 -72 38 36.48 AC vents light/ alum frame, green;
FS 1140 BAC 27ECT-158 8/06/96-1 40 38 32.68 -72 38 36.48
floor beam segment 40 38 43.20 -72 38 36.00 section of
bulkhead; life raft support eam (fragment 40" length) FS
800-860, LHS 8/19/96-12 40 38 48.67 -72 38 35.96 clothing;
7'1" piping, door hinge 8/06/96-1 40 38 48.07 -72 38 35.95
FS 820-900; stringers 14L-25L 8/06/96-1 40 39 17.96 -72 38

35.91 clothing 9/10/96-4 40 39 17.96 -72 38 35.91 misc.
plastic parts 9/11/96-4 40 39 17.96 -72 38 35.91 misc. plastic
piece 9/11/96-4 40 38 28.24 -72 38 35.85 3(2 1/2 inner light
framing/2' seat rail 8/08/96-14 40 38 34.67 -72 38 35.41
frame work speaker 8/05/96-2 40 38 19.90 -72 38 35.14
thick rubber piece 1' (4" (1" / clear plastic cover 8/17/96-4
40 38 32.20 -72 38 35.00 Small electrical access panel with 2
plugs 8/24/96-8 40 38 29.20 -72 38 35.00 Small metal
structure with rivets 8/24/96-8 40 38 33.00 -72 38 34.80 2
small pieces of channel 8/24/96-8 40 38 18.00 -72 38 34.70
lamp frame L517 40 38 26.39 -72 38 34.66 FS 800-880;
stringer 36L-40L 8/08/96-14 40 38 26.39 -72 38 34.66 FS
800-860; stringer 39L-44L 40 38 27.14 -72 38 34.54 18" light
braising; 1(6 alum bulkhead 8/08/96-14 40 38 27.14 -72 38
34.54 cw spanwise beam #1 section 40 38 26.92 -72 38 34.47
6" plastic piece 8/19/96-11 40 38 22.55 -72 38 34.25 green 5'
strut 8/14/96-11 40 38 20.80 -72 38 34.10 "Y" shaped Metal
with holes; overhead support 40 38 23.87 -72 38 34.01 6'
piece of red wire 8/19/96-23 40 38 22.70 -72 38 33.40 exit
sign w/ electronics; spring hinged arm; 4" tubing
8/10/96-9 40 39 09.35 -72 38 33.29 small O2 bottle; metal
strut; plastic strap 8/28/96-14 40 38 53.00 -72 38 33.00 Black
suitcase (softside) containing misc items.-Personal Effects-
8/22/96-7 40 38 36.81 -72 38 33.00 blank photos/men's tie
8/28/96-24 40 38 27.78 -72 38 32.88 strut 5'(3" p/n
65B04366-145; 4'(3' p/n 86-4638 s/n AC668 8/11/96-1 40 38
27.78 -72 38 32.88 metal piece with possible foot rest,
1.5' (1.5' 40 38 17.80 -72 38 32.84 forward lower cargo bay
structure FS 960 right hand side (intercostal fairing ES
920-960) 8/17/96-4 40 38 17.80 -72 38 32.84 FS 960 lower

body frame stringer 43L-47L 40 38 39.27 -72 38 32.83 floor
panel 2(4 BMS4-17F, TY.2; Lot# 903140 MFGR.CIBA -
GEIGY 8/06/96-46 FBM 19 40 38 39.27 -72 38 32.83 floor
assy. STA 780 -840 RBL3 to LBL 94 8/06/96-46 40 38 39.27
-72 38 32.83 fuselage skin 40 38 39.27 -72 38 32.83 fuselage
skin 40 38 39.27 -72 38 32.83 fuselage belly skin 40 38 39.27
-72 38 32.83 fuselage skin 40 38 36.96 -72 38 32.76 blue chair
(no seat #) 8/05/96-2 40 38 33.02 -72 38 32.52 3' strut 1'(1
green FS 920 8/08/96-14 40 38 18.64 -72 38 32.52 cargo bin
ceiling 8/17/96-4 40 38 29.10 -72 38 32.34 6' length of
rectangular metal tubing 6'(.5"(1" 8/20/96-15 40 39 19.96
-72 38 32.32 misc clothing (bagged) 40 38 39.85 -72 38 32.29
small suitcase frame, MT-Personal Effects- 8/19/96-11 40
38 20.64 -72 38 32.05 fuselage fairing frame 8/17/96-4 40 38
20.64 -72 38 32.04 wire harness in bag 8/17/96-4 40 38 20.64
-72 38 32.04 piece of bracket w/section of stringer &
fiberglass/plastic sheet; cargo compartment support 40 39
03.00 -72 38 32.00 Motor actuator cargo door 40 39 03.00 -72
38 32.00 BAC 65B07943-931 40 39 03.00 -72 38 32.00 power
unit F+D wheel drive cargo 40 39 03.00 -72 38 32.00 TWA
38003; 12" diam press relief valve 40 39 03.00 -72 38 32.00
cabin; 10"(12" door frame 40 39 03.00 -72 38 32.00 1'(2' white
structure w/90 deg 2' track 40 39 03.00 -72 38 32.00 white
bulkhead unknown location 40 39 03.00 -72 38 32.00 40 39
03.00 -72 38 32.00 813/96-85 40 39 03.00 -72 38 32.00 TWA
14002; see B053 40 39 03.00 -72 38 32.00 40" piece spiral
staircase center support 40 39 03.00 -72 38 32.00 same as
B049; press relief valve 40 39 03.00 -72 38 32.00 canted
bulkhead FS 400 40 39 03.00 -72 38 32.00 forward bulkhead
FS 400 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00

stringer 26R - 38R Canted bulkhead FS 260-280 40 39 03.00
-72 38 32.00 canted bulkhead FS 400 40 39 03.00 -72 38 32.00
row?? Seat 9 8/3/96-145 40 39 03.00 -72 38 32.00 40 39 03.00
-72 38 32.00 canted bulkhead FS 260; 2(4 Bulkhead W/L323
Equip Center Light - FWD 40 39 03.00 -72 38 32.00 L-1 door
slide raft housing 40 39 03.00 -72 38 32.00 upper portion FS
140; bulkhead 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38
32.00 FS 240-287; stringer 22R-26R (Right fuselage; w/ pitot
tube) 40 39 03.00 -72 38 32.00 power drive 747-5100-5-0;
5"(6"(8" 40 39 03.00 -72 38 32.00 Rain repellent 40 39 03.00
-72 38 32.00 Puritan plastic valve BAC# 60B50016-1 40 39
03.00 -72 38 32.00 2' section seat rail w/ floor 40 39 03.00 -72
38 32.00 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00
cargo floor w/ wheels 40 39 03.00 -72 38 32.00 cargo
handling drive wheel 40 39 03.00 -72 38 32.00 10"(30" green
assy p/n 65B0173240 40 39 03.00 -72 38 32.00 40 39 03.00 -72
38 32.00 40 39 03.00 -72 38 32.00 see 35; 5"(13" roller latch-
cargo 40 39 03.00 -72 38 32.00 PA system 40 39 03.00 -72 38
32.00 2'(3' red & white skin peeled 40 39 03.00 -72 38 32.00
R1 Door Top 40 39 03.00 -72 38 32.00 power unit F+D wheel
drive cargo 40 39 03.00 -72 38 32.00 controlled thermostat
2BACR158A5AD 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38
32.00 FS 600-640 stringers 26R-25R with portion of floor
beam 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00
western power drive scd # 60B60006 40 39 03.00 -72 38
32.00 RF 3 Cargo door hinge; 2 rollers 40 39 03.00 -72 38
32.00 cargo 3"(4"(4" red latch 40 39 03.00 -72 38 32.00
actuator 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 FS
340 bulkhead 40 39 03.00 -72 38 32.00 LF22-05 40 39 03.00
-72 38 32.00 FS 740; stringer 39L-44L 40 39 03.00 -72 38 32.00

RH wing upper skin plank; Right Hand Wing Upper Skin Plank 40 39 03.00 -72 38 32.00 SWB #2 RBL 33-3. was cut by NTSB, its associated piece is B2003 or (CW 704) 40 39 03.00 -72 38 32.00 bag support 3" base; EMCO 3 phase motor D2113 40 39 03.00 -72 38 32.00 RH Nose Wheel & Tire 40 39 03.00 -72 38 32.00 nose wheel well sidewall and FS 340 Bulkhead 40 39 03.00 -72 38 32.00 FS 680-720 Stringer 26R-36R 40 39 03.00 -72 38 32.00 small 3"(8" sheet structure w/latch arm 2 40 39 03.00 -72 38 32.00 cargo floor 40 39 03.00 -72 38 32.00 4"(40" beam LF22-19 40 39 03.00 -72 38 32.00 FS 580-600; stringer L38-L39 40 39 03.00 -72 38 32.00 LF22-14 40 39 03.00 -72 38 32.00 FS 600-620; stringer 42L-39L 40 39 03.00 -72 38 32.00 floor heater, electrical 40 39 03.00 -72 38 32.00 6"(26" green structure; stiffener p/n 65B38600-36 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 cargo tie down latch;AL 5"(14"track red latch 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 1'(1'(1' green structure w/12"armature shaft 40 39 03.00 -72 38 32.00 6"(20" twisted white like box 6 40 39 03.00 -72 38 32.00 40 39 03.00 -72 38 32.00 FS 740-760 40 39 03.00 -72 38 32.00 linear actuator 747-5700-2-0 40 39 03.00 -72 38 32.00 R/A gear box for fixed wheel drive 40 39 03.00 -72 38 32.00 65B01731-402 40 39 03.00 -72 38 32.00 Seat Frame 40 39 03.00 -72 38 32.00 513-28-8750; 1"(10" casting w/eccentric groves 40 39 03.00 -72 38 32.00 2'(3' cargo structure w/2-6" rubber wheels 40 39 03.00 -72 38 32.00 white 40" roller ball track w/balls 40 39 03.00 -72 38 32.00 spanwise beam #2 RBL 11 stiffener 40 39 03.00 -72 38 32.00 right hand fuselage window bays; FS 620-740 stringer 19R-26R with windows 40 38 23.46 -72 38 31.94 FS 840-880. Stringer R1-R6 8/19/96-11 40 39 09.49 -72

38 31.92 galley "A" kitchen galley ovens A6, A6a, A6b, A6c, A6c, A6d (3 pieces) 8/08/96-14 40 39 09.49 -72 38 31.92 dish tray box; 1'(16"(6" w/2 dishes 8/08/96-31 40 39 09.49 -72 38 31.92 2 pieces alum sheet; ea 3'(2' 8/08/96-31 40 39 09.49 -72 38 31.92 galley A 4 ovens, coffee maker & drawers 8/08/96-14 40 39 09.49 -72 38 31.92 seat 52 (3) armrest/tray, 40 39 09.49 -72 38 31.92 Fuselage skin 40 39 09.49 -72 38 31.92 FS 160-180 stringer 24R-26R 40 39 06.38 -72 38 31.72 insulation / lining; misc debris 8/31/96-3 40 39 01.66 -72 38 31.62 p/n 58607, DME Receiver 40 38 56.80 -72 38 31.50 lavatory door 8/22/96-7 40 38 35.44 -72 38 31.49 strut 1.5'(2' / light fixture 8/28/96-22 40 39 06.77 -72 38 31.47 luggage carrier; black dress 8/08/96-31 40 38 30.40 -72 38 31.43 10(2(3 Metal box; 967-A stenciling inside 8/04/96-66 40 38 23.58 -72 38 31.23 9/28/96-1 40 39 08.46 -72 38 31.20 debris, fuel line 10/06/96-2 40 38 24.30 -72 38 31.08 1) floor beam and frame segment FS 920 LBL 100-SOB S25L-27.5 2) 1.5(6" skin 3) drawer 1.5'(2'(3" p/n A0 8/19/96-23 40 38 24.30 -72 38 31.08 fuselage skin 40 38 24.30 -72 38 31.08 cargo container piece 40 38 30.10 -72 38 31.07 white wire, marked 02125 or C2125 (xeroxed dive report) approx 2' long 8/22/96-7 40 38 36.22 -72 38 30.98 shirt / metal siding 8/28/96-25 40 38 24.01 -72 38 30.95 6" piece of J channel; white brace 40 38 18.57 -72 38 30.89 wiring 8/17/96-4 40 38 29.76 -72 38 30.84 7' long strut; small piece 6"(2.5"(4" p/n 65B38600-154; small piece 1'(5" no number; small metal shard with 2 whee 8/22/96-7 40 38 17.46 -72 38 30.72 Plastic window frame 8/17/96-4 40 38 19.98 -72 38 30.60 4'(2" Med. wtr Framing 8/17/96-4 40 39 01.90 -72 38 30.00 piece of aircraft interior panel (insulation) 8/22/96-7 40 38

33.00 -72 38 30.00 metal w/vent holes "ZONE C" on side
8/24/96-8 40 38 22.30 -72 38 30.00 FS 900 frame stringer
25R-21R 40 38 18.96 -72 38 30.00 wire harness/small
framing 8/17/96-4 40 38 18.96 -72 38 30.00 3' fiberglass
duct, 1' bent metal; Insulated duct 40 38 36.18 -72 38 29.99
plastic bag containing 1. pencil sharpener, 2. pen
"Reynolds" 3. stapler 4. little box of staples 8/28/96-23 40
38 27.97 -72 38 29.96 4' light alum framing 8/14/96-11 40 38
27.97 -72 38 29.96 upper portion of galley "B" 8/14/96-11 40
38 35.98 -72 38 29.95 magna filter frame box structure p/n
GB52424A30X 2'(2'(4" 8/06/96-46 40 38 42.43 -72 38 29.73
empty plastic bag 40 38 24.90 -72 38 29.43 seat electronic
box 85 8/06/96-1 40 38 22.97 -72 38 29.33 1) rubber window
molding 2) piece of Insulation with plastic latch 3) angled
plastic molding 6" (3" p/n 162-103-8 8/19/96-23 40 38
58.70 -72 38 29.30 black plastic tray 8/22/96-7 40 38 32.71
-72 38 29.30 floor beam lower chord (3' long); FS 920; LBL
28-71 40 38 32.71 -72 38 29.30 floor beam lower chord (12")
40 38 21.70 -72 38 29.30 Interior Metal Piece with Support
Struts; metal panel 40 39 04.02 -72 38 29.25 various aircraft
parts in basket 40 38 25.38 -72 38 29.22 5 pieces 69B517061
HC 8/19/96-11 40 39 06.10 -72 38 29.21 TWA AKN7415
cargo container 40 38 17.01 -72 38 28.97 1' (1' siding / light
framing 8/17/96-4 40 38 47.80 -72 38 28.78 row 11 seat 6
armrest 8/03/96-85 40 38 43.63 -72 38 28.78 2 seats one red,
one blue # row 11' seat 6 40 38 28.80 -72 38 28.70 metal
piece w/jagged edge 10" in length-green 8/24/96-8 40 39
04.12 -72 38 28.52 wallet 40 38 57.30 -72 38 28.50 black
suitcase, softside, full of misc items 8/26/96-31 40 38 20.94
-72 38 28.49 body stringer cargo floor Area 4' long 40 38

20.94 -72 38 28.49 stringer p/n 65B04366-144 8/19/96-23 40
39 03.74 -72 38 28.43 green bag containing personal effects
(inside clear bag) 8/21/96-3 40 39 03.74 -72 38 28.43 misc
debris inside Black Bag 8/21/96-3 40 39 03.74 -72 38 28.43
misc debris placed inside black plastic bag 8/21/96-3 40 39
03.74 -72 38 28.42 Black Bag (Tag inside) contains Misc
Debris 8/21/96-3 40 39 03.70 -72 38 28.40 misc pieces
8/19/96-10 40 39 03.70 -72 38 28.40 victim 40 39 03.70 -72
38 28.40 misc pieces 8/19/96-10 40 39 03.70 -72 38 28.40
miscellaneous small pieces 8/19/96-10 40 39 03.70 -72 38
28.40 fuselage skin, small fragment TBD 40 39 06.27 -72 38
28.39 tubing & parts in plastic bag 8/17/96-1 40 39 06.27
-72 38 28.39 4' tubing section "65B40128-756" 8/17/96-1 40
39 06.27 -72 38 28.39 8' frame piece 8/17/96-1 40 39 13.28
-72 38 28.32 1 green carry on bag 10/10/96-1 40 39 03.80 -72
38 28.30 fuselage LHS FS 600-760 40 38 34.72 -72 38 28.27
harlem NY shirt; Alum shelf siding 8/05/96-2 40 39 03.60
-72 38 28.20 window frame interior 8/29/96-1 40 39 03.60
-72 38 28.20 window frame 8/26/96-31 FBM-8A 40 38 31.73
-72 38 27.88 FS 900 floor beam & frame LBL 85 to SOB; this
part is part of LF36 & FBM-8A 8/08/96-14 40 38 31.73 -72
38 27.88 piece of cabin overhead compartment 20" (4" 40 39
04.853 -72 38 27.85 bag of small misc. debris 8/24/96-9 40
39 04.853 -72 38 27.85 bag of misc. debris 8/24/96-9 40 39
04.853 -72 38 27.85 bag of misc. debris 8/24/96-9 40 39
04.85 -72 38 27.85 insulated hose with fittings 8/24/96-9 40
38 43.99 -72 38 27.81 40 38 21.75 -72 38 27.64 body crown
fuselage; changed from B561 to A2031 to match actual
debris field 40 39 04.63 -72 38 27.62 human remains (spine)
8/23/96-13 40 39 04.63 -72 38 27.62 bag of misc. debris

8/24/96-9 40 39 04.63 -72 38 27.62 bag of misc. debris
8/24/96-9 40 39 04.63 -72 38 27.62 bag of misc. debris
8/24/96-9 40 39 04.63 -72 38 27.62 bag of misc. debris
8/24/96-9 40 39 04.63 -72 38 27.62 bag of misc. debris
8/24/96-9 40 39 04.63 -72 38 27.62 bag of misc. debris
8/24/96-9 40 39 07.70 -72 38 27.50 fuselage skin 40 39 07.70
-72 38 27.50 Misc. Personal Electronics and pr. women's
glasses 8/29/96-1 40 39 07.70 -72 38 27.50 part of
intercoastal with # 326 8/29/96-1 40 39 07.70 -72 38 27.50
fuselage formering with 660 written on it 8/29/96-1 40 39
07.70 -72 38 27.50 row 10 seat 2 label-cap 8/29/96-1 40 39
07.70 -72 38 27.50 Baggage Claim TW 210981 8/29/96-1 40
39 07.70 -72 38 27.50 part of RADOME 8/29/96-1 40 39
07.70 -72 38 27.50 misc small debris 8/29/96-1 40 39 07.70
-72 38 27.50 misc. debris 8/29/96-1 40 39 07.70 -72 38 27.50
metal strap with internal cargo door switch for forward
cargo door; FS 560; WL 164; RBL 96 40 38 58.80 -72 38 27.48
misc. debris 8/29/96-1 40 38 58.80 -72 38 27.48 misc. debris
8/29/96-1 40 38 58.80 -72 38 27.48 misc. debris 8/29/96-1
40 38 58.80 -72 38 27.48 misc. debris 8/29/96-1 40 38 58.80
-72 38 27.48 misc. debris 8/29/96-1 40 38 58.80 -72 38 27.48
misc. debris 8/29/96-1 40 39 05.70 -72 38 27.40 crate
containing misc plane fragments aluminum, fiberglass,
liner plastic, wood, plexiglass, personal clothing, paper
8/28/96-9 40 39 05.70 -72 38 27.40 crate containing misc
plane fragments aluminum, fiberglass, liner plastic, wood,
plexiglass, personal clothing 8/28/96-8 40 39 01.00 -72 38
27.40 bone possibly human 40 39 01.00 -72 38 27.40 bone,
possibly human 40 39 01.00 -72 38 27.40 Cargo Net of Misc
wreckage Debris 8/26/96-31 40 39 04.30 -72 38 27.20

personal luggage 8/03/96-145 40 39 04.30 -72 38 27.20
personal luggage 8/03/96-145 40 39 04.30 -72 38 27.20 row
5 seat 5 & 6 8/03/96-145 40 39 04.30 -72 38 27.20 debris-
sweepings 8/05/96-7 40 39 04.30 -72 38 27.20 personal
luggage 8/03/96-145 40 39 04.30 -72 38 27.20 personal
luggage 40 39 04.30 -72 38 27.20 1 pair eyeglass frames 40
39 04.30 -72 38 27.20 FS 420-440; stringer 20R-27R
8/03/96-145 40 39 04.30 -72 38 27.20 forward fuselage
bulkhead 8/03/96-145 40 39 04.30 -72 38 27.20 sweepings
8/05/96-11 40 39 04.30 -72 38 27.20 victim 40 39 04.30 -72 38
27.20 5' round spiral staircase ceiling panel 8/03/96-145 40
39 04.30 -72 38 27.20 1 jacket with contents of B138
8/04/96-65 LF22-04 40 39 04.30 -72 38 27.20 FS 741; stringer
45L-43R (1'(2'(5' twisted AL w/U stiffeners; cargo bin white
w/primer) 8/05/96-5 40 39 04.30 -72 38 27.20 nose wheel
well skin surrounding nose seal FS 320-260 8/03/96-145 40
39 04.30 -72 38 27.20 right side cargo door, FS 640-760 aft
stringer 28R-43R 8/04/96-65 40 39 04.30 -72 38 27.20 1 large
suitcase 8/04/96-65 40 39 04.30 -72 38 27.20 personal
luggage 8/04/96-65 40 39 04.30 -72 38 27.20 circuit board
8/05/96-6 40 39 04.30 -72 38 27.20 personal luggage
8/04/96-65 40 39 04.30 -72 38 27.20 row 5; seat 8-9
8/04/96-65 40 39 04.30 -72 38 27.20 personal luggage
8/04/96-65 40 39 04.30 -72 38 27.20 FWD cargo door lift
8/04/96-65 40 39 04.30 -72 38 27.20 personal luggage
8/04/96-65 40 39 04.30 -72 38 27.20 personal luggage
8/04/96-65 40 39 04.30 -72 38 27.20 personal luggage
8/04/96-65 40 39 04.30 -72 38 27.20 tan sport jacket
containing B208 (travelers checks/ticket) 40 39 04.30 -72 38
27.20 one pair of pants 8/04/96-65 40 39 04.30 -72 38 27.20

personal luggage 8/04/96-65 40 39 04.30 -72 38 27.20 row 4,
seat 8 8/04/96-65 40 39 04.30 -72 38 27.20 personal luggage
8/04/96-65 40 39 04.30 -72 38 27.20 armrest 54- 8, 10
8/04/96-54 40 39 04.30 -72 38 27.20 5 gal fiber drum small
parts wire and plastic 8/03/96-145 40 39 04.30 -72 38 27.20
cockpit debris; armrest, partial frame 34-9 -10, armrest 45-8,
seat 45-10 8/04/96-64 40 39 04.30 -72 38 27.20 light fixture
8/04/96-57 40 39 04.30 -72 38 27.20 personal property
8/04/96-64 40 39 04.30 -72 38 27.20 cockpit wreckage
8/04/96-64 40 39 04.30 -72 38 27.20 FS 488-560 stringer
13R-31R, aft and beneath R-1 door (Aircraft door frame
and 3 window frames) 8/04/96-65 40 39 04.30 -72 38 27.20
L-1 door 40 39 04.30 -72 38 27.20 personal property
8/03/96-145 40 39 04.30 -72 38 27.20 personal luggage
8/04/96-65 40 39 04.30 -72 38 27.20 FS 380-488; stringer
17L-30L includes door L1 8/04/96-65 40 39 04.30 -72 38
27.20 canted bulkhead FS 400 8/04/96-65 40 39 04.30 -72 38
27.20 personal luggage 8/04/96-65 40 39 04.30 -72 38 27.20
L2 door 65B04425-411 8/04/96-65 40 39 04.30 -72 38 27.20
forward fuselage 8/03/96-145 40 39 04.30 -72 38 27.20
wallets, passports, cash 8/04/96-65 40 39 04.30 -72 38 27.20
operations manual 8/04/96-64 40 39 04.30 -72 38 27.20
clothing 8/05/96-10 40 39 04.30 -72 38 27.20 personal
luggage 8/06/96-2 40 39 04.30 -72 38 27.20 personal
luggage 8/06/96-2 40 39 04.30 -72 38 27.20 portion of a
cargo bin 8/05/96-34 40 39 04.30 -72 38 27.20 personal
luggage 8/05/96-34 40 39 04.30 -72 38 27.20 4'(6' floor FS
580-520; left butt line 75 to RBL 11 8/05/96-34 40 39 04.30
-72 38 27.20 INS battery 8/03/96-145 40 39 04.30 -72 38
27.20 scraps, pieces 8/05/96-34 40 39 04.30 -72 38 27.20

Three(3) human feet and tissue 40 39 04.30 -72 38 27.20
avionics bay; seat 9-10 8/05/96-17 40 39 04.30 -72 38 27.20
3'(4-1/2' cargo floor w/ roller balls 8/03/96-145 40 39 04.30
-72 38 27.20 victim white female 8/03/96-145 40 39 04.30
-72 38 27.20 victim white male 8/03/96-145 40 39 04.30 -72
38 27.20 row 2, seat 8 and 9; row 3 seat 1 and 2 (See tag
B2070) 8/05/96-34 40 39 04.30 -72 38 27.20 victim
8/03/96-145 40 39 04.30 -72 38 27.20 victim 40 39 04.30 -72
38 27.20 FS 380-580; stringer 23L-40L 8/05/96-34 40 39
04.30 -72 38 27.20 personal effects 8/03/96-145 40 39 04.30
-72 38 27.20 Cargo bin 7866 (FC2) 8/06/96-2 40 39 04.30 -72
38 27.20 Cargo bin 8/06/96-2 40 39 04.30 -72 38 27.20
Victim-w/m Row 92, seat 1, wallet attached in clear plastic
bag 40 39 04.30 -72 38 27.20 fuselage skin; FS 340-360;
stringer 37R-41R 8/06/96-2 40 39 04.30 -72 38 27.20
personal effects 8/05/96-34 40 39 04.30 -72 38 27.20 40 39
04.30 -72 38 27.20 fuselage part 8/06/96-2 40 39 04.30 -72 38
27.20 misc. debris 8/05/96-34 40 39 04.30 -72 38 27.20 cargo
bin 8/05/96-34 40 39 04.30 -72 38 27.20 travelers checks
and ticket found in B207 40 39 04.30 -72 38 27.20 FS 540-580
stringers 24R-30R with top right corner of forward cargo
door 8/06/96-2 40 39 04.30 -72 38 27.20 personal luggage
8/06/96-2 40 39 04.30 -72 38 27.20 FS 260-400; stringer
23L-42L from window belt to nose wheel well 8/05/96-34
40 39 04.30 -72 38 27.20 personal luggage 8/06/96-2 40 39
04.30 -72 38 27.20 frame member 8/05/96-34 40 39 04.30 -72
38 27.20 forward fuselage bulkhead 8/03/96-145 LF22-27
40 39 04.30 -72 38 27.20 FS 560; stringer 44R 8/06/96-2 40
39 04.30 -72 38 27.20TM FS 240, skin splice, fuselage; FS
260-280 8/06/96-2 40 39 04.30 -72 38 27.20 8/03/96-145 40

39 04.30 -72 38 27.20 1 large brown suitcase 40 39 04.30 -72
38 27.20 row 4 seat 9 8/05/96-3 40 39 04.30 -72 38 27.20
right hand skin R1 door FS 460-520 40 39 04.30 -72 38 27.20
FS 340-380, stringer 23R-37R 8/06/96-2 40 39 04.30 -72 38
27.20 personal effects 8/03/96-145 40 39 04.30 -72 38 27.20
FS 420-480 stringers 11R-19R, door 1 upper door cutout;
8/06/96-2 40 39 04.30 -72 38 27.20 crash ax 8/04/96-65 40
39 04.30 -72 38 27.20 8/03/96-145 40 39 04.30 -72 38 27.20
FS 440-580; stringer 42L-37R 8/06/96-2 40 39 04.30 -72 38
27.20 fwd portion lower right cargo door; FS 560-670;
target # 2931.2S 40 39 04.30 -72 38 27.20 section of cargo bin
8/06/96-2 40 39 04.30 -72 38 27.20 personal effects
8/03/96-145 40 39 04.30 -72 38 27.20 personal effects, scarf
8/06/96-2 40 39 04.30 -72 38 27.20 personal luggage
8/06/96-2 40 39 04.30 -72 38 27.20 personal effects
8/03/96-145 40 39 04.30 -72 38 27.20 support beam, fwd
cargo 8/06/96-2 LF04, RF04 40 39 04.30 -72 38 27.20 FS
520-800; stringer 4L-24L (Note: saw cut above from RF04)
8/03/96-145 40 39 04.30 -72 38 27.20 clothing from debris
field row 5 seat 5 8/05/96-9 40 39 04.30 -72 38 27.20
personal effects 8/03/96-145 40 39 04.30 -72 38 27.20 row
92, seat 1,2 8/06/96-2 40 39 04.30 -72 38 27.20 personal
effects 8/03/96-145 40 39 04.30 -72 38 27.20 clothing
8/05/96-12 40 39 04.30 -72 38 27.20 FS 340, skin 8/05/96-4
40 39 04.30 -72 38 27.20 personal effects 8/03/96-145 40 39
04.30 -72 38 27.20 FS 340-360; stringer 19R-22R with
window 40 39 04.30 -72 38 27.20 fuselage skin w/ red paint
40 39 04.30 -72 38 27.20 FS 360-380; stringer 19R-23R with
window 40 39 04.30 -72 38 27.20 FS 140-380; stringer 0-45L;
top of skin below cockpit window structure 8/07/96-15 40

39 04.30 -72 38 27.20 FS 240-287; stringer 8A-14R
8/07/96-15 LF22-34 40 39 04.30 -72 38 27.20 FS 500-540;
stringer 40R-45R 40 39 04.30 -72 38 27.20 seat 36 (9) armrest
40 39 04.30 -72 38 27.20 fuselage skin 40 39 04.30 -72 38
27.20 fuselage skin 40 39 04.30 -72 38 27.20 Seat 8 (1 2 3)
8/23/96-1 40 39 04.30 -72 38 27.20 fuselage skin 40 39 04.30
-72 38 27.20 lower 140 bulkhead structure 40 39 04.30 -72 38
27.20 fuselage skin 40 39 04.30 -72 38 27.20 seat 3 (8) 40 39
04.30 -72 38 27.20 first ACM seat 40 39 04.30 -72 38 27.20
personal luggage; black bag w/wallet 8/07/96-15 40 39
04.30 -72 38 27.20 LBL 70, Frame FS 320 (approx 50"
fragment) @WL 302 with fragment of floor beam about 30"
length 8/04/96-64 40 39 04.30 -72 38 27.20 personal
computer 8/07/96-15 40 39 04.30 -72 38 27.20 personal
luggage- 8/07/96-15 40 39 04.30 -72 38 27.20 personal
luggage 8/07/96-15 40 39 04.30 -72 38 27.20 personal
luggage pants w/wallet 8/07/96-15 40 39 04.30 -72 38
27.20 nose gear wheel well FWD bulkhead w/actuator
8/07/96-15 40 39 04.30 -72 38 27.20 fuselage skin w/red
paint 40 39 04.30 -72 38 27.20 second ACM seat 40 39 04.30
-72 38 27.20 FS 1480-1550, 1480 bulkhead WL 220 to
stringer 36R; 8/04/96-64 40 39 04.30 -72 38 27.20 FS
580-800; stringer 23L-39L (upper deck floor beam segment
(approx 20" length)) 40 39 04.30 -72 38 27.20 pulley bracket
assy 40 39 04.30 -72 38 27.20 upper deck floor 40 39 04.30
-72 38 27.20 upper deck floor 40 39 04.30 -72 38 27.20 Upper
deck floor beam segment, about 7' length, FS 740 Stateroom
8/04/96-64 40 39 04.30 -72 38 27.20 FS 440-520; stringer
9R-14R 40 39 04.30 -72 38 27.20 personal luggage; black
handbag 40 39 04.30 -72 38 27.20 cargo bin floor 40 39 04.30

-72 38 27.20 cockpit windows to FS 400. S 9L - 15 R 40 39
04.30 -72 38 27.20 FS 380-400 stringer 22R-23R (piece of
window frame) 40 39 04.30 -72 38 27.20 Fuselage skin 40 39
04.30 -72 38 27.20 cargo bin piece 40 39 04.30 -72 38 27.20
personal luggage, electronics 8/07/96-15 40 39 04.30 -72 38
27.20 nose wheel well structure upper pressure panel 40 39
04.30 -72 38 27.20 cargo bin support from B222 8/07/96-15
40 39 04.30 -72 38 27.20 FS 520-560; aft; 40" long stringer
12R-19R 40 39 04.30 -72 38 27.20 structural support 40 39
04.30 -72 38 27.20 aircraft skin, 65B04705 410 40 39 04.30 -72
38 27.20 small section of upper forward cargo door 40 39
04.30 -72 38 27.20 FS 460-520; stringer 31R-38R 40 39 04.30
-72 38 27.20 cargo bin floor 40 39 04.30 -72 38 27.20 oxygen
bottle 8/07/96-15 40 39 04.30 -72 38 27.20 cockpit windows
to FS 400 stringer 9L-15R includes B211 and B238; skin with
wash nozzles and crew service door 40 39 04.30 -72 38 27.20
wheel well structure 8/07/96-15 8 07 96-15 40 39 04.30 -72
38 27.20 row 91, seat 1,2 8/07/96-15 40 39 04.30 -72 38 27.20
passport 8/07/96-15 40 39 04.30 -72 38 27.20 cockpit floor
40 39 04.30 -72 38 27.20 personal luggage, personal
computer 8/07/96-15 40 39 04.30 -72 38 27.20 FS 560-640;
stringer 19R-23R with window belt 8/07/96-15 40 39 04.30
-72 38 27.20 aircraft debris 8/07/96-15 LF22-23 40 39 04.30
-72 38 27.20 FS 640-660; stringer 44R-46R 8/07/96-15 40 39
04.30 -72 38 27.20 FS 600-780 stringer 23R-44R with
attached cargo door 40 39 04.30 -72 38 27.20 forward
pressure bulkhead 8/07/96-15 LF22-20 40 39 04.30 -72 38
27.20 FS 600-620; stringer 44R-47R 8/07/96-15 40 39 04.30
-72 38 27.20 cardboard box 8/07/96-15 40 39 04.30 -72 38
27.20 FS 220-287; stringer 14A-22R with window belt

8/07/96-15 40 39 04.30 -72 38 27.20 section 41 FS 300-340.
NWW Right fuselage side panel 8/07/96-15 40 39 04.30 -72
38 27.20 FS 600-720, stringers 24R-26R with rear top portion
of forward cargo door 8/07/96-15 40 39 04.30 -72 38 27.20
personal items 8/07/96-15 40 39 04.30 -72 38 27.20 skin
section FS 200-260; stringer 34-43 8/07/96-15 40 39 04.30
-72 38 27.20 upper deck floor 40 39 04.30 -72 38 27.20 FS 720
frame fragment w/ fragment of upper deck floor beam
8/04/96-64 LF22-11 40 39 04.30 -72 38 27.20 right fuselage
FS 580-560 stringer 40-44 8/07/96-15 LF22-06 40 39 04.30
-72 38 27.20 belly piece; FS 780-800 Stringer 40L-45L
8/07/96-15 40 39 04.30 -72 38 27.20 cargo bin 8/07/96-15
LF22-13 40 39 04.30 -72 38 27.20 FS 660-680; stringer
41L-45L 8/07/96-15 40 39 04.30 -72 38 27.20 side panel,
nose wheel well, FS 245-340, p/n65B07942 pressure panel
8/07/96-15 40 39 04.30 -72 38 27.20 FS 740-800; stringer
44L-43R 40 39 04.30 -72 38 27.20 skin section 8/07/96-15 40
39 04.30 -72 38 27.20 cargo bin 7430(FC4) 8/07/96-15 40 39
04.30 -72 38 27.20 crew door 8/07/96-15 40 39 04.30 -72 38
27.20 seat 4 (9) 40 39 04.30 -72 38 27.20 floor assy; FS
720-740; LBL 2 to LBL72 8/03/96-145 40 39 04.30 -72 38
27.20 floor assy FS 740-800; RBL 11.33 to RBL 11.33
8/03/96-145 40 39 04.30 -72 38 27.20 FS 180-120 stringer
26R-36R, two pieces 40 39 04.30 -72 38 27.20 seat 3 (1 2) 40
39 04.30 -72 38 27.20 FS 200-240 stringer 24R-45R 40 38
24.48 -72 38 27.12 3' piece of circular green metal
8/19/96-11 40 38 24.48 -72 38 27.12 spanwise beam #2 RH
web door RBL 8-30 8/19/96-11 40 38 24.48 -72 38 27.12
Forward lower cargo bay structures, FS 900 8/19/96-11 40
39 02.70 -72 38 27.10 blue and white shirt, TWA face cloth,

white sock 8/26/96-31 40 39 04.00 -72 38 27.00 green bag of
misc pieces, airplane debris, wiring 8/26/96-26 40 39 04.00
-72 38 27.00 green bag misc pieces airplane debris,
insulation 8/26/96-25 40 39 03.10 -72 38 27.00 small body
parts/tissue 40 39 03.10 -72 38 27.00 personal effects
including tickets 8/29/96-1 40 39 03.10 -72 38 27.00 landing
gear safety pin 8/29/96-1 40 39 03.10 -72 38 27.00 luggage
tag 8/29/96-1 40 39 03.10 -72 38 27.00 TWA employee ID
8/29/96-1 40 39 03.10 -72 38 27.00 personal checkbook
8/29/96-1 40 38 28.22 -72 38 26.96 small piece of wire
8/19/96-23 40 38 28.22 -72 38 26.96 piece of insulation
found in vicinity of DIG268 8/19/96-23 40 38 29.30 -72 38
26.90 Black plastic with two hinged pieces -white
8/24/96-8 40 38 21.39 -72 38 26.86 white plastic box cover
p/n 60B40053-3 8/19/96-23 40 39 04.70 -72 38 26.80 frame
part; 65 B 14073-1 8/08/96-31 40 39 04.70 -72 38 26.80 frame
part; 65B14006-2 8/08/96-31 40 39 04.70 -72 38 26.80 debris
parts 8/12/96-4 40 39 04.70 -72 38 26.80 general aircraft
debris 8/08/96-31 40 39 04.70 -72 38 26.80 FS 570-600
stringers 22R-23R 8/08/96-31 40 39 04.70 -72 38 26.80
window frame 8/08/96-31 40 39 04.70 -72 38 26.80 FS 500
part 8/08/96-31 40 39 04.70 -72 38 26.80 floor frame deck
8/08/96-31 40 39 04.70 -72 38 26.80 8/12/96-4 40 39 04.70
-72 38 26.80 8/12/96-4 40 39 04.70 -72 38 26.80 FS 740-760
stringer 32R-36R 8/12/96-4 40 39 04.70 -72 38 26.80 aircraft
skin 8/12/96-4 40 39 04.70 -72 38 26.80 debris/parts
8/12/96-4 LF22-24 40 39 04.70 -72 38 26.80 skin/frame; FS
760-780 Stringer 40L-42L 8/12/96-4 40 39 04.70 -72 38 26.80
8/12/96-4 40 39 04.70 -72 38 26.80 cargo bin/part
8/12/96-4 40 39 04.70 -72 38 26.80 electronic bay 8/12/96-4

40 39 04.70 -72 38 26.80 personal effects 8/08/96-31 40 39
04.70 -72 38 26.80 aircraft skin/frame; FWD Cargo Door
skin 8/12/96-4 40 39 04.70 -72 38 26.80 aircraft skin/frame
8/12/96-4 40 39 04.70 -72 38 26.80 FS 675-725; stringer
34L-38L 8/12/96-4 40 39 04.70 -72 38 26.80 personal effects
8/12/96-4 40 39 04.70 -72 38 26.80 personal effects
8/12/96-4 40 39 04.70 -72 38 26.80 plastic frame with darl
8/08/96-31 40 39 04.70 -72 38 26.80 plastic frame
8/08/96-31 40 39 04.70 -72 38 26.80 electronic box
8/12/96-4 40 39 04.70 -72 38 26.80 personal effects
8/08/96-31 40 39 04.70 -72 38 26.80 FS 380-400; stringer
19R-23R with window (skin panel; w/ window)
8/08/96-31 40 39 04.70 -72 38 26.80 section 42 - skin
8/08/96-31 40 39 04.70 -72 38 26.80 cargo floor 8/08/96-31
40 39 04.70 -72 38 26.80 720 main deck floor beam
8/08/96-31 40 39 04.70 -72 38 26.80 belly skin 8/08/96-31
40 39 04.70 -72 38 26.80 cargo liners 8/08/96-31 40 39 04.70
-72 38 26.80 FS 580, upper floor support beam 8/08/96-31
40 39 04.70 -72 38 26.80 FS 340-400 stringer 15R-19R
(passenger cabin skin, section 410) 8/08/96-31 40 39 04.70
-72 38 26.80 personal luggage 8/08/96-31 40 39 04.70 -72 38
26.80 frame section 8/08/96-31 40 39 04.70 -72 38 26.80
personal luggage 8/08/96-31 40 39 04.70 -72 38 26.80
personal luggage 8/08/96-31 40 39 04.70 -72 38 26.80
personal effects 8/08/96-31 40 39 04.70 -72 38 26.80 Row 92
seats 8-9 8/08/96-31 40 39 04.70 -72 38 26.80 cargo liner
8/08/96-31 40 39 04.70 -72 38 26.80 TWA cargo container
skin 8/08/96-31 40 39 04.70 -72 38 26.80 FS 160-220;
stringer 22R-24A with window belt. 8/08/96-31 40 39 04.70
-72 38 26.80 cargo container top frame - 7866 8/08/96-31 40

39 04.70 -72 38 26.80 galley cabinet; row 10, seat 1-3
8/08/96-31 40 39 04.70 -72 38 26.80 generator control unit
8/08/96-31 40 39 04.70 -72 38 26.80 FS 340-380; stringer 9L -
19L 8/08/96-31 40 39 04.70 -72 38 26.80 air-conditioning
cabin duct 8/08/96-31 40 39 04.70 -72 38 26.80 personal
effects 8/08/96-31 40 39 04.70 -72 38 26.80 load controller
8/08/96-31 40 39 04.70 -72 38 26.80 wheel well part
8/08/96-31 40 39 04.70 -72 38 26.80 personal effects
8/08/96-31 40 39 04.70 -72 38 26.80 frame w/ phenolic
block 8/08/96-31 40 39 04.70 -72 38 26.80 personal effects
8/08/96-31 40 39 04.70 -72 38 26.80 personal effects
8/08/96-31 40 39 04.70 -72 38 26.80 FS 400-420; stringer
18R-23R with window 8/08/96-31 LF22-02 40 39 04.70 -72
38 26.80 FS 680-700; stringer 41L-47R 8/08/96-31 40 39
04.70 -72 38 26.80 generator control 8/08/96-31 40 39 04.70
-72 38 26.80 belly skin 8/08/96-31 40 39 04.70 -72 38 26.80
personal effects 8/08/96-31 40 39 04.70 -72 38 26.80 FS 720
frame 8/08/96-31 40 39 04.70 -72 38 26.80 FS 540-560;
stringer 34R (cargo door skin; RF FWD) 8/08/96-31 40 39
04.70 -72 38 26.80 belly frame 8/08/96-31 40 39 04.70 -72 38
26.80 FS 800 frame 8/08/96-31 40 39 04.70 -72 38 26.80
galley floor 8/08/96-31 40 39 04.90 -72 38 24.80 personal
luggage, 8/07/96-15 40 39 00.90 -72 38 24.80 piece of plastic
& hair spray cylinder 8/26/96-31 40 38 27.00 -72 38 24.60
seat belt and buckle 8/24/96-8 40 38 26.90 -72 38 24.50
Aluminum Pipe 8/24/96-8 40 38 23.00 -72 38 24.50 metal
object w/ loose wire assembly 8/24/96-8 40 38 53.30 -72 38
24.40 plastic box 8/26/96-31 40 38 54.17 -72 38 24.36 2
pictures (photographs) & wallet type picture holder
10/02/96-1 40 38 35.07 -72 38 24.27 3' light siding trim

8/19/96-11 40 38 19.20 -72 38 24.26 1'(3"(3" green metal
brace, piece of white electrical wire 8/22/96-7 40 38 52.70
-72 38 24.20 electronic box "AIDS DATA ACQUISITION
UNIT" part # 2222228 mod dav-70-101 ser. 30 TWA part #
53502 8/26/96-31 40 39 00.00 -72 38 24.00 various aircraft
debris / parts 8/10/96-9 40 39 00.00 -72 38 24.00 vent part
FS 380 8/10/96-9 40 39 00.00 -72 38 24.00 seat 1 (1),
8/10/96-9 40 39 00.00 -72 38 24.00 fuselage skin 40 39 00.00
-72 38 24.00 air-conditioning/vent part station 11-15
8/10/96-9 40 39 00.00 -72 38 24.00 aircraft skin 8/10/96-16
40 39 00.00 -72 38 24.00 generator control unit 8/10/96-9 40
39 00.00 -72 38 24.00 personal effects 8/10/96-9 40 39 00.00
-72 38 24.00 row 9 seat (8 9 10), 8/10/96-9 40 39 00.00 -72 38
24.00 personal effects 8/10/96-9 40 39 00.00 -72 38 24.00
various aircraft debris / parts 8/10/96-9 40 39 00.00 -72 38
24.00 personal effects 8/10/96-9 40 39 00.00 -72 38 24.00
various aircraft debris 8/10/96-9 40 38 20.83 -72 38 23.95
light alum/plastic 1' (1' 8/06/96-1 40 38 20.83 -72 38 23.95
light alum/plastic 1'(1' 40 38 29.23 -72 38 23.90 3 short
metal pieces w/ wires # stamped; must bend alum to see #
8/05/96-2 40 38 23.00 -72 38 23.90 Duct 5" in diameter
8/24/96-8 40 38 19.51 -72 38 23.68 forward lower cargo bay
structure FS 840 left hand side (3(1 light inner framing)
8/06/96-46 40 38 16.37 -72 38 23.68 O2 mask & overhead
8/17/96-4 40 38 20.38 -72 38 23.58 small piece of metal
frame 12"(3"(3" attached to coil spring 8/22/96-7 40 39
05.10 -72 38 23.50 3' aluminum pc. 8/26/96-31 40 39 03.41
-72 38 23.26 personal effects & a light fixture moved by
ROV from unknown point, also wire and fiber glass moved
from 12597.4P 8/22/96-8 40 38 47.50 -72 38 22.95 tag "towel

disposal no cigarette disposal" - paper towel disposal door
10/02/96-1 40 38 19.04 -72 38 22.74 coil of white electrical
wire 8/22/96-7 40 38 26.32 -72 38 22.71 vent screen 2(8"
LH#9 C ZONE AC#17119 40 38 18.40 -72 38 22.61 1(1 light
alum framing assembly# 65B52747 8/06/96-46 40 38 20.48
-72 38 22.58 18" alum light framing 1" thick 8/06/96-46 40
38 21.02 -72 38 22.57 alum angle 2"(1"; 1" u shape angle;
alum sheet w/brackets & hole 18"(12"; flex hose 10"; plastic
window frame 8/08/96-31 40 39 04.50 -72 38 22.50 life vest
and cover 8/26/96-31 40 39 04.50 -72 38 22.50 TWA label
book 8/26/96-31 40 38 28.55 -72 38 22.39 small duffel;
containing books, walkman, tapes; 8/08/96-31 40 38 20.04
-72 38 21.80 metal/alum framing w/ smoke detector type
II; p/n 30-231-7B, S/N 30336 8/06/96-1 40 38 28.55 -72 38
21.78 egress system power supply M9412 8/04/96-66 40 38
19.29 -72 38 21.50 FS 900 fuselage frame stringer 34L-36L
8/06/96-1 40 38 21.00 -72 38 21.21 TWA Plate, 8", Broken,
White 40 38 21.00 -72 38 21.21 TWA Plate, 8" broken, white
40 38 23.05 -72 38 20.74 3"(2" piece of aluminum 8/31/96-2
40 38 20.35 -72 38 20.68 1) oxygen mask, 2) 6'(1" brown
rubber molding, 3) 5"(1" green metal bracket #69B50687-1,
4) navy blue TWA seat 40 38 24.38 -72 38 20.64 misc metal
9/28/96-1 40 39 01.62 -72 38 20.60 1 small bone 40 39 03.10
-72 38 20.50 misc pieces 8/19/96-10 40 39 03.10 -72 38 20.50
misc pieces 8/19/96-10 40 39 05.21 -72 38 20.20 bra, alum
angle 18"(1"; 5"(3" misc honey comb 8/08/96-31 40 38 59.90
-72 38 20.20 Passport - French, 8/26/96-31 40 38 23.52 -72
38 20.02 4' black wire with modular plug (#cory 71771)
1'(10" piece of aluminum 8/31/96-1 40 38 52.00 -72 38 20.00
metal box w/handle 8/26/96-31 40 38 53.60 -72 38 19.80

seat row 22 seat 7 8/26/96-31 40 38 34.34 -72 38 19.49 40 38
34.34 -72 38 19.49 3" metal structure, 6" (4" white plastic
serving tray 10/13/96-4 40 39 04.40 -72 38 19.20
passengerair & lightvent 8/26/96-31 40 39 02.00 -72 38
19.00 pilot op manual; plastic window frame; 1' tubing
alum "T", plastic insulation 8/08/96-31 40 39 02.00 -72 38
19.00 American tourister suitcase; black 8/08/96-31 40 39
02.00 -72 38 19.00 Clothing and misc debris; personal
effects 8/08/96-31 40 38 25.47 -72 38 18.91 multi color wires
8/28/96-13 40 39 06.51 -72 38 18.88 misc personal effects
and small parts 8/08/96-31 40 39 06.51 -72 38 18.88 seat 9
(1), 40 38 19.78 -72 38 18.43 1 shirt; wire 8/30/96-6 40 38
17.94 -72 38 18.42 5/16" socket driver; phenolic latch; alum
metal w/bolts; alum angle 5'(10" rib 8/08/96-31 40 39 04.55
-72 38 18.27 metal 1'(1'; pieces of ceramic plate; white
pouch; wire; white slide; spiral notebook 8/28/96-20 40 38
17.60 -72 38 18.17 8" flex tubing; 2" diameter 8/06/96-1 40
38 45.45 -72 38 17.91 aluminum frame 8/03/96-85 40 39
06.50 -72 38 17.90 stainless tray 8/26/96-31 40 39 01.21 -72
38 17.89 multicolored suitcase, misc. luggage pieces
8/22/96-8 40 39 01.21 -72 38 17.89 wallet 8/22/96-8 40 39
01.21 -72 38 17.89 metal scraps (duty free cart) 8/22/96-8 40
39 01.21 -72 38 17.89 stainless metal drawer 8/22/96-8 40
38 55.76 -72 38 17.87 row 8 seat (8, 9, 10) 8/24/96-9 40 38
27.07 -72 38 17.83 7' long 1" wide light strut 40 38 26.69 -72
38 17.81 green suitcase/black hairclip 8/11/96-1 40 38
26.69 -72 38 17.81 plastic tube #B18-5 3 1; metal green; 5'(5"
metal p/n 65B54114-9SK; white insulation 8/11/96-1 40 38
23.06 -72 38 17.78 light framing with trim "Assy 65B54____"
8/19/96-11 40 38 13.88 -72 38 17.29 siding with 65B54890-1

4 3071 / O2 mask 8/17/96-4 40 39 02.80 -72 38 16.90 small debris/parts 8/12/96-4 40 39 02.80 -72 38 16.90 personal effects 8/12/96-4 40 39 02.80 -72 38 16.90 personal effects 8/12/96-4 40 39 02.80 -72 38 16.90 digital computer central air data 8/12/96-4 40 39 02.80 -72 38 16.90 various aircraft debris/parts 8/12/96-4 40 39 02.80 -72 38 16.90 personal effects 8/12/96-4 40 38 23.99 -72 38 16.84 1) metal seat frame "5403359-404"; 2) electrical wire; 3) plastic tray small 3" (6" 8/19/96-11 40 38 39.44 -72 38 16.82 P/N 863703 dispenser for head 8/04/96-66 40 39 04.00 -72 38 16.80 windowgasket 8/26/96-31 40 38 28.51 -72 38 16.55 overhead flood light mfr p/n 30-0418-5/TWA 291-0191 8/10/96-9 40 38 16.20 -72 38 16.53 body stringer segment (approx 6") 40 38 16.20 -72 38 16.53 white frame 1' (10" (2" 8/19/96-23 40 38 19.20 -72 38 16.32 3 pieces 1) Porthole frame 2) Piece of porthole frame 3) "147/1074-98" green brace 8/19/96-11 40 38 24.03 -72 38 16.17 seat back 8/08/96-31 40 38 15.00 -72 38 16.16 rubber window gasket 8/11/96-1 40 39 13.18 -72 38 15.72 pair of shorts 10/08/96-2 40 38 13.35 -72 38 15.71 1) 1-2' piece of pipe 3/4" diam, 2) 6"(1.5" piece (1621012B), 3) 3'(1/2(1/8 strip, 4) 1' with bend with snap hook (69B 40 38 13.98 -72 38 14.91 forward lower cargo bay structure FS 860 left hand side (5'(2.5'(1" metal piece p/n 65B107; also a 1.5'(2" metal piec 8/22/96-7 40 38 15.28 -72 38 14.65 green angle iron 20" (1.5" (1.5" 8/19/96-23 40 38 22.60 -72 38 14.47 1) pair of socks; 2) piece of window 8/19/96-11 40 38 13.44 -72 38 14.47 wires, magnetic cassette tape, passenger headphones, bungie cord material, hair tie, 2 pieces of fiberglass, 2'(1' & 1' 8/22/96-7 40 38 20.34 -72 38 13.50 5 pieces 1) TWA 44-0842 1' (2'

plastic door 2) Plastic bin 3) small plastic tray 3 (6 4)
RayBan Cats Eyeglass frame 8/19/96-11 40 38 13.09 -72 38
13.50 18" piece of wire 8/19/96-23 40 38 12.18 -72 38 13.50
honeycomb insulation 18"(5" 8/19/96-11 40 39 02.09 -72 38
13.45 green strut 6"(2"(1" 8/28/96-15 40 39 03.68 -72 38
12.85 misc. metal debris 8/22/96-8 40 39 03.68 -72 38 12.85
flex tubing p/n 4811-189 8/28/96-10 40 38 24.50 -72 38
12.79 8" green light strut 8/19/96-11 40 38 16.53 -72 38
12.68 seat tray 8/08/96-31 40 38 12.43 -72 38 12.68 forward
lower cargo bay structure FS 880 center line (7'(2 1/2" light
interior framing; wire harness W552-M621) 8/08/96-14 40
38 15.48 -72 38 12.33 aluminum trim rail, green
honeycombed fiberglass (2 pcs) 8/24/96-8 40 39 04.97 -72
38 12.28 blue shirt 8/28/96-11 40 39 02.93 -72 38 12.02 ID
card and business card 8/28/96-29 40 38 58.14 -72 38 11.61
cargo container AKN 9737 TWA 8/11/96-1 40 38 55.16 -72
38 11.53 black umbrella 8/11/96-1 40 39 16.97 -72 38 11.44
plastic piece - white, interior (possible window frame)
10/02/96-1 40 38 20.26 -72 38 11.40 3' light alum strut
8/06/96-46 40 38 20.32 -72 38 11.38 1. 10"(4" fiberglass duct
2. metal strut 5"(1.5" "621012D" 3. white wire 8/30/96-4 40
39 01.82 -72 38 11.36 metal tube 1.5'(0.5"; small luggage lock
8/28/96-21 40 38 58.57 -72 38 11.25 2(2 white metal panel
w. many connectors and wiring 8/11/96-1 40 39 01.47 -72
38 11.04 blue suitcase of 8/22/96-8 40 39 01.47 -72 38 11.04
green suitcase of 8/22/96-8 40 39 01.47 -72 38 11.04 blue
soft side bag of 8/22/96-8 40 39 01.47 -72 38 11.04
unidentified blue suitcase 8/22/96-8 40 39 01.47 -72 38
11.04 metal box misc. metal pieces 8/22/96-8 40 39 01.47
-72 38 11.04 black soft luggage of 8/22/96-8 40 38 15.40 -72

38 10.97 intercostal door frame FS 434 (p/n 69B50675 DEC 9) 8/22/96-7 40 38 06.10 -72 38 10.80 human body 40 39 00.17 -72 38 10.35 brown soft luggage 8/11/96-1 40 39 00.65 -72 38 10.15 6'(2' metal structure w/ ribs and insulation assmbl # ASSY 65B103305000085 8/11/96-1 40 38 57.39 -72 38 10.07 1. 3' flexible tubing (1.5" 2.2' flexible tubing plus pipe with clear plastic box attached "4811-189" 3. jockey underwe 8/28/96-12 40 38 55.24 -72 38 09.74 8/11/96-1 40 38 35.38 -72 38 08.94 fuselage FS 940-820; stringer 6L-17L 8/04/96-66 40 38 35.38 -72 38 08.94 FS 270-290; stringer 39R: 40 38 35.38 -72 38 08.94 FS 400-420; stringer 24A-32A right hand fuselage: 40 38 35.38 -72 38 08.94 fuselage skin FS 360-400 stringer 34R-41R; 8/04/96-66 40 38 35.38 -72 38 08.94 FS 300-340; stringers 29R-41R; 8/04/96-66 40 38 35.38 -72 38 08.94 fuselage skin FS 260; stringer 39R-41R; 8/04/96-66 40 38 49.39 -72 38 08.49 food container 8/28/96-21 40 38 12.01 -72 38 08.21 2' (6" aluminum siding; #3 spanwise center fuel tank beam 8/19/96-11 40 38 58.75 -72 38 08.09 2 bottle O2 container attached to a wire protective blowout panel 8/08/96-14 40 38 17.24 -72 38 07.67 1) 1 blanket, 2) 1 1/2' (2" (1/4" angle bracket, 3) 1 1/2' (1/4" (1 1/2' metal piece 40 39 02.50 -72 38 07.25 clothing 8/28/96-16 40 38 12.41 -72 38 06.75 1) 3' strut - white 2) contact panel 4" (6" 8/19/96-11 40 38 08.67 -72 38 05.68 2 pieces 1) 1.5'(1' shard R644 R645 BAC27EEL652 2) 2'(8" metal stamped TWA 8/20/96-15 40 38 08.67 -72 38 05.68 floor beam lower chord FS 980 RBL 8-28 40 38 59.90 -72 38 05.53 curved white exterior piece 4(4; TWA colored nose cone 8/08/96-14 40 38 59.90 -72 38 05.53 p/n 65B50570-121 p/n 2-3 Order # E330894; 12(1(1 framing

8/08/96-14 40 38 57.56 -72 38 05.50 fiberglass w/
honeycomb insulation, approx 1'(1'. p/n 69B55044-1
SL648A3-500 8/22/96-7 40 38 49.88 -72 38 04.92 3"(2" white
clear plastic piece w/3 small holes 10/02/96-1 40 38 59.44
-72 38 04.65 yellow inflatable slide (p/n 3A2065-21 on
handle)/strap^{*}10 knife cut by riggers
8/08/96-14 40 38 15.94 -72 38 02.36 food tray (plastic)
8/19/96-11 40 38 52.19 -72 38 01.22 metal box; sneaker;
piece of plate 9/25/96-2 40 38 52.19 -72 38 01.20 luggage
9/22/96-1 40 38 50.05 -72 38 00.75 metal food storage unit
10/03/96-4 40 38 07.32 -72 38 00.70 plastic piece p/n
65B50174 "breathing oxygen" 8/11/96-1 40 39 02.88 -72 37
59.88 debris 10/03/96-4 40 39 02.88 -72 37 59.88 clothing in
plastic bag 10/03/96-4 40 38 57.66 -72 37 59.51 plastic bag
w/ unknown contents 10/03/96-4 40 38 45.05 -72 37 59.05
lg. piece of debris 10/03/96-4 40 38 05.10 -72 37 57.40 right
forward cargo bin STA 780; 3'(1' alum siding -ribbed on
back 8/10/96-9 40 38 05.04 -72 37 57.40 2'(10"(1/8"
fiberglass w/ hinge p/n 69B52864-1 8/20/96-15 40 38 19.28
-72 37 57.32 1. 7" plastic curved tube 2. 2.5'(1' metal 3. white
wire 4 dirty white panties "hanes her way" 8/30/96-8 40 38
08.06 -72 37 55.95 3'(1' piece of aluminum; 1'(2" piece of
rubber 8/30/96-3 40 38 18.65 -72 37 55.58 plastic top of
phone; metal shard curved 1'(6" 8/30/96-9 40 38 53.95 -72
37 55.20 knife & signal mirror in plastic bag 10/03/96-4 40
38 08.68 -72 37 54.73 1) grill cover assy 65B64174-2 2) green
strut 2.5'(1"(1" assy 65B50404-27 8/19/96-23 40 38 47.67 -72
37 54.52 misc. piece of metal from aircraft 8/29/96-5 40 39
04.57 -72 37 54.12 debris 10/06/96-3 40 38 51.92 -72 37 52.92
metal tray and plastic 10/02/96-1 40 38 54.67 -72 37 52.68

rubber like debris & butter knife 10/02/96-1 40 38 05.10 -72
37 51.18 12"(18" thin alum sheet 8/10/96-9 40 38 49.23 -72
37 51.08 metal piece of airplane 8/29/96-5 40 38 19.51 -72
37 50.33 metal shelf 3'(1.5'(10" 8/30/96-7 40 39 53.12 -72 37
49.96 green metal piece 8" (1.5" (angular, riveted)
10/13/96-3 40 40 02.93 -72 37 49.86 2 pieces aircraft
structural metal 40 38 07.75 -72 37 49.44 4'(1.5' piece of
aluminum 8/30/96-2 40 39 42.59 -72 37 49.29 plastic fuse
cover TWA p/n 291-1570 10/11/96-10 40 39 13.30 -72 37
48.31 pictures 10/08/96-2 40 39 52.00 -72 37 48.26 plastic
bag w/ unknown contents 10/08/96-1 40 39 49.47 -72 37
48.12 1 plastic bag various items 10/17/96-2 40 40 07.60 -72
37 47.90 metal ribbing 40 39 47.94 -72 37 47.61 3 oxygen
masks, assorted wires, plastic tubing 10/11/96-10 40 39
47.95 -72 37 47.61 plastic time piece wrapped in plastic,
10"(2" small green metal, 2"(1" fabric scrap, one photo
10/13/96-3 40 39 51.83 -72 37 47.43 plastic bag w/ debris
10/08/96-1 40 40 01.80 -72 37 47.40 aircraft structural metal
with rib attached 40 39 54.64 -72 37 47.05 green twisted
metal w/ rivets p/n 65B38600-350 209 10/11/96-10 40 40
46.40 -72 37 46.50 structural framing 40 39 47.96 -72 37
45.44 white plastic 6" (6", and black plastic cover with one
metal prong 10/11/96-10 40 39 59.83 -72 37 44.60 skin
yellow / green with electrical wiring and ribs attached
10/18/96-3 40 40 04.70 -72 37 44.40 aircraft skin with
structural partition attached white one side 40 39 56.69 -72
37 43.72 twisted green metal 10/13/96-3 40 40 00.14 -72 37
43.57 plastic bag with small debris 10/02/96-1 40 40 00.14
-72 37 43.51 debris 9/22/96-1 40 40 05.11 -72 37 43.28
honeycombed skin 10/13/96-3 40 39 52.14 -72 37 41.94

plastic bag w/ debris 10/08/96-1 40 39 49.68 -72 37 40.14
auto transformer; misc. metal; cloth; photos 9/27/96-1 40
39 39.92 -72 37 40.12 1 twisted 12" (6" aluminum w/ seams
and rivets 1 small piece tan 2"(3" plastic - 1 piece light g
Z2592a 40 39 43.30 -72 37 4.95 some kind of carpet; nylon
bag other debris 40 39 51.12 -72 37 39.99 debris w/ pipe
protruding, & plastic bag of unknown debris 10/08/96-1
40 39 49.23 -72 37 39.54 curved plastic w/ black shirt
10/11/96-10 40 39 51.08 -72 37 39.54 curved plastic
attached to metal section w/ screws & nuts 10/11/96-10 40
39 41.47 -72 37 38.90 aluminum piece with spring; skin
plastic 10/11/96-10 40 40 00.73 -72 37 38.85 small piece
curled aluminum 10/17/96-1 40 40 01.60 -72 37 38.80
aluminum beam 10/17/96-1 40 40 01.60 -72 37 38.80 arm
rest 10/17/96-1 40 39 55.18 -72 37 38.76 various white
metal strips 10/17/96-2 40 39 57.97 -72 37 38.75 debris
10/08/96-1 40 39 57.05 -72 37 38.35 metal debris and other
debris in clear plastic bags 10/02/96-1 40 39 57.05 -72 37
38.35 debris 9/22/96-1 40 39 55.05 -72 37 38.35 debris
9/22/96-1 RF114A 40 39 49.80 -72 37 38.30 window;
fuselage 9/28/96-1 40 40 00.03 -72 37 38.22 debris & plastic
bag containing debris 10/08/96-1 40 39 49.80 -72 37 38.10
black melted plastic w/ tubing 9/28/96-1 40 39 59.78 -72
37 37.55 small piece bent skin, aluminum 10/17/96-1 40 39
50.80 -72 37 37.47 fuselage bulkhead parts, 8'(2' 8/16/96-5
40 40 04.90 -72 37 37.00 10/17/96-1 40 39 44.60 -72 37 36.90
carpet; seatbelt; wires; motor; misc. metal 9/27/96-1 40 39
42.18 -72 37 36.79 plastic and metal cover 10/13/96-3 40 39
42.20 -72 37 36.78 unknown type of motor 10/09/96-1 40 39
42.20 -72 37 36.78 6' (3' (3' piece of wreckage 10/09/96-1

40 40 01.10 -72 37 36.70 aluminum strip w/ red material attached 10/17/96-1 40 40 09.16 -72 37 36.54 2 small pieces of wreckage, s/n 65B82330 on larger piece 10/10/96-1 40 40 09.16 -72 37 36.54 1 piece of skin s/n 65B02424-53 10/10/96-1 40 40 09.16 -72 37 36.54 arm rest passenger seat 10/10/96-1 40 39 46.70 -72 37 36.51 front spar web; RBL 65-112; CW MOCKUP 9/08/96-2 40 39 46.70 -72 37 36.51 fire extinguisher tanks and pipes; debris 9/21/96-1 40 39 46.70 -72 37 36.51 white piece of metal 10/17/96-2 40 39 46.70 -72 37 36.51 green metal piece w/ black metal piece (twisted) attached 10/13/96-3 40 39 46.70 -72 37 36.51 window; carpet; debris; human jaw bone 9/21/96-1 40 39 46.70 -72 37 36.51 riveting, fuel filter 10/18/96-3 40 39 58.10 -72 37 36.50 aluminum strip 10/17/96-1 40 39 11.05 -72 37 36.48 debris 40 39 10.84 -72 37 36.12 debris 40 40 00.30 -72 37 35.60 6" piece of aluminum 10/17/96-1 40 40 00.30 -72 37 35.60 small sheet metal piece 10/17/96-1 40 40 03.40 -72 37 35.60 small light structural piece 10/17/96-1 40 39 45.57 -72 37 35.30 twisted metal, riveted 10/13/96-3 40 39 45.40 -72 37 35.20 fuselage skin w/2 skin patches 40 39 45.40 -72 37 35.20 Fwd belly skin 40 39 45.40 -72 37 35.20 Belly skin w/ stringer 40 39 45.40 -72 37 35.20 Portion of engine 40 39 45.40 -72 37 35.20 FS 2412-2436 (3'(2.5')); stringer 18L-23L PARTS BAY 8/29/96-2 40 39 45.40 -72 37 35.20 one piece of metal from aircraft 8/29/96-2 C1652 40 39 45.40 -72 37 35.20 engine exhaust; tail cone 8/29/96-2 40 39 45.40 -72 37 35.20 misc. debris 8/29/96-2 40 39 45.40 -72 37 35.20 misc. debris 8/29/96-2 40 39 45.40 -72 37 35.20 small piece or cw tank side of body rib web (2" (3")) CW MOCKUP 40 39 45.40 -72 37 35.20 Fuselage

skin 40 39 45.40 -72 37 35.20 fwd belly skin 40 39 45.40 -72
37 35.20 Portion of fan reverser 40 40 04.45 -72 37 35.18 skin
w/ red paint, mangled 10/17/96-1 40 39 49.00 -72 37 34.83
curved alum. w/honeycombs 10/17/96-1 40 40 00.43 -72
37 34.66 skin part 10/17/96-1 40 39 58.10 -72 37 34.50 small
irregular piece of aluminum 10/17/96-1 40 39 47.70 -72 37
34.30 misc. wires; metal; flourny pipes; plastic 9/27/96-1
40 39 47.70 -72 37 34.30 personal effects - 2 fanny packs;
jacket; white shoe; waist band of pants 9/27/96-1 40 39
56.68 -72 37 34.24 duct work and metal 9/11/96-5 40 39
56.68 -72 37 34.24 debris 10/02/96-1 40 39 51.51 -72 37 34.22
film projection device 10/10/96-1 40 39 53.38 -72 37 34.22
debris 10/07/96-1 40 39 53.38 -72 37 34.22 debris
10/07/96-1 40 39 53.38 -72 37 34.22 piece of black pipe, 2
pieces of debris 10/07/96-1 40 39 51.51 -72 37 34.22 plastic
bag w/ unknown contents 10/08/96-1 40 39 53.38 -72 37
34.22 part of filter system 10/07/96-1 40 40 01.50 -72 37
34.20 skin piece 10/17/96-1 40 39 56.88 -72 37 34.02 debris
10/07/96-1 40 39 45.00 -72 37 34.00 #2 engine fan casing
ENG HGR 8/10/96-16 40 39 45.00 -72 37 34.00 #2 engine
ENG HGR 8/10/96-16 40 39 45.00 -72 37 34.00 #2 engine
oil tank and main gear box ENG HGR 8/10/96-16 40 39
45.00 -72 37 34.00 variable camber flap section ENG HGR
8/10/96-16 40 39 45.00 -72 37 34.00 #2 engine tail pipe
ENG HGR 8/10/96-16 40 39 45.00 -72 37 34.00 aircraft
hydraulic filter assembly ENG HGR 8/10/96-16 40 40 06.10
-72 37 33.79 long piece of stringer 10/17/96-1 40 39 46.89
-72 37 33.74 spanwise beam 3 web + stiffener RBL 83.24
CW MOCKUP 10/03/96-4 CW1020 40 39 46.89 -72 37 33.74
LBL 66; rear spar web segment with stiffener flange CW

MOCKUP 10/03/96-4 40 39 46.89 -72 37 33.74 debris
9/22/96-1 40 39 46.89 -72 37 33.74 debris and black bag of
debris 9/22/96-1 40 39 46.89 -72 37 33.74 misc. metal debris
9/24/96-16 40 39 46.89 -72 37 33.74 debris and black bag of
debris 9/22/96-1
Z3500 40 39 46.89 -72 37 33.74 misc. metal debris
9/24/96-16 40 39 46.89 -72 37 33.74 misc. metal debris
9/24/96-16 40 39 46.89 -72 37 33.74 misc. metal debris
9/24/96-16 40 39 46.89 -72 37 33.74 VISA card and
photographs 9/24/96-16 40 39 46.89 -72 37 33.74 large fuel
flange 9/22/96-1 40 39 46.89 -72 37 33.74 debris and black
bag of debris 9/22/96-1 40 39 54.40 -72 37 33.70 coupler
antenna; large piece of metal 9/27/96-1 40 39 54.40 -72 37
33.70 misc. metal debris; clothing; rubber hose 9/27/96-1
40 39 54.46 -72 37 33.57 FS 1350-1394 stringer 23L - 33L
9/19/96-1 40 39 54.46 -72 37 33.57 misc. metal debris
9/19/96-1 40 39 54.46 -72 37 33.57 plastic bag and air duct
9/11/96-5 40 40 01.50 -72 37 33.40 aluminum structural
10/17/96-1 40 39 49.80 -72 37 33.20 green metal strip 40 39
49.80 -72 37 33.20 misc. metal; plastic; lifevest; wires; rope
9/27/96-1 40 39 49.80 -72 37 33.20 large metal green piece
9/27/96-1 40 39 49.80 -72 37 33.20 misc. metal; plastic tray
table 9/27/96-1 40 39 52.37 -72 37 33.01 burnt skin part &
structure skin 10/17/96-1 40 39 52.37 -72 37 33.01 2' (3'
piece of skin 40 39 30.48 -72 37 32.98 one woman's shoe
(black). 10/17/96-1 40 40 04.30 -72 37 32.76 yellow
structural piece 10/17/96-1 40 39 58.71 -72 37 32.73 piece of
tubing 10/07/96-1 40 39 56.90 -72 37 32.71 green metal
piece 1.5" (7" 10/13/96-3 40 39 29.95 -72 37 32.61 aircraft
skin 10/17/96-3 40 39 48.20 -72 37 32.60 black boot; misc.

metal 9/27/96-1 40 40 05.30 -72 37 32.55 small metal piece,
purple on one side, yellow on the other 10/12/96-3 40 40
05.30 -72 37 32.55 fuselage skin 40 40 05.30 -72 37 32.55
cloth insulation (2 1/2"(2 1/2")) 10/12/96-3 40 40 05.30 -72
37 32.55 fuselage skin w/ frames (1' (1')) 10/12/96-3 40 40
05.30 -72 37 32.55 3' strip aluminum frame 10/12/96-3 40
39 47.20 -72 37 32.40 misc. metal wires attached; seat back;
plastic; flashlight 9/28/96-1 40 39 49.18 -72 37 32.15 green
metal 40 38 12.04 -72 37 32.11 40 39 52.70 -72 37 32.10 grey
"U" shaped metal 40 39 52.70 -72 37 31.90 heavy gauge
green metal w/ rivet holes 40 38 11.33 -72 37 31.77 FS
880-900 stringer 1R-3R RHS 1'(1' fuselage crown skin/
6"(2"(2" alum strut; 8/10/96-9 40 39 53.85 -72 37 31.41
debris 10/07/96-1
Z1783 40 39 53.85 -72 37 31.41 2 blazers, blue slacks,
garment bag, 3 hangers 10/07/96-1 40 40 03.12 -72 37 31.34
green american tourist luggage 10/17/96-1 40 40 04.07
-72 37 31.31 towel dispenser 40 39 48.10 -72 37 31.20 7'(9'
section of metal debris 9/25/96-2 40 39 48.10 -72 37 31.20 2
cameras; personal hygiene items 9/25/96-2 40 39 48.10 -72
37 31.20 1 hydro pump (vickers s/n MX438017); misc.
metal debris 9/25/96-2 40 39 47.00 -72 37 31.00 #2 engine
left hand side cowl door ENG HGR 8/10/96-16 40 39 47.00
-72 37 31.00 #2 engine fuel pump and control ENG HGR
8/10/96-16 40 39 47.00 -72 37 31.00 aircraft fire bottle
8/10/96-16 40 39 47.00 -72 37 31.00 #2 engine angle gear
box ENG HGR 8/10/96-16 40 39 47.00 -72 37 31.00 #2
engine tail pipe lining ENG HGR 8/10/96-16 40 39 47.00
-72 37 31.00 40 39 47.00 -72 37 31.00 40 39 47.00 -72 37 31.00
40 39 47.00 -72 37 31.00 #2 engine strut ENG HGR

8/10/96-16 40 39 47.00 -72 37 31.00 #2 engine inlet duct
ENG HGR 8/10/96-16 40 39 47.00 -72 37 31.00 APU
exhaust duct ENG HGR 8/10/96-16 40 39 47.00 -72 37
31.00 #2 engine reverser air motor ENG HGR 8/10/96-16
40 39 47.00 -72 37 31.00 #1 engine LPT rub strip ENG HGR
8/10/96-16 40 39 47.00 -72 37 31.00 fuselage skin cargo
door surround FS 1920-1960; stringer 27R-34R 8/10/96-16
40 39 47.00 -72 37 31.00 power unit EEMCO 60B0037-25
ENG HGR 8/10/96-16 40 39 47.00 -72 37 31.00 bulkhead
section PARTS BAY 8/10/96-16 40 39 47.00 -72 37 31.00 FS
2275-2360 stringer 11R-23R, aft lower body skin;
8/10/96-16 40 39 47.00 -72 37 31.00 FS 1870-1930; stringer
22R-23R with window frame (fuselage strip with 3
window frame portions) 8/10/96-16 40 39 47.00 -72 37
31.00 FS 1920-1965, right side fuselage bulkhead frame
8/10/96-16 40 39 47.00 -72 37 31.00 FS 2290-2230, fuselage
section 8/10/96-16 40 39 47.00 -72 37 31.00 FS 2460, frame
8/10/96-16 40 39 47.00 -72 37 31.00 FS 2340-2360; stringer
8R-4L aft portion of RHS crown skin 8/10/96-16 40 39
47.00 -72 37 31.00 bulk cargo door structure FS 1960-2060;
stringer 23R-46R 8/10/96-16 40 39 47.00 -72 37 31.00 #2
engine inlet duct ENG HGR 8/10/96-16 40 39 47.00 -72 37
31.00 door crank mechanism/ actuator arm EEMCO
60B40037-25 8/10/96-16 40 39 47.00 -72 37 31.00 FS 1640
frame section 8/10/96-16 40 39 47.00 -72 37 31.00 cw lower
skin-left S-14 to S-15 CW MOCKUP 40 39 48.10 -72 37 30.90
hazmat bag containing human spine 40 39 45.70 -72 37
30.90 camera (Nikkormat); lens; luggage tag brown
9/26/96-17 40 39 45.70 -72 37 30.90 piece of luggage
9/26/96-17

Z3534 40 39 45.70 -72 37 30.90 seat 32 (7) arm and rail;
window section (skin); motor exhaust (TWA #1501); misc
metal debris 9/26/96-17 40 39 56.00 -72 37 30.80 piece of
metal 1'(2" 10/09/96-1 40 39 50.40 -72 37 30.80 misc. metal/
rubber debris 9/25/96-2 40 39 47.90 -72 37 30.80 actuator
pneumatic drive s/n 40P-1126C; misc. debris 9/27/96-1 40
39 32.72 -72 37 30.72 18"(10" insulation PARTS BAY
8/09/96-37 40 39 13.31 -72 37 30.69 blank photo
10/07/96-1 40 39 49.68 -72 37 30.51 bag of debris
10/02/96-1 40 39 49.68 -72 37 30.51 debris and black bag of
debris 9/22/96-1 40 39 49.68 -72 37 30.51 debris and black
bag of debris 9/22/96-1 40 39 49.70 -72 37 30.50 hazmat
bag containing human bone 40 39 49.70 -72 37 30.50 lower
center wing STR 13; 3"(4" piece; Lot # 9-24-96-16 CW
MOCKUP 40 39 49.70 -72 37 30.50 lower center wing skin
panel; RBL 85; stringer 14-15; Lot# 9-24-96-16 CW
MOCKUP 40 39 49.70 -72 37 30.50 lower center wing skin
panel; RBL 57-75; stringer 13-14; Lot # 9-24-96-16 CW
MOCKUP 40 39 49.70 -72 37 30.50 misc. debris; camera;
clothing (womens) 9/24/96-16 40 39 49.70 -72 37 30.50 long
metal tube 9/24/96-16 40 39 48.00 -72 37 30.40 6'(2' section
of metal 9/25/96-2 40 39 49.40 -72 37 30.40 aluminum strip
10/17/96-1 40 39 48.00 -72 37 30.40 misc. metal doors
9/25/96-2 40 39 45.17 -72 37 30.39 metal pump 10/13/96-3
40 39 43.58 -72 37 30.35 honeycombed metal 10/13/96-3 40
39 50.10 -72 37 30.30 external aircraft skin #65B15697-5
approx. 10'(8' CW MOCKUP 9/24/96-16 40 39 50.20 -72 37
30.30 misc. metal debris; 1 pressure regulation bypass
valve 9/25/96-2 40 39 56.10 -72 37 30.30 small structural
piece 10/09/96-1 40 39 50.10 -72 37 30.30 misc. debris

9/24/96-16 40 39 50.20 -72 37 30.30 misc. metal debris
9/25/96-2 40 39 47.17 -72 37 30.13 #1 engine cascade
support ring ENG HGR 8/08/96-39 40 39 47.17 -72 37 30.13
FEGV casing #1 engine ENG HGR 8/08/96-39 40 39 47.50
-72 37 30.10 drivers license/camera 9/25/96-2 40 39 59.50
-72 37 30.10 small piece of aluminum 10/17/96-1 40 39
53.90 -72 37 30.08 fuselage fragment or flight control
surface or wing 9/11/96-5 40 39 53.90 -72 37 30.08 metal
and pipe 9/11/96-5 40 39 53.90 -72 37 30.08 debris
9/21/96-1 40 39 53.90 -72 37 30.08 misc. metal; rubber
gasket material 9/27/96-1 40 39 53.90 -72 37 30.08 metal
tubing; scrap metal 9/27/96-1 40 39 47.17 -72 37 30.01 #1
engine ENG HGR 8/08/96-39 40 39 47.17 -72 37 30.01 inlet
duct half ENG HGR 8/08/96-39 40 39 47.17 -72 37 30.01 #1
engine fan case ENG HGR 8/08/96-39 40 39 47.17 -72 37
30.01 turbine exhaust casing #1 engine ENG HGR
8/08/96-39 40 39 47.17 -72 37 30.01 #1 engine half intake
duct ENG HGR 8/08/96-39 40 39 49.40 -72 37 30.00 misc.
metal debris; wiring; plastic 9/25/96-2 40 39 48.00 -72 37
30.00 long metal piece 9/24/96-16 40 39 51.50 -72 37 30.00
yellow metal 40 39 48.00 -72 37 30.00 misc. debris
9/24/96-16 40 39 48.00 -72 37 30.00 misc. debris 9/24/96-16
40 39 49.40 -72 37 30.00 seat 49 (6) cap and ashtray only
CABIN HGR 40 39 49.40 -72 37 30.00 SOB web CW
MOCKUP 40 39 48.00 -72 37 30.00 luggage w/ wheels
9/24/96-16 40 39 47.18 -72 37 30.00 misc. metal debris
10/13/96-3 40 39 48.50 -72 37 30.00 misc. metal debris
9/26/96-17 40 39 49.40 -72 37 30.00 seat 46 (0) armrest only
40 39 48.50 -72 37 30.00 camera; perfume; clothing
9/26/96-17 40 39 48.50 -72 37 30.00 metal debris

9/26/96-17 40 39 49.40 -72 37 30.00 green metal piece
10/17/96-1 40 39 42.74 -72 37 29.97 aircraft skin 10/18/96-3
40 39 48.50 -72 37 29.90 misc. metal debris 9/26/96-17 40 39
47.90 -72 37 29.90 misc. metal debris 9/25/96-2 40 39 51.50
-72 37 29.90 small piece of aluminum & section of fiberglass
panel 10/17/96-1 40 39 49.40 -72 37 29.80 wallet
9/24/96-16 40 39 49.40 -72 37 29.80 watches, US currency,
personal effects 9/24/96-16 40 39 49.40 -72 37 29.80 black
canvas carry-on bag 9/24/96-16 40 39 49.40 -72 37 29.80
#65B9753-1EMG position 1&2, 3&4 9/24/96-16 40 39 47.80
-72 37 29.60 leading edge flap; drive torque tube
8/30/96-22 40 39 47.80 -72 37 29.60 misc. piece of metal
from aircraft 8/29/96-4 40 39 47.80 -72 37 29.60 misc. metal
debris PARTS BAY 8/29/96-4 40 39 47.80 -72 37 29.60
human bones 40 39 47.80 -72 37 29.60 misc. piece of metal
from aircraft 8/29/96-4 40 39 47.80 -72 37 29.60 stainless
steel tubing (hydro line) 8/30/96-23 40 39 47.80 -72 37
29.60 FS 2220-2330 (lower L5 door) stringer 23-31
8/29/96-4 40 39 47.80 -72 37 29.60 wallet, earring set;
8/29/96-4 40 39 47.80 -72 37 29.60 FS 2360-2506; stringer
8L-20L; piece of outer skin of aircraft 8/29/96-4 40 39 47.80
-72 37 29.60 misc metal piece from aircraft PARTS BAY
8/29/96-4 40 39 47.80 -72 37 29.60 misc. metal pieces of
aircraft PARTS BAY 8/29/96-4
C1656 40 39 47.80 -72 37 29.60 misc piece of metal from
aircraft 8/29/96-4 40 39 47.80 -72 37 29.60 FS 2440-2500, aft
fuselage, upper crown skin 8/29/96-4 40 39 47.80 -72 37
29.60 frame #5 door; fragments probably from R5 door
area 40 39 47.80 -72 37 29.60 aft fuselage FS 2436 angle
bulkhead 40 39 47.80 -72 37 29.60 FS 1480 bulkhead outer

cord; fragment approximately 16" in length at WL 186
8/29/96-14 40 39 47.80 -72 37 29.60 vertical fin canted rib
#3, section 86 40 39 47.80 -72 37 29.60 aft fuselage FS 2502
upper bulkhead 40 39 47.80 -72 37 29.60 rod-to-cap/web;
truss; 48 section 40 39 47.80 -72 37 29.60 misc. debris from
aircraft PARTS BAY 8/30/96-23 40 39 47.80 -72 37 29.60
stabilizer trim quadrant and cable 40 39 47.80 -72 37 29.60
8/29/96-4 40 39 47.80 -72 37 29.60 cabin entry door R5
upper flap seal (upper gate #5R door FS 2261); stringer 17R
8/29/96-4 40 39 47.80 -72 37 29.60 Piece of fuselage 40 39
47.80 -72 37 29.60 rudder web, rudder FS 32.865 8/29/96-4
40 39 47.80 -72 37 29.60 FS 1480-1500; stringer 10R-13R
8/29/96-4 40 39 47.80 -72 37 29.60 misc. piece of metal from
aircraft PARTS BAY 8/30/96-21 40 39 47.80 -72 37 29.60 left
wing outboard aileron - outer 1/3 of the aileron 8/29/96-4
40 39 47.80 -72 37 29.60 misc. piece of metal from aircraft
PARTS BAY 8/29/96-4 40 39 47.80 -72 37 29.60 fragment
bulk cargo door; forward end with tee-stop 40 39 47.80 -72
37 29.60 piece of fuselage, left side 8/29/96-4 40 39 47.80
-72 37 29.60 Piece of fuselage - red (2' (1') PARTS BAY 40 39
47.80 -72 37 29.60 fuselage skin, aft belly (3' (1') 40 39 47.80
-72 37 29.60 Left side belly fuselage 40 39 47.80 -72 37 29.60
Piece of fuselage 40 39 47.80 -72 37 29.60 FS 2320-2340
stringer 20R-21R 8/29/96-4 40 39 47.80 -72 37 29.60 piece of
fuselage, red/white/silver 40 39 47.80 -72 37 29.60 Portion
of fuselage - red - aft belly PARTS BAY 40 39 47.80 -72 37
29.60 misc. personal effects including watch 8/29/96-4 40
39 47.80 -72 37 29.60 misc. metal pieces from aircraft
8/29/96-4 40 39 47.80 -72 37 29.60 FS 1500-1600; stringer
12R-21R; with window belt 8/29/96-4 40 39 47.80 -72 37

29.60 misc. metal pieces from aircraft 8/29/96-4 40 39 47.80
-72 37 29.60 misc. metal pieces from aircraft 8/29/96-4 40
39 47.80 -72 37 29.60 misc. part (tail section) of aircraft
8/29/96-4 40 39 47.80 -72 37 29.60 misc. body parts 40 39
47.80 -72 37 29.60 Piece of fuselage - left side 40 39 47.80 -72
37 29.60 piece of keel beam
C2214 40 39 47.80 -72 37 29.60 fuselage section w/ fairing
attachments 40 39 47.80 -72 37 29.60 fuselage skin. red/
white paint aft FS 520 40 39 47.80 -72 37 29.60 fuselage skin-
red/white paint (1' (1') 40 39 47.80 -72 37 29.60 Galley cart
40 39 47.80 -72 37 29.60 Portion of fuselage 40 39 47.80 -72
37 29.60 Lower left side fuselage - red PARTS BAY 40 39
47.80 -72 37 29.60 Piece of belly fuselage aft 40 39 47.80 -72
37 29.60 Right side floor of duty free module. FS 2223-2253
CABIN HGR 40 39 47.80 -72 37 29.60 FS 2436-2484; stringer
17L-23L 8/29/96-4 40 39 47.80 -72 37 29.60 Piece of fuselage
- aft PARTS BAY 40 39 47.80 -72 37 29.60 Piece of fuselage -
red - right side PARTS BAY 40 39 47.80 -72 37 29.60 Piece of
fuselage white/red PARTS BAY 40 39 47.80 -72 37 29.60
portion of fuselage 8/29/96-4 40 39 47.80 -72 37 29.60 cabin
entry door R5 lower section; FS 2240-2285, stringer
24R-25R 8/29/96-4 40 39 47.80 -72 37 29.60 FS 2280-2345,
stringer 42R-51L 8/29/96-4 40 39 47.80 -72 37 29.60 long
piece of metal 8/29/96-4 40 39 47.10 -72 37 29.60 misc.
metal debris to include: metal fragment labeled p/n
65B97321B s/n RR005402 and 9.5'(6" ch 9/26/96-17 40 40
01.78 -72 37 29.57 piece of bulkhead 10/17/96-1 40 39 41.70
-72 37 29.56 piece of metal 10/17/96-2 40 39 47.31 -72 37
29.56 misc. metal debris 10/13/96-3 40 39 46.27 -72 37 29.52
metal piping 10/17/96-1 40 40 04.97 -72 37 29.44 aluminum

skin 10/12/96-3 40 40 04.97 -72 37 29.44 plastic valve
assembly 10/12/96-3 40 39 47.50 -72 37 29.36 misc. metal
debris 10/13/96-3 40 39 49.20 -72 37 29.20 metal tubes and
misc. debris 9/24/96-16 40 39 49.20 -72 37 29.20 wire and
fabric 9/24/96-16 40 39 49.20 -72 37 29.20 long metal tube
9/24/96-16 40 39 49.29 -72 37 29.20 white plastic bag
containing misc. debris 9/24/96-16 40 39 49.20 -72 37 29.20
large riveted metal piece of debris 9/24/96-16 40 40 06.70
-72 37 29.13 small piece of fiberglass honeycomb
10/12/96-3 40 39 49.10 -72 37 29.10 FS 940-960; stringer
38L-40L; fuselage skin under body fairing; lot # 9-25-96-2
9/25/96-2 40 39 49.10 -72 37 29.10 misc. metal debris
9/25/96-2 40 39 49.10 -72 37 29.10 right wing upper surface
near rear spar WS 1250 9/25/96-2 40 39 49.10 -72 37 29.10
SOB rib segment CW MOCKUP 40 39 47.00 -72 37 29.00
frame fragment, white and green, 2'(3' 8/14/96-9 40 39
47.00 -72 37 29.00 fuselage fragment, green/white/
partially charred 6'(8' 8/14/96-9 40 39 47.00 -72 37 29.00
fuselage fragment 12'(10' w/windows and door, FS
2140-2280 8/14/96-9 40 39 47.00 -72 37 29.00 portion aft
section bulkhead 8/14/96-9 40 39 47.00 -72 37 29.00
fuselage fragment green/white 3'(2' 8/14/96-9 40 39 47.00
-72 37 29.00 fuselage, red heavy frame 3'(2' 8/14/96-9 40 39
47.00 -72 37 29.00 human remains 40 39 47.00 -72 37 29.00
left fuselage FS 2200 - 2240. S34L - 46L; fuselage bulkhead
w/window, red and white 3'(4' 8/14/96-9 40 39 47.00 -72
37 29.00 fuselage fragment 3'(1' 8/14/96-9 40 39 47.00 -72
37 29.00 fuselage fragment 10'(8' green/white; STA
2320-2489, stringer 3L-11L 8/14/96-9 40 39 47.00 -72 37
29.00 actuator outflow valve, electric MOTOR BAY

8/14/96-9 40 39 47.00 -72 37 29.00 cabin entry door R5,
partial structure (window damage distinctive); FS
2240-2285; stringer 18R-22 8/14/96-9 40 39 47.00 -72 37
29.00 fuselage, exterior, red 1'(1' 8/14/96-9 40 39 46.90 -72
37 29.00 2 cameras; US mail; perfume; watches 9/26/96-17
40 39 46.90 -72 37 29.00 misc. metal debris 9/26/96-17 40 39
49.00 -72 37 29.00 1 camera; 1 watch; 1 cassette recorder
9/26/96-17 40 39 49.00 -72 37 29.00 plastic bag containing
small copper pieces 9/26/96-17 40 39 49.00 -72 37 29.00 a/c
motor s/n 325P205; metal fragment marked "93" and misc.
debris 9/26/96-17 40 39 49.00 -72 37 29.00 misc. metal
debris 9/26/96-17 40 39 55.61 -72 37 28.97 green metal
piece 9/16/96-2 40 39 55.61 -72 37 28.97 pipe; material
(cloth); little piece of filter; debris 9/20/96-33 40 39 52.40
-72 37 28.90 misc. debris and large camber shaped piece of
metal 9/24/96-16 40 39 45.39 -72 37 28.90 debris 9/22/96-1
40 39 50.90 -72 37 28.90 piece of door 9/25/96-2 40 39 45.80
-72 37 28.70 8' metal shaft w/ u-joint attached 9/26/96-17
40 39 45.00 -72 37 28.70 3' aircraft skin 9/21/96-1 40 39
46.00 -72 37 28.60 FS 1394-1880 fuselage; stringer 26L-12R
40 39 49.20 -72 37 28.60 4 watches and 1 Visa gold card; 2
cassette recorders 9/25/96-2 40 40 59.50 -72 37 28.60
curved piece w/ bulkhead & honeycomb 10/17/96-1 40 39
49.20 -72 37 28.60 misc. metal debris 9/25/96-2 40 39 49.20
-72 37 28.60 misc. metal debris to include: 1 large and
heavy circular shaped section of metal 9/25/96-2 40 39
51.76 -72 37 28.59 metal tube and misc. parts 9/24/96-16 40
39 51.76 -72 37 28.59 misc. metal; wires; window frame
9/27/96-1 40 39 51.76 -72 37 28.59 numerous pieces of
debris 9/20/96-33 40 39 51.76 -72 37 28.59 misc. metal piece

9/27/96-1 40 39 46.44 -72 37 28.55 seat 32 (6) CABIN HGR
40 39 49.55 -72 37 28.39 8" air vent line; 5' long 9/30/96-1 40
39 49.55 -72 37 28.39 misc. siding
Z2552 40 39 49.55 -72 37 28.39 various siding (bagged);
hydraulic framing 40 39 49.55 -72 37 28.39 cargo deck roller,
red encased- piece of tubing joint, small green tubing,
green plastic, misc. wires, 10/03/96-1 40 39 49.55 -72 37
28.39 various siding (bagged)/ hydraulic framing 40 39
49.55 -72 37 28.39 misc. siding 40 39 49.55 -72 37 28.39
debris 10/06/96-1 40 39 49.55 -72 37 28.39 misc debris,
details on hard copy 40 39 49.55 -72 37 28.39 misc. metal
debris from plane 10/13/96-3 40 39 49.55 -72 37 28.39 misc.
metal debris from plane 10/13/96-3 40 39 49.55 -72 37 28.39
misc. wire, small pieces of metal, large circular piece of
metal 10/13/96-3 40 39 49.55 -72 37 28.39 misc wires;
metal; metal coupling; skin 10/13/96-3 40 39 49.55 -72 37
28.39 a/c skin, life jacket, tubing, actuator valve, black
plastic bag 40 39 49.55 -72 37 28.39 debris, beeper? hose,
computer disk 10/06/96-1 40 39 49.55 -72 37 28.39 black
electronics part, 3' gray metal tube w/ ball joint @ one end
10/06/96-4 40 39 45.02 -72 37 28.38 bulkhead with hinge
9/30/96-1 40 39 41.67 -72 37 28.38 large metal riveted pipe
and channel and skin 10/13/96-3 40 39 41.67 -72 37 28.38 5'
piece of metal section 10/13/96-3 40 39 49.10 -72 37 28.20
aluminum strip 40 39 48.70 -72 37 28.20 two full baskets of
debris 8/30/96-1 40 39 48.30 -72 37 28.20 metal debris
10/13/96-3 40 39 48.70 -72 37 28.20 two full baskets of
debris 8/30/96-1 40 39 49.60 -72 37 28.10 upper CW skin;
RH side R.S. to STR 19 CW MOCKUP 8/08/96-15 RW08,
CW8 40 39 49.60 -72 37 28.10 right wing / part of fuselage

FS 1140-1319; mid spar upper SOB paddle/fitting/web;
right wing upper CW MOCKUP 8/08/96-15 40 39 49.60 -72
37 28.10 right wing/part of fuselage FS 1140-1319
8/08/96-15 40 39 49.60 -72 37 28.10 right wing/part of
fuselage FS 1140-1319 8/08/96-15 40 39 49.60 -72 37 28.10
lower aft CW skin S1 to S5; LBL 76 to RBL 98 CW
MOCKUP 8/08/96-15 40 39 49.60 -72 37 28.10 right wing/
part of fuselage FS 1140-1319 8/08/96-15 40 39 49.60 -72 37
28.10 right wing/part of fuselage FS 1140-1319 8/08/96-15
40 39 49.60 -72 37 28.10 right wing/part of fuselage FS
1140-1319 8/08/96-15 CW1003 40 39 49.60 -72 37 28.10 rear
spar RBL33 to RBL87 CW MOCKUP CW1004 40 39 49.60
-72 37 28.10 rear spar web RBL-21 -LBL11 CW MOCKUP 40
39 49.60 -72 37 28.10 spanwise beam #2; RBL 83-110 at
lower chord CW MOCKUP CW1012 40 39 49.60 -72 37
28.10 rear spar RBL85 CW MOCKUP CW1011 40 39 49.60
-72 37 28.10 rear spar right side RBL 70 to RBL 33 at lower
chord CW MOCKUP CW1001 40 39 49.60 -72 37 28.10 #3 of
3 tags on same piece right side CW rear spar (see also
C2278 (RF17), C2279 (CW CW MOCKUP 40 39 49.60 -72 37
28.10 lower CW skin; RBL 98-127.5; R.S. to STR 1 CW
MOCKUP 40 39 49.60 -72 37 28.10 #2 of 3 on same piece
right side CW upper segment SOB rib (see also C2278
(RF17), C2280 (CW CW MOCKUP
C2278 40 39 49.60 -72 37 28.10 right hand body attached to
right hand upper wing with 3R door opening; (#1 of 3 tags
(see also C2 CW MOCKUP 40 39 48.20 -72 37 28.10 3'(5'
section of twisted metal 9/26/96-17 40 40 01.00 -72 37 28.10
aluminum strips & wires 10/17/96-1 40 39 48.20 -72 37
28.10 misc. metal debris 9/26/96-17 40 39 48.20 -72 37 28.10

watch; note recorder; nail polish 9/26/96-17 40 39 48.20 -72
37 28.10 2'(1' metal section 9/26/96-17 40 39 46.50 -72 37
28.00 row 54 seat 3 CABIN HGR 8/14/96-9 40 39 46.50 -72
37 28.00 skull fragment 8/14/96-9 40 39 46.50 -72 37 28.00
row 42 seat 1 CABIN HGR 8/14/96-9 40 39 46.50 -72 37
28.00 FS 1900-1960; stringer 49L-51R 8/14/96-9 40 39 46.50
-72 37 28.00 spar fragment 8"(1' 8/14/96-9 40 39 46.50 -72
37 28.00 fuselage skin fragment 1'(2' 8/14/96-9 40 39 46.50
-72 37 28.00 spar fragment 1-1/2'(2' PARTS BAY 8/14/96-9
40 39 46.50 -72 37 28.00 bulkhead fragment 2'(2' PARTS
BAY 8/14/96-9 40 39 46.50 -72 37 28.00 cargo container
base CARGO BAY 8/14/96-9 40 39 46.50 -72 37 28.00 1/2
wing rib fragment 4'(8' 8/14/96-9 40 39 51.00 -72 37 28.00
longitudinal floor beam overhead pressure deck 40 39 51.00
-72 37 28.00 body landing gear trunion support backup
fitting aft 1450 inner and outer 40 39 51.00 -72 37 28.00
stabilizer hinge fitting with hinge pin FS 2598 diagonal
braces 40 39 51.00 -72 37 28.00 misc. debris 9/24/96-16 40
39 51.00 -72 37 28.00 misc. debris 9/24/96-16 40 39 51.00
-72 37 28.00 misc. debris 9/24/96-16 40 39 51.00 -72 37
28.00 misc. debris CW MOCKUP 9/24/96-16 40 39 49.35
-72 37 27.93 65B07810917 section w/ tubing & debris
(tubing lost) 10/09/96-1 40 39 49.35 -72 37 27.93 metal
labeled oil tank capacity 9/24/96-16 40 39 49.35 -72 37
27.93 seat 34 (1) CABIN HGR CW1105 40 39 49.35 -72 37
27.93 CW tank BL0 web aft of midspar CW MOCKUP
10/9/96-1 40 39 47.00 -72 37 27.90 pneumatic duct (blue
stainless) 40 39 47.00 -72 37 27.90 pneumatic duct (blue
stainless) 40 39 47.00 -72 37 27.90 row 26 seat 2-3, armrest &
frame 26-1 CABIN HGR 40 39 47.00 -72 37 27.90 fire

extinguisher 40 39 47.00 -72 37 27.90 row 26 seat 4-5 CABIN
HGR 40 39 47.00 -72 37 27.90 seat frame seat 44 (3) seat
(partial) CABIN HGR 40 39 47.00 -72 37 27.90 row 30 seat 8
CABIN HGR 40 39 47.00 -72 37 27.90 fuselage sect w/ parts
of 3 window apertures, FS 2020-2100 40 39 47.00 -72 37
27.90 cargo container wall CARGO BAY 40 39 47.00 -72 37
27.90 recirculation fan 40 39 47.00 -72 37 27.90 wing
bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 wing
bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 row 45 seats
2-6 armrest 45-1 seat 45-2 CABIN HGR 8/06/96-46 40 39
47.80 -72 37 27.90 row 44 seat 2 (partial) CABIN HGR 40 39
47.00 -72 37 27.90 wing bulkhead 8/08/96-30 40 39 47.00
-72 37 27.90 wing bulkhead 8/08/96-30 40 39 47.00 -72 37
27.90 wing bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90
wing bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 wing
bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 wing
bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 tire w/
section of hub (Imbedded) - 6R 40 39 47.00 -72 37 27.90
wing bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 wing
bulkhead 8/08/96-30 40 39 47.00 -72 37 27.90 wing
bulkhead with attached ACM ducting 8/08/96-30 40 39
47.00 -72 37 27.90 right cw body rib in-between rear spar
and SWB #1 CW MOCKUP 8/08/96-30 40 39 47.00 -72 37
27.90 hydraulic filter assembly 8/08/96-30 40 39 47.00 -72
37 27.90 #7 flap track 8/08/96-30 CW203, CW 40 39 47.00
-72 37 27.90 lower CW skin, STR 1-3, LBL 60-13 CW
MOCKUP 8/08/96-30 40 39 47.00 -72 37 27.90 galley 40 39
47.00 -72 37 27.90 wing bulkhead 8/08/96-30 40 39 47.00
-72 37 27.90 misc fuselage skin sect w/ red paint; FS
1960-2020; stringers 30L - 37L 8/06/96-46 40 39 47.00 -72 37

27.90 wing section 40 39 47.00 -72 37 27.90 FS XXXX frame
40 39 47.00 -72 37 27.90 FS 2120-2180; stringer 13L-22L with
window belt 40 39 47.00 -72 37 27.90 misc fuselage skin sect
w/ red paint 40 39 47.00 -72 37 27.90 misc fuselage skin
sect w/ red paint 40 39 47.00 -72 37 27.90 misc fuselage
skin sect w/ red paint; FS 1080-1120 stringer 24R-27R
8/06/96-46 40 39 47.00 -72 37 27.90 FS 1080-1120; stringer
24R-39R 40 39 47.00 -72 37 27.90 misc fuselage skin sect w/
red paint 40 39 47.00 -72 37 27.90 FS XXXX frame 40 39
47.00 -72 37 27.90 LF FS 1980-2020 8/06/96-46 40 39 47.00
-72 37 27.90 FS XXXX frame 40 39 47.00 -72 37 27.90 LF FS
1840-1940; Stringer 22L - 30L 8/06/96-46 40 39 47.00 -72 37
27.90 LF FS 1840-1940-part of C149, tag removed 40 39
47.00 -72 37 27.90 misc fuselage skin sect w/ red paint-part
of C149, tag removed 40 39 47.00 -72 37 27.90 misc fuselage
skin sect w/ red paint 40 39 47.00 -72 37 27.90 LF FS
1940-1960 8/06/96-46 40 39 47.00 -72 37 27.90 LF FS
1960-2020 8/06/96-46 40 39 47.00 -72 37 27.90 misc fuselage
skin sect w/ red paint 40 39 47.00 -72 37 27.90 misc
fuselage skin sect w/ red paint 40 39 47.00 -72 37 27.90 FS
1060-1120; stinger 19R-24R, fuselage skin sect w/2
windows, 8/06/96-46 40 39 47.00 -72 37 27.90 left wing
section w/ variable camber scissors around WS 1516.6
CW204, CW 40 39 47.00 -72 37 27.90 lower CW skin - STR
R.S. -3; LBL 104-62 CW MOCKUP 40 39 47.00 -72 37 27.90
misc fuselage skin sect w/ red paint 40 39 46.90 -72 37
27.90 bulk cargo door structure FS 1960-2080; stringer
23R-45R (Fuselage skin, FS 1960) 8/05/96-70 40 39 46.90
-72 37 27.90 FS 1480-1860; stringers 2R-23R with window
belt and R4 door frame 8/04/96-111 40 39 46.90 -72 37 27.90

right body gear L22-24 8/04/96-55 40 39 46.90 -72 37 27.90
left body gear 8/04/96-56 40 39 46.90 -72 37 27.90 speaker
system overhead mounting assembly 52747; position 9714 -
9352 8/04/96-64 40 39 46.90 -72 37 27.90 cargo container
AP7309 CARGO BAY 8/04/96-64 40 39 46.90 -72 37 27.90
LH keel chord FS 1480-1620 8/04/96-64 40 39 47.00 -72 37
27.90 hydraulic sequence valve assembly MOTOR BAY
8/08/96-30 40 39 47.80 -72 37 27.90 aft pressure bulkhead
(approx 50%); 40 39 46.90 -72 37 27.90 lower portion bulk
cargo door surround FS 1960 - 2080; stringer 36R - 45R
8/18/96-6 40 39 47.00 -72 37 27.90 FS XXXX frame 40 39
46.90 -72 37 27.90 aft cargo door - lower sill latches & locks
8/05/96-70 40 39 47.00 -72 37 27.90 Left FS 1760-1800. S25L
-31L 8/06/96-46 40 39 46.90 -72 37 27.90 entrance door 40
39 46.90 -72 37 27.90 tire on rim; main wheel 40 39 46.90 -72
37 27.90 fuel pump w/ on-off valve and check valve 40 39
47.00 -72 37 27.90 FS 2664-2742, LH APU access door hinge
40 39 47.00 -72 37 27.90 corner of passenger entry door 40
39 47.00 -72 37 27.90 FS XXXX frame 40 39 47.00 -72 37
27.90 FS XXXX frame 40 39 47.00 -72 37 27.90 FS XXXX
frame 40 39 47.00 -72 37 27.90 FS XXXX frame 40 39 47.00
-72 37 27.90 FS XXXX frame 40 39 47.00 -72 37 27.90 FS
XXXX frame 40 39 46.90 -72 37 27.90 5 bales jeans/jean
jackets 40 39 46.90 -72 37 27.90 BL 0 keel beam center web
from FS 1330-1241 8/04/96-111 40 39 47.00 -72 37 27.90 var.
L.E. device torque tube 40 39 46.90 -72 37 27.90 aft cargo
door cutout (#1860)/seats/fuselage 40 39 46.90 -72 37 27.90
FS frame 1350 stringer 22L-29L LW07, CW10 40 39 46.90 -72
37 27.90 left upper wing skin; SOB to WBL 200; part of
CW106, LW07, & CW401 CW MOCKUP 8/05/96-70 40 39

46.90 -72 37 27.90 door (R4) 8/05/96-70 40 39 46.90 -72 37
27.90 misc debris/black suitcase/red seat/2 bales (partial
seat 42-6, seat 42-7 (armrest 42-9, armrest 43 8/05/96-70 40
39 46.90 -72 37 27.90 FS 2280-2340 includes saw cut RF9A/
B 40 39 46.90 -72 37 27.90 left lower wing skin jack point to
LWS 670 8/04/96-111 40 39 46.90 -72 37 27.90 spoiler panel
40 39 46.90 -72 37 27.90 E-galley counter top 40 39 46.90 -72
37 27.90 FS 2000-2120; stringer 8L-22L with window belt
8/05/96-70 RF109B 40 39 47.00 -72 37 27.90 FS 1580-1620,
stringer 30R-39R fuselage bulkhead w/ frame section
8/06/96-46 40 39 46.90 -72 37 27.90 FS 2200-2310 stringer
21R-38R, cargo bulk door right side lower 8/05/96-70 40 39
47.00 -72 37 27.90 fuel pump maint pad 40 39 46.90 -72 37
27.90 wing section, top landing gear FS 469-820 8/05/96-70
40 39 47.00 -72 37 27.90 row 24 seat 4-5-6-7 CABIN HGR 40
39 46.90 -72 37 27.90 bottom left wing 8/05/96-70 40 39
47.00 -72 37 27.90 wing leading edge w/ picelo tube/
triangle 40 39 47.00 -72 37 27.90 hinged panel 40 39 46.90
-72 37 27.90 fuselage skin FS 1740-1760; stringer 42R-44R
8/05/96-70 40 39 46.90 -72 37 27.90 FS 1660-1700; stringers
40R-43R 8/05/96-70 40 39 46.90 -72 37 27.90 FS 1840-1960;
stringer 23R-26R 8/05/96-70 40 39 46.90 -72 37 27.90 FS
1820-1840 stringer 23R-27R with aft cargo door hinge
8/05/96-70 40 39 46.90 -72 37 27.90 lower cw skin- right
fwd side S21 to S23 CW MOCKUP 40 39 46.90 -72 37 27.90
lower cw skin-right fwd side STR 1-21 CW MOCKUP 40 39
46.90 -72 37 27.90 FS 1720-1820; stringers 49L-51L, 51R
8/14/96-9 40 39 46.90 -72 37 27.90 FS 1840; stringer
45R-46R 8/05/96-70 40 39 46.90 -72 37 27.90 FS 1630-1680;
stringer 22R-30R, with R4 door structure 8/05/96-70 40 39

46.90 -72 37 27.90 fuselage skin FS 1760-1780; stringer 41R-35R 8/05/96-70 LF16A, CW1 40 39 46.90 -72 37 27.90 part of CW1002; Note: saw cut separates part into two pieces; rear spar RBL 0 - RBL 76 CW MOCKUP 40 39 46.90 -72 37 27.90 portion of aft press bulkhead FS 2360 8/05/96-70 40 39 46.90 -72 37 27.90 FS 1620-1680; stringers 45L-51L,51R 8/12/96-3 40 39 46.90 -72 37 27.90 fuselage skin FS 1720-1760; stringer 40R-41R 8/05/96-70 40 39 46.90 -72 37 27.90 FS 1960-2080 stringer 36R-45R bulk cargo door surround 8/5/96-70 40 39 46.90 -72 37 27.90 FS 1620-1680; stringer 36R-42R 8/05/96-70 40 39 46.90 -72 37 27.90 FS 2040 stringer 32R-33R 8/05/96-70 40 39 46.90 -72 37 27.90 FS 1680-1720; stringers 36R-41R 8/05/96-70 C2242 40 39 46.90 -72 37 27.90 FS 1640-1740; stringers 43R-51R and 51L-49L 40 39 47.80 -72 37 27.90 portion aft press bulkhead FS 2360 LF16B, CW1 40 39 46.90 -72 37 27.90 part of CW1006; Note: saw cut separate part into two pieces; rear spar web LBL21-LBL57 CW MOCKUP 40 39 46.90 -72 37 27.90 seat 52 (7) CABIN HGR 40 39 46.90 -72 37 27.90 seat 50 (5) armrest partial frame CABIN HGR 40 39 46.90 -72 37 27.90 seat 52 (6) armrest partial frame CABIN HGR 40 39 46.90 -72 37 27.90 FS 1900-2320 stringers 10L-6R Note: saw cut from RHS for RF9B and RF15 40 39 44.30 -72 37 27.90 9/12/96-2 40 39 46.90 -72 37 27.90 FS 1810-1836; stringer 27R-30R; forward right upper corner of aft cargo door 8/05/96-70 40 39 46.90 -72 37 27.90 left lower wing skin; SOB - WS600 40 39 46.90 -72 37 27.90 FS 1980-2010, stringer 38R; handle from aft bulk cargo door 8/04/96-111 40 39 46.90 -72 37 27.90 FS 1900-2140; stringer 6R-22R with window Note: saw cut from RF 9A and RF15 40 39 46.90

-72 37 27.90 FS 1480-1520 stringer 26R-30R, from lot #
8-5-96-70 8/05/96-70 40 39 46.90 -72 37 27.90 seat 49 (7)
armrest, CABIN HGR 40 39 46.90 -72 37 27.90 seat 42 (2 3)
armrest, CABIN HGR 40 39 46.90 -72 37 27.90 fow 41 seat
10 seat CABIN HGR 40 39 46.90 -72 37 27.90 seat 50 (6)
armrest, partial frame CABIN HGR 40 39 46.90 -72 37 27.90
seat 48 (9) armrest, CABIN HGR 40 39 46.90 -72 37 27.90 FS
1480-1580, stringer 19R-26R with window frame 40 39
46.90 -72 37 27.90 FS 1982-2020 36R-39R; section of aft bulk
cargo door 8/04/96-111 40 39 46.90 -72 37 27.90 50 (8)
armrest, partial frame, CABIN HGR 40 39 46.90 -72 37 27.90
seat 33 (1 2 3), CABIN HGR 40 39 46.90 -72 37 27.90 FS 1760
stringer 42R-43R 8/05/96-70 40 39 46.90 -72 37 27.90
armrest for seat 35 (2), CABIN HGR 8/04/96-111 40 39
46.90 -72 37 27.90 seat 35 (8 9 0) armrest/partial seat
CABIN HGR 8/04/96-64 40 39 46.90 -72 37 27.90 seat 37 (8)
armrest/partial seat, seat 37 (10) armrest, CABIN HGR 40
39 46.90 -72 37 27.90 FS 1960-1980; stringer 28R-31R
8/05/96-70 40 39 44.30 -72 37 27.90 FS 1060 stub beam
9/12/96-2 40 39 46.90 -72 37 27.90 seat 47 (5) armrest
CABIN HGR 40 39 46.90 -72 37 27.90 FS 2060-3000; stringer
29R-36R 40 39 47.00 -72 37 27.90 FS 1820-1840 stringer
31L-34L 8/06/96-46 40 39 46.90 -72 37 27.90 left wing
outboard tip HF antenna portion 40 39 46.90 -72 37 27.90
seat 26 (8 9 0) CABIN HGR 40 39 46.90 -72 37 27.90 seat 43
(9) CABIN HGR 40 39 46.90 -72 37 27.90 seat 44 (6) CABIN
HGR 40 39 46.90 -72 37 27.90 seat 45 (6 7) CABIN HGR
C2367 40 39 46.90 -72 37 27.90 seat 42 (6 7) CABIN HGR
RF109A 40 39 46.90 -72 37 27.90 FS 1610-1640 stringer
37R-40R 8/05/96-70 40 39 46.90 -72 37 27.90 seat 42 (9)

armrest only CABIN HGR 40 39 46.90 -72 37 27.90 FS
1416-1480 stringers 28L-33L with chord beam 8/04/96-111
RF109E 40 39 46.90 -72 37 27.90 FS 1660-1680 stringer
31R-35R 8/05/96-70 40 39 46.90 -72 37 27.90 seat 51 (6)
armrest, cap, and tray table 40 39 46.90 -72 37 27.90 LHS
body gear drag brace reaction fitting common to the keel
beam box FS 1350-1416 40 39 47.96 -72 37 27.84 seat 54 (1)
CABIN HGR 8/12/96-3 CW104 CW 40 39 46.40 -72 37
27.80 upper right fwd CW skin, double plus chord, STR
19-30; also a portion of right SOB CW rib (CW30 CW
MOCKUP 40 39 46.40 -72 37 27.80 lower CW skin; left SOB
to LBL 100; R.S. to STR 3; (wing center section, lower skin
segment, 20" CW MOCKUP 40 39 46.40 -72 37 27.80
fuselage skin FS 1780-1800; stringer 34R-40R 8/26/96-36 40
39 46.40 -72 37 27.80 landing gear trunion support segment;
FS 1480 8/26/96-36 40 39 46.40 -72 37 27.80 FS 1916-1960;
stringer 48R-51R 8/26/96-36 40 39 46.40 -72 37 27.80 FS
1480-1570; stringer 36R-45R with body landing gear
trunion 8/26/96-36 40 39 46.40 -72 37 27.80 Body Belly skin
3' (2'. Red paint 40 39 46.40 -72 37 27.80 FS 1900-1940 aft
cargo door surround; stringer 41R-44R L 15.8 8/26/96-36
40 39 46.40 -72 37 27.80 Bulkhead Aft wheelwell lower 40
39 46.40 -72 37 27.80 Body belly skin 2' (2'. Red paint 40 39
46.40 -72 37 27.80 a/c 1/2" tubing TUBING BAY
8/26/96-36 40 39 46.40 -72 37 27.80 L5 - door threshold
8/26/96-36 40 39 46.40 -72 37 27.80 unidentified landing
gear brace with connected hydraulic line 8/26/96-36 40 39
46.40 -72 37 27.80 FS 1536-1620, stringer 42R-49R
8/26/96-36 40 39 46.40 -72 37 27.80 FS 1800 RIB 40 39 46.40
-72 37 27.80 FS 1810; outer frame aft cargo door panel

stringer STR 24R-28R (aft upper main cargo door sill)
8/26/96-36 40 39 46.40 -72 37 27.80 Aft cargo step 40 39
46.40 -72 37 27.80 RHS keel chord aft of FS 1480 40 39 46.40
-72 37 27.80 FS 1480 Frame 40 39 46.40 -72 37 27.80 aircraft
motor (main landing gear and anti-skid valves, MOTOR
BAY 8/26/96-36 40 39 46.40 -72 37 27.80 unidentified piece
of wreckage PARTS BAY 8/26/96-36 40 39 46.40 -72 37
27.80 cargo bin stanchion, marked "STA 1680" 8/26/96-36
40 39 46.40 -72 37 27.80 part of cargo bin structure
8/26/96-36 40 39 46.40 -72 37 27.80 food storage box 40 39
46.40 -72 37 27.80 support beam 8/26/96-36 40 39 46.40 -72
37 27.80 unidentified piece of wreckage 8/26/96-36 40 39
46.40 -72 37 27.80 partial seat assembly 8/26/96-36 40 39
46.40 -72 37 27.80 FS 1920-1940; stringer 39R-45R
8/26/96-36
C1098 40 39 46.40 -72 37 27.80 partial seat assembly armrest
8/26/96-36 40 39 46.40 -72 37 27.80 seat 49 (5) armrest
CABIN HGR 8/26/96-36 40 39 46.40 -72 37 27.80 portion of
bottom of food service cart 8/26/96-36 40 39 46.40 -72 37
27.80 seat 48 (10) armrest CABIN HGR 8/26/96-36 40 39
46.40 -72 37 27.80 seat 43 (10) armrest and partial frame
CABIN HGR 8/26/96-36 40 39 51.30 -72 37 27.80 3 bags of
small metal shards and plastic debris, one bag contains 3'
length of 3" pipe marked fuel 9/24/96-16 40 39 51.30 -72 37
27.80 3 bags of small metal shards and plastic debris, one
bag contains 3' length of 3" pipe marked fuel 9/24/96-16 40
39 46.40 -72 37 27.80 seat 38 (6) armrest, not previously in
database CABIN HGR 8/26/96-36 40 39 46.40 -72 37 27.80
seat 32 (3) armrest and partial frame CABIN HGR
8/26/96-36 40 39 46.40 -72 37 27.80 seat 49 (10), armrest

and partial frame CABIN HGR 40 39 46.40 -72 37 27.80 FS 1940-1961, stringer 30R-34R. Lot # 8-26-96-36 8/26/96-36 40 39 46.40 -72 37 27.80 FS 1920-1940, stringer 34R-40R. Lot # 8-26-96-36 8/26/96-36 40 39 46.40 -72 37 27.80 main landing gear wheel half 8/26/96-36 40 39 46.40 -72 37 27.80 LHS fuselage segment FS 1416 8/26/96-36 40 39 46.40 -72 37 27.80 unidentified piece of wreckage marked with STA 1580 8/26/96-36 40 39 46.40 -72 37 27.80 cargo compartment barrier net, 8/26/96-36 40 39 46.40 -72 37 27.80 horizontal jack screw 8/26/96-36 40 39 46.40 -72 37 27.80 main landing gear wheel half 8/26/96-36 40 39 46.40 -72 37 27.80 partial seat assembly seat 50 (9) 8/26/96-36 40 39 46.40 -72 37 27.80 B. L. 0 keel beam web (wheel well) FS 1460-1480 8/26/96-36 40 39 51.30 -72 37 27.80 3 bags of small metal shards & plastic debris, one bag contains 3' length of 3" pipe marked fuel 9/24/96-16 40 39 46.40 -72 37 27.80 unidentified aircraft part 8/26/96-36 40 39 46.40 -72 37 27.80 seat 38 (7) armrest, partial frame CABIN HGR 8/26/96-36 40 39 46.40 -72 37 27.80 seat 46 (8), armrest, partial frame CABIN HGR 40 39 46.40 -72 37 27.80 wheel half with brake assembly 8/26/96-36 40 39 46.40 -72 37 27.80 main landing gear wheel half 8/26/96-36 40 39 46.40 -72 37 27.80 seat 52 (0), armrest CABIN HGR 40 39 46.40 -72 37 27.80 cargo bin stanchion, secondary structure marked "STA 1680" 8/26/96-36 40 39 46.40 -72 37 27.80 unidentified piece of wreckage 8/26/96-36 40 39 46.40 -72 37 27.80 hydraulic shutoff valves 8/26/96-36 40 39 46.40 -72 37 27.80 possible gear well bulkhead piece 8/26/96-36 40 39 46.40 -72 37 27.80 partial floor track and seat assembly with purple backpack remnants attached. Note: char marks o

8/26/96-36 40 39 46.40 -72 37 27.80 main landing gear
wheel half 8/26/96-36 40 39 46.40 -72 37 27.80 partial brake
assembly with torque rod 8/26/96-36 40 39 46.40 -72 37
27.80 black wallet 8/26/96-31 40 39 46.40 -72 37 27.80 one
swiss army watch and one set of keys 8/26/96-31
C2386 40 39 46.40 -72 37 27.80 FS 1720-1750 stringer
45L-48L 8/26/96-36 40 39 46.40 -72 37 27.80 misc clothing
and personal effects 8/26/96-31 40 39 46.40 -72 37 27.80 US
passport 8/27/96-9 40 39 46.40 -72 37 27.80 human remains
appearing to be 2 hip bones and one skull bone, 8/27/96-9
40 39 46.40 -72 37 27.80 possible human skull fragment
8/26/96-31 40 39 46.40 -72 37 27.80 FS 2160-2200 stringer
35L-42L 8/26/96-36 40 39 46.40 -72 37 27.80 black fanny
pack containing identification 8/26/96-31 40 39 46.40 -72
37 27.80 misc personal clothing, intact camera, other effects
8/26/96-31 40 39 46.40 -72 37 27.80 misc clothing and
personal effects 8/26/96-31 40 39 46.40 -72 37 27.80
apparent piece of jawbone with tooth 8/26/96-31 40 39
46.40 -72 37 27.80 human remains 8/26/96-31 40 39 46.40
-72 37 27.80 human remains 8/26/96-31 40 39 46.40 -72 37
27.80 human remains 8/26/96-31 40 39 46.40 -72 37 27.80
human remains 8/26/96-31 40 39 51.00 -72 37 27.80 flat
yellow metal approx 4"(6" 40 39 46.40 -72 37 27.80 possible
human hair 40 39 46.40 -72 37 27.80 social security card
8/27/96-9 40 39 46.40 -72 37 27.80 misc clothing and
various personal effects 8/27/96-9 40 39 46.40 -72 37 27.80
six apparent human bones with tissue, 8/26/96-31 40 39
46.40 -72 37 27.80 gold necklace 8/27/96-9 40 39 46.40 -72
37 27.80 wallet containing French passport 8/27/96-9 40 39
46.40 -72 37 27.80 human remains appearing to be 1 knee +

1 arm 8/27/96-9 40 39 46.40 -72 37 27.80 misc clothing and personal effects including a US mail plastic bag, empty 8/27/96-9 40 39 46.40 -72 37 27.80 black fanny pack with green trim 8/27/96-9 40 39 46.40 -72 37 27.80 photo album of children 8/26/96-31 40 39 46.40 -72 37 27.80 misc personal clothing + effects 8/26/96-31 40 39 46.40 -72 37 27.80 possible human remains 8/26/96-31 40 39 47.36 -72 37 27.71 personal effects 40 39 47.36 -72 37 27.71 personal items - glasses in case 40 39 47.36 -72 37 27.71 miscellaneous personal items 8/19/96-16 40 39 47.36 -72 37 27.71 cargo bin handling tires CARGO BAY 8/19/96-22 40 39 47.36 -72 37 27.71 miscellaneous hydraulic line 8/19/96-22 40 39 47.36 -72 37 27.71 personal effects - red box 2" (4" 40 39 47.36 -72 37 27.71 belly skin aft cargo bin 8/19/96-22 40 39 47.36 -72 37 27.71 small portion (2' (2' section) wing skin 40 39 47.36 -72 37 27.71 Trash can lid aft of L-5 Door 40 39 47.36 -72 37 27.71 miscellaneous clothing, pocket calculator 40 39 47.36 -72 37 27.71 cargo container CARGO BAY 8/19/96-22 40 39 47.36 -72 37 27.71 FS 1920-2020; stringer 44L-49R 8/19/96-22 40 39 47.36 -72 37 27.71 miscellaneous parts & pieces PARTS BAY 8/20/96-12 40 39 47.36 -72 37 27.71 cargo bin CARGO BAY 8/20/96-12 40 39 47.36 -72 37 27.71 aircraft 1/2" tubing (miscellaneous cargo bin parts & pieces, carpet roll, passenger seats, floor boar TUBING BAY 8/20/96-12 40 39 47.36 -72 37 27.71 personal items 40 39 47.36 -72 37 27.71 miscellaneous parts & pieces PARTS BAY 8/20/96-12 40 39 47.36 -72 37 27.71 miscellaneous parts & pieces PARTS BAY 8/20/96-12 40 39 47.36 -72 37 27.71 fuselage frame circa 1980 and miscellaneous parts 8/20/96-12 40 39 47.36 -72 37 27.71

personal effects black box 2" (4" 40 39 47.36 -72 37 27.71
row 52 seat 2 duty free module CABIN HGR 8/19/96-22 40
39 47.36 -72 37 27.71 miscellaneous cargo bin parts &
pieces, carpet roll, passenger seats, floor board, cargo lock;
row 4 CABIN HGR 8/20/96-12 40 39 47.36 -72 37 27.71
cargo bin CARGO BAY 8/20/96-12 40 39 47.36 -72 37 27.71
miscellaneous cargo bin parts & pieces, carpet roll,
passenger seats, floor board, cargo lock 8/20/96-12 40 39
47.36 -72 37 27.71 Bulkhead Web 40 39 47.36 -72 37 27.71 6"
Piece of turbine blade ENG HGR 40 39 47.36 -72 37 27.71
Anti-Skid Hydraulic Part 40 39 47.36 -72 37 27.71 pickup
for fuel tank FUEL ROOM 40 39 47.36 -72 37 27.71 seat
Row 50 seats 1 & 2 40 39 47.36 -72 37 27.71 lot -seat parts
CABIN HGR 40 39 47.36 -72 37 27.71 FS 1847-1877, stringer
20R-23R 8/20/96-12 40 39 47.36 -72 37 27.71 Fuselage
Section PARTS BAY 40 39 47.36 -72 37 27.71 FS 1800-1900;
stringers 50R-50L 40 39 47.36 -72 37 27.71 FS 1680-1720,
stringer 27R-31R 8/20/96-12 40 39 47.36 -72 37 27.71
armrest 44-5 40 39 47.36 -72 37 27.71 cabin flooring PARTS
BAY 40 39 47.36 -72 37 27.71 seat arm rest 43-5 40 39 48.60
-72 37 27.70 misc metal debris 9/20/96-33 40 40 01.10 -72 37
27.70 small piece of aluminum w/ flap 10/17/96-1 40 39
47.36 -72 37 27.66 misc. green metal 10/13/96-3 40 39 47.36
-72 37 27.66 misc. metal debris 10/13/96-3 40 39 47.36 -72
37 27.66 misc. green metal 10/13/96-3 40 39 47.36 -72 37
27.66 misc. green metal 10/13/96-3 40 39 47.36 -72 37 27.66
misc. wires, possible engine components, cylinder gear 40
39 47.41 -72 37 27.64 cargo container CARGO BAY
8/20/96-12 40 39 47.41 -72 37 27.64 seat part foot rest
8/20/96-12 40 39 47.41 -72 37 27.64 Mail, FED EX, DHL,

manual 40 39 47.41 -72 37 27.64 row 42, seat 8 armrest
CABIN HGR 40 39 47.41 -72 37 27.64 Miscellaneous
personal items 40 39 47.41 -72 37 27.64 cargo container
CARGO BAY 8/20/96-12 40 39 47.41 -72 37 27.64 piece of
fuel line 8/20/96-12 40 39 47.41 -72 37 27.64 cargo flooring
CABIN HGR 40 39 47.41 -72 37 27.64 Intercostal fuel tank
40 39 47.41 -72 37 27.64 miscellaneous parts & pieces
8/20/96-12 40 39 47.41 -72 37 27.64 FS 1760-1850; stringers
44R-48R 8/20/96-12 40 39 47.41 -72 37 27.64 cargo pallet
floor CARGO BAY 40 39 47.41 -72 37 27.64 FS 1740-1780;
stringers 46L-49L. fuselage skin 8/20/96-12 40 39 47.41 -72
37 27.64 miscellaneous parts 8/20/96-12 40 39 47.41 -72 37
27.64 miscellaneous body parts 40 39 47.41 -72 37 27.64 skin
& stiffeners-stringers, Crown, white-exterior apparent skin
splice AF FS 1241 8/20/96-12 40 39 47.41 -72 37 27.64
miscellaneous parts 8/20/96-12 40 39 47.41 -72 37 27.64
miscellaneous parts 8/20/96-12 40 39 47.41 -72 37 27.64
personal effects, memorex tape players, casio watches 40 39
47.41 -72 37 27.64 miscellaneous body parts 40 39 47.41 -72
37 27.64 miscellaneous parts 8/20/96-12 40 39 47.41 -72 37
27.64 misc parts 8/20/96-12 40 39 47.41 -72 37 27.64 misc
parts 8/20/96-12 40 39 47.41 -72 37 27.64 miscellaneous
body parts 40 39 47.41 -72 37 27.64 portion of cargo bin
CARGO BAY 8/20/96-12 40 39 47.41 -72 37 27.64
miscellaneous parts 40 39 47.41 -72 37 27.64 Portion of
Cargo bin CARGO BAY 8/20/96-12 40 39 47.41 -72 37 27.64
miscellaneous personal items 40 39 47.41 -72 37 27.64
personal effects (wallet) 40 39 47.41 -72 37 27.64 Rt Hand
rear spar, inboard in; left landing gear beam FS 1350
8/20/96-12 40 39 47.41 -72 37 27.64 FS 2600-2640; station

4L-46L 8/20/96-12 40 39 47.41 -72 37 27.64 personal effects,
3 women's make-up purses 40 39 47.41 -72 37 27.64
miscellaneous body parts 40 39 47.41 -72 37 27.64
miscellaneous body parts 40 39 47.41 -72 37 27.64 spanwise
beam #1BL 0 - 60 / chord segment CW MOCKUP
8/20/96-12 40 39 47.41 -72 37 27.64 Cabin flooring CABIN
HGR 40 39 47.41 -72 37 27.64 seat 53 (3) armrest, CABIN
HGR
C2311 40 39 47.41 -72 37 27.64 seat 54 (5) armrest CABIN
HGR 40 39 47.41 -72 37 27.64 FS 1780-1840, stringer
38R-46R forward lower corner of aft cargo door cut-out.
Lot # 8-20-96-12 40 39 47.41 -72 37 27.64 seat 45 (4) armrest,
CABIN HGR 40 39 47.41 -72 37 27.64 seat 45 (5) armrest,
CABIN HGR 40 39 47.41 -72 37 27.64 portion of aft pressure
bulkhead 8/20/96-12 40 39 47.41 -72 37 27.64 FS 1660-1700
stringer 39L-42L 8/20/96-12 40 39 47.41 -72 37 27.64 FS
1480-1500 stringer 23L-27L w/ frame support 8/20/96-12
40 39 49.10 -72 37 27.60 aircraft skin, red on one side
10/17/96-1 40 39 48.02 -72 37 27.46 row 27, seats 1-2-3
CABIN HGR 8/12/96-3 40 39 48.90 -72 37 27.40 misc metal
debris 9/20/96-33 40 39 52.39 -72 37 27.31 some kind of
pipes with (TWA 15201 / s/n 237) 9/21/96-1 40 39 49.70 -72
37 27.30 CW stringer CW MOCKUP 40 39 49.70 -72 37 27.30
CW stringers- upper CW MOCKUP 40 39 49.70 -72 37 27.30
right SOB web (9-23-96-5) CW MOCKUP 40 39 49.70 -72 37
27.30 terminal fitting rear spar wing CW MOCKUP 40 39
49.70 -72 37 27.30 CW lower skin CW MOCKUP 40 39 49.70
-72 37 27.30 CW lower skin CW MOCKUP 40 39 49.70 -72
37 27.30 Fuel vent 9/23/96-5 40 39 49.70 -72 37 27.30 black
camera bag 9/23/96-5 40 39 49.70 -72 37 27.30 riveted piece

of metal 9/23/96-5 40 39 49.70 -72 37 27.30 metal tube
9/23/96-5 40 39 49.70 -72 37 27.30 misc. debris 9/23/96-5
40 39 49.70 -72 37 27.30 CW lower skin CW MOCKUP 40 39
49.60 -72 37 27.30 center tank lower stringer CW MOCKUP
40 39 49.70 -72 37 27.30 spanwise beam section CW
MOCKUP 40 39 49.70 -72 37 27.30 CW fuel capacitance
probe 40 39 49.70 -72 37 27.30 CW stringer end CW
MOCKUP 40 39 49.70 -72 37 27.30 spanwise beam section
CW MOCKUP 40 39 49.70 -72 37 27.30 bio hazard bag
containing skull fragment 9/23/96-5 40 39 49.60 -72 37
27.30 misc. debris 9/22/96-1 40 39 49.60 -72 37 27.30 1
cargo net (misc. debris, passenger seats, 1 shoe 9/22/96-1
40 39 46.00 -72 37 27.30 green metal rod 20' long 9/12/96-2
40 39 46.00 -72 37 27.30 green metal rod 15' long 9/12/96-2
40 39 49.60 -72 37 27.30 1 long tube 9/22/96-1 40 39 49.60
-72 37 27.30 #8 flap track assembly and carriage
transmission 9/22/96-1 40 39 49.60 -72 37 27.30 fuel probe
9/22/96-1
Z3387 40 39 49.60 -72 37 27.30 1 long piece of debris
9/22/96-1 40 39 49.60 -72 37 27.30 misc. debris (1 long
piece) 9/22/96-1 40 39 47.24 -72 37 27.28 AKN7488 cargo
container CARGO HGR 40 39 47.24 -72 37 27.28 cargo
container 40 39 47.24 -72 37 27.28 one bag of jeans &
miscellaneous personal effects 40 39 47.24 -72 37 27.28
fuselage skin 3' (2', aft cargo belly section 46 40 39 47.24 -72
37 27.28 cargo bin ballmat 8/20/96-12 40 39 47.24 -72 37
27.28 oxygen bottle 8/20/96-12 40 39 47.24 -72 37 27.28 FS
1480 bulkhead & skin 8/20/96-12 40 39 47.24 -72 37 27.28
piece of cargo floor with rollers 40 39 47.24 -72 37 27.28
Cargo floor panel from close to rear pressure bulkhead 40

39 47.24 -72 37 27.28 4' piece of cargo bin support frame
CARGO BAY 40 39 47.24 -72 37 27.28 FS skin rear belly keel
beam 8/22/96-5 40 39 47.24 -72 37 27.28 cargo container
AKN7501 CARGO BAY 40 39 47.24 -72 37 27.28 galley
container CABIN HGR 40 39 47.24 -72 37 27.28 cargo
flooring CARGO HGR 40 39 47.24 -72 37 27.28 arm rest seat
37 (2) 40 39 47.24 -72 37 27.28 small section wing interior
skin with nozzle fitting 40 39 47.24 -72 37 27.28 food carrier
CABIN HGR 40 39 47.24 -72 37 27.28 lower section of
galley 8/20/96-12 40 39 47.24 -72 37 27.28 personal effects
(suitcase) 8/21/96-6 40 39 47.24 -72 37 27.28 mag of blue
jeans and misc. personal effects 8/21/96-6 40 39 47.24 -72
37 27.28 misc. personal effects 8/21/96-6 40 39 47.24 -72 37
27.28 part of cargo hold #4 CARGO BAY 8/22/96-5 40 39
47.24 -72 37 27.28 upper part of galley 8/22/96-5 40 39
47.24 -72 37 27.28 aircraft frame 8/22/96-5 40 39 47.24 -72
37 27.28 misc personal effects 8/21/96-6 40 39 47.24 -72 37
27.28 galley top 8/22/96-5 40 39 47.24 -72 37 27.28 Galley
Drawer 8/22/96-5 40 39 47.24 -72 37 27.28 cargo handling
wheel CARGO BAY 8/22/96-5 40 39 47.24 -72 37 27.28
gasper duct DUCTING BAY 8/22/96-5 40 39 47.24 -72 37
27.28 misc part of galley 8/22/96-5 40 39 47.24 -72 37 27.28
part of galley 8/22/96-5 40 39 47.24 -72 37 27.28 Movie
Projector 8/22/96-5 40 39 47.24 -72 37 27.28 US mail
8/21/96-6 40 39 47.24 -72 37 27.28 cargo lock CARGO BAY
8/22/96-5
C2090 40 39 47.24 -72 37 27.28 wiring bundle 40 39 47.24 -72
37 27.28 misc personal items; clothing, watches 8/21/96-6
40 39 47.24 -72 37 27.28 personal effects: purse, jewelry,
coinage, credit card belonging to: 8/21/96-6 40 39 47.24 -72

37 27.28 misc. body parts and bones 8/21/96-6 40 39 47.24
-72 37 27.28 cabin floor support PARTS BAY 8/22/96-5 40
39 47.24 -72 37 27.28 piece of frame PARTS BAY 8/22/96-5
40 39 47.24 -72 37 27.28 misc. personal effects 8/21/96-6 40
39 47.24 -72 37 27.28 US mail 8/21/96-6 40 39 47.24 -72 37
27.28 part of cabin chair 37 (3), CABIN HGR 8/22/96-5 40
39 47.24 -72 37 27.28 FS 2180-2240; stringers 36R-44R
8/22/96-5 40 39 47.24 -72 37 27.28 DHL Mail Bag
8/21/96-6 40 39 47.24 -72 37 27.28 Part of Galley and
Galley Bulkhead (D section) 8/22/96-5 40 39 47.24 -72 37
27.28 service galley CABIN HGR 40 39 47.24 -72 37 27.28
cargo container CARGO BAY 8/22/96-5 40 39 47.24 -72 37
27.28 seat 34 (4), CABIN HGR 40 39 47.24 -72 37 27.28 seat
35 (4), armrest with partial frame, CABIN HGR 40 39 47.24
-72 37 27.28 seat 38 (5) armrest, CABIN HGR 40 39 47.24 -72
37 27.28 seat 47 (7), CABIN HGR 40 39 47.24 -72 37 27.28
seat 34 (5), CABIN HGR 40 39 47.24 -72 37 27.28 seat 44 (4),
CABIN HGR 40 39 47.24 -72 37 27.28 seat 36 (8), CABIN
HGR 8/20/96-12 40 39 50.14 -72 37 27.24 generator cable
lead 40 39 50.14 -72 37 27.24 flap mechanism 8/09/96-37 40
39 50.14 -72 37 27.24 fuel tank bulkhead; ?? CW MOCKUP
8/09/96-37 40 39 50.14 -72 37 27.24 fuel tank bulkhead;
right inboard fuel tank 8/09/96-37 40 39 50.14 -72 37 27.24
4 reserve fueling valve 8/09/96-37 40 39 50.14 -72 37
27.24 flap carriage assembly 8/09/96-37 40 39 50.14 -72 37
27.24 engine pylon firewall and harness 8/09/96-37 40 39
50.14 -72 37 27.24 right lower wing skin; SOB rib, stringer
3-rear spar 8/09/96-37 40 39 50.14 -72 37 27.24 flap carriage
assembly 8/09/96-37 40 39 50.14 -72 37 27.24 fuel tank slice
8/09/96-37 40 39 50.14 -72 37 27.24 flap carriage section

8/09/96-37 40 39 50.14 -72 37 27.24 flap drive assembly
8/09/96-37 CW215, CW 40 39 50.14 -72 37 27.24 front spar
RH terminal fitting/jack point #2; right hand lower panel;
contains jack point #2; this part i CW MOCKUP
8/08/96-30 40 39 50.14 -72 37 27.24 spoiler section
8/08/96-30 40 39 50.14 -72 37 27.24 engine wiring harness
CW30?? 40 39 50.14 -72 37 27.24 R14 #5 CW Body Rib. SWB
#2 to mid spar CW MOCKUP 8/09/96-37 40 39 50.14 -72
37 27.24 FS 2285-2360; stringer 8L-24L 8/09/96-37 40 39
50.14 -72 37 27.24 right wing stringer 8/08/96-30 40 39
50.14 -72 37 27.24 spar section FSSI 920.00-ILES 922.25
8/09/96-37 40 39 50.14 -72 37 27.24 variable cambor
scissors 8/09/96-37 LF15A, RF09 40 39 50.14 -72 37 27.24 FS
2100-2160; stringers 22L-30L 8/09/96-37 40 39 50.14 -72 37
27.24 flap section 8/09/96-37 40 39 50.14 -72 37 27.24
fuselage section including 8 window apertures 8/09/96-37
40 39 50.14 -72 37 27.24 wing center box bulkhead fragment
8/08/96-30 40 39 50.14 -72 37 27.24 fuel capacitance probe
8/09/96-37 40 39 50.14 -72 37 27.24 ?? center fuel tank
assembly 8/09/96-37 40 39 50.14 -72 37 27.24 R3 main entry
door 8/08/96-30 40 39 50.14 -72 37 27.24 lower CW skin;
S-4 to S-10; left SOB to RBL 80 CW MOCKUP 8/08/96-30
40 39 50.14 -72 37 27.24 FS 2530 -2618 stringer 23R - 49L
8/08/96-30 40 39 50.14 -72 37 27.24 flaptrack 8/08/96-30 40
39 50.14 -72 37 27.24 top aft right cw tank skin S-1A to S-9
CW MOCKUP 8/08/96-30 40 39 50.14 -72 37 27.24 right
wing lower skin; RWS 1196-1424 8/09/96-37 CW801, CW
40 39 50.14 -72 37 27.24 mid spar web RBL 85 to LBL 49
(CW801); SWB #2 RH web RBL 30,80 (CW702). Top right
portion CW MOCKUP 8/08/96-30 40 39 50.14 -72 37 27.24

lower center and left CW skin 5-10 to 5-15; LBL 97 to RBL
104 CW MOCKUP 8/09/96-37 40 39 50.14 -72 37 27.24
horizontal stabilizer skin section 8/08/96-30 40 39 50.14 -72
37 27.24 FS 1540-1820 left side fuselage 8/08/96-30 40 39
50.14 -72 37 27.24 right wing stringer 8/08/96-30 40 39
50.14 -72 37 27.24 left wing #1 flap carriage ((See C2029)
8/08/96-30 40 39 50.14 -72 37 27.24 CABIN HGR
8/08/96-30 40 39 50.14 -72 37 27.24 trailing edge flap
8/09/96-37 40 39 50.14 -72 37 27.24 trailing edge flap
8/09/96-37 40 39 50.14 -72 37 27.24 trailing edge flap
8/09/96-37 40 39 50.14 -72 37 27.24 upper fwd inboard
section wheel well wall; FS 1360-1380 8/09/96-37 40 39
50.14 -72 37 27.24 wing to fuselage angle 8/09/96-37 40 39
50.14 -72 37 27.24 right trailing edge flap section
8/08/96-30 CW1010 40 39 50.14 -72 37 27.24 rear spar RBL
11-80, web @ lower chord CW MOCKUP 40 39 50.14 -72 37
27.24 cw tank stringer 40 39 50.14 -72 37 27.24 cw stringer
CW MOCKUP 40 39 50.14 -72 37 27.24 spanwise beam #1-
lower RBL 53 to 66 CW MOCKUP 40 39 50.14 -72 37 27.24
cw spanwise beam #2-LH web door perimeter CW
MOCKUP 40 39 50.14 -72 37 27.24 lower CW skin; STR
14-15; RBL 30-80 CW MOCKUP
C2160 40 39 50.14 -72 37 27.24 cw lower skin-left side mid
spar to S13; left SOB to LBL 104 CW MOCKUP 40 39 50.14
-72 37 27.24 cw lower skin stringer CW MOCKUP 40 39
50.14 -72 37 27.24 lower wing skin; right hand wing; WS
1214-1243; FS 6 to rear spar 8/09/96-37 40 39 50.14 -72 37
27.24 lower cw skin-fwd left corner CW MOCKUP 40 39
50.14 -72 37 27.24 skin panel FS 2020-2040; stringer 36L-41L
8/09/96-37 40 39 50.14 -72 37 27.24 FS 2160-2220; stringer

23L-30L 8/09/96-37 40 39 50.14 -72 37 27.24 seats 51 (1 2 3),
CABIN HGR 40 39 50.14 -72 37 27.24 rear spar CW tank @
RBL 127, was cut from lower right wing CW MOCKUP 40
39 50.14 -72 37 27.24 FS 2270-2300 stringer 10L-13L
8/09/96-37 40 39 50.14 -72 37 27.24 FS 1920-1940 stringer
32L-36L 40 39 50.14 -72 37 27.24 right wing outboard fore
flap 40 39 50.14 -72 37 27.24 FS 1760-1810 stringer 25L-30L
8/09/96-37 40 39 50.14 -72 37 27.24 FS 1740-1800 stringer
30L-34L 8/08/96-30 40 39 49.40 -72 37 27.20 misc metal
debris 9/20/96-33 40 39 49.40 -72 37 27.20 miscellaneous
metal debris 40 39 48.90 -72 37 27.20 grey metal rivet 40 39
47.62 -72 37 27.15 seat 36 (4) 8/12/96-3 40 39 47.62 -72 37
27.15 cargo bin w/ bone fragment in side CARGO BAY
8/12/96-3 40 39 47.62 -72 37 27.15 fuselage frame approx 5',
no FS # 8/12/96-3 40 39 47.62 -72 37 27.15 toilet paper
holder 8/12/96-3 40 39 47.62 -72 37 27.15 metal strip 6"(1;
cargo liner PARTS BAY 8/12/96-3 40 39 47.62 -72 37 27.15
cargo container fragment, approx 2'(2' 8/12/96-3 40 39
47.62 -72 37 27.15 olive drab green panel, 4'(2' w/ link to 4'
structure 8/12/96-3 40 39 47.62 -72 37 27.15 door section
3'(1/2' 8/12/96-3 40 39 47.62 -72 37 27.15 cargo container
w/letters AK CARGO BAY 8/12/96-3 40 39 47.62 -72 37
27.15 cargo container 5'(2' w/letters KN7488 CARGO BAY
8/12/96-3 40 39 47.62 -72 37 27.15 cargo container
#AAP7309 1'(2' CARGO BAY 8/12/96-3 40 39 47.62 -72 37
27.15 bundle of blue jeans 8/12/96-3 40 39 47.62 -72 37
27.15 seat 41 (4 5) armrest only CABIN HGR 8/12/96-3 40
39 47.62 -72 37 27.15 row 43 seat 7 armrest CABIN HGR
8/12/96-3 40 39 47.62 -72 37 27.15 wing leading edge air
foil rib 8/12/96-3 40 39 47.62 -72 37 27.15 wing box beam

w/fuel vent port approx 3' long 8/12/96-3 40 39 47.62 -72
37 27.15 white carry-on cloth bag 8/12/96-3 40 39 47.62 -72
37 27.15 FS 1900 fuselage approx 3' long p/n 65B04600
separated 8/12/96-3 40 39 47.62 -72 37 27.15 section of
floor w/ball decking 2'(2' 8/12/96-3 40 39 47.62 -72 37
27.15 suitcase w/ tag located in galley structure 8/12/96-3
40 39 47.62 -72 37 27.15 galley storage locker 8/12/96-3 40
39 47.62 -72 37 27.15 black carry-on bag w/ name tag
(8/12/96-3 40 39 47.62 -72 37 27.15 US mail bag 8/12/96-3
40 39 47.62 -72 37 27.15 red crushed fuselage skin 1'(1'
8/12/96-3 40 39 47.62 -72 37 27.15 bulkhead fragment w/
circular fairing area (unpainted) approx 4'(4'(3/16"
8/12/96-3 40 39 47.62 -72 37 27.15 electric pump - non-
aircraft 8/12/96-3 40 39 47.62 -72 37 27.15 5' section of
leading edge 8/12/96-3 40 39 47.62 -72 37 27.15 5' length of
fuselage frame w/handwritten "1960" 8/12/96-3 40 39
47.62 -72 37 27.15 fuselage frame, FS 1520 approx 8' long
8/12/96-3 40 39 47.62 -72 37 27.15 FS 1220 frame from
stringer 5R-11R 40 39 47.62 -72 37 27.15 FS 1620 frame
section from stringer STR 5R-9R 40 39 47.60 -72 37 27.11
black handbag 8/12/96-3 40 39 47.60 -72 37 27.10 fuselage
frame # 1900 8/12/96-3 40 39 47.60 -72 37 27.10 bulkhead
fragment, approx 3'(4' 8/12/96-3 40 39 46.80 -72 37 27.10
1.5' long metal with hinge red on one side 9/10/96-4 40 39
47.60 -72 37 27.10 seat 36 (1) armrest. CABIN HGR 40 39
52.50 -72 37 27.10 misc metal 9/28/96-1 40 39 47.35 -72 37
27.06 wing rib w/ #WS 1454.0 8/14/96-9 40 39 47.35 -72 37
27.06 seat frame, unknown # 8/14/96-9 40 39 47.35 -72 37
27.06 luggage; olive green flower print; 1'(2' 8/14/96-9 40
39 47.35 -72 37 27.06 wallet and pants, 8/26/96-30 40 39

47.35 -72 37 27.06 cargo container fragment; 2'(4' CARGO BAY 8/14/96-9 40 39 47.35 -72 37 27.06 misc mail packet, DHL unopened 8/14/96-9 40 39 47.35 -72 37 27.06 cargo retention mechanism, 3' long 8/14/96-9 40 39 47.35 -72 37 27.06 fuel tank bulkhead fragment, 1'(2' 8/14/96-9 40 39 47.35 -72 37 27.06 light duty structural frame, 5' long 8/14/96-9 40 39 47.35 -72 37 27.06 tire fragment 8/14/96-9 40 39 47.35 -72 37 27.06 pneumatic actuator MOTOR BAY 8/14/96-9 40 39 47.35 -72 37 27.06 movie projector housing CABIN HGR 8/14/96-9 40 39 47.35 -72 37 27.06 bathroom toilet paper dispenser CABIN HGR 8/14/96-9 40 39 47.35 -72 37 27.06 FS 1680 frame segment; stringers 4L-12L 8/14/96-9 40 39 47.35 -72 37 27.06 misc luggage 8/14/96-9 40 39 47.35 -72 37 27.06 FS 1860 frame segment; stringers 7L-16L; light structural frame, 7' PARTS BAY 8/14/96-9 40 39 47.35 -72 37 27.06 misc mail packets in bags, USPS\ 8/14/96-9 40 39 47.35 -72 37 27.06 fuselage bulkhead fragment 1' 8/14/96-9 40 39 47.35 -72 37 27.06 FS 1800-1848 stringer 22R with two windows (fuselage bulkhead, w/ window fragment) 8/14/96-9 40 39 47.35 -72 37 27.06 row 43, seat 4 armrest CABIN HGR 8/14/96-9 40 39 47.35 -72 37 27.06 row 42 seat 4-5 CABIN HGR 8/14/96-9 40 39 47.35 -72 37 27.06 light structural frame 3' PARTS BAY 8/14/96-9 40 39 47.35 -72 37 27.06 fuselage bulkhead fragment 8'(3' PARTS BAY 8/14/96-9 40 39 47.35 -72 37 27.06 fuselage FS 1560 8/14/96-9 40 39 47.35 -72 37 27.06 fuselage bulkhead fragment 6'(1' 8/14/96-9 40 39 47.35 -72 37 27.06 passports and wallets, 8/14/96-9 40 39 47.35 -72 37 27.06 red fuselage skin 1'(1' 8/14/96-9 40 39 47.35 -72 37 27.06 a/c duct filter 8/14/96-9 40 39 47.35 -72 37 27.06 cargo container

fragment CARGO BAY 8/14/96-9 40 39 47.35 -72 37 27.06
interior bulkhead section 8/14/96-9 40 39 47.35 -72 37 27.06
interior bulkhead fragment 1'(2' 8/14/96-9 40 39 47.35 -72
37 27.06 cargo container wall and edge CARGO BAY
8/14/96-9 40 39 47.35 -72 37 27.06 cargo container
motorized wheel CARGO BAY 8/14/96-9 40 39 47.35 -72
37 27.06 olive drab box, 5'(3' 8/14/96-9 40 39 47.35 -72 37
27.06 main landing gear tire 8/14/96-9 40 39 47.35 -72 37
27.06 non-structural interior, red, 5' long PARTS BAY
8/14/96-9 40 39 47.35 -72 37 27.06 R4 jumpseat, F/A
CABIN HGR 8/14/96-9 40 39 47.35 -72 37 27.06 door,
corner, exterior 8/14/96-9 40 39 47.35 -72 37 27.06 cargo
container 2'(1' CARGO BAY 8/14/96-9 40 39 47.35 -72 37
27.06 5'(5' alum pallet CARGO BAY 8/14/96-9 40 39 47.35
-72 37 27.06 cargo container edge (10') CARGO BAY
8/14/96-9 40 39 47.35 -72 37 27.06 door section fragment
8/14/96-9 40 39 47.35 -72 37 27.06 interior non-structural
box 2'(2' 8/14/96-9 40 39 47.35 -72 37 27.06 luggage
8/14/96-9 40 39 47.35 -72 37 27.06 fuselage bulkhead
fragment 8/14/96-9 40 39 47.35 -72 37 27.06 cargo
container fragment 4'(6' CARGO BAY 8/14/96-9 40 39
47.35 -72 37 27.06 40 39 47.35 -72 37 27.06 FS 2484-2598;
stringer 23L-42L 8/14/96-9 40 39 48.01 -72 37 27.06 armrest
25 (0) CABIN HGR 40 39 47.35 -72 37 27.06 seat 52 (8),
partial seat/armrest no back, CABIN HGR 40 39 48.01 -72
37 27.06 portion of spanwise beam CW tank CW MOCKUP
40 39 47.35 -72 37 27.06 seat 35 (6 7), CABIN HGR 40 39
48.01 -72 37 27.06 portion of spanwise beam CW tank CW
MOCKUP 40 39 48.01 -72 37 27.06 debris 9/22/96-1 40 39
48.01 -72 37 27.06 CW lower skin, RBL 9-50, STGR 10-13

CW MOCKUP 9/22/96-1

Z3375 40 39 48.01 -72 37 27.06 debris 9/22/96-1 40 39 48.01
-72 37 27.06 debris 9/22/96-1 40 39 48.01 -72 37 27.06 debris
9/22/96-1 40 39 48.01 -72 37 27.06 debris 9/22/96-1 40 39
48.01 -72 37 27.06 debris 9/22/96-1 40 39 48.01 -72 37 27.06
debris 9/22/96-1 40 39 45.03 -72 37 27.01 FS 910-940;
stringer 13L-14L 9/02/96-11 CW1016 40 39 49.03 -72 37
27.01 inboard leg CW tank left hand pickle fork rear CW
MOCKUP 9/21/96-1 40 39 45.03 -72 37 27.01 CW front spar
lower chord, LBL98.48 CW MOCKUP 9/21/96-1 40 39
49.03 -72 37 27.01 metal debris 9/21/96-1 40 39 45.03 -72 37
27.01 metal debris and wire (1 cargo net) 9/21/96-1 40 39
45.03 -72 37 27.01 #2 eng, left under wing fitting outbd
9/21/96-1 40 39 47.00 -72 37 27.00 #3 engine diagonal brace
pylon ENG HGR 8/08/96-30 40 39 45.00 -72 37 27.00 lower
left wing skin; WBL 448-1098; mid to rear spar 40 39 47.00
-72 37 27.00 right wing trailing edge flap; upper airfoil
section 8/08/96-30 40 39 47.00 -72 37 27.00 internal
components to right wing 8/08/96-30 40 39 47.00 -72 37
27.00 R3 cabin door; internal components to right wing
8/08/96-30 40 39 47.00 -72 37 27.00 left wing - outboard
section of the inboard aileron 8/08/96-30 40 39 47.00 -72 37
27.00 internal components to right wing 8/08/96-30 40 39
45.00 -72 37 27.00 L/W inside brace 40 39 47.00 -72 37 27.00
internal components to right wing 8/08/96-30 40 39 47.00
-72 37 27.00 internal components to right wing 8/08/96-30
40 39 47.00 -72 37 27.00 internal components to right wing
8/08/96-30 40 39 45.00 -72 37 27.00 lower left wing skin;
WBL 584-910; lower panel skin splice to aft spar 40 39 45.00
-72 37 27.00 left wing #4 flap track assembly 40 39 48.50 -72

37 27.00 misc. airplane shell parts with snake-skin belt
9/11/96-4 40 39 48.50 -72 37 27.00 CW spar CW MOCKUP
40 39 48.50 -72 37 27.00 side of body center wing tank CW
MOCKUP 40 39 49.00 -72 37 27.00 6 ft curved piece of
metal 9/20/96-33 40 39 48.50 -72 37 27.00 right hand
inboard aileron actuator and support assembly 9/12/96-2
40 39 49.50 -72 37 27.00 debris 9/22/96-1 40 39 48.50 -72 37
27.00 FS 923-960; stringer 29L-35L with FS 940 frame
segment 40 39 47.12 -72 37 26.99 misc. metal & plastic
fragments 10/17/96-1< 40 39 47.12 -72 37 26.99 misc. metal
debris 10/13/96-3 40 39 47.12 -72 37 26.99 misc. metal
debris 10/13/96-3 40 39 47.04 -72 37 26.90 spanwise H4,
LE1A 40 39 47.04 -72 37 26.90 piece of horizontal stabilizer
station 106.9-131.9; part of H4 and LE1A 8/23/96-15 40 39
47.04 -72 37 26.90 seat armrest marked Row 48 Seat 6
CABIN HGR 8/23/96-15 40 39 47.04 -72 37 26.90 human
remains 8/23/96-13 40 39 47.04 -72 37 26.90 wreckage
labeled actuator rotary motor part #544646-1 8/23/96-15
40 39 47.04 -72 37 26.90 portion of galley-per ALPA
representative CABIN HGR 8/23/96-15 40 39 47.04 -72 37
26.90 fuselage side of body; FS 1393; LBL 98.58 to 110.5
8/23/96-15 40 39 47.04 -72 37 26.90 portion of galley
container- CABIN HGR 8/23/96-15 40 39 47.04 -72 37 26.90
unidentified aircraft part PARTS BAY 8/23/96-15 40 39
47.04 -72 37 26.90 partial seat assembly marked row 43 seat
2 (armrest row 43 seat 1 and 2) 8/23/96-15 40 39 47.04 -72
37 26.90 portion of fuselage skin PARTS BAY 8/23/96-15 40
39 47.04 -72 37 26.90 FS 1540-1600; stringer 35R-43R
8/23/96-15 40 39 47.04 -72 37 26.90 unidentified aircraft
part 8/23/96-15 40 39 47.04 -72 37 26.90 unidentified

aircraft part 8/23/96-15 40 39 47.04 -72 37 26.90 fuselage
skin FS 1680-1700; stringer 42R-44R 8/23/96-15 40 39 47.04
-72 37 26.90 portion of galley- CABIN HGR 8/23/96-15 40
39 47.04 -72 37 26.90 seat 51 (6); armrest and partial frame
CABIN HGR 40 39 47.04 -72 37 26.90 misc clothing and
personal effects 8/23/96-1 40 39 47.04 -72 37 26.90 DHL
package and misc papers 8/23/96-1 40 39 47.04 -72 37 26.90
misc clothing and personal effects 8/23/96-1 40 39 47.04
-72 37 26.90 possible human bone 8/23/96-13 40 39 47.04
-72 37 26.90 misc clothing and personal effects 8/23/96-1
40 39 47.04 -72 37 26.90 one small photograph album
8/23/96-1 40 39 47.04 -72 37 26.90 possible human bone
8/23/96-13 40 39 47.04 -72 37 26.90 misc clothing and
personal effects 8/23/96-13 40 39 46.81 -72 37 26.86 body
part 8/21/96-6 40 39 46.81 -72 37 26.86 suitcase with misc.
personal effects 8/21/96-6 40 39 46.81 -72 37 26.86 chair
part row 35 seat 3 CABIN HGR 8/22/96-5 40 39 46.81 -72
37 26.86 chair part; armrest 54-6,7 8/22/96-5 40 39 46.81 -72
37 26.86 partial head skull 40 39 46.81 -72 37 26.86 FS
2020-2160 stringer 41L - 45R 8/22/96-5 40 39 46.81 -72 37
26.86 suitcase and misc. personal effects 8/22/96-4 40 39
46.81 -72 37 26.86 personal effects 8/22/96-4 40 39 46.81 -72
37 26.86 misc. personal effects 8/22/96-4 40 39 46.81 -72 37
26.86 bone part 40 39 46.81 -72 37 26.86 stringer 8/22/96-5
40 39 54.24 -72 37 26.84 debris 10/07/96-1
C2110 40 39 48.32 -72 37 26.81 fuel line tubing: seat 53-7
CABIN HGR 40 39 46.40 -72 37 26.80 scavenge pump 40 39
51.30 -72 37 26.80 oxygen cylinder 9/24/96-16 40 39 46.40
-72 37 26.80 misc. debris 9/23/96-5 40 39 46.40 -72 37 26.80
CW SOB rib CW MOCKUP 40 39 46.40 -72 37 26.80 SWB #1

web right hand closure panel CW MOCKUP 40 39 46.40 -72
37 26.80 SWB #1 web right hand closure panel CW
MOCKUP 40 39 46.40 -72 37 26.80 SWB #1 web right hand
closure panel CW MOCKUP 40 39 46.50 -72 37 26.80 2
pieces gray metal 40 39 46.40 -72 37 26.80 right SOB rib
lower chord segment at SWB #1 CW MOCKUP 40 39 49.56
-72 37 26.73 row 30, seat 9-10 CABIN HGR 40 39 45.60 -72
37 26.70 FS 2100-2280 stringer 23R-2R 40 39 46.60 -72 37
26.70 FS 1720-2018, stringer 27L-3R 40 39 51.33 -72 37 26.66
seats 23 (2 3) armrest for 23 (1) CABIN HGR 8/23/96-1 40
39 55.63 -72 37 26.64 debris, wing 9/16/96-2 40 39 55.63 -72
37 26.64 right hand inboard flap assembly trailing edge
with carriages (20'(10') 9/16/96-2 40 39 55.63 -72 37 26.64
piece of debris 9/20/96-33 40 39 46.89 -72 37 26.59 center
fuel tank gauge 40 39 46.89 -72 37 26.59 skin with stringer
40 39 46.89 -72 37 26.59 spanwise beam #1 - lower web at
LBL 98 intercostal (wing center section intercostal) CW
MOCKUP 40 39 46.89 -72 37 26.59 Wing Skin 1'(2' CW
MOCKUP 40 39 46.89 -72 37 26.59 mid spar wing section
65B01036-17 40 39 46.89 -72 37 26.59 fuel tank probe
CW504A 40 39 46.89 -72 37 26.59 front spar LH web above
access hole approx 8"(8" section CW MOCKUP 40 39 46.89
-72 37 26.59 seat 47 (6) armrest; seat 47 (7) seat CABIN
HGR 40 39 46.89 -72 37 26.59 FS 1840-1920, stringer
47R-50R 8/22/96-5 40 39 46.89 -72 37 26.59 center wing
tank span 40 39 46.89 -72 37 26.59 misc. personal clothing
and effects 8/25/96-1 40 39 46.89 -72 37 26.59 tail cone /
APU exhaust; FS 2742-2775 8/24/96-7 40 39 46.89 -72 37
26.59 Item of jewelry and photo 8/25/96-7 40 39 46.89 -72
37 26.59 one human foot 8/25/96-1 40 39 46.89 -72 37 26.59

aft cargo door fragment 8/23/96-15 40 39 46.89 -72 37 26.59
cargo bin structure CARGO BAY 8/22/96-5 40 39 46.89 -72
37 26.59 cargo container CARGO BAY 8/22/96-5 40 39
46.89 -72 37 26.59 landing gear actuator 8/22/96-5 40 39
46.89 -72 37 26.59 piece of cargo door 8/22/96-5 40 39 46.89
-72 37 26.59 FS 940-1000; stringer 35L-39L with piece of
bulkhead under wing front spar 8/22/96-5 40 39 46.89 -72
37 26.59 inner sleeve for hydraulic actuator 8/22/96-5 40
39 46.89 -72 37 26.59 seat 29 (1) armrest, seat 29 (2) seat
CABIN HGR 8/22/96-5 40 39 46.89 -72 37 26.59 left wing,
rear spar, inboard end 8/22/96-5 40 39 46.89 -72 37 26.59
TWA flight attendant jacket 8/22/96-4 40 39 46.89 -72 37
26.59 misc personal clothing and effects 8/22/96-4 40 39
46.89 -72 37 26.59 cargo bin ball matt - CARGO BAY
8/22/96-5 40 39 46.89 -72 37 26.59 portion of cargo bin
flooring CARGO BAY 8/22/96-5 40 39 46.89 -72 37 26.59
seat - Row 50 seat 3 CABIN HGR 8/22/96-5 40 39 46.89 -72
37 26.59 armrest 51(7) and partial seat assembly CBN INT
8/24/96-7 40 39 46.89 -72 37 26.59 seat 41 (8) armrest cap
8/24/96-7 40 39 46.89 -72 37 26.59 armrest, Row 47 Seat 9
40 39 46.89 -72 37 26.59 landing gear actuator 8/22/96-5 40
39 46.89 -72 37 26.59 library card 8/22/96-4 40 39 46.89 -72
37 26.59 one piece of luggage 8/22/96-4 40 39 46.89 -72 37
26.59 one piece of luggage 8/22/96-4 40 39 46.89 -72 37
26.59 misc clothing 8/22/96-4 40 39 46.89 -72 37 26.59 2 US
mail bags 8/22/96-4 40 39 46.89 -72 37 26.59 2 pieces of
luggage + misc personal effects 8/22/96-4 40 39 46.89 -72
37 26.59 lower belly skin 8/22/96-5 40 39 46.89 -72 37 26.59
misc. personal clothing + ID credit card 8/22/96-4 40 39
46.89 -72 37 26.59 one lap top computer 8/22/96-4 40 39

46.89 -72 37 26.59 piece of skull 40 39 46.89 -72 37 26.59
small blue pack containing French passport + US currency
8/22/96-4 40 39 46.89 -72 37 26.59 check book 8/22/96-4 40
39 46.89 -72 37 26.59 one piece of luggage 8/22/96-4 40 39
46.89 -72 37 26.59 misc clothing 8/22/96-4 40 39 46.89 -72
37 26.59 2 US mail bags 8/22/96-4 40 39 46.89 -72 37 26.59
one piece of Luggage w/"TWA" cap visible 8/22/96-4 40
39 46.89 -72 37 26.59 body parts 40 39 46.89 -72 37 26.59
unidentified aircraft wreckage 8/22/96-5 40 39 46.89 -72 37
26.59 rib FS 1620 8/24/96-7 40 39 46.89 -72 37 26.59 waist
garment chain (charred) 8/22/96-4 40 39 46.89 -72 37 26.59
right hand side aft bulk cargo door lower section
8/23/96-15 RF109D 40 39 46.89 -72 37 26.59 FS1620-1660
stringer 30R-33R 8/24/96-7 40 39 46.89 -72 37 26.59 piece of
aircraft fuselage 8/22/96-5
C2126 40 39 46.89 -72 37 26.59 Row 53 Seat 8 40 39 46.89 -72
37 26.59 aircraft wreckage labeled rotary actuator TUBING
BAY 8/22/96-5 40 39 46.89 -72 37 26.59 shutoff bleed valve
40 39 46.89 -72 37 26.59 aircraft wreckage labeled "water
separator" 8/22/96-5 40 39 46.89 -72 37 26.59 unidentified
aircraft wreckage 8/22/96-5 40 39 46.89 -72 37 26.59
unidentified aircraft wreckage 8/22/96-5 40 39 46.89 -72 37
26.59 a/c 1/2" tubing TUBING BAY 8/22/96-5 40 39 46.89
-72 37 26.59 aircraft tire/wheel 8/22/96-5 40 39 46.89 -72 37
26.59 unidentified aircraft wreckage 8/22/96-5 40 39 46.89
-72 37 26.59 unidentified aircraft wreckage 8/22/96-5 40 39
46.89 -72 37 26.59 aircraft wreckage TUBING BAY
8/25/96-1 40 39 46.89 -72 37 26.59 one (1) dollar bill US
currency 8/25/96-1 40 39 46.89 -72 37 26.59 flap drive tube
PARTS BAY 8/22/96-5 40 39 46.89 -72 37 26.59 8/22/96-5

40 39 46.89 -72 37 26.59 8/22/96-5 40 39 46.89 -72 37 26.59
wheel well structure 8/22/96-5 40 39 46.89 -72 37 26.59
piece of fuselage 8/22/96-5 40 39 46.89 -72 37 26.59 seat 49
(4) armrest 8/24/96-7 40 39 46.89 -72 37 26.59 possible seat
part CABIN HGR 8/22/96-5 40 39 46.89 -72 37 26.59
unidentified wreckage 8/22/96-5 40 39 46.89 -72 37 26.59
piece of clear plastic to which foot was attached 8/25/96-1
40 39 46.89 -72 37 26.59 partial seat assembly; seat 34 (2)
8/24/96-7 40 39 46.89 -72 37 26.59 left main landing gear
air ducting for air start (with small hinged door marked
"pneumatic ground se 8/24/96-7 40 39 46.89 -72 37 26.59 FS
1620 rib 8/24/96-7 40 39 46.89 -72 37 26.59 seat 32 (1)
armrest CBN INT 8/24/96-7 40 39 46.89 -72 37 26.59 seats
33 (4 5 6 7) CABIN HGR 8/24/96-7 40 39 46.89 -72 37 26.59
FS 2140-2160; stringer 23R - 35R 8/24/96-7 40 39 46.89 -72
37 26.59 rib for wing 8/24/96-7 40 39 46.89 -72 37 26.59
8/22/96-5 40 39 46.89 -72 37 26.59 Aircraft Wreckage
8/23/96-15 40 39 46.89 -72 37 26.59 misc. personal effects
and clothing 8/25/96-1 40 39 46.89 -72 37 26.59 misc. paper,
magazines and other debris 8/25/96-5 40 39 46.89 -72 37
26.59 Portion of Meal cart 8/23/96-15 40 39 46.89 -72 37
26.59 Aircraft Wreckage 40 39 46.89 -72 37 26.59 Aircraft
Wreckage 8/23/96-15 40 39 46.89 -72 37 26.59 FS 1725-1820,
stringer 44R-50R 8/23/96-15
C1008 40 39 46.89 -72 37 26.59 aircraft part with wires
attached 8/23/96-15 40 39 46.89 -72 37 26.59 fuselage skin
(per ALPA representative) PARTS BAY 8/23/96-15 40 39
46.89 -72 37 26.59 seat 32 (8 9 10) seat backs CABIN HGR
8/23/96-15 40 39 46.89 -72 37 26.59 Apparent partial
speaker assembly (aircraft wreckage) 8/23/96-15 40 39

46.89 -72 37 26.59 two (2) bone fragments with some tissue attached 8/25/96-1 40 39 46.89 -72 37 26.59 Aircraft Wreckage 40 39 46.89 -72 37 26.59 partial seat assembly marked row 51 seat 9 CABIN HGR 8/23/96-15 40 39 46.89 -72 37 26.59 FS 1760-1780, stringer 43R-45R 8/23/96-15 40 39 46.89 -72 37 26.59 right main wheel well; FS 1460; (body steering harness included) 8/24/96-7 40 39 46.89 -72 37 26.59 seat assembly marked row 53 seat 10 CABIN HGR 8/23/96-15 40 39 46.89 -72 37 26.59 portion of cargo container CARGO BAY 8/23/96-15 40 39 46.89 -72 37 26.59 piece of horizontal stabilizer 8/23/96-15 40 39 46.89 -72 37 26.59 aircraft part marked FS 1660 8/23/96-15 40 39 46.89 -72 37 26.59 partial seat assembly marked row 38 seat 3 8/23/96-15 40 39 46.89 -72 37 26.59 apparent container portion marked "TWA" bearing number 7501 CARGO BAY 8/23/96-15 40 39 46.89 -72 37 26.59 armrest marked Row 50 Seat 7 8/23/96-15 40 39 46.89 -72 37 26.59 aircraft wreckage 8/23/96-15 40 39 46.89 -72 37 26.59 misc. personal clothing and effects 8/25/96-1 40 39 46.89 -72 37 26.59 misc clothing and personal effects 40 39 46.89 -72 37 26.59 unidentified piece of aircraft wreckage 8/23/96-15 40 39 46.89 -72 37 26.59 six bones - all found in same proximity 8/25/96-1 40 39 46.89 -72 37 26.59 2 bags marked "US Postal Service" 8/25/96-1 40 39 46.89 -72 37 26.59 1 Bundle of Blue Jeans 8/25/96-1 40 39 46.89 -72 37 26.59 Mail Bag, Misc. Personal Effects 8/25/96-1 40 39 46.89 -72 37 26.59 Blue Jean Pants From Bundle 8/25/96-1 40 39 46.89 -72 37 26.59 FS 1540-1620; stringer 24R-31R 8/23/96-15 40 39 46.89 -72 37 26.59 one (1) one-hundred dollar bill; one (1) fifty dollar bill; One (1) twenty dollar bill (all US Currency) 8/25/96-1

40 39 46.89 -72 37 26.59 one bone approx. 8" long with black discoloration about 1/2 of bones length 8/25/96-1 40 39 46.89 -72 37 26.59 one possible bone fragment 8/25/96-1 40 39 46.89 -72 37 26.59 Personal effects including various forms of identification and photographs 8/25/96-1 40 39 46.89 -72 37 26.59 aircraft wreckage 8/23/96-15 40 39 46.89 -72 37 26.59 misc. personal clothing and effects 8/25/96-1 40 39 46.89 -72 37 26.59 possible human bones and tissue 8/25/96-1 40 39 46.89 -72 37 26.59 FS 1680-1800; stringer 46L - 50R 8/23/96-15 40 39 46.89 -72 37 26.59 misc personal effects and clothing 8/25/96-1 40 39 46.89 -72 37 26.59 1 photo ID), 1 photo album, 1 broken JVC tape cassette 8/25/96-1

C1048 40 39 46.89 -72 37 26.59 portion of fore support joist marked "STA 1980" PARTS BAY 8/24/96-7 40 39 46.89 -72 37 26.59 1 Bundle of Blue Jeans 8/25/96-1 40 39 46.89 -72 37 26.59 one possible human tooth (located on cargo net during loading of M boat) 8/25/96-1 40 39 46.89 -72 37 26.59 Misc. Personal effects and clothing 8/25/96-1 40 39 46.89 -72 37 26.59 possible piece of luggage with apparent charring 8/25/96-6 40 39 46.89 -72 37 26.59 Blue Jean Pants From Bundle 8/25/96-1 40 39 46.89 -72 37 26.59 Blue Jean Pants From Bundle 8/25/96-1 40 39 46.89 -72 37 26.59 aircraft wreckage 8/23/96-15 40 39 46.89 -72 37 26.59 seat 51 (5) armrest, CABIN HGR 40 39 46.89 -72 37 26.59 unidentified piece of wreckage 8/26/96-36 40 39 46.89 -72 37 26.59 seat 46 (4) armrest, CABIN HGR 40 39 46.89 -72 37 26.59 fuselage skin under body fairing, stringer 34 40 39 46.89 -72 37 26.59 LE2B is portion of LHS outboard elevator from ES FS 335-385 8/26/96-36 40 39 46.89 -72 37 26.59

unidentified piece of wreckage marked "STA 1820"
8/26/96-36 40 39 46.89 -72 37 26.59 seat 48 (5) armrest,
CABIN HGR 40 39 46.89 -72 37 26.59 partial seat assembly
8/24/96-7 40 39 46.89 -72 37 26.59 FS 1800 frame segment;
stringer 6L-14L 8/22/96-5 40 39 46.89 -72 37 26.59 seat 53
(4) arm rest, CABIN HGR 40 39 46.89 -72 37 26.59 seat 53
(6) arm rest, CABIN HGR 40 39 46.89 -72 37 26.59
unidentified aircraft wreckage 8/24/96-7 40 39 46.89 -72 37
26.59 apparent top of cargo bay - 8/24/96-7 40 39 46.89 -72
37 26.59 partial seat assembly marked "ROW 36 SEAT 7"
8/24/96-7 40 39 46.89 -72 37 26.59 seat 36 (5) armrest,
CABIN HGR 8/8/96-31 40 39 46.89 -72 37 26.59 partial
cargo container 8/24/96-7 40 39 46.89 -72 37 26.59 seat 47
(8) armrest, CABIN HGR 40 39 46.89 -72 37 26.59 FS
2725-2742, part of RH APU access door hinge 40 39 46.89
-72 37 26.59 FS 1438-1460 stringer 28L-29L 8/23/96-15 40
39 46.89 -72 37 26.59 human remains 8/23/96-13 40 39
46.89 -72 37 26.59 insulation material containing possible
human bones 8/23/96-13 40 39 46.89 -72 37 26.59 misc
clothing 8/23/96-13 40 39 46.89 -72 37 26.59 misc clothing
and personal effects 8/23/96-1 40 39 46.89 -72 37 26.59 bag
marked US mail 8/23/96-13 40 39 52.85 -72 37 26.54 1 large
piece of twisted metal; 1 window and seal; 1 small piece of
twisted metal 9/11/96-5 40 39 52.85 -72 37 26.54 CW tank
midspair web LBL 52-78 CW MOCKUP 40 39 52.85 -72 37
26.54 4.5-5' (2-3' piece of skin (red/white & green metal)
10/02/96-1 40 39 52.85 -72 37 26.54 camera, black
notebook, various sizes of green, gray, yellow metal pieces,
woven belt 10/02/96-1
Z3227 40 39 52.85 -72 37 26.54 thin metal (meshed) interior

(seat arm rest), 1 tube colgate toothpaste, approx. 1'(6" gray metal pie 10/02/96-1 40 39 52.85 -72 37 26.54 debris-airplane/metal debris w/ plastic bag attached w/ debris in it also 10/02/96-1 40 39 46.70 -72 37 26.50 small body parts 8/30/96-23 40 39 46.70 -72 37 26.50 misc. debris from aircraft PARTS BAY 8/30/96-23 40 39 46.70 -72 37 26.50 personal items including a black Casio watch 8/30/96-23 40 39 46.70 -72 37 26.50 FS 2018-2040, with partial window 40 39 46.70 -72 37 26.50 misc debris from aircraft PARTS BAY 40 39 46.70 -72 37 26.50 wire bundle 8/30/96-23 40 39 46.70 -72 37 26.50 personal effects - black reading glasses 40 39 46.70 -72 37 26.50 misc metal from aircraft 8/31/96-4 40 39 46.70 -72 37 26.50 Triple A Card 40 39 46.70 -72 37 26.50 black cover of the Holy Bible 40 39 46.70 -72 37 26.50 FS 920-1000, stringer 29R-34R CW MOCKUP 8/30/96-23 40 39 46.70 -72 37 26.50 seat 47 (4) armrest CABIN HGR 40 39 50.20 -72 37 26.50 debris 9/22/96-1 40 39 46.70 -72 37 26.50 seat 46 (9) armrest only CABIN HGR 40 39 46.15 -72 37 26.49 #4 engine pylon section ENG HGR 8/19/96-22 40 39 46.15 -72 37 26.49 left wing lower skin LWS 1030-1230; front spar aft to S1 8/17/96-7 40 39 46.15 -72 37 26.49 aft spar WS 400 No. 2 tank outboard jettison 40 39 46.15 -72 37 26.49 leading edge left wing with leading edge flap; part of edge flap 8/19/96-22 40 39 46.15 -72 37 26.49 Main Landing Gear Strut with tires 1F, 1R, 2R 8/17/96-7 40 39 46.15 -72 37 26.49 miscellaneous cabin interior parts CABIN HGR 8/19/96-22 40 39 46.15 -72 37 26.49 seat 36 (3) CABIN HGR 8/19/96-22 40 39 46.15 -72 37 26.49 window reveal 8/19/96-22 40 39 46.15 -72 37 26.49 hydraulic lines TUBING BAY 8/19/96-22 40 39 46.15 -72 37 26.49 wing

structure part of hydraulic area 8/17/96-7 40 39 46.15 -72
37 26.49 miscellaneous Payne Webber paper reports
8/19/96-16 40 39 46.15 -72 37 26.49 clothing, life vest,
suitcase 8/19/96-20 40 39 46.15 -72 37 26.49 personal
effects, 8/19/96-16 40 39 46.15 -72 37 26.49 2 bags of US
Mail 8/19/96-16 40 39 46.15 -72 37 26.49 wing ribs
8/19/96-22 40 39 46.15 -72 37 26.49 FS 1920 crown frame
(C891) 40 39 46.15 -72 37 26.49 fuselage station 1319
8/16/96-5 40 39 46.15 -72 37 26.49 left wing up skin; LWS
771-808 with front span cap (skin segment (C891)) 40 39
46.15 -72 37 26.49 Lot - Misc Pieces Interior CABIN HGR 40
39 46.15 -72 37 26.49 Piece of door with handle - L5 door
C2012 40 39 46.15 -72 37 26.49 seat 51 (8) armrest and tray
table CABIN HGR 8/06/96-46 40 39 46.15 -72 37 26.49 duct
8" dia. (C891) 40 39 46.15 -72 37 26.49 personal effects;
wallet 8/19/96-22 40 39 46.15 -72 37 26.49 row 49 seat 8
armrest CBN HGR 8/18/96-6 40 39 46.15 -72 37 26.49 wing
stringer (C891) 40 39 46.15 -72 37 26.49 miscellaneous parts
8/19/96-22 40 39 46.15 -72 37 26.49 wing skin piece
2' (1' (C891) 40 39 46.15 -72 37 26.49 rib (C891) 40 39 46.15
-72 37 26.49 rear spar segment WS 450.00 (C891) 40 39 46.15
-72 37 26.49 FS 920-1000; stringer S 24-28 (C891) 8/18/96-6
40 39 46.15 -72 37 26.49 FS 1235 WL 168 RBL 87 (C891) 40 39
46.15 -72 37 26.49 upper skin @ side body (C891) 40 39
46.15 -72 37 26.49 left wing #1 flap carriage (C891) (See
C229) 40 39 46.15 -72 37 26.49 wing spar segment (C891)
CW108, CW 40 39 46.15 -72 37 26.49 upper CW LH splice
S14 (M.S.) (CW108); mid spar - 3' portion of LBL 127.5
fitting; this part is part CW MOCKUP 8/18/96-6 40 39
46.15 -72 37 26.49 wing front spar left lower center section

CW MOCKUP 40 39 46.15 -72 37 26.49 wing rib (C891)
PARTS BAY 40 39 46.15 -72 37 26.49 rear spar WS 522.00
(C891) 40 39 46.15 -72 37 26.49 stringer 7-13; upper left
hand splice body to center wing LBL 127.5(C891) CW
MOCKUP 40 39 46.15 -72 37 26.49 hydraulic return filter
wheel well area (C891) 40 39 46.15 -72 37 26.49 vent line
18" (C891) 40 39 46.15 -72 37 26.49 cargo container (C891)
CARGO BAY 40 39 46.15 -72 37 26.49 12" (3" wing skin
(C891) 40 39 46.15 -72 37 26.49 miscellaneous clothing
8/19/96-22 40 39 46.15 -72 37 26.49 miscellaneous human
rib bones 40 39 46.15 -72 37 26.49 APU firewall segment
8/18/96-6 40 39 46.15 -72 37 26.49 personal effects
8/18/96-4 40 39 46.15 -72 37 26.49 left wing outboard
aileron section and wing bulkhead WS 1325-1390
8/18/96-4 40 39 46.15 -72 37 26.49 left lower wing skin WS
520-660 8/18/96-6 40 39 46.15 -72 37 26.49 lower left wing
skin; WS 525-690 8/18/96-6 40 39 46.15 -72 37 26.49 #3 left
flap track and carriage assembly 8/18/96-6 40 39 46.15 -72
37 26.49 FS 2484-2638, stringer 1R-17R 8/18/96-6 40 39
46.15 -72 37 26.49 left wing lower skin; (WS 650-1035;
midspar to front spar) 8/18/96-6 40 39 46.15 -72 37 26.49
air cycle machine 8/18/96-6 40 39 46.15 72 37 26.49
8/18/96-6 40 39 46.15 -72 37 26.49 left wing up skin; LWS
586-688; from STR 10 to midspar 8/18/96-6 40 39 46.15 -72
37 26.49 fuel pump 8/18/96-6 40 39 46.15 -72 37 26.49
personal effects, 8/18/96-6 40 39 46.15 -72 37 26.49 wing
ribs 8/19/96-22 40 39 46.15 -72 37 26.49 section of wing flap
8/19/96-22 40 39 46.15 -72 37 26.49 miscellaneous wing
parts PARTS BAY 8/19/96-22 40 39 46.15 -72 37 26.49 fuel
boost pump 8/19/96-22 40 39 46.15 -72 37 26.49 left wing

#1 flap track 8/19/96-22 40 39 46.15 -72 37 26.49 long piece
- misc parts 8/19/96-22 40 39 46.15 -72 37 26.49 spoiler
actuator, flap, gear box & misc wing structure & tubing;
MOTOR BAY 8/19/96-22 40 39 46.15 -72 37 26.49 lot-
pieces of wing and fuel tank WING AREA 8/19/96-22 40
39 46.15 -72 37 26.49 left wing flap track support LWBL 353
5-7 8/19/96-22 40 39 46.15 -72 37 26.49 miscellaneous parts
8/19/96-22 40 39 46.15 -72 37 26.49 miscellaneous wing
parts 8/19/96-22 40 39 46.15 -72 37 26.49 wing stringer -
lower panel 40 39 46.15 -72 37 26.49 fore flap track Assy -
outboard 40 39 46.15 -72 37 26.49 CW side body chord -
upper; fits with C2176 CW MOCKUP LW15, CW 40 40 39
46.15 -72 37 26.49 left upper wing skin at SOB S25-S33 CW
MOCKUP 40 39 46.15 -72 37 26.49 Front spar center section
Web CW MOCKUP 40 39 46.15 -72 37 26.49 lower front
spar Side of Body outboard wing left CW MOCKUP 40 39
46.15 -72 37 26.49 left lower wing skin panel segment; WS
860-902 8/19/96-22 40 39 46.15 -72 37 26.49 Row 37 Seat 4
armrest CABIN HGR 40 39 46.15 -72 37 26.49 front spar
web piece; center fuel tank CW MOCKUP 40 39 46.15 -72
37 26.49 spanwise beam #3LBL 127.5 paddle fitting and
web CW MOCKUP 40 39 46.15 -72 37 26.49 left lower wing
skin; WS 650-760; STR 10-13 CW407A 40 39 46.15 -72 37
26.49 LH BL127.5 (SOB) rib stiff at mid spar (lower half) o/
b wing side 65B11557-3 CW MOCKUP 40 39 46.15 -72 37
26.49 SOB rib at upper FS LH side CW MOCKUP 40 39
46.15 -72 37 26.49 SOB rib at upper FS LH side CW
MOCKUP CW407B 40 39 46.15 -72 37 26.49 LH BL127.5
(SOB) rib, stiff at MS (upper half) o/b wing side
65B11557-3 CW MOCKUP 40 39 46.15 -72 37 26.49 left

upper wing skin; LWS 499-528 from STR 4-7 8/19/96-22 40
39 46.15 -72 37 26.49 left upper wing up skin; WBL 470 to
WS 791 from midspar to STR 17 8/19/96-22 40 39 46.15 -72
37 26.49 FS 1319 WL 305 RBL 65 frame 40 39 46.15 -72 37
26.49 spar segment approximately 2' 40 39 46.15 -72 37
26.49 upper center wing skin piece; LH side at stringer 5-1;
LBL 104-115 at upper STR 5-1 CW MOCKUP 8/18/96-6 40
39 46.15 -72 37 26.49 upper CW left hand splice stringer
17-28 CW MOCKUP 40 39 46.15 -72 37 26.49 ducting
SYSTEMS ARE 40 39 46.15 -72 37 26.49 lot - cargo area pieces
CARGO BAY

C2037 40 39 46.15 -72 37 26.49 Pylon Fairing - Right Wing
ENG HGR 40 39 46.15 -72 37 26.49 FS 1500 RBL 120 WL264
Framing 40 39 46.15 -72 37 26.49 FS 2000 Framing 40 39
46.15 -72 37 26.49 rear spar segment WS 1007 to WS 1040
CW113, CW 40 39 46.15 -72 37 26.49 upper CW skin; LBL
72-93; stringer 12-13; this part is part of CW113 & CW817
CW MOCKUP 40 39 46.15 -72 37 26.49 upper CW skin
piece; LBL 6-29 stringer 20-21 CW MOCKUP 40 39 46.15
-72 37 26.49 wing front spar fragment, possibly LHS WS
686 (Rear Spar Segment approximately 2') 40 39 46.15 -72
37 26.49 front spar LHS corner fitting CW MOCKUP 40 39
46.15 -72 37 26.49 cw lower skin-matches w/ C2160. LBL
104 STR 11.5-13.5 CW MOCKUP 40 39 46.15 -72 37 26.49 lot
- fuel vent + fuel feeds - several pieces FUEL ROOM 40 39
46.15 -72 37 26.49 left lower wing skin; WS 660-734; stringer
S5-S8 8/19/96-22 40 39 46.15 -72 37 26.49 wing and tank
parts small debris 40 39 46.15 -72 37 26.49 front spar LH
terminal fitting piece CW MOCKUP 40 39 46.15 -72 37
26.49 left upper wing skin LWS 670-725 with front spar to

S23 8/19/96-22 40 39 46.15 -72 37 26.49 upper CW skin;
LBL 107.5-118.5; upper STR 3; center fuel tank CW
MOCKUP 8/18/96-6 40 39 46.15 -72 37 26.49 front spar,
lower dry bay access hole CW MOCKUP 40 39 46.15 -72 37
26.49 front spar- LH web SOB above access hole CW
MOCKUP 40 39 46.15 -72 37 26.49 cw lower skin-fwd left
corner CW MOCKUP 40 39 46.15 -72 37 26.49 front spar
lower dry bay access hole CW MOCKUP 40 39 46.15 -72 37
26.49 center fuel tank stiffener, side of body, left hand S3
upper S2 lower CW MOCKUP 40 39 46.15 -72 37 26.49 left
upper wing skin WS 780-804 from stringer 22 to forward
edge of panel 8/18/96-6 CW1013 40 39 46.15 -72 37 26.49
upper rear spar web 40 39 46.15 -72 37 26.49 left wing #3
trailing edge flap drive gear box 8/19/96-22 40 39 46.15 -72
37 26.49 center wing tank lower 40 39 46.15 -72 37 26.49
center fuel tank left hand near rear spar 40 39 46.15 -72 37
26.49 FS 1260-1280 stringer 28L-31L 8/18/96-6 40 39 46.15
-72 37 26.49 center wing tank spanwise beam 40 39 46.15
-72 37 26.49 cw mid spar stiffener BL 11L CW MOCKUP 40
39 46.15 -72 37 26.49 center wing tank LH side of body,
upper span wise beam 1 40 39 46.15 -72 37 26.49 seat 43 (8)
armrest and partial frame CABIN HGR 40 39 46.15 -72 37
26.49 SOB rib segment CW MOCKUP 40 39 46.15 -72 37
26.49 seat 41 (3) CABIN HGR 40 39 46.15 -72 37 26.49 SOB
rib segment @ SWB #1 CW MOCKUP 40 39 46.15 -72 37
26.49 left wing front spar ILES 280-440 40 39 46.15 -72 37
26.49 SOB rib segment, in line w/ S-7 LWR CW MOCKUP
40 39 46.15 -72 37 26.49 SOB rib segment CW MOCKUP
C2368 40 39 46.15 -72 37 26.49 seat 41 (6 7) CABIN HGR 40
39 46.15 -72 37 26.49 right side CW upper skin CW

MOCKUP 40 39 46.15 -72 37 26.49 left SOB web CW
MOCKUP 40 39 46.15 -72 37 26.49 TWA blue passenger
blanket and misc personal clothing 8/19/96-22 40 39 46.15
-72 37 26.49 TWA blue passenger blanket with clear plastic
material that was attached to it 8/19/96-22 40 39 46.15 -72
37 26.49 one Nikon one touch 100 camera 8/19/96-22 40 39
46.15 -72 37 26.49 center wing tank upper skin stringers 3-6
CW MOCKUP 40 39 46.15 -72 37 26.49 left sob web BBL
127.5 CW MOCKUP 40 39 46.15 -72 37 26.49 left SOB rib
stiffener free FLG + web - 14" long CW MOCKUP 40 39
46.15 -72 37 26.49 CW upper skin LBL 98 @ S-16 CW
MOCKUP 8/19/96-22 40 39 46.15 -72 37 26.49 wing gear
door rt side 8/19/96-22 40 39 46.15 -72 37 26.49 left upper
wing skin WS 766-780; stringer 24-25 8/19/96-22 40 40
03.70 -72 37 26.40 stainless steel tubing 10/17/96-1 40 40
01.53 -72 37 26.34 skin yellow (4'(1')) 10/17/96-1 40 39 44.90
-72 37 26.30 misc. wreckage balance of cargo net 9/12/96-2
40 39 44.75 -72 37 26.20 landing gear strut 10' long
9/11/96-4 40 39 44.75 -72 37 26.20 CW upper skin M.S. to
SWB #1, LBL 45 - LBL 98 CW MOCKUP 9/11/96-4 40 39
44.75 -72 37 26.20 left wing flap track actuator #2 9/11/96-4
40 39 44.75 -72 37 26.20 CW stringer 40 39 44.75 -72 37 26.20
CW spar 40 39 44.75 -72 37 26.20 center section stringer 40
39 50.60 -72 37 26.20 misc. debris 9/22/96-1 40 39 58.97 -72
37 26.18 aircraft skin with red paint 10/17/96-1 40 39 46.40
-72 37 26.10 15' ft curved metal piece 9/20/96-33 40 39
46.40 -72 37 26.10 misc. debris in cargo net 9/20/96-33 40
39 46.40 -72 37 26.10 miscellaneous metal debris
9/20/96-33 40 39 48.70 -72 37 26.10 1 arm rest and misc.
debris 9/22/96-1 40 39 46.40 -72 37 26.10 1 cargo net full of

miscellaneous debris 9/20/96-33 40 39 46.40 -72 37 26.10 3
pieces of fuel probes 9/20/96-33 40 39 46.40 -72 37 26.10
cargo net full of misc. debris 9/20/96-33 CW1017 40 39
46.40 -72 37 26.10 CW rear spar stiffener and web -LBL 98
(9-20-96-33) CW MOCKUP 40 39 46.40 -72 37 26.10 3
sections of probable fuel probes 9/20/96-33 40 39 46.40 -72
37 26.10 SOB rib lower cord (9-20-96-33) CW MOCKUP 40
39 46.40 -72 37 26.10 SOB rib segment CW MOCKUP 40 39
46.40 -72 37 26.10 SOB rib segment CW MOCKUP 40 39
46.40 -72 37 26.10 SOB rib segment CW MOCKUP
Z2801 40 39 46.40 -72 37 26.10 left SOB top edge of rib CW
MOCKUP 40 39 46.40 -72 37 26.10 CW upper skin tension
fittings @ SWB #1, 3" (6" LBL 98 CW MOCKUP 40 39 46.40
-72 37 26.10 left SOB top edge of rib CW MOCKUP 40 39
46.40 -72 37 26.10 mid spar web, LBL 97-105, 9'(12' CW
MOCKUP 40 39 46.40 -72 37 26.10 right SOB web, just
below CW310 CW MOCKUP 40 39 46.40 -72 37 26.10 left
SOB top edge of rib CW MOCKUP 40 39 46.08 -72 37 26.07
lower center wing skin panel; LBL 127; stringer 2-5; Lot #
9-21-96-1 CW MOCKUP 40 39 46.08 -72 37 26.07 FS
1700-1760; stringer 26R-28R 9/21/96-1 40 39 46.06 -72 37
26.07 debris (1 cargo net) 9/21/96-1 40 39 46.08 -72 37 26.07
fuselage skin under body fairing; stringer 37L; Lot #
9-21-96-1 9/21/96-1 40 39 48.10 -72 37 26.00 misc metal
debris 9/20/96-33 40 39 56.15 -72 37 25.96 two 5' long
pieces of debris, plastic bag of debris 10/07/96-1 40 39
45.25 -72 37 25.86 misc. metal & plastic pieces 10/17/96-1
40 39 48.50 -72 37 25.70 debris 9/21/96-1 40 39 46.06 -72 37
25.62 green & gray metal piece 10/17/96-1 40 39 51.70 -72
37 25.50 misc. debris; wire 9/23/96-5 40 39 45.20 -72 37

25.50 gray green piece of wreckage 9/12/96-2 40 39 45.20
-72 37 25.50 stringer 34; Lot # 9-12-96-2 9/12/96-2 40 39
51.70 -72 37 25.50 long metal debris 9/23/96-5 40 39 51.70
-72 37 25.50 SOB rib web CW MOCKUP 40 39 48.70 -72 37
25.50 left lower wing skin (6'(8')); WS 1335-1450; stringer s4
to mid spar 9/22/96-1 40 39 45.20 -72 37 25.50 center wing
tank LH side of body lower spanwise beam 1 40 39 51.70
-72 37 25.50 misc. debris 9/23/96-5 CW1014 40 39 45.20 -72
37 25.50 Left butt line 98 rear spar stiffener CW1015 40 39
45.20 -72 37 25.50 Aft left rear spar pickle fork, upper rear
spar kik fitting CW MOCKUP 40 39 45.20 -72 37 25.50
upper CW tank wing skin @ side of body 4" (6" CW
MOCKUP 40 39 45.20 -72 37 25.50 left SOB web CW
MOCKUP 40 39 46.50 -72 37 25.50 gray metal "T" bar 40 39
51.70 -72 37 25.50 mid spar web RBL 112-116, 7'(6' CW
MOCKUP 40 39 45.20 -72 37 25.50 left SOB rib upper
stiffener between SWB #2 & mid spar CW MOCKUP 40 39
46.50 -72 37 25.50 fuel probe 40 39 31.66 -72 37 25.49 misc.
green metal. 10/17/96-1 40 39 31.66 -72 37 25.49 marked
"M LAV DOOR" 10/17/96-1 40 39 48.71 -72 37 25.32 gray
metal panel 10/17/96-1 40 39 53.78 -72 37 25.31 debris
10/07/96-1 40 39 46.50 -72 37 25.30 misc metal debris
9/20/96-33
Z2664 40 39 47.72 -72 37 25.28 seat 34 (7) armrest CABIN
HGR 40 39 46.45 -72 37 25.21 1) "L" shaped green metal
piece 2) 4' long gray metal 9/09/96-49 40 39 48.60 -72 37
25.20 misc metal debris 9/20/96-33 40 39 46.50 -72 37 25.20
metal pump 8"(8"; pump/gear box with brackets
9/12/96-2 40 39 46.50 -72 37 25.20 green metal strip beam
10/17/96-1 40 39 47.00 -72 37 25.10 small motor and/or

pump, "27 - 1061" 9/09/96-49 40 39 49.02 -72 37 25.09 left hand SOB stiffener CW MOCKUP 40 39 49.02 -72 37 25.09 right hand SOB stiffener CW MOCKUP 40 39 49.02 -72 37 25.09 CW stringer 22 RH end CW MOCKUP 40 39 49.02 -72 37 25.09 upper center section stringer, LBL 11.3 - RBL 76 CW MOCKUP 40 39 49.02 -72 37 25.09 debris 9/21/96-1 40 39 49.02 -72 37 25.09 1 cargo net of debris (fuel probe, personal effects) 9/21/96-1 40 39 49.02 -72 37 25.09 debris 9/21/96-1 40 39 49.02 -72 37 25.09 debris 9/21/96-1 Z3351a 40 39 49.01 -72 37 25.07 personal effects (camera and wallet) 40 39 49.01 -72 37 25.07 human remains - skull fragment 9/21/96-1 40 39 49.00 -72 37 25.05 long piping debris 9/22/96-1 40 39 49.00 -72 37 25.05 debris (1 cargo net); camera, mini cassette 9/22/96-1 40 39 49.00 -72 37 25.05 RH SOB rib 24" portion of lwr chord FS 1058 - 1082 CW MOCKUP 9/22/96-1 40 39 49.00 -72 37 25.05 RH SOB rib 13" portion of lwr chord FS 1039 - 1052 CW MOCKUP 9/22/96-1 40 39 49.00 -72 37 25.05 RH SOB rib 26" of inbd & outbd mipspar stiffener CW MOCKUP 9/22/96-1 40 39 47.50 -72 37 25.00 misc metal debris 9/20/96-33 40 39 49.70 -72 37 25.00 sink; green oxygen bottle; debris 9/21/96-1 40 39 45.90 -72 37 24.90 actuator w/ motor; 4'-5' long piece of wreckage; 2'-3' long piece of metal 9/12/96-2 40 40 02.70 -72 37 24.90 airvent 10/17/96-1 40 39 46.30 -72 37 24.80 lower panel out board wing (6' (2' section of wing) 9/09/96-49 40 39 42.60 -72 37 24.80 rectangular piece of metal approx. 5' (2.5' 9/11/96-4 40 39 42.60 -72 37 24.80 left wing WS 523 9/11/96-4 40 39 45.40 -72 37 24.80 MED 3L cutout skin, lower part FS 1250-1241 stringer 24.5L-28.5L 9/12/96-2 40 39 42.60 -72 37 24.80 squared 3-D green piece

of metal 9/11/96-4 40 39 42.60 -72 37 24.80 metal with rivet
holes and stripes 9/11/96-4 40 39 45.40 -72 37 24.80
hydraulic shaft w/ metal body 9/12/96-2 40 39 45.40 -72
37 24.80 circular metal piece w/ arm 9/12/96-2 40 39 45.40
-72 37 24.80 gray/green tube w/ gears on end 2' long
9/12/96-2 40 39 45.40 -72 37 24.80 left mid-spar fitting at
double plus chord CW MOCKUP 40 39 45.40 -72 37 24.80
gray/green piece of wreckage 1.5'(4.5' 9/12/96-2
Z3066 40 39 42.60 -72 37 24.80 9/11/96-4 40 39 45.40 -72 37
24.80 misc. items contained in cargo net 9/12/96-2 40 39
55.75 -72 37 24.76 7' (5' piece of debris, plastic bag of debris
10/07/96-1 40 39 44.70 -72 37 24.70 pump w/ hoses and
large section of wing 9/12/96-2 40 39 47.40 -72 37 24.60
small debris which fell from larger pieces on deck
8/15/96-8 40 39 47,40 -72 37 24.60 top fwd, right and
center; stringer 22 to front spar, LBL 33 to RBL 127.5 CW
MOCKUP 8/15/96-8 40 39 47.40 -72 37 24.60 bag US Mail
foreign - unopened 8/15/96-8 40 39 47.40 -72 37 24.60 wing
front spar at station 778 - fragment 8/15/96-8 40 39 47.40
-72 37 24.60 right hand upper wing segment, front spar to
mid spar WS 1186-1280 8/15/96-8 40 39 47.40 -72 37 24.60
FS 2638-2709, stringer 7R-4L 8/15/96-8 40 39 47.40 -72 37
24.60 BLO web body gear wheel well 8/15/96-8 RF37,
CW51 40 39 47.40 -72 37 24.60 FS 930-1065; stringer
10R-27R; CW front spar - RH web and stiffener with
window frame (upper R CW MOCKUP 8/15/96-8 40 39
45.60 -72 37 24.60 5' pointy green metal piece 9/09/96-49 40
39 45.00 -72 37 24.60 5' long gold colored tubing, bent
9/09/96-49 40 39 45.10 -72 37 24.60 40 39 49.35 -72 37 24.60
housing w/ attached tubing 10/07/96-1 40 39 45.01 -72 37

24.60 metal strip 40 39 45.01 -72 37 24.60 aircraft door panel
40 39 45.01 -72 37 24.60 engine fan blade 40 39 50.90 -72 37
24.60 honey comb aluminum, 2 pieces of skin, laptop
computer, framing w/ holes, twisted framing 10/07/96-1
40 39 45.01 -72 37 24.60 metal skin 40 39 45.01 -72 37 24.60
metal fragment 40 39 45.01 -72 37 24.60 screened metal 40
39 45.01 -72 37 24.60 metal fragment 40 39 45.01 -72 37 24.60
wire bundle 40 39 43.10 -72 37 24.54 perforated metal
10/17/96-2 40 39 43.10 -72 37 24.54 2 pieces of metal
10/17/96-2 40 39 56.22 -72 37 24.53 possible wing skin, also
possible hydraulic line broken off 10/10/96-1 40 39 45.20
-72 37 24.50 1) 2' long structure 2) 3' long tubing 3) egg
crate type rectangular 4"(12" 4) small metal piece
9/09/96-49 40 39 48.40 -72 37 24.50 many misc items,
details on hard copy 40 39 51.30 -72 37 24.50 seat foot rest
40 39 48.40 -72 37 24.50 gear box 40 39 56.10 -72 37 24.39 #6
flap track 10/10/96-1 40 39 48.43 -72 37 24.33 seat 32 (4 5)
armrest and frame CABIN HGR 40 39 47.30 -72 37 24.30
misc metal debris 9/20/96-33 40 39 47.50 -72 37 24.30 skin
section 10/17/96-1
Z3233 40 39 52.37 -72 37 24.21 possible section of structural
ribbing (plastic) 10/07/96-1 40 39 49.00 -72 37 24.20 7' (2'
metal 9/09/96-49 40 39 46.10 -72 37 24.20 misc metal debris
9/20/96-33 40 39 41.30 -72 37 24.20 misc metal debris
9/20/96-33 40 39 50.66 -72 37 24.14 possible section of
structural ribbing 10/07/96-1 40 39 48.00 -72 37 24.00 trim
air valve 40 39 49.90 -72 37 24.00 passenger seat + wire,
debris 9/22/96-1 40 39 55.62 -72 37 23.91 bag with small
metal part 9/09/96-49 40 39 48.90 -72 37 23.90 hinged
bracket 10/17/96-1 40 39 47.60 -72 37 23.80 wing CW

stringer 40 39 47.40 -72 37 23.80 FS 940-960 (2' long);
stringer 31L-32L 9/09/96-49 40 39 47.60 -72 37 23.80 keel
beam chord FS 1480 40 39 47.60 -72 37 23.80 3' long metal
structure type assembly 9/09/96-49 40 39 47.60 -72 37 23.80
heavy metal structure 9/09/96-49 40 39 47.40 -72 37 23.80
sealed buttrib; WBL 140 40 39 47.40 -72 37 23.80 skin
segment; FS 990-1000; stringer 32L-34L 9/09/96-49 40 39
47.12 -72 37 23.76 beam with skin 10/17/96-1 40 39 57.98
-72 37 23.73 upper CW skin FS to stringer 27; LBL 17-117
(4' (5' section of interior structure) CW MOCKUP
9/08/96-2 40 39 57.98 -72 37 23.73 small piece of crumpled
metal 9/09/96-49 40 39 57.98 -72 37 23.73 misc. metal
9/28/96-1 40 39 47.90 -72 37 23.70 #4 engine stator Ring
ENG HGR 8/15/96-5 40 39 47.90 -72 37 23.70 wallet
8/15/96-5 40 39 47.90 -72 37 23.70 portion of engine #4
cowling ENG HGR 8/15/96-5 40 39 47.90 -72 37 23.70 #4
engine accessory gear box ENG HGR 8/15/96-5 40 39 47.90
-72 37 23.70 cowling ENG HGR 8/15/96-5 40 39 47.90 -72
37 23.70 #4 engine thrust reverser actuator ENG HGR
8/15/96-5 40 39 47.90 -72 37 23.70 #4 engine worm gear
ENG HGR 8/15/96-5 40 39 47.90 -72 37 23.70 cowling ENG
HGR 8/15/96-5 40 39 47.90 -72 37 23.70 cowling ENG HGR
8/15/96-5 40 39 47.90 -72 37 23.70 cowling ENG HGR
8/15/96-5 40 39 47.90 -72 37 23.70 #4 engine cowling ENG
HGR 8/15/96-5 40 39 47.90 -72 37 23.70 #4 engine thrust
reverser actuator ENG HGR 8/15/96-5 40 39 45.30 -72 37
23.70 5' long white tubular piece 9/09/96-49 40 39 45.30 -72
37 23.70 15' long structural member CW MOCKUP 40 39
47.60 -72 37 23.70 FS 2517-2598 (6'(2')); stringer 8L-11L
9/09/96-49 40 39 45.30 -72 37 23.70 15' long structural

member CW MOCKUP 9/08/96-2
Z3319 40 39 46.30 -72 37 23.70 misc metal fragments
9/16/96-2 40 39 45.20 -72 37 23.70 propeller blade
9/12/96-2 40 39 49.50 -72 37 23.70 seat 28 (8) armrest
CABIN HGR 9/22/96-1 40 39 43.20 -72 37 23.70 hydraulic
fuel pump 9/12/96-2 40 39 45.30 -72 37 23.70 left lower
wing skin; WS 1140-1210; rear spar stringer S5 9/09/96-49
40 39 45.30 -72 37 23.70 skin segment FS 960-1000 stringer
27.5L -31.5L 40 39 46.40 -72 37 23.70 metal fragments
9/16/96-2 40 39 45.20 -72 37 23.70 L shaped piece of metal
light green, white and a bit blue 9/12/96-2 40 39 45.30 -72
37 23.70 FS 1080 stub beam at side of body LHS 9/09/96-49
40 39 47.50 -72 37 23.60 pieces of wheel assembly
9/09/96-49 Z3108B 40 39 47.60 -72 37 23.60 flight
attendant's personal luggage 40 39 43.50 -72 37 23.60 round
metal item; misc. wreckage 9/12/96-2 Z3108A 40 39 47.60
-72 37 23.60 5' high, 1' (1' square green and white metal
structure 40 39 43.50 -72 37 23.60 CW stiffener 40 39 47.80
-72 37 23.50 left lower wing skin (10'(2')); WS 557-670; mid-
spar to stringer 8 9/09/96-49 40 39 47.80 -72 37 23.50 black
Jansport knapsack with contents in small pouch
9/09/96-49 40 39 47.80 -72 37 23.50 assorted small pieces of
debris 9/10/96-4 40 39 47.80 -72 37 23.50 1 3" (5"
photograph 9/09/96-49 40 39 46.30 -72 37 23.50 CW
stabilization braces CW MOCKUP 40 39 46.30 -72 37 23.50
outboard wing rib FS 1280 40 39 46.30 -72 37 23.50 edge of
wing 7' section 9/09/96-49 40 39 47.40 -72 37 23.50 seat
34-6 and other assorted pieces CABIN HGR 9/09/96-49 40
39 47.80 -72 37 23.50 plastic bag with clothes and misc. wire
9/10/96-3 40 39 47.80 -72 37 23.50 suitcase luggage

9/10/96-3 40 39 47.40 -72 37 23.50 portion of spanwise
beam CW tank CW MOCKUP 40 39 47.80 -72 37 23.50
9/10/96-4 40 39 47.80 -72 37 23.50 9/10/96-3 40 39 50.80
-72 37 23.47 seat part 40 39 50.80 -72 37 23.47 fuselage
section, green, 4' (3', charred 40 39 50.80 -72 37 23.47
fuselage bulkhead parts 8' (2' 40 39 50.80 -72 37 23.47
spanwise beam #2 - RH web; SOB rib to RBL 90 CW
MOCKUP 8/16/96-5 40 39 50.80 -72 37 23.47 seat part
8/16/96-5 40 39 43.25 -72 37 23.45 round piece (like a gear)
9/11/96-4 40 39 43.25 -72 37 23.45 FS 1350; stringer
23L-30L; fuselage skin w/ red paint 9/11/96-4 40 39 43.25
-72 37 23.45 outboard wing spar chord 40 39 43.25 -72 37
23.45 beam section with metal plate attached (green)
9/11/96-4
Z3103 40 39 00.00 -72 37 23.40 5' metal beam 9/09/96-49 40
39 50.94 -72 37 23.39 left lower wing & skin WS 1214-1420
8/17/96-7 40 39 50.94 -72 37 23.39 HF coupler; "180R-17"
8/17/96-7 40 39 50.94 -72 37 23.39 part of fuel tank 3'(6'
section CARGO BAY 8/17/96-7 40 39 50.94 -72 37 23.39
systems hydraulic reservoir & 3 pumps (all connected)
8/17/96-7 40 39 50.94 -72 37 23.39 spanwise beam #3 RBL
78-127.5 CW MOCKUP 8/17/96-7 40 39 50.94 -72 37 23.39
right LW outboard 8/17/96-7 40 39 50.94 -72 37 23.39 small
pieces - human skull 40 39 50.94 -72 37 23.39 LWS
1309-1423; left upper wing skin 8/17/96-7 40 39 50.94 -72
37 23.89 FS 1319-1434; stringer 5L-23-L 8/17/96-7 40 39
50.94 -72 37 23.39 leading edge 8/17/96-7 40 39 50.94 -72 37
23.39 SWB #3 chord with small segment right SOB web
attached CW MOCKUP 40 39 46.75 -72 37 23.33 large metal
piece w/ holes 10/17/96-1 40 39 43.05 -72 37 23.32 metal

plate gray on one side, bright blue on the other 9/11/96-4
40 39 43.20 -72 37 23.30 FS 920-1000; stringer 35R-40R
9/11/96-4 40 39 43.20 -72 37 23.30 fuselage skin w/ red
paint 9/11/96-4 40 39 43.20 -72 37 23.30 small piece with
hydraulics lines attached 9/11/96-4 40 39 43.30 -72 37 23.30
gear box assembly 9/11/96-4 40 39 43.20 -72 37 23.30
possible CW spar 40 39 51.31 -72 37 23.22 stringer section
10/07/96-1 40 39 43.65 -72 37 23.20 stainless steel tube
9/11/96-4 40 39 43.65 -72 37 23.20 round engine part
9/11/96-4 40 39 43.65 -72 37 23.20 "shovel-like" pieces of
metal, green and red colors 9/11/96-4 40 39 43.65 -72 37
23.20 flap panel with support arm 40 39 43.05 -72 37 23.20
frame piece (semi-circle) burnt looking 9/11/96-4 40 39
43.65 -72 37 23.20 framing piece 9/11/96-4 40 39 43.65 -72
37 23.20 metal plate; gray on one side, green and red
(screws) on the other side 9/11/96-4 40 39 47.10 -72 37
23.17 10/17/96-1 40 39 50.50 -72 37 23.10 seats; seat 25 (1 2
3), seat backs and frame CABIN HGR 9/08/96-2 40 39
50.90 -72 37 23.10 wing section, 9/23/96-5 40 39 44.20 -72
37 23.10 stainless duct 9/12/96-2 40 39 44.20 -72 37 23.10
metal tubing with torque hanging off 9/12/96-2 40 39 44.20
-72 37 23.10 MED 3L cutout skin, LWR part FS 1265-1350,
stringer 23L-31L 9/12/96-2 40 39 49.05 -72 37 23.07 1 long
strand 9/22/96-1 40 39 49.05 -72 37 23.07 1 long strand
9/22/96-1 40 39 49.05 -72 37 23.07 debris 9/22/96-1
Z3381 40 39 49.05 -72 37 23.07 1 long strand 9/22/96-1 40
39 47.68 -72 37 23.06 row 31, seats 9-10 CABIN HGR
8/15/96-8 40 39 46.65 -72 37 23.04 section of stringer
10/17/96-1 40 39 48.30 -72 37 22.95 metal debris
10/17/96-1 40 39 45.85 -72 37 22.82 actuator part round

metal item with rivets 18" round 9/12/96-2 40 39 49.50 -72
37 22.80 body landing gear drag strut 8' 8/15/96-8 40 39
49.50 -72 37 22.80 fuselage right side; FS 1350-1480, stringer
23R-32R with FS 1350 bulkhead frame and RHS landing
8/15/96-8 40 39 43.72 -72 37 22.80 motorblade (#23 written
on it) 9/11/96-4 40 39 43.72 -72 37 22.80 flat plate
9/11/96-4 40 39 43.72 -72 37 22.80 white metal w/ rivet
holes 40 39 55.92 -72 37 22.75 4 small pieces of debris
10/10/96-1 40 39 45.20 -72 37 22.70 left lower wing skin;
WS 1120-1180; stringer 5-7 9/11/96-4 40 39 45.20 -72 37
22.70 2 seats (row 27 seat 8 and seat 0) a third seat came off
but we attached with plastic strap; seats 27 CABIN HGR
9/11/96-4 40 39 48.50 -72 37 22.70 debris 9/22/96-1 40 39
45.20 -72 37 22.70 outboard wing spar 40 39 48.50 -72 37
22.70 possible CW lower skin CW MOCKUP 40 39 45.20
-72 37 22.70 left wing spoiler #5 with actuator 9/11/96-4 40
39 50.78 -72 37 22.68 metal ducting. 10/17/96-1 40 39 46.60
-72 37 22.60 2' long green metal with jagged ends
9/10/96-4 40 39 51.19 -72 37 22.50 FS 1170-1500; stringer
7R-24R with window belt and door frame 8/16/96-5 40 39
51.19 -72 37 22.50 spanwise beam #1- LBL 60-100 web
segment CW MOCKUP 8/16/96-5 40 39 51.19 -72 37 22.50
span wise beam #1 - upper LBL SOB connection CW
MOCKUP 40 39 50.50 -72 37 22.50 seat belt w/ buckle
9/24/96-16 40 39 45.80 -72 37 22.40 piece of bulkhead with
frame section, hole in side of outer skin 9/08/96-2 40 39
50.90 -72 37 22.40 small section of metal & housing
10/07/96-1 40 39 46.10 -72 37 22.20 5' long twisted metal
9/09/96-49 40 39 46.10 -72 37 22.20 portion of top wing 40
39 46.10 -72 37 22.20 15' long twisted beam 9/09/96-49 40

39 46.10 -72 37 22.20 seat 44 (9), CABIN HGR 40 39 43.66
-72 37 22.19 #3 engine LP compressor ENG HGR
8/09/96-37 40 39 48.42 -72 37 22.19 I-beam w/ attached
skin 10/09/96-1 40 39 43.66 -72 37 22.17 #3 engine inlet
cowl 6'(2'; TWA tag s/n 2019; RR# 22028 ENG HGR
8/09/96-37 40 39 43.66 -72 37 22.17 #3 engine exhaust (s/n
64) case & piece of tailpipe ENG HGR 8/09/96-37 40 39
43.66 -72 37 22.17 lg piece of engine core cowling; hng end
6'(4.5' ENG HGR 8/09/96-37 40 39 43.66 -72 37 22.17
21/2'(3' irreg shape, heat exchanger "precooler air bleed" s/
n 50-679 8/09/96-37 40 39 46.60 -72 37 22.15 piece of metal
with pipe 10/17/96-1
Z3724 40 39 46.60 -72 37 22.15 10/17/96-1 CW1104 40 39
48.04 -72 37 22.06 spanwise beam web CW MOCKUP 40 39
48.04 -72 37 22.06 debris (camera) 9/22/96-1 40 39 48.04 -72
37 22.06 black metal box 9/22/96-1 40 39 48.04 -72 37 22.06
CW stiffener CW MOCKUP 40 39 48.04 -72 37 22.06 debris
9/22/96-1 40 39 42.00 -72 37 22.00 left wing up fragment
mates in LWS 554-580 behind mid-spar small fragment
8/11/96-2 40 39 43.50 -72 37 22.00 formerly round-brown
metal container 9/11/96-4 8/11/96-2 40 39 42.00 -72 37
22.00 #3 engine ENG HGR 8/11/96-2 8/11/96-2 40 39
42.00 -72 37 22.00 #3 engine fan rub ring ENG HGR 40 39
43.50 -72 37 22.00 wing support strut 9/11/96-4 40 39 43.50
-72 37 22.00 mangled metal 2.5' long with blue on it
9/11/96-4 40 39 43.50 -72 37 22.00 mangled green metal 3.5'
long with arm 9/11/96-4 40 39 43.50 -72 37 22.00 misc
engine parts 40 39 42.00 -72 37 22.00 aircraft pneumatic
duct and panel 8/11/96-2 40 39 42.00 -72 37 22.00 aircraft
pneumatic duct and panel 8/11/96-2 40 39 42.00 -72 37

22.00 #3 engine ENGINE HGR 8/10/96-16 40 39 43.50 -72
37 22.00 3' piece of metal w/ rubber molding 40 39 43.50
-72 37 22.00 misc airline fragments in a black body bag and
cardboard box; also loose turbine blades (engine bl 40 39
47.25 -72 37 21.90 seat frame row 33; seats 33 (8 9 10)
armrests and frames CABIN HGR 9/08/96-2 40 39 47.25
-72 37 21.90 photograph 3" (5" color, partially destroyed
9/09/96-49 40 39 47.25 -72 37 21.90 fuel probe 40 39 47.25
-72 37 21.90 CW tank piece CW MOCKUP 40 39 47.25 -72
37 21.90 assorted plane parts 9/09/96-49 40 39 47.25 -72 37
21.90 1 black leather type bag with contents 9/08/96-2 40
39 47.25 -72 37 21.90 structural piece approximately 3' long
9/08/96-2 40 39 47.25 -72 37 21.90 FS 1120-1140, stringer
23R-27R 40 39 47.25 -72 37 21.90 portion CW tank 40 39
47.25 -72 37 21.90 personal luggage 9/08/96-2 40 39 47.25
-72 37 21.90 portion of flap assembly 40 39 47.25 -72 37
21.90 anti-skid valve module MOTOR BAY 40 39 47.25 -72
37 21.90 portion of outboard fore flap 40 39 47.25 -72 37
21.90 metal frame with wheels from luggage 9/08/96-2 40
39 47.25 -72 37 21.90 CW wing center section floor beam 40
39 47.25 -72 37 21.90 piece of seat, seat 31(7) armrest frame
CABIN HGR 9/08/96-2 40 39 47.25 -72 37 21.90 left wing
aileron segment (o/b) 3'(4' 9/08/96-2
Z3017 40 39 47.25 -72 37 21.90 passenger seats; seats 25 (4 5
6 7), seat 4 - frame, seat 5 - armrest/ frame, seat 6 - frame,
seat 7 - CABIN HGR 9/08/96-2 40 39 47.25 -72 37 21.90
metal tubing, 1 approximately 25' long, 1 approximately 6'
long 9/08/96-2 40 39 47.25 -72 37 21.90 9' long metal with
rivets 9/08/96-2 40 39 47.25 -72 37 21.90 seats 25 (8 9 10)
seat 25 (10) frame; seat 25(8) -armrest, back, frame; seat 25

(9) - armrest, frame CABIN HGR 9/08/96-2 40 39 47.25 -72
37 21.90 3' long cone shaped metal 9/08/96-2 40 39 47.25
-72 37 21.90 section 40 39 47.25 -72 37 21.90 cargo net full of
debris; portion of rudder 9/08/96-2 40 39 47.25 -72 37 21.90
5' long metal strut hinged 9/08/96-2 40 39 47.25 -72 37
21.90 structural piece with pump type assembly 9/08/96-2
40 39 47.25 -72 37 21.90 4' piece of airplane flap 9/08/96-2
40 39 47.25 -72 37 21.90 2' length of large tubing 9/09/96-49
40 39 47.25 -72 37 21.90 assorted pieces of metal 9/09/96-49
40 39 47.25 -72 37 21.90 approximately 8' section of wing
9/08/96-2 40 39 47.25 -72 37 21.90 right hand HF antenna
assembly approximately 8' long 9/08/96-2 40 39 47.25 -72
37 21.90 bleed air #3 manifold station 1240 ACM BAY
9/09/96-49 40 39 47.25 -72 37 21.90 human remains, spine,
rib, small bones, lumbar vertebrae 1-5, sacrum, 1 rib, 2
metatarsals 9/09/96-49 40 39 47.25 -72 37 21.90 heavy
tubular strut 9/08/96-2 40 39 47.25 -72 37 21.90 5' long
frame section 9/08/96-2 40 39 44.90 -72 37 21.90 misc metal
pieces 9/16/96-2 40 39 47.25 -72 37 21.90 CW tank upper
center stringer 40 39 47.25 -72 37 21.90 portion of spanwise
beam CW tank CW MOCKUP 40 39 47.25 -72 37 21.90 3'
long piece of metal 40 39 47.20 -72 37 21.70 6" (2' section of
aluminum with rivets 9/08/96-2 40 39 44.25 -72 37 21.70
various airplane parts and debris 9/16/96-2 40 39 45.13 -72
37 21.52 6' (4' edge of wing target # GRS992 9/08/96-2
CW211, CW 40 39 50.46 -72 37 21.45 lower CW skin; R.S. to
STR 1; LBL 15 to RBL 15 CW MOCKUP 8/23/96-15 40 39
46.00 -72 37 21.20 horizontal stabilizer upper skin between
aux. spar and rear spar. stabilizer STA 143.60-180.50
9/10/96-4 40 39 50.47 -72 37 21.03 seats 22 (8 and 9) plus

armrest for 22(10) CABIN HGR 8/23/96-15 40 39 46.10 -72
37 21.00 2 small pieces 1) 2.5' long 2) approximately 1' long
and bent over 9/10/96-4 40 39 48.10 -72 37 21.00 toilet
assembly 10/17/96-1 40 39 54.00 -72 37 20.98 piece of
debris 9/20/96-33 40 40 02.82 -72 37 20.84 debris 9/22/96-1
40 39 51.41 -72 37 20.65 2'(2' skin 10/07/96-1 40 39 41.30 -72
37 20.50 landing gear door 9/11/96-4 40 39 44.90 -72 37
20.40 large metal debris 9/16/96-2 40 39 44.90 -72 37 20.40
bone fragments
Z3128 40 39 45.00 -72 37 20.40 4' metal, triangular section,
wing edge? 9/10/96-4 40 39 46.00 -72 37 20.30 1) 6' ribbed
metal piece 2) 2' (1' piece of outside skin of plane
9/10/96-4 40 39 45.60 -72 37 20.30 human remains skull,
scalp, eye socket, jaw bone, teeth, part of spinal column
9/10/96-4 40 39 50.72 -72 37 20.15 3' (4' section 9/08/96-2
40 39 50.72 -72 37 20.15 outer part of plane 9/08/96-2 40 39
48.46 -72 37 20.08 structural section 10/17/96-1 40 39 46.70
-72 37 20.00 2' (2' section with 3 pieces of tubular coming
off 9/10/96-4 40 39 47.53 -72 37 19.98 O2 compressore,
wire, masks 40 39 47.53 -72 37 19.98 ss 1/2 tubing, 2 pieces
40 39 47.20 -72 37 19.80 4 pieces 1) 3' long piece of rubber 2)
5' piece of ribbed metal 3) 5' long, 6" wide green metal with
"S 9/10/96-4 40 40 00.66 -72 37 19.80 AR1054; big
cylindrical object 9/20/96-33 40 39 46.30 -72 37 19.70 5'
long green metal with bolts and clips on edge 9/10/96-4 40
39 53.55 -72 37 19.60 vhf antenna poss. 10/07/96-6 40 39
50.57 -72 37 19.49 misc. metal; battery charger 9/28/96-1 40
39 50.57 -72 37 19.49 misc metal 9/28/96-1 40 39 48.77 -72
37 19.47 armrest 32??2 40 39 48.77 -72 37 19.47 seat 36 (10)
armrest CABIN HGR 8/24/96-7 40 39 48.77 -72 37 19.47

seat 36 (6) 40 39 48.77 -72 37 19.47 main landing gear
assembly 8/24/96-7 40 40 02.30 -72 37 19.40 metal structure
10/17/96-1 40 39 43.28 -72 37 19.15 left upper wing skin,
WS 503-584 from STR 16-22 8/09/96-37 40 39 48.60 -72 37
19.10 1 small leather wallet 9/30/96-1 40 39 46.90 -72 37
19.00 left upper wing skin (3'(10')); WS 1200-1330; stringer
5-12 9/10/96-4 40 39 46.90 -72 37 19.00 wing portion
10/13/96-4 40 39 46.90 -72 37 19.00 aft wheel well
bulkhead 40 39 53.02 -72 37 18.91 31 (5) partial frame, 31(6)
armrest/frame CABIN HGR 9/09/96-49 40 39 46.30 -72 37
18.90 2' (3' green metal with electrical connections plus
assorted metal pieces and small items 9/10/96-4 40 39
46.30 -72 37 18.90 passenger head phone tubing 9/10/96-3
40 39 46.30 -72 37 18.90 door port (interior) 9/10/96-3 40 39
46.30 -72 37 18.90 9/10/96-3 40 39 46.50 -72 37 18.80 1' (2'
metal structure, green on one side, gray on the other
9/10/96-4 40 39 49.48 -72 37 18.78 tire hub 10/07/96-11 40
39 59.40 -72 37 18.70 metal skin section 10/17/96-1 40 39
52.08 -72 37 18.66 #5 flap track "TWA 17729" mfg
5B81129-6; flap track with jack screw 8/09/96-37 40 39
46.60 -72 37 18.60 CW upper stringer 10/13/96-4 40 39
46.60 -72 37 18.60 removed tag from part tagged Z3125
10/13/96-4
Z2531 40 39 46.60 -72 37 18.60 upper wing skin - left side
10/13/96-4 40 39 46.60 -72 37 18.60 upper wing section left
side 40 39 46.60 -72 37 18.60 flight attendant jump seat 40
39 46.60 -72 37 18.60 9/10/96-4 40 39 50.10 -72 37 18.60 5
pieces of small metal; 2 small metal pipes intertwined;
wire; life vest in package 9/30/96-1 40 39 46.60 -72 37 18.60
wing tank web 10/13/96-4 CW1021 40 39 46.60 -72 37 18.60

CW tank rear spar LBL 85 stiffener CW MOCKUP
9/30/96-1 40 39 46.60 -72 37 18.60 outboard wing stringer
10/13/96-4 40 39 46.60 -72 37 18.60 humerus bone 40 39
46.60 -72 37 18.60 ulna and radius with metacarpal and
distal/middle phalanges with skin intact 40 39 46.60 -72 37
18.60 spinal column (complete) with humerus 40 39 46.60
-72 37 18.60 10' (1' long/wide green metal, plus assorted
smaller pieces of wreckage 9/10/96-4 40 39 46.60 -72 37
18.60 8' long (1' wide curved, green metal with rivets
9/10/96-4 40 39 46.60 -72 37 18.60 11' long, narrow angular
piece with rivets - green color 9/10/96-4 40 39 46.60 -72 37
18.60 portion of fuselage longeron 40 39 45.90 -72 37 18.40
CW tank upper skin segment CW MOCKUP 10/03/96-4 40
39 50.70 -72 37 18.40 misc metal box 9/28/96-2 40 39 45.90
-72 37 18.40 green, yellow, and gray pieces of metal and
piping; some interior pieces and personal items 9/30/96-1
40 39 45.90 -72 37 18.40 8' to 9' piece of metal w/yellow
exterior paint CW MOCKUP 9/30/96-1 40 39 45.90 -72 37
18.40 8' to 9' metal piece; white on one side/green on
opposite side 9/30/96-1 40 39 45.90 -72 37 18.40 1 multi-
colored rugby shirt; one piece of white notebook 9/30/96-1
40 39 45.90 -72 37 18.40 blown-out tire including metal rim
on tire 9/30/96-1 40 39 45.90 -72 37 18.40 CW tank
spanwise beam #3 LBL 82-98.6 CW MOCKUP 10/03/96-4
40 39 50.00 -72 37 18.30 #4 engine with wing strut ENG
HGR 8/15/96-8 40 39 51.20 -72 37 18.10 Goodyear tire and
rim (large) 10/07/96-1 40 39 51.20 -72 37 18.10 Goodyear
tire & rim 10/07/96-1 40 39 43.86 -72 37 18.00 left upper
wing skin; LWS 554-580 from STR 7-10 40 40 08.00 -72 37
17.97 brown date book w/calculator 10/07/96-1 40 39

54.72 -72 37 17.92 misc. metal; life vest; pipe 9/28/96-1 40
39 47.61 -72 37 17.80 black + green metal, wire 40 39 52.10
-72 37 17.50 small stringer section 10/07/96-10 40 39 50.40
-72 37 17.50 misc metal 9/28/96-2 40 39 45.80 -72 37 17.40
center wing fuel tank spanwise beam CW MOCKUP 40 39
45.80 -72 37 17.40 right upper wing skin 96"(33" adjoins
mid spar FS1250 9/19/96-1 40 39 45.80 -72 37 17.40 misc.
small debris (1 cargo net full) 9/19/96-1 40 39 45.80 -72 37
17.40 (1) shoe and personal property 9/19/96-1
Z2261 40 39 45.80 -72 37 17.40 skin surface horizontal stab
40 39 45.80 -72 37 17.40 horizontal stabilizer, part of 40 39
45.80 -72 37 17.40 left upper wing skin; WS 1336-1423;
stringer 5-14 40 39 45.80 -72 37 17.40 SWB #3 upper web
RBL 99-112 CW MOCKUP 40 39 45.92 -72 37 17.38 metal
beam 9/16/96-2 40 39 39.57 -72 37 17.34 fuselage fragment
with attached burned insulation 3'(3'(1' 9/27/96-2 40 39
50.68 -72 37 17.26 motor or valve 10/07/96-7 40 39 48.40 -72
37 17.00 approx. 3' green metal spring w/ partial white
metal casing 9/30/96-1 40 39 48.40 -72 37 17.00 8' to 9'
metal piping 9/30/96-1 40 39 48.40 -72 37 17.00 CW tank
spanwise beam 3 LBL 98.6 side of body CW MOCKUP
10/03/96-4 40 39 48.40 -72 37 17.00 approx. 6'(6" green
metal trim 9/30/96-1 40 39 48.40 -72 37 17.00 one interior
light; headphone switch; 4 pieces of metal debris; one
plastic debris piece 9/30/96-1 RF114C 40 39 48.40 -72 37
17.00 3.5' to 4' square plane skin 9/30/96-1 40 39 48.40 -72
37 17.00 approx. 1.5' diameter mech. part, one cylinder w/ 2
rows of 1" diameter holed, variety of interior/exte
10/06/96-1 40 39 48.40 -72 37 17.00 approx. 4' pipe possible
shock attached to 1' square piece of metal and smaller

metal pieces at a jo 9/30/96-1 40 39 48.40 -72 37 17.00
approx. 1.5'(3.5' gray metal piece w/ appendatures
9/30/96-1 40 39 48.40 -72 37 17.00 approx. 4' piece green
metal w/ slight curvature 9/30/96-1 40 39 06.44 -72 37
16.68 life raft, debris 10/06/96-1 40 40 12.10 -72 37 16.67
debris 10/07/96-1 Z3201a 40 39 50.80 -72 37 16.60 misc
metal, first aid kit, wires near wheel well door 40 39 54.23
-72 37 16.49 misc. metal 9/28/96-1 40 39 50.33 -72 37 16.46
misc engine component ENG HGR 8/16/96-5 40 39 50.33
-72 37 16.46 #4 engine cowl, thrust reverser ENG HGR
8/16/96-5 40 39 50.33 -72 37 16.46 engine component
8/16/96-5 40 39 50.33 -72 37 16.46 misc actuator 8/16/96-5
40 39 50.33 -72 37 16.46 misc actuator 8/16/96-5 40 39 50.33
-72 37 16.46 misc engine component ENG HGR 8/16/96-5
40 39 50.33 -72 37 16.46 metal, misc engine part ENG HGR
8/16/96-5 40 39 50.33 -72 37 16.46 engine part ENG HGR
8/16/96-5 40 39 50.33 -72 37 16.46 gear pump, fuel
8/16/96-5 40 39 50.33 -72 37 16.46 #4 engine accessory,
pump? ENG HGR 8/16/96-5 40 39 50.33 -72 37 16.46 #4
engine accessory, generator ENG HGR 8/16/96-5 40 39
50.33 -72 37 16.46 engine fan stage ENG HGR 8/16/96-5 40
39 50.33 -72 37 16.46 engine block part ENG HGR
8/16/96-5 40 39 50.33 -72 37 16.46 engine cowl frame ENG
HGR 8/16/96-5 40 39 50.33 -72 37 16.46 #4 engine intake
section ENG HGR 8/16/96-5 40 39 50.33 -72 37 16.46 row
20 passenger vent CABIN HGR 8/16/96-5 40 39 50.33 -72
37 16.46 engine component 8/16/96-5 40 39 50.33 -72 37
16.46 misc engine component ENG HGR 8/16/96-5 40 38
52.84 -72 37 16.32 plastic debris & a piece of american flyer
luggage - piece of black gasket 10/02/96-1 40 39 43.17 -72

37 16.07 cowling 10/13/96-3 40 39 46.90 -72 37 16.00 center wing tank spanwise 40 39 46.90 -72 37 16.00 misc. metal pieces CW MOCKUP 9/19/96-1 40 39 46.90 -72 37 16.00 airplane part 9/19/96-1 40 39 46.90 -72 37 16.00 main entry door L3 9/19/96-1 40 39 46.90 -72 37 16.00 misc. parts 9/19/96-1 40 39 46.90 -72 37 16.00 upper wing skin 9/19/96-1 40 39 48.40 -72 37 16.00 multiple pieces of gray metal piping, yellow & green metal, shredded plastic/cloth; piece of burnt bl 9/30/96-1 40 39 48.40 -72 37 16.00 multiple green and yellow pieces of metal; interior seat pieces; piping; approx. 1.5' diameter gray m 9/30/96-1 40 39 47.50 -72 37 15.90 misc. metal pieces 9/19/96-1 40 39 47.50 -72 37 15.90 fuselage skin aft 40 39 47.50 -72 37 15.90 misc. metal pieces 9/19/96-1 40 39 46.00 -72 37 15.80 metal piece 9/19/96-1 40 39 46.00 -72 37 15.80 misc. metal debris 9/19/96-1 40 39 46.00 -72 37 15.80 various metal fragments 9/19/96-1 40 39 46.00 -72 37 15.80 misc. metal fragments 9/19/96-1 40 39 46.05 -72 37 15.76 alum siding, figerglass vent and framing 8/14/96-10 40 39 45.80 -72 37 15.60 (1) cargo net full of misc. debris 9/19/96-1 40 39 45.80 -72 37 15.60 personal effects 9/19/96-1 40 39 45.80 -72 37 15.60 3'(3' metal panel 9/19/96-1 40 39 45.80 -72 37 15.60 part of landing gear door 9/19/96-1 40 39 45.80 -72 37 15.60 APU fire wall Z3202a 40 39 48.20 -72 37 15.40 metal U-shaped wing piece 40 39 07.96 -72 37 15.24 black bag 10/96/96-1 40 39 47.20 -72 37 15.16 misc metal, life vest with seat belt 9/28/96-2 40 39 47.20 -72 37 15.16 upper center wing left hand SOB-LBL30; STR22-27 CW MOCKUP CW1103 40 39 47.20 -72 37 15.16 center wing rear spar to SWB #1; BL0 rib; Lot # 9-28-96-2 CW MOCKUP 40 39 40.59 -72 37 15.15

7'(2.5' aircraft skin 40 39 40.59 -72 37 15.15 yellow plastic with aircraft skin 10/17/96-2 40 39 44.57 -72 37 15.01 piece of skin and channel 10/13/96-3 40 39 08.21 -72 37 14.88 life raft 10/06/96-1 40 39 49.51 -72 37 14.83 9 pieces (largest 3'(15"(3"); B2B1 has chair rail attached p/n 65B817-2 PARTS BAY 8/11/96-1 40 39 49.51 -72 37 14.83 #65-41916-21 7 pieces with part of back seat parts are charred CABIN HGR 8/09/96-37 40 39 49.51 -72 37 14.83 4 pieces including a shoe and melted life vest 8/09/96-37 40 39 49.51 -72 37 14.83 #4 engine portion of cowling ENG HGR 8/11/96-1 40 39 49.51 -72 37 14.83 5 small pieces; p/n 65B1029817; 65B0275-15; 65B0275-16; 65B0275-17 PARTS BAY 8/11/96-1 40 39 49.51 -72 37 14.83 2 pieces 6' long p/n 65B04600-9 FS 1394; p/n 65B38600-170; s/n 001047 8/11/96-1 40 39 49.51 -72 37 14.83 p/n 69B02355; 1'(1' green metal; 3-1/2'(2' tube p/n 10234 on clamp PARTS BAY 8/11/96-1 40 39 49.51 -72 37 14.83 white metal skin 3'(2'(.25"; green mesh 3'(1.5'(1/8" 8/11/96-1 40 39 49.51 -72 37 14.83 1(1 electronic piece BAC 60B40037-25 8/09/96-37 40 39 49.51 -72 37 14.83 #3 engine portion of cowling ENG HGR 8/09/96-37 40 39 49.51 -72 37 14.83 15'(4.5'(1.5' green metal; right wing with skin 8/11/96-1 40 39 49.51 -72 37 14.83 intercostal between beam #2 to #3 CW MOCKUP 40 39 49.51 -72 37 14.83 mid spar-lower web piece LBL 66-87 CW MOCKUP CW1022 40 39 49.51 -72 37 14.83 rear spar stiffener at RBL 21, complete CW MOCKUP 40 40 06.31 -72 37 14.64 3' piece of metal (yellow) 10/17/96-2 40 39 46.50 -72 37 14.50 center wing tank spanwise 2 CW MOCKUP 9/19/96-1 40 39 46.34 -72 37 14.42 burnt suitcase and aircraft skin 10/17/96-2 40 39 47.00 -72 37 14.10 9/19/96-1 40 39 47.00 -72 37 14.10

ducting 9/19/96-1 40 39 47.00 -72 37 14.10 metal frame
work 9/19/96-1 40 39 47.00 -72 37 14.10 sheet of metal
9/19/96-1 40 39 47.00 -72 37 14.10 oxygen bottle 9/19/96-1
40 39 47.00 -72 37 14.10 misc parts 9/19/96-1 40 39 46.76 -72
37 14.05 CW tank upper skin segment@ LBL 106, stringer 2
CW MOCKUP 10/03/96-4 40 39 46.76 -72 37 14.05 right
hand SWB #1 web RBL 106.2 CW MOCKUP 40 39 46.76 -72
37 14.05 9/20/96-33 40 39 46.76 -72 37 14.05 LH SOB rib RS
CW MOCKUP 40 39 46.76 -72 37 14.05 left hand rib near
right side (fits between CW411 and CW412) CW MOCKUP
40 39 46.76 -72 37 14.05 portion of spanwise beam CW tank
CW MOCKUP 40 39 46.76 -72 37 14.05 left hand SOB rib
section CW MOCKUP 40 39 46.76 -72 37 14.05 portion of
spanwise beam CW tank CW MOCKUP 40 39 46.76 -72 37
14.05 misc debris 9/19/96-1 40 39 46.76 -72 37 14.05 left
hand upper center section stringer end CW MOCKUP
CW1018 40 39 46.76 -72 37 14.05 LBL 70; rear spar web
segment at upper chord with 8" piece of stiffener CW
MOCKUP 10/03/96-4 CW1019 40 39 46.76 -72 37 14.05 LBL
66; rear spar web skin segment with 2' of stiffener CW
MOCKUP 10/03/96-4 40 39 46.76 -72 37 14.05 fuselage skin
under body fairing; Lot # 9-20-96-33 9/20/96-33 40 39
46.76 -72 37 14.05 CW tank upper skin segment with piece
of spanwise beam and chord CW MOCKUP 10/03/96-4
Z2785 40 39 46.76 -72 37 14.05 CW upper skin, 10 pieces
CW MOCKUP 40 39 46.76 -72 37 14.05 CW upper skin LBL
127, S-2 to R.S. CW MOCKUP 9/20/96-33 40 39 46.76 -72
37 14.05 CW upper skin LBL 127; S-2 to R.S. CW MOCKUP
9/20/96-33 40 39 46.76 -72 37 14.05 vertical stabilizer
station, fin staion 230.412-410.045 40 39 46.76 -72 37 14.05

FS 1000 ring chord segment with stringer 37L end fitting
9/20/96-33 CW518, LF3 40 39 52.48 -72 37 14.03 FS
900-1350 stringer 4R-29L; 15'(40'; 14 windows CW
MOCKUP 8/16/96-5 40 39 47.11 -72 37 13.88 lower center
wing skin panel; LBL 100; stringer 2; Lot # 9-27-96-1 CW
MOCKUP CW1106 40 39 47.11 -72 37 13.88 portion of span
wise beam CW tank CW MOCKUP 40 39 47.11 -72 37 13.88
large metal piece CW MOCKUP 9/27/96-1 40 39 47.11 -72
37 13.88 metal snap; plastic; wiring; seatbelt; mirror base;
picture; misc. metal 9/27/96-1 40 39 49.04 -72 37 13.76 5'(1'
reinforced metal and insulation 8/09/96-37 40 39 49.04 -72
37 13.76 amex travel checks 8/09/96-37 40 39 49.04 -72 37
13.76 portion center wing fuel tank. butts up with C2132
8/09/96-87 40 39 49.04 -72 37 13.76 various small pieces
8/09/96-37 40 39 23.76 -72 37 13.74 6" piece metal frame #
5B38600-361 10/12/96-2 40 39 44.50 -72 37 13.70 piece of
skin 10/13/96-3 40 39 43.70 -72 37 13.60 aluminum skin w/
red paint 10/13/96-3 40 39 34.91 -72 37 13.56 6(18"(3 1/2
piece of rudder; FS 357.4 and 382.4 8/09/96-37 40 39 50.72
-72 37 13.33 fuselage fragment; FS 1135-1280; stringer
11R-6L 8/16/96-5 40 39 50.72 -72 37 13.33 center wing tank
spar 3' (3' 8/16/96-5 40 39 50.72 -72 37 13.33 PARTS BAY
8/16/96-5 40 39 50.72 -72 37 13.33 row 23 seat 9-10 CABIN
HGR 8/16/96-5 40 39 50.72 -72 37 13.33 head rest F/A
jumpseat CABIN HGR 8/16/96-5 40 39 50.72 -72 37 13.33
fuselage frame FS 1200 (fuselage part green, 6' (6')
8/16/96-5 40 39 50.72 -72 37 13.33 fuselage part, 2.5' (6",
"65B38600-170" PARTS BAY 8/16/96-5 40 39 50.72 -72 37
13.33 control surface, 6' (1' (ribbed metal skin) 8/16/96-5
40 39 50.72 -72 37 13.33 engine part, exhaust cone ENG

HGR 8/16/96-5 40 39 44.50 -72 37 13.30 oblong metal
frame 9/19/96-1 40 39 44.50 -72 37 13.30 SWB #1 stiffener
free flange CW MOCKUP 40 39 44.50 -72 37 13.30 3' (5'
metal 9/19/96-1 40 39 44.50 -72 37 13.30 women's purse
9/19/96-1 40 39 44.50 -72 37 13.30 misc metal 9/19/96-1 40
39 44.50 -72 37 13.30 misc metal 9/19/96-1 40 39 44.50 -72
37 13.30 misc metal 9/19/96-1 40 39 44.50 -72 37 13.30 misc
metal 9/19/96-1 40 39 44.50 -72 37 13.30 CW upper skin
M.S. to SWB #2, LBL 41 - LBL 96 CW MOCKUP 9/19/96-1
Z3342 40 39 44.50 -72 37 13.30 metal frame 9/19/96-1 40 39
44.50 -72 37 13.30 hatch door 9/19/96-1 40 39 44.50 -72 37
13.30 right SWB #1 above door CW MOCKUP 40 39 44.50
-72 37 13.30 LBL 57.5 floor beam CW MOCKUP 40 39 44.50
-72 37 13.30 misc metal 9/21/96-1 40 39 44.50 -72 37 13.30
long metal beam 9/19/96-1 40 39 44.50 -72 37 13.30 large
wing section with window 9/19/96-1 40 39 47.11 -72 37
13.18 misc. metal 9/27/96-1 40 39 31.88 -72 37 13.13 misc.
plastic 40 39 44.63 -72 37 13.11 pieces of skin 10/13/96-3 40
39 45.70 -72 37 13.10 metal pieces 9/19/96-1 40 39 45.70 -72
37 13.10 metal fragment 9/19/96-1 40 39 45.70 -72 37 13.10
metal sheet approximately 3'(4' 9/19/96-1 40 39 45.70 -72
37 13.10 various metal fragments 9/19/96-1 40 39 45.70 -72
37 13.10 small door 9/19/96-1 40 39 53.43 -72 37 12.66
7'(1/2" hydro landing gear tubing TUBING BAY 8/11/96-1
40 39 48.10 -72 37 12.50 several small pieces of metal
green/silver/white; 1 battery to a cellular phone
9/30/96-1 40 39 48.10 -72 37 12.50 small green piece of
metal 2'(2' 9/30/96-1 40 39 48.10 -72 37 12.50 large oval
cone shaped metal piece - black/silver 9/30/96-1 40 39
43.30 -72 37 12.40 miscellaneous skin 10/13/96-3 40 39

53.10 -72 37 12.30 misc metal, life vest 9/28/96-2 40 40
03.58 -72 37 12.25 metal ribbing w/ partial honey comb
attached 10/17/96-2 40 39 44.13 -72 37 12.15 flat aluminum,
aluminum channel 10/13/96-3 40 39 44.13 -72 37 12.15
wing piece and wiring conduit; piece of seat 10/13/96-3 40
40 08.63 -72 37 12.14 stainless steel debris 10/07/96-1 40 39
45.81 -72 37 12.12 9/19/96-1 40 39 42.00 -72 37 12.00 rusty
gray metal pieces (2) approx. 6"(1'2"; approx. 8'(3" green/
gray metal piece (twisted); approx. 10/02/96-1 Z3324a 40
39 45.40 -72 37 11.90 misc. metal 40 39 47.56 -72 37 11.84
honeycomb piping and channel 10/13/96-3 40 39 47.56 -72
37 11.84 misc. metal 9/28/96-1 40 39 39.42 -72 37 11.77
piece of metal 10/17/96-2 40 39 44.91 -72 37 11.70 4 pieces
longest 3'(2'(2" 8/09/96-37 40 39 44.91 -72 37 11.70 14
pieces; p/n 65B10295-27 MAR 17; FS 2180 8/09/96-37 40 39
46.99 -72 37 11.57 misc. metal; hoses; TWA p/n #291-4304
s/n 1799 9/28/96-1 40 39 49.20 -72 37 11.20 10-12' gray,
crushed pipe approx 6-8" diameter 10/02/96-1 40 39 43.30
-72 37 11.20 aluminum strip 10/13/96-3
Z2670 40 39 43.60 -72 37 11.10 center section floor beam 40
39 43.60 -72 37 11.10 misc metal pieces 9/19/96-1 40 39
43.60 -72 37 11.10 part of CW fuel tank CW MOCKUP 40 39
43.60 -72 37 11.10 part of center wing tank 40 39 43.60 -72 37
11.10 part of center wing tank 40 39 45.89 -72 37 11.10
aluminum angle (2), piece of skin, bracket, metal strap with
holes 10/13/96-3 40 39 33.13 -72 37 11.06 piece of metal and
fiberglass 10/17/96-2 40 40 07.85 -72 37 10.95 window
frame 10/11/96-9 40 39 45.40 -72 37 10.90 5'(8' piece of
airplane structure 9/08/96-2 40 39 44.30 -72 37 10.90 green
metal structure 10/13/96-3 40 39 43.60 -72 37 10.60 toilet

seat 10/13/96-3 40 39 46.80 -72 37 10.50 8(8 section
9/19/96-1 40 39 46.80 -72 37 10.50 3'(3' section 9/19/96-1
40 39 46.40 -72 37 10.20 assorted small structural pieces
9/09/96-49 40 39 42.66 -72 37 10.07 misc debris 9/11/96-5
40 39 42.66 -72 37 10.07 6" hose + 7' aluminum 9/27/96-2 40
39 42.66 -72 37 10.07 human leg bone 9/27/96-2 40 39 42.66
-72 37 10.07 misc fuselage fragments, ribbing, wiring
9/27/96-2 40 39 42.66 -72 37 10.07 seat and misc fragments
9/27/96-2 40 39 42.66 -72 37 10.07 3' aluminum flanged
pipe 9/27/96-2 40 39 42.66 -72 37 10.07 cargo door, 7'(3'(1'
9/27/96-2 40 39 45.61 -72 37 10.01 bag of small metal parts
9/09/96-49 40 39 45.61 -72 37 10.01 white toilet seat
9/09/96-49 40 39 45.61 -72 37 10.01 RT stub frame FS 1060,
RBL 98.58 - RBL 127.50 CW MOCKUP 40 39 54.20 -72 37
09.86 bag of debris 10/07/96-1 40 39 54.20 -72 37 09.86
debris 10/07/96-1 40 39 54.20 -72 37 09.86 debris, poss.
speaker assy. 10/08/96-1 40 39 46.59 -72 37 09.60 seat belt
and small piece of structure 10/13/96-3 40 39 48.15 -72 37
09.58 5' light framing/ various piping & light edging;
waterline 100 RBL 55 Support 8/16/96-10 40 39 36.37 -72
37 09.58 8/09/96-37 40 39 48.15 -72 37 09.58 aircraft struts,
frame 6' length 8/15/96-12 40 39 43.30 -72 37 09.30 one 8' &
one 2' of "z" channel 10/13/96-3 40 39 46.97 -72 37 09.21
panel structure 10/11/96-10 40 39 46.90 -72 37 09.20
9/19/96-1 40 39 46.90 -72 37 09.20 9/19/96-1 40 39 43.20
-72 37 09.20 aluminum channeling 10/13/96-3 40 39 52.57
-72 37 09.14 4'(1.5'(3" red/white exterior skin p/n
65B03318376 8/11/96-1 40 39 52.57 -72 37 09.14 3 small
pieces largest 3'(3"(1" #65B12201-8 8/09/96-37 40 39 45.46
-72 37 09.10 one canvas bag; one knap sack 9/09/96-49 40

39 45.46 -72 37 09.10 2'(2'(1' section of structure 9/09/96-49
40 39 45.46 -72 37 09.10 3' length of tubing 9/09/96-49 40 39
49.49 -72 37 09.00 fuselage 6'(2' 8/14/96-9 40 39 49.49 -72 37
09.00 fuselage (yellow) 2.5'(18" CW MOCKUP 8/14/96-9
40 39 43.40 -72 37 09.00 structural metal w/wire
10/13/96-3 40 39 50.46 -72 37 08.96 5'(3',2'(3' oblong metal
sect honeycomb insulation; fire damage part-metal
8/14/96-11 40 39 45.83 -72 37 08.61 8" tubing & pieces
8/15/96-12 40 39 45.13 -72 37 08.61 paper products
8/15/96-12 40 39 45.83 -72 37 08.61 US mail; magazine
8/14/96-10 40 39 45.83 -72 37 08.61 food container unit
8/15/96-12 40 39 45.83 -72 37 08.61 exterior part PARTS
BAY 8/15/96-12 40 39 45.83 -72 37 08.61 metal part PARTS
BAY 8/15/96-12 40 39 45.83 -72 37 08.61 denimjacket
8/15/96-12 40 39 45.83 -72 37 08.61 fiberglass part
8/15/96-12 40 39 45.83 -72 37 08.61 metal part 8/15/96-12
40 39 45.83 -72 37 08.61 metal part 8/15/96-12 40 39 45.83
-72 37 08.61 sandal & metal parts 8/15/96-12 40 39 45.83
-72 37 08.61 metal frame parts 8/15/96-12 40 39 45.83 -72
37 08.61 5' metal piece 8/15/96-12 40 39 45.83 -72 37 08.61
seat back and rounded fwd wing sect 5'(4'(2' 8/14/96-10 40
39 45.83 -72 37 08.61 photo's, suitcase parts - burn damage
8/15/96-12 40 39 45.83 -72 37 08.61 horizontal stabilizer
right side inboard nose section 40 39 34.02 -72 37 08.58
piece of metal 10/17/96-2 40 39 43.10 -72 37 08.30
honeycomb skin 10/13/96-3 40 39 47.30 -72 37 07.90 right
SOB web-lower segment CW MOCKUP 40 39 47.30 -72 37
07.90 2 small pieces of skin 10/13/96-3 40 39 47.95 -72 37
07.80 forward lower cargo bay structure FS 920 right hand
side 8/15/96-11 40 39 47.95 -72 37 07.80 aircraft - exterior &

frame 40 39 47.95 -72 37 07.80 plastic & metal parts PARTS
BAY 8/16/96-9 40 39 47.95 -72 37 07.80 aircraft exterior
with access panel 8/16/96-9 40 39 47.95 -72 37 07.80 skin &
frame 8/14/96-10 40 39 47.95 -72 37 07.80 A/C exterior,
overhead panel, metal carts fire damage 8/15/96-12 40 39
05.11 -72 37 07.68 tan curtain or sheet 10/06/96-1
Z3640 40 39 44.60 -72 37 07.50 gasket and metal parts
10/13/96-3 40 38 05.10 -72 37 07.40 12"(18" thin alum sheet
8/10/96-9 40 39 44.70 -72 37 07.40 aluminum skin, 2'(3'
10/13/96-3 40 39 43.35 -72 37 07.38 misc debris 9/11/96-5
40 39 48.38 -72 37 07.13 section of aluminum angle
10/11/96-10 40 39 48.38 -72 37 07.13 white plastic strip
with black screws and nuts 10/11/96-10 40 39 44.15 -72 37
07.08 honeycomb fragment 10/13/96-3 40 39 44.15 -72 37
07.08 panel structure 10/13/96-3 40 39 44.15 -72 37 07.08
skin section 10/13/96-3 40 39 51.18 -72 37 06.75 assorted
small pieces 9/09/96-49 40 39 45.00 -72 37 06.50 tubing &
channel parts 10/13/96-3 40 39 43.70 -72 37 06.50 rubber
hose and structure 10/13/96-3 40 39 46.85 -72 37 06.22 6
pcs alum framing, 2 inner walls, largest 3'(1' 8/14/96-9 40
39 46.30 -72 37 06.20 plastic skin and metal fragment
10/13/96-3 40 39 46.40 -72 37 06.20 section of metal
structure 10/13/96-3 40 39 46.30 -72 37 06.20 miss rubber,
small stainless part 10/13/96-3 40 39 46.30 -72 37 06.20
honeycomb 40 39 47.47 -72 37 06.01 aluminum structural
GD 205.2A - serial #; plane skin 10/11/96-10 40 39 44.30 -72
37 06.00 wiring bundle 10/13/96-3 40 39 44.30 -72 37 06.00
one piece of aluminum skin, red, white & green, 6'
10/13/96-3 40 39 47.37 -72 37 05.80 beam CW rear spar CW
MOCKUP 40 39 47.37 -72 37 05.80 SWB #1 web; 1'(2' green

sheet metal with rivets CW MOCKUP 9/09/96-49 40 39
47.37 -72 37 05.80 mid spar CW stiffener CW MOCKUP 40
39 32.77 -72 37 05.57 10'(1'3" 8/09/96-37 40 39 48.13 -72 37
05.51 overhead bin / various light framing / speaker frame
8/16/96-10 40 39 48.13 -72 37 05.51 speaker frame, 4' metal
frame, overhead compartment 8/15/96-12 40 39 51.71 -72
37 05.34 bag of debris 10/07/96-1 40 39 51.71 -72 37 05.34
4'(2' piece of debris 10/07/96-1 40 39 43.30 -72 37 04.95
outboard wing rib segment, upper and lower 40 39 43.30
-72 37 04.95 debris, purse 9/16/96-2 40 39 43.30 -72 37 04.95
FS 1100 frame segment 40 39 43.30 -72 37 04.95 wing rib
segment lower chord 40 39 43.30 -72 37 04.95 # 1 engine
pylon access panel inboard 40 39 43.30 -72 37 04.95 gap
cover engine 40 39 47.28 -72 37 04.89 5 small pcs alum
framing, metal pc 4'(2' jagged edges 8/14/96-9 40 39 47.28
-72 37 04.89 seat belt, wire harness p/n 8131913; 5 small
pieces aluminum framing 8/14/96-9 40 39 45.05 -72 37
04.78 metal parts and tubing 8/14/96-11 40 39 44.36 -72 37
04.63 CW upper skin (9-21-96-1) CW MOCKUP 40 39 44.36
-72 37 04.63 9/22/96-1 40 39 44.36 -72 37 04.63 CW upper
skin CW MOCKUP 40 39 44.36 -72 37 04.63 SWB #1
(9-21-96-1 CW MOCKUP 40 39 44.36 -72 37 04.63 name tag
and debris plus some kind of pipe 9/20/96-33 40 39 44.36
-72 37 04.63 large pieces of debris 9/20/96-33 40 39 44.36
-72 37 04.63 debris 9/21/96-1 40 40 04.43 -72 37 04.48 metal
bucket like object 10/17/96-2 40 39 47.98 -72 37 04.08 metal
seat back 10/11/96-10 40 39 45.00 -72 37 03.76 20'(10'
fuselage sect, also metal part # 501 8/14/96-9 40 39 45.00
-72 37 03.76 4'(2' curled metal framing & siding; 20'(10'
piece of fuselage 40 39 51.38 -72 37 03.58 debris 9/22/96-1

40 39 46.31 -72 37 03.51 1'(2" metal piece PARTS BAY
8/15/96-12 40 39 46.31 -72 37 03.51 metal parts, tubing,
smoke detector 8/16/96-9 40 39 46.31 -72 37 03.51 light
metal framing 8/15/96-12 40 39 46.31 -72 37 03.51 framing
& clamp 8/15/96-12 40 39 46.31 -72 37 03.51 A/C exterior
10'(10" 8/15/96-12 40 39 46.31 -72 37 03.51 A/C exterior &
light framing 40 39 46.31 -72 37 03.51 metal parts 8/16/96-9
40 39 46.31 -72 37 03.51 5'(2' siding (alum) 8/15/96-12 40 39
46.31 -72 37 03.51 fan inlet diffuser housing for air cycle
machine 8/15/96-12 40 39 50.17 -72 37 03.35 metal plastic
parts, headsets and spring 8/14/96-11 40 39 50.17 -72 37
03.35 2.5' framing 8/15/96-11 40 39 46.62 -72 37 03.35
7'(2'(1' square framing p/n 65B50570-119 8/14/96-9 40 39
46.62 -72 37 03.35 light framing at hole built in #1621011 21
8/14/96-9 40 39 46.62 -72 37 03.35 mail label; book
8/14/96-9 40 39 57.66 -72 37 03.06 debris 10/08/96-1 40 39
47.34 -72 37 02.89 strut marked 814491, alum framing w/
burn marking 8/14/96-9 40 39 59.07 -72 37 02.75 aircraft
ribbing, 1.5' long, 'Z'shaped 10/17/96-2 40 38 19.30 -72 37
02.70 plastic window framing (whole) 8/10/96-9 40 39
36.47 -72 37 02.70 2'(1"(1" angle iron, small bundle of wires
W1295-2CC48 8/14/96-9 40 39 45.72 -72 37 02.67 metal
frame structure p/n 69B518H9-6, 4370, A3191; black
luggage 8/14/96-9 40 39 45.72 -72 37 02.67 metal frame
structure "69B518H9-6 4370 A3191" 40 38 52.33 -72 37 02.64
some kind of gray tray 10/02/96-1 40 39 48.47 -72 37 02.59
white + yellow curved piece of plastic 10/11/96-10
Z3426 40 39 48.47 -72 37 02.59 debris and a piece of carpet
9/22/96-1 40 39 48.47 -72 37 02.59 lower center wing skin
panel mid spar at BL0; Lot # 9-22-96-1 CW MOCKUP 40 39

48.47 -72 37 02.59 lower center wing skin panel; front spar at BL110; Lot # 9-22-96-1 CW MOCKUP 40 39 48.47 -72 37 02.59 misc. metal debris 10/02/96-1 40 39 48.47 -72 37 02.59 lower center wing skin panel; RBL 98; stringer 13-14, Lot # 9-22-96-1 CW MOCKUP 40 39 48.47 -72 37 02.59 lower center wing skin panel; RBL 98; stringer 9; Lot # 9-22-96-1 CW MOCKUP 40 39 48.47 -72 37 02.59 debris 9/16/96-2 40 39 48.47 -72 37 02.59 SOB rib segment CW MOCKUP 40 39 30.20 -72 37 02.30 rudder section 10/17/96-1 40 39 36.06 -72 37 02.28 tail rudder 6'(8'(1' "65B25056-1" 8/09/96-37 40 39 53.91 -72 37 02.26 plastic bag of debris 10/07/96-1 40 39 53.91 -72 37 02.26 debris 10/07/96-1 40 39 46.35 -72 37 02.14 speaker frame, 6" exhaust tubing 4' long, side panels; lighting panel PARTS BAY 8/14/96-10 40 39 46.75 -72 37 02.14 metal parts, tubing test switch for fire ext. 8/16/96-9 40 39 46.75 -72 37 02.14 rubber tubing 8/16/96-9 40 39 32.16 -72 37 01.61 aircraft skin 10/17/96-1 40 39 30.50 -72 37 01.30 skin, 1' (6" 10/17/96-1 40 39 46.40 -72 37 01.20 1 gray plastic bag and misc metal 9/11/96-5 40 39 46.40 -72 37 01.20 debris 9/21/96-1 40 39 46.40 -72 37 01.20 piece of jewelry on a piece of clothes; eye or sunglass case; debris 9/21/96-1 40 39 49.50 -72 37 00.60 green metal, 3'(2"(3" 10/11/96-10 40 39 46.36 -72 37 00.45 inner framing and wiring 8/14/96-10 40 39 46.36 -72 37 00.45 6'(4' siding various piping and siding 8/14/96-10 40 39 47.41 -72 37 00.06 green metal with rivets twisted 10/11/96-10 40 39 26.46 -72 37 00.06 aircraft skin 10/17/96-1 40 39 47.41 -72 37 00.06 frame member/station 1438 40 39 00.00 -72 37 00.00 misc metal debris from plane 40 39 45.04 -72 36 59.81 bag of debris 10/02/96-1 40 39 45.04 -72 36 59.81 toilet seat lid; life

vest; debris 9/11/96-5 40 39 52.50 -72 36 59.80 debris -
some kind of paper 9/22/96-1 40 39 45.23 -72 36 59.71
green skin 10/11/96-10 40 39 47.70 -72 36 59.60 green skin
10/11/96-10 40 39 48.08 -72 36 59.49 green skin
10/11/96-10 40 39 46.08 -72 36 58.60 2 plastic bags; hatch;
misc metal pieces 9/11/96-5 40 39 28.40 -72 36 58.50
structural part 10/17/96-1 40 39 43.52 -72 36 58.38 debris
9/16/96-2
Z2568 40 39 43.52 -72 36 58.38 bags, gray 9/11/96-5 40 39
43.52 -72 36 58.38 misc. debris; hoses 9/27/96-1 40 39 43.00
-72 36 58.20 skin + 1 beam 10/11/96-10 40 39 46.07 -72 36
58.02 green skin; framing 10/11/96-10 40 39 46.07 -72 36
58.02 green metal with rivets with four circular holes
10/11/96-10 40 39 46.07 -72 36 58.02 green metal 40 39
46.94 -72 36 58.00 gasket 9/20/96-33 40 39 42.80 -72 36
57.50 10/11/96-10 40 39 31.08 -72 36 57.32 LHS vertical
stabilizer upper fin station 370-520 8/09/96-37 40 39 44.92
-72 36 57.32 DOD flight info sheets/ 12 pieces bagged with
flight info and 3'(2'(4' piece PARTS BAY 8/09/96-37 40 39
45.74 -72 36 57.27 1'(1' outer hatch bolted shut; wallet
8/14/96-9 40 39 45.74 -72 36 57.27 exhaust tubing?, 1'(1'
small alum pcs, wallet 8/14/96-9 40 39 45.74 -72 36 57.27
metal framing ?? damage PARTS BAY 8/14/96-9 40 39
45.03 -72 36 56.89 3'(4" inner wall attached to framing
8/15/96-12 40 39 31.10 -72 36 56.80 small structural part
10/17/96-1 40 39 45.13 -72 36 56.61 inner framing, largest
18"(12", oxygen mask, alum rail 1' long CABIN HGR
8/14/96-9 40 39 42.10 -72 36 55.94 brown zip bag; piece of
small debris; bag containing newspaper 10/02/96-1 40 39
42.10 -72 36 55.94 pipes & debris 9/16/96-2 40 39 44.77 -72

36 55.72 possible wing framing 3'(1'(1'; 3'(1'(3" framing;
misc. pieces 8/14/96-9 40 39 44.77 -72 36 55.72 1'(6"
insulation and small aluminum inner siding 8/14/96-9 40
39 44.42 -72 36 55.17 crown skin FS 1241-1438 stringer
5L-8R 9/16/96-2 40 39 44.42 -72 36 55.17 debris - clothes
9/20/96-33 40 39 32.00 -72 36 54.60 small structural part
w/ fabric 10/17/96-1 40 39 46.30 -72 36 54.18 misc. small
framing aluminum DUCTING BAY 8/14/96-9 40 39 46.60
-72 36 54.18 7' long curved ducting p/n 65B38600-153-256
8/14/96-9 40 39 30.50 -72 36 54.00 black boot w/ possible
human remains 40 39 45.72 -72 36 53.73 p/n 65B0 3862 20;
4'(2.5' inner wall; various hoses (melted) 8/14/96-9 40 39
45.72 -72 36 53.73 various hoses melted PARTS BAY
8/14/96-9 40 39 28.40 -72 36 52.70 ribbing with access hole
10/17/96-1 40 39 44.79 -72 36 52.47 debris 9/16/96-2 40 39
44.79 -72 36 52.47 debris 9/20/96-33 40 39 44.31 -72 36 51.63
2 pieces of skin, aluminum on one side, green on the other
side 40 39 42.39 -72 36 50.64 2 pieces plastic & magazines
10/12/96-2 40 39 45.10 -72 36 50.19 2 pieces of metal
10/12/96-2 40 39 34.36 -72 36 49.37 1' light framing PARTS
BAY 8/26/96-33 40 39 44.69 -72 36 49.13 bent piece of metal
1' long
Z1756 40 39 34.96 -72 36 49.06 small piece of debris
10/02/96-1 40 39 29.65 -72 36 48.92 several small pieces of
metal framing (5) the largest is 1'(6" 8/20/96-15 40 39 46.11
-72 36 48.90 debris 10/08/96-1 40 39 28.22 -72 36 48.71 2
pieces 1) 2'(1/8"(1' p/n 65B40501 M206; 2) 1'(2" shard
8/20/96-15 40 39 43.93 -72 36 48.43 plastic window shade,
fabric with insulation 8/26/96-33 40 39 43.93 -72 36 48.43
baggage & wreckage; 1 large aluminum piece marked:

INTER COS. 65B01113-?; 4' curved fram in 8/26/96-17 40 39
43.93 -72 36 48.43 large bundle of debris 8/26/96-28 40 39
43.93 -72 36 48.43 white bag with plane pieces 8/26/96-33
40 39 43.93 -72 36 48.43 metal tubing. burnt metal frame
PARTS BAY 8/26/96-33 40 39 43.93 -72 36 48.43 blue bag,
foreign air mail 8/26/96-33 40 39 43.93 -72 36 48.43 2'(1.5'
metal skin; 3'(20" metal 8/26/96-33 40 39 43.93 -72 36 48.43
misc debris 8/26/96-1 40 39 53.91 -72 36 48.31 debris
10/08/96-1 40 39 43.76 -72 36 48.16 1. 3' long with "DOOR
MUST BE LATCHED" tag 2. 2' long with ripped out rivet
holes 3. 3" piec 10/12/96-2 40 39 31.33 -72 36 47.97 part of
aircraft skin 40 39 43.90 -72 36 47.67 various pieces of scrap
metal; 18"(10"; 18"(36"; 15"(3.5" 8/24/96-10 40 39 25.97 -72
36 47.25 3 pieces of green metal framing, longest 2.5'(2"(2"
8/20/96-15 40 39 27.20 -72 36 47.00 aluminum strip
10/17/96-1 40 39 43.90 -72 36 46.43 US airmail envelope
8/26/96-14 40 39 43.04 -72 36 46.32 10/07/96-9 40 39 37.98
-72 36 45.94 large piece of debris 10/02/96-1 40 39 37.97 -72
36 45.93 seat frame with blanket; 1.5'(2' metal with 10'
carpet; FWD unit #320 CABIN HGR 8/26/96-33 40 39
41.83 -72 36 45.87 skin 1'(2' 10/07/96-12 40 39 48.09 -72 36
45.78 debris 10/08/96-1 40 39 42.44 -72 36 44.43 piece of
metal - 1 ft. long with "WL/310" stenciling 10/12/96-2 40
38 26.13 -72 36 43.93 seat 5 (1 2) first class CBN INT
10/29/96-2 40 39 24.05 -72 36 43.38 3'(1' exterior skin, 2'(1'
exterior skin 8/26/96-33 40 39 23.45 -72 36 43.20 1'(8"
exterior skin 8/26/96-33 40 39 53.68 -72 36 42.65 debris
10/07/96-1 40 39 41.79 -72 36 42.48 debris 9/21/96-1 40 39
41.7 -72 36 42.48 book; debris 9/21/96-1 40 39 26.40 -72 36
42.30 black blanket 10/17/96-1 40 39 44.22 -72 36 42.19

misc. debris 9/27/96-1 40 39 44.22 -72 36 42.19 debris
9/21/96-1 40 39 49.22 -72 36 42.09 carpet 10/07/96-1 40 38
50.27 -72 36 41.71 passport photo 10/02/96-1
Z1703 40 39 18.20 -72 36 41.38 4' piece of debris 10/07/96-1
40 39 49.50 -72 36 41.13 2.5" piece of plastic / fiberglass
10/17/96-2 40 39 49.50 -72 36 41.13 1.5" green metal piece
10/17/96-2 40 39 28.82 -72 36 40.73 1 piece plastic w/ metal
strap 10/17/96-2 40 39 49.27 -72 36 40.24 debris 10/08/96-1
40 39 26.70 -72 36 40.00 black rubber 10/17/96-1 40 39 40.22
-72 36 39.99 debris 9/22/96-1 40 39 55.29 -72 36 39.48 3'
long frame section 8/24/96-10 40 39 44.16 -72 36 39.23
financial papers 8/26/96-11 40 39 44.16 -72 36 39.23 2'(2'
siding; t shirt; j&b whiskey bottle; siding p/n M442 B03287
1 8/26/96-2 40 39 45.10 -72 36 39.17 metal pieces, hair
dryer, rubber pieces 8/26/96-16 40 39 42.95 -72 36 39.04
small plastic siding; small aluminum piece; 6"(6" fiberglass
8/26/96-21 40 39 41.48 -72 36 38.76 window shade 3' (4'
aluminum 8/26/96-3 40 39 43.36 -72 36 37.93 2'(1.5' piece of
aluminum; 8"(14" aluminum; magazines; fiberglass pieces
8/26/96-23 40 39 40.05 -72 36 37.90 metal debris,
toothbrush, and photographs 9/23/96-5 40 39 40.15 -72 36
37.80 debris 9/21/96-1 40 39 40.15 -72 36 37.80 piece of
pipe or hose 9/21/96-1 40 39 46.52 -72 36 36.92
unidentified clothing 8/24/96-7 40 39 46.52 -72 36 36.92
metal part w/ frame (56B0551511), 4' (4" metal ?? toilet seat
cover, misc debris (details on ha 8/24/96-7 40 39 41.24 -72
36 36.62 debris; tube 9/21/96-1 40 39 38.86 -72 36 36.33
piece of wire and a book 9/22/96-1 40 39 42.41 -72 36 36.19
10/08/96-1 40 39 40.14 -72 36 36.02 portion of spartwise
beam CW tank CW MOCKUP 40 39 37.86 -72 36 34.77 piece

of carpet and debris 9/22/96-1 40 39 37.86 -72 36 34.77 4'
long beam 10/17/96-2 40 39 37.86 -72 36 34.77 blackened
metal debris 9/25/96-2 40 39 37.86 -72 36 34.77 misc. metal
debris; towel; quilt; photographs; US mail 9/25/96-2 40 39
37.86 -72 36 34.77 newspaper and letter with address
10/17/96-2 40 39 37.86 -72 36 34.77 flight bag; flashlight
9/27/96-1 40 39 37.86 -72 36 34.77 several pieces of metal
(& 1 wire bundle) from wreckage log 10/17/96-2 40 39
37.86 -72 36 34.77 1 piece of metal with oil tank written on
it 10/17/96-2 40 39 37.86 -72 36 34.77 seat pan 10/17/96-2
40 39 37.86 -72 36 34.77 support beam metal 9/27/96-1 40
39 37.86 -72 36 34.77 misc. metal debris 9/27/96-1 40 39
37.86 -72 36 34.77 misc. debris 9/27/96-1 40 39 37.86 -72 36
34.77 hose; misc. debris; flotation device 9/27/96-1
Z3544 40 39 37.86 -72 36 34.77 west clock timer; seat cover
9/27/96-1 40 39 37.86 -72 36 34.77 misc. metal debris
9/27/96-1 40 39 37.86 -72 36 34.77 misc metal 9/28/96-1 40
39 37.86 -72 36 34.77 misc metal 9/28/96-1 40 39 37.86 -72
36 34.77 carpet; misc. metal debris; floor trim 9/27/96-1 40
39 37.86 -72 36 34.77 rubber gasket 10/17/96-2 40 39 37.86
-72 36 34.77 misc metal 9/28/96-1 40 39 37.86 -72 36 34.77
personel effects, calculator 10/18/96-3 40 39 37.86 -72 36
34.77 pieces of metal 10/17/96-2 40 39 37.86 -72 36 34.77
small pieces of metal 10/17/96-2 40 39 37.86 -72 36 34.77
several pieces of metal 10/17/96-2 40 39 37.86 -72 36 34.77
piece of plastic 10/17/96-2 40 39 37.86 -72 36 34.77 2.5'
length of pipe w/ metal 10/17/96-2 40 39 37.86 -72 36 34.77
honeycomb insulation 10/17/96-2 40 39 37.86 -72 36 34.77
green metal piece 10/17/96-2 40 39 37.86 -72 36 34.77 1'
long piece of plastic 10/17/96-2 40 39 37.86 -72 36 34.77

plastic ventilation 10/17/96-2 40 39 37.86 -72 36 34.77
fiberglass w/ warning label 10/17/96-2 40 39 37.86 -72 36
34.77 1' (2' piece of metal 10/17/96-2 40 39 37.86 -72 36
34.77 misc metal 9/28/96-1 40 39 37.86 -72 36 34.77 piece
rubber coated wire 10/17/96-2 40 39 37.86 -72 36 34.77
wiring harness 10/17/96-2 40 39 37.86 -72 36 34.77
framework 40 39 37.86 -72 36 34.77 framework 40 39 37.86
-72 36 34.77 framework 10/18/96-3 40 39 37.86 -72 36 34.77
3' (4' metal piece 10/17/96-2 40 39 37.86 -72 36 34.77 5'
piece of black metal 10/17/96-2 40 39 37.86 -72 36 34.77 6'
metal piece 10/17/96-2 40 39 37.86 -72 36 34.77 metal tube
& wiring 10/17/96-2 40 39 37.86 -72 36 34.77 6" green metal
(qty 2); 7" triangular orange metal; 5" flat metal 1/2
wrapped in black plastic 40 39 37.86 -72 36 34.77 brown
denim shorts, size small 40 39 46.96 -72 36 34.73 1'(1.5"
metal p/n 65B03153 32; 6" wire cover; 1'(3" fiberglass
8/24/96-7 40 39 23.84 -72 36 34.44 debris, head phone cords
black; red exterior piece of plane 10/02/96-1 40 39 23.98 -72
36 34.16 misc. metal 9/28/96-1 40 39 40.09 -72 36 34.11
debris - carpet - P1 to 50 9/22/96-1 40 39 45.81 -72 36 34.11
misc. metal 9/28/96-1
Z3448 40 39 26.24 -72 36 34.01 debris 9/22/96-1 40 39 40.21
-72 36 33.92 debris 9/22/96-1 40 39 44.99 -72 36 33.78 white
plastic bag and metal debris 9/23/96-5 40 39 44.10 -72 36
33.64 debris 9/22/96-1 40 39 43.26 -72 36 33.16 debris
9/22/96-1 40 39 33.57 -72 36 33.04 vent 5'(5" p/n
1471075-34 8/20/96-15 40 39 45.38 -72 36 32.96 6"(6" alum.;
metal fragments PARTS BAY 8/24/96-7 40 39 43.76 -72 36
32.55 mail envelope (white); piece of hose 9/22/96-1 40 39
40.29 -72 36 32.45 2 pieces of debris 10/07/96-1 40 39 46.40

-72 36 32.44 umbrella, 6'(4' carpet; piece of burnt plastic, Carpet 7' long 8/24/96-7 40 39 39.49 -72 36 32.23 portion of aft pressure bulkhead; 9'(6' tapering mass w/insl attached p/n 65B0263458 on clip 8/11/96-1 40 39 39.49 -72 36 32.23 8/11/96-1 40 39 39.49 -72 36 32.23 bag full of insulation 8/11/96-1 40 39 23.26 -72 36 31.96 misc. metal 9/28/96-1 40 39 42.67 -72 36 31.94 debris 9/22/96-1 40 39 43.10 -72 36 31.49 debris 9/22/96-1 40 39 43.10 -72 36 31.49 strut 7' long 65B067617 9/22/96-1 40 39 43.10 -72 36 31.49 2 women's cosmetic bags, striped with misc materials in it - no ID 8/26/96-12 40 39 46.98 -72 36 31.42 1'(6" alum PARTS BAY 8/24/96-7 40 39 44.95 -72 36 31.34 FS 920 frame; stringer 33L-35L; (rib assy #65001736-401) 40 39 44.95 -72 36 31.34 carpet & alum. pcs / panties / headphone 8/24/96-7 40 39 45.37 -72 36 31.08 debris- honey comb/ plastic 10/02/96-1 40 39 45.70 -72 36 30.46 debris 9/20/96-33 40 39 43.24 -72 36 30.45 small pieces of debris 9/23/96-5 40 39 43.93 -72 36 29.83 green cloth 9/23/96-5 40 39 03.03 -72 36 29.57 burnt rubber tubing DUCTING BAY 8/24/96-7 40 39 39.68 -72 36 29.54 personal effects photo (no picture) 40 39 44.55 -72 36 29.11 debris 10/02/96-1 40 39 44.94 -72 36 28.85 debris 9/22/96-1 40 39 45.10 -72 36 28.75 luggage rack cart 8/22/96-7 40 39 38.37 -72 36 28.75 2 small pieces of debris 10/07/96-1 40 39 45.82 -72 36 28.59 2"(4" plastic #68-5330; armrest piece 8/24/96-7 40 39 19.58 -72 36 28.58 new levi's jeans, tags still attached; rubber weather strip 8/26/96-33 40 39 19.43 -72 36 28.58 debris 9/22/96-1 40 39 42.04 -72 36 28.57 gasket; debris; picture 9/21/96-1 40 39 37.42 -72 36 28.42 debris 9/20/96-33 40 39 41.63 -72 36 28.41 fiberglass pieces, metal pieces, world business report 8/26/96-33 40

39 41.63 -72 36 28.41 6'(4" curved framing p/n
65B38600-170 257 PARTS BAY 8/26/96-33 40 39 41.63 -72
36 28.41 p/n 69B501101:1 on frame 6'(2' 8/26/96-33 40 39
42.01 -72 36 27.99 piece of backbone 9/21/96-1 40 39 42.01
-72 36 27.99 debris 9/21/96-1 40 39 42.83 -72 36 27.99 debris
9/21/96-1 40 39 20.35 -72 36 27.82 piece of metal with paint
on one side 10/17/96-2 40 39 40.42 -72 36 27.56 debris
9/11/96-5 40 39 46.28 -72 36 27.56 debris 9/20/96-33 40 39
34.23 -72 36 27.55 strapped gray mass unknown (mail?)
9/22/96-1 40 39 37.76 -72 36 27.41 debris 9/20/96-33 40 39
40.66 -72 36 27.34 bag of debris 9/22/96-1 40 39 44.43 -72 36
27.20 various small metal pieces (6) & 1 picture; small alum
and plastic pieces 8/24/96-7 40 39 37.60 -72 36 27.00
insulation panel, 6"(6" 10/12/96-3 40 39 37.60 -72 36 27.00
coded steel cable 10/12/96-3 40 39 42.87 -72 36 26.64
windows shade; debris 9/21/96-1 40 39 43.53 -72 36 26.17
window molding 9/21/96-1 40 39 44.72 -72 36 25.97 debris
9/22/96-1 40 39 37.78 -72 36 25.65 two pieces of debris
9/22/96-1 40 39 38.81 -72 36 25.39 debris 9/22/96-1 40 39
43.10 -72 36 24.97 debris 9/21/96-1 40 39 42.93 -72 36 24.91
1'(4" piece of plastic; a photo; 3 small pieces of fiberglass; 5
bags 8/24/96-7 40 39 15.55 -72 36 24.87 white rain jacket &
small burlap bag 8/24/96-10 40 39 43.32 -72 36 24.87 debris
9/22/96-1 40 39 38.88 -72 36 24.77 debris 9/22/96-1 40 39
38.88 -72 36 24.77 row 31 (1 2 3) seats CABIN HGR 40 39
38.88 -72 36 24.77 paper and debris 9/20/96-33 40 39 35.62
-72 36 24.73 various framing 40 39 35.62 -72 36 24.73 misc
debris with the following p/n 65B09123-23 919 FS 1301; p/
n 69B42019-1 8/26/96-33 40 39 43.65 -72 36 24.67 debris
9/22/96-1 40 39 41.38 -72 36 24.55 debris 9/11/96-5 40 39

32.58 -72 36 24.49 9/22/96-1 40 39 41.41 -72 36 24.15 piece of black hose 10/12/96-3 40 39 41.41 -72 36 24.15 one side of honeycomb insulation panel 10/12/96-3 40 39 37.82 -72 36 23.96 debris 9/20/96-33 40 39 37.25 -72 36 23.43 debris 9/20/96-33

Z3413 40 39 37.25 -72 36 23.43 some kind of book and computer disk 9/21/96-1 40 39 41.28 -72 36 23.13 debris 9/11/96-5 40 39 38.34 -72 36 22.87 US mail envelope; hose; debris 9/21/96-1 40 39 38.34 -72 36 22.87 see tag 9/21/96-1 40 39 00.03 -72 36 22.79 microfiche, red bag, orange bag 8/24/96-10 40 39 38.99 -72 36 22.67 right SOB stiffener, 4th aft of SWB #3; 65B11554-16 CW MOCKUP 40 39 38.99 -72 36 22.67 right SOB web at first stiff forward of M.S., FS 1120, below CW303 CW MOCKUP 40 39 38,99 -72 36 22.67 SWB #1 web right hand closure panel CW MOCKUP 40 39 38.99 -72 36 22.67 right SOB web at SWB #1 CW MOCKUP 40 39 38.99 -72 36 22.67 right wing upper surface, stringer 9-mid spar, WS 1250 40 39 38.99 -72 36 22.67 SWB #1 web right hand closure panel CW MOCKUP 40 39 38.99 -72 36 22.67 rubber strip and debris 9/22/96-1 40 39 38.99 -72 36 22.67 SWB #1 web right hand closure panel CW MOCKUP 40 39 40.05 -72 36 22.00 debris in bag 9/22/96-1 40 39 36.15 -72 36 21.94 misc. debris 9/23/96-5 40 39 38.43 -72 36 21.78 personal effects and debris 9/21/96-1 40 39 39.29 -72 36 21.75 various small metal & plastic pieces, one measures 18"(8"(8" 8/24/96-10 40 39 39.62 -72 36 21.74 debris 9/22/96-1 40 39 33.43 -72 36 21.38 fuel pipe 9/22/96-1 40 39 37.20 -72 36 21.35 debris 9/22/96-1 40 39 36.96 -72 36 20.93 9/22/96-1 40 39 41.20 -72 36 20.82 debris and miniature bottle 9/22/96-1 40 39 39.69 -72 36 20.69 debris

9/21/96-1 40 39 39.69 -72 36 20.69 SWB #2, LBL 93.48 web,
9'(14'H inc?? fuel hole CW MOCKUP 40 39 39.69 -72 36
20.69 CW upper skin 5 pieces CW MOCKUP 40 39 39.69
-72 36 20.69 large piece of debris 9/22/96-1 40 39 35.92 -72
36 20.24 misc. debris 9/23/96-5 40 39 22.52 -72 36 19.81
misc. plastic 10/17/96-1 40 39 43.02 -72 36 19.42 debris
9/16/96-2 40 39 29.60 -72 36 19.40 structural piece
10/17/96-1 40 39 43.42 -72 36 19.06 debris 9/16/96-2 40 39
42.44 -72 36 19.01 clothes (bumt); burnt lifevest 8/24/96-7
CW1008 40 39 42.44 -72 36 19.01 rear spar, left corner
section CW MOCKUP 8/24/96-7 40 39 41.28 -72 36 18.99
picture - bundle - piece of debris 9/22/96-1 40 39 39.55 -72
36 18.31 book; debris 9/21/96-1 40 39 39.55 -72 36 18.31
metal & fiberglass insulation 10/17/96-2
Z3457 40 39 35.01 -72 36 18.25 misc. debris 9/23/96-5 40 39
39.72 -72 36 18.22 piece of debris - piece of cloth -
instruction book- picture 9/22/96-1 40 39 36.65 -72 36 18.17
misc. debris 9/23/96-5 40 39 31.73 -72 36 17.67 2'(2"
framing 8/26/96-33 40 39 34.15 -72 36 17.55 p/n
69B01906-1 7/24/70; a/c headphones; rain jacket
8/26/96-33 40 39 35.02 -72 36 17.52 mail box; plastic tubing;
metal piece of fuselage 8/26/96-33 40 39 32.82 -72 36 17.52
men's slipper, US Mail 8/26/96-33 40 39 35.02 -72 36 17.52
4'(2' framing and wall PARTS BAY 8/26/96-33 40 39 44.02
-72 36 17.37 debris 9/16/96-2 40 39 33.92 -72 36 16.54 1'(4"
metal piece and 8"(4" insulation 8/26/96-33 40 39 42.28 -72
36 14.50 1 piece rubber, piece skin 4' long (1' wide 40 39
42.45 -72 36 13.92 10"(10" piece of siding 8/24/96-7 40 38
58.84 -72 36 13.53 inner wall siding CABIN HGR 8/24/96-7
40 39 36.67 -72 36 12.89 misc. debris, strap 9/23/96-5 40 39

38.31 -72 36 11.20 plastic gasket 9/16/96-2 40 39 41.91 -72
36 10.87 p/n 69B41076- piece of pipe - seatbelt 9/22/96-1
40 39 42.73 -72 36 10.77 debris 9/22/96-1 40 39 42.31 -72 36
10.57 CW stiffener (9-22-96-1) CW MOCKUP 40 39 42.31
-72 36 10.57 CW mid spar RBL 87.26-98.59 (9-22-96-1) CW
MOCKUP 40 39 42.31 -72 36 10.57 CW mid spar CW
MOCKUP 40 39 42.31 -72 36 10.57 debris 9/22/96-1 40 39
42.31 -72 36 10.57 SWB #1 (9-22-96-1) CW MOCKUP 40 39
42.31 -72 36 10.57 right SOB web CW MOCKUP 40 39 42.31
-72 36 10.57 right SOB web (9-22-96-1) CW MOCKUP 40 39
42.31 -72 36 10.57 CW stiffener CW MOCKUP 40 39 42.31
-72 36 10.57 CW stiffener (9-22-96-1) CW MOCKUP 40 39
42.31 -72 36 10.57 CW upper skin (9-22-96-1) CW MOCKUP
40 39 42.31 -72 36 10.57 CW upper skin CW MOCKUP 40
39 42.31 -72 36 10.57 portion of spanwise beam #1 upper
chord CW MOCKUP 40 39 42.31 -72 36 10.57 SWB web
(9-22-96-1) CW MOCKUP 40 39 43.85 -72 36 09.48 misc.
debris 9/23/96-5 40 39 40.98 -72 36 08.72 magazine bundle,
photograph 10/07/96-1 40 38 55.45 -72 36 08.34 metal
debris 10/02/96-1 40 39 46.00 -72 36 08.18 debris 9/16/96-2
40 39 34.44 -72 36 06.17 misc metal debris 9/24/96-16 40 39
31.49 -72 36 05.17 misc. metal 10/17/96-1
Z2577 40 39 44.66 -72 36 05.01 rudder sta. 57.8 9/16/96-2 40
39 33.70 -72 36 04.98 L shaped metal with honeycomb
fiberglass p/n 65B54890-1 4 3071; small 20" wire p/n
W9412107 8/26/96-10 40 39 39.34 -72 36 04.53 assy p/n
65B0350392 (M151), 10"(1' siding 8/24/96-7 40 39 37.63 -72
36 03.90 2'(2' fiberglass, possible wing section /
photograph 8/24/96-7 40 39 45.88 -72 36 03.74 3" triangular
fiberglass piece & photos 8/23/96-6 40 39 05.64 -72 36 03.45

left wing outboard aileron section and wing bulkhead
8/24/96-7 40 39 36.46 -72 36 01.00 1'(7" fiberglass debris
8/24/96-7 40 39 33.63 -72 35 58.95 2'(2' aluminum interior
skin & framing - m1 2 65B?3864 PARTS BAY 8/26/96-18 40
39 21.88 -72 35 57.87 various pieces of laptop computer
largest is 12"(8"(2" 8/24/96-10 40 39 26.78 -72 35 56.81
aluminum with honeycomb 10/18/96-3 40 39 29.04 -72 35
56.09 plastic 1.5'(6", Eddie Bauer shirt 8/26/96-7 40 39
30.43 -72 35 55.18 2' framing p/n 65B52313-192 8/26/96-19
40 39 36.60 -72 35 54.71 plastic parts #1621028-2; US mail
envelope and sheet music 8/23/96-6 40 39 38.20 -72 35
54.66 wreckage log says 2'(6" aluminum piece 8/26/96-29
40 39 38.29 -72 35 54.66 plastic sink basin CABIN HGR 40
39 38.29 -72 35 54.66 plastic sink basin 8/26/96-33 40 39
21.78 -72 35 54.39 various pieces of cloth 8/24/96-10 40 39
30.70 -72 35 53.80 plastic window framing 8/26/96-33 40 39
34.97 -72 35 53.57 metal parts, p/n 65B0386314 M207; 2
fiberglass parts; black clothing 8/23/96-6 40 39 27.80 -72 35
53.48 misc. plastic 10/17/96-1 40 39 09.86 -72 35 53.16 outer
metal skin - 2 pieces 40 39 41.43 -72 35 52.61 debris
9/16/96-2 40 39 29.20 -72 35 52.56 suit case tag #A21131;
clothing; cargo overhead bin 8/26/96-27 40 39 31.17 -72 35
51.34 2'(3" metal structure PARTS BAY 8/26/96-33 40 39
39.00 -72 35 51.25 4 photos 8/26/96-13 40 39 39.00 -72 35
51.25 8"(12" fiberglass/ 18" (12" twisted metal 8/26/96-22
40 39 35.05 -72 35 49.33 2.5'(20" insulation 8/26/96-29 40 39
29.69 -72 35 48.54 partial jordache suitcase (frame)
10/17/96-1 40 39 32.44 -72 35 47.62 small metal piece; small
fiberglass piece marked with p/n 65B16805-004 42;
horizontal stabilizer w plcd w/horz stab 40 39 32.44 -72 35

47.62 1.5'(1" fiberglass 1"(2' metal (assy M3255 p/n
65B16805-04) 8/26/96-20 40 39 23.59 -72 35 45.51 luggage/
personal items (glasses, belt, pants) in white plastic bag 40
39 33.45 -72 35 43.89 magazine 8/26/96-15 40 39 33.40 -72
35 43.89 1) fiberglass piece; 2) picture; 3) burnt life
preserver CABIN HGR 8/26/96-9 40 39 37.20 -72 35 41.76
1) torn fiberglass with honeycomb; 2) faded kodak paper;
3) torn fiberglass with honeycomb, mild 8/26/96-8 40 39
31.50 -72 35 39.93 bent window shade; seat cover
8/26/96-29 40 38 57.83 -72 35 37.23 parachute & metal
cylinder 10/03/96-4
Z3791 40 39 30.32 -72 35 33.05 rib framing 6"(7' long arc,
STA 2080, lime green 40 39 31.71 -72 35 32.43 aluminum
structure, circular with 3 protusions 40 39 31.26 -72 35 32.36
metal structure with many wires, 15' long (2' wide, #'s
available STA 280, STA 2200 40 39 24.43 -72 35 31.60 life
jacket 10/17/96-2 40 39 21.92 -72 35 26.16 debris
10/07/96-1 40 39 21.97 -72 35 25.42 plastic with insulation
on opposite side 10/17/96-2 40 39 04.07 -72 32 23.90
various (7 bags and various piping) all in metal box
8/26/96-24 40 37 52.79 -72 30 06.79 black and white plastic
10/02/96-1 4L9)y0 4L9)AZ 4L9)k3 4P9)xr 4P9)!\$ 4P9)<Y
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LF22-01 40 39 04.70 -72 38 26.80 Skin panel section 42, FS
660-680, stringer 41L-47L 8/08/96-31 40 39 04.70 -72 38
26.80 FS 520-560 stringer 27R-35R cargo bin #7430
8/08/96-31 40 39 04.70 -72 38 26.80 Wheel well frame,
torque box ^ nose wheel FS 340 LH Side 8/08/96-31 40 39
01 60 -72 38 26.80 General aircraft debris 8/08/96-31 40 39
01 60 -72 38 26.80 General aircraft debris 8/08/96-31 40 39
01 60 -72 38 26.80 Personal effects 8/08/96-31 40 39 01 60
-72 38 26.80 Personal effects 8/08/96-31 40 39 04.10 -72 38
26.30 Carpet 8/08/96-37 40 39 04.10 -72 38 26.30 1 suit
case, small bag 8/08/96-37 40 38 20 00 -72 38 26.30 Metal &
Plastic interior piece #147107B 1, 147 1114 26; galley piece?
40 38 27 70 -72 38 26.20 Metal piece with electronics
8/24/96-8 40 39 00 40 -72 38 26.10 Bone, possibly human
40 38 21 45 -72 38 26.09 Alum angle w/wires 1.5,x3%
(#65B52112-76) 8/08/96-31 40 38 21 82 -72 38 25.96 FS
940-1000; stringer 9R-15R 8/06/96-46 40 39 18.23 -72 38
25.62 Vent 5% \times 6% diameter 40 39 04.75 -72 38 25.51
Window frame, cushion, honeycomb insulation; shorts
8/14/96-11 40 39 00.30 -72 38 25.50 Plastic box w/handle
8/26/96-31 40 39 05.50 -72 38 25.40 Luggage tag
8/26/96-31 40 39 00.00 -72 38 25.40 Misc pieces 8/19/96-10
40 39 06.41 -72 38 25.26 passport 8/08/96-31 40 38 40.92 -72
38 25.24 FS 800-860, RBL 33 to RBL 53.5, portion of life raft
beam 8/04/96-66 40 38 26.67 -72 38 25.04 1) 3 oxygen
masks 2) metal shard 1 foot long 3) 2 small pieces of
framing 8/19/96-23 40 39 06.00 -72 38 25.00 Plastic pc.

Approx 4%, gray 8/26/96-31 40 38 22.81 -72 38 24.99
Interior metal sheet with rivets & strut 65B01741; rib and
stringer 40 38 31.64 -72 38 24.90 Assy part 65B54209-5, 2,x5
, green alum folded w/holes 8/08/96-31 40 38 23.70 -72 38
24.90 Alum angle 6% \times 1% \times 1% (assy #65B09314-950)
7-8-70 R373 8/10/96-9 40 39 04.90 -72 38 24.80 Personal
luggage. 8/07/96-15 40 39 04.90 -72 38 24.80 Personal
luggage/makeup case 8/08/96-31 40 39 04.90 -72 38 24.80
Small pieces from deck sweepings 8/08/96-31 40 39 04.90
-72 38 24.80 FWD Pressure Bulkhead Portion FS180 40 39
04.90 -72 38 24.80 FWD Pressure Bulkhead Portion FS180
40 39 04.90 -72 38 24.80 Personal luggage 8/07/96-15 40 39
04.90 -72 38 24.80 FS 140-220; stringer 0-31A with window
belt 8/07/96-15 40 39 04.90 -72 38 24.80 Front end
passenger floor & radome bulkhead FS 140-180 8/07/96-15
40 39 04.90 -72 38 24.80 Left side upper fuselage, FS
380-520, stringer 18L-19R 8/07/96-15 40 39 04.90 -72 38
24.80 Part of LF19A; saw cut separated part into two pieces
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01 60 -72 38 26 B304` } 8/08/96-31 40 39 01 60 al effects
8/08/96-31 40 39 0 8/08/96-31 40 39 04.10 -72 38 26.3 40 39
04 -72 38 26.30 Metal & P(piece #147107B 1, 14 Microsoft
Word Document MSWordDoc Word.Document.6 Normal
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MSWordDoc Word.Document.8

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **And so it goes...**

Wednesday, May 8, 2002

More delays likely in Air India trial
By DENE MOORE-- Canadian Press

VANCOUVER (CP) -- The trial of three men accused in the bombing of Air India Flight 182 will likely be delayed again as a new lawyer for one of the accused gets up to speed on the case. David Gibbons appeared in court representing Inderjit Singh Reyat for the first time during pre-trial motions in B.C. Supreme Court on Wednesday.

Details of the court proceedings are under a publication ban, but Gibbons confirmed outside court that he will be the lead lawyer for Reyat's defence team.

Gibbons defended Reyat at his 1991 trial for the manslaughter of two Japanese baggage handlers killed by a bomb at the Narita airport. He said pre-trial motions in the latest case will likely continue into March.

"We'd be ready to start the trial soon after that," Gibbons said. The trial was set to begin in November and the Crown will continue to prepare for that date, Crown spokesman Geoff Gaul said after the brief court appearance.

"Right now there's a trial date that's set," he said. "If there's an adjournment of the trial, that will be a decision that the judge makes."

Eight of the 10 lawyers on Reyat's defence team resigned last week.

Gibbons wouldn't comment on the resignations or a media report that two of Reyat's adult children are employed by taxpayer-

funded defence lawyers as an office clerk and a receptionist. He said he would not be employing any members of Reyat's family.

Gibbons said David Martin is still a member of the defence team and they are looking for more lawyers to join them.

"Good counsel are busy and they can't just drop their other commitments to begin right away," Gibbons said.

B.C. Attorney General Geoff Plant said the allegations about defence funding will be investigated but he wouldn't comment on reports that public money was paid to Reyat's children.

"The public has an interest in ensuring that its expenditure, or the expenditure made on its behalf in relation to the Air India case, is money properly spent," he said.

"And my job as attorney general is to do what I can within the limits of my ability to protect the public interest in that regard." But there is a publication ban in the case that limits what he can say, Plant said.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: **Maybe again?**

Accident description - Status: Preliminary

Date: 25 MAY 2002

Time: 15.30

Type: Boeing 747-209B

Operator: China Airlines

Registration: B-18255

C/n: 21843 / 386

Year built: 1979

Engines: 4 Pratt & Whitney Canada JT9D-7AW

Crew: 19 fatalities / 19 on board

Passengers: 206 fatalities / 206 on board

Total: 225 fatalities / 225 on board

Location: 20mls NE off Penghu ([Taiwan](#))

Phase: Climb

Nature: Scheduled Passenger

Departure airport: Taipei-Chiang Kai Shek Airport (TPE)

Destination airport: Hong Kong-Chek Lap Kok

International Airport (HKG)

Flightnumber: 611**Remarks:**

Flight 611 departed Taipei at 14.50, ten minutes late for a flight to Hong Kong which would take an estimated time of 1 hour and 38 minutes. The plane was flying at 35,000 feet just before it disappeared off radar screens, some 40 minutes after takeoff.

Source: (also check out [sources](#) used for every accident)

BBC

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: Bill.Tucker@tsb.gc.ca, ksmart@aaib.gov.uk

Subject: **China Airlines 611**

W.T. (Bill) Tucker

Director General,

Investigation Operations

Transportation Safety Board

Canada

Ken Smart

Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Bill Tucker and Mr. Ken Smart, 25 May 2002

It probably happened again. Based upon what is released to the public, the pattern is the same as TWA 800, Air India Flight 182, and Pan Am Flight 103 and of course, United Airlines Flight 811.

The chart below will be filled in slowly with 'yes' for most of the pattern for China Airlines Flight 611. It already fits eight categories. The CVR with the sudden loud sound followed by an abrupt power cut will be the clincher at this stage.

Gentlemen, please, please, reconsider continuing/reopening your respective investigations with aircraft accidents within your jurisdiction, Air India Flight 182 and Pan Am Flight 103. Now is the time to announce reexamination based upon subsequent similar events of United Airlines Flight 811 and now China Airlines Flight 611 with the view of the probable cause being the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. Several weeks ago I said there was urgency. I was right.

Mr. Tucker, please don't retire until you have seen the photographs of the cargo door area of Air India Flight 182 to see if it matches Pan Am Flight 103 and United Airlines Flight 811. Please don't retire until the CVR and FDR are recovered for China Airlines Flight 611 to see if the sudden loud sound is there as it is on all of them. Fate has timed this accident before your

retirement/bailing out.

Mr. Smart, please reply to my email response to your email and to my Smith AAR for PA 103 sent to you. They warrant consideration and response since they are primarily factual, refute the bomb explanation, and support the wiring/cargo door cause. I am on your side even though we may disagree.

Waiting has been done while hoping the problem goes away; it didn't. And there are still 500 early model 747s in service exposed to catastrophic breakup by the aging wiring. Aging problems get worse with age, not better.

Could you have members of your staffs contact me for further information?

China Airlines Flight 611 may be a bomb and that will be the first choice of the nations involved. At this time, 24 hours after the event, the cause could be the usual, bomb, missile, or explosive decompression by hull rupture and all must be considered. Center fuel tank explosion may be tentatively ruled out because of lack of extensive fire.

The Taiwanese authorities grounded the other 747-200 in the China Airlines Fleet, a very prudent action. Sooner or later the Chinese will come upon the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for their crash.

China Airlines Flight 611 probably is another mechanical problem that will be difficult to prove except we have historical precedent to lead the way. Another 225 persons died to get the attention of authorities. It's very difficult to shut off the power to

an entire large airliner and have it come apart in flight allowing no time for a Mayday while giving a sudden loud sound on the CVR that is not matched to a bomb sound but is matched to an explosive decompression in an open cargo door event. It's only happened four times in the history of the model and soon to be five when the CVR is recovered for China Airlines Flight 611.

To ignore me and my AARs, to ignore United Airlines Flight 811, and to ignore China Airlines Flight 611 in relation to Air India Flight 182 and Pan Am Flight 103 is not right. To reexamine the causes of Air India Flight 182 and Pan Am Flight 103 is right and the sooner the better.

I am feeling the same way I did in July 1996 when Trans World Airlines Flight 800 came apart in the air and I knew the cause then and emailed the authorities. What is more important? Political red faces or passengers at risk for their lives? I know some would say politics is everything but I hope the aviation safety officials of two countries believe passenger safety is paramount.

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

	AI 182	PA103	UAL 811	TWA 800
CI 611				
Boeing 747	Yes	Yes	Yes	Yes
Yes				
Early model -100 or -200		Yes	Yes	Yes
Yes Yes				
Polyimide wiring (Poly X type)		Yes	Yes	Yes
Yes				
Sudden airframe breakup in flight (partial or total)			Yes	
Yes Yes Yes Yes				

Breakup occurs amidships	Yes	Yes	Yes
Yes			
High flight time (over 55,000 flight hours)		No	
Yes Yes Yes Yes			
Aged airframe (over 18 years of service)		No	Yes
Yes Yes Yes			
Previous maintenance problems with forward cargo door			
Yes Maybe Yes Maybe			
Initial event within an hour after takeoff	No	Yes	
Yes Yes Yes			
Initial event at about 300 knots			
while proceeding normally in all parameters		Yes	
Yes Yes Yes Yes			
Initial event has unusual radar contacts		Maybe	Yes
Yes Yes			
Initial event involves hull rupture in or near forward cargo door area			
Yes Yes Yes Yes			
Initial event starts with sudden sound		Yes	
Yes Yes Yes			
Initial event sound is loud	Yes	Yes	Yes
Yes			
Initial event sound is audible to humans		Yes	Yes
Yes Yes			
Initial event followed immediately by abrupt power cut to data recorders	Yes	Yes	Yes
Yes Yes			
Initial event sound matched to explosion of bomb sound			
No No No No			
Initial event sound matched to explosive decompression sound in wide body airliner	Yes	Yes	Yes
Yes Yes			
Torn off skin on fuselage above forward cargo door area			
Yes Yes Yes Yes			
Unusual paint smears on and above forward cargo door			
Maybe Maybe Yes Yes			
Evidence of explosion in forward cargo compartment		Yes	

Yes Yes Yes
 Foreign object damage to engine or cowling of engine number three
 Yes Yes Yes Yes
 Fire/soot in engine number three Maybe Yes
 Yes Yes
 Foreign object damage to engine or cowling of engine number four
 Yes Yes Yes Yes
 Right wing leading edge damaged in flight Yes
 Maybe Yes Maybe
 Vertical stabilizer damaged in flight Yes Yes
 Yes Maybe
 Right horizontal stabilizer damaged in flight Yes
 Yes Yes Yes
 More severe inflight damage on starboard side than port side
 Yes Yes Yes Yes
 Port side relatively undamaged by inflight debris Yes
 Yes Yes Yes
 Vertical fuselage tear lines just aft or forward of the forward cargo door
 Yes Yes Yes Yes
 Fracture/tear/rupture at a midspan latch of forward cargo door
 Maybe Yes Yes Yes
 Midspan latching status of forward cargo door reported as latched
 No No No No
 Airworthiness Directive 88-12-04 implemented (stronger lock sectors)
 No No No Yes
 Outwardly peeled skin on upper forward fuselage
 Yes Yes Yes Yes
 Rectangular shape of shattered area around forward cargo door
 Yes Yes Yes Yes
 Forward cargo door fractured in two longitudinally Yes
 Yes Yes Maybe
 Status of aft cargo door as intact and latched Yes
 Yes Yes Maybe
 Passengers suffered decompression type injuries Yes

Yes Yes Yes

At least nine missing and never recovered passenger bodies

Yes Yes Yes Yes

Wreckage debris field in two main areas,

forward and aft sections of aircraft

Yes Yes

No Yes

Initial official determination of probable cause as bomb explosion.

Yes Yes Yes Yes

Initial official determination modified from bomb explosion

Yes Yes Yes Yes

Structural failure considered for probable cause

Yes

Yes Yes Yes

Inadvertently opened forward cargo door considered for probable

cause Yes No Yes Yes

Official probable cause as bomb explosion

Yes Yes

No No

Official probable cause as 'improvised explosive device'

No Yes No No

Official probable cause as explosion by unstated cause

Yes No No No

Official probable cause as explosion in center fuel tank

with unknown ignition source

No No No

Yes

Official probable cause as improper latching of forward cargo door

No No Yes No

Official probable cause as switch /wiring

inadvertently opening forward cargo door

No No

Yes No

Significant Direct and Tangible Evidence Obtained for Four B747

Breakups in Flight

AI 182 PA103 UAL 811 TWA 800

Cheers,

Barry

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Below email sent 20 July 1996, three days after the event.

To: newyork@fbi.gov
From: barry@corazon.com
Subject: TWA Flight 800 Crash Theory Explained
Cc:
Bcc:
X-Attachments:

I have a reasonable explanation for the cause of crash of TWA flight 800. May I speak with someone involved with aircraft accident investigations? I have extensive aircraft experience and am a retired military officer. It's worth listening to.

The culprit was caught on radar. A radar blip fell with the aircraft, news

reports state. The cargo door opened inadvertently and explosive decompression leading to disintegration of wing storing fuel to fireball.

Extensive research on UAL Flight 811, Pan Am 103 and other accidents has

led me to this inescapable conclusion. I welcome contrary discussion.

Email at barry@corazon.com.

John Barry Smith email at barry@corazon.com

phone 4086593552

address 551 Country Club Drive

Carmel Valley Ca 93924

Below email sent November 1996

To: webmaster@ntsb.gov

From: barry@corazon.com

Subject: TWA 800 mechanical cause analysis, door versus fire

Cc:

Bcc:

X-Attachments:

Dear Webmaster/postmaser, please forward to Mr. Jim Hall,
Chairman.

Chairman Hall, please consider the following analysis...

Friday, 15 November, 1996

Crash of TWA 800: Analysis of two possible causes.

Not a bomb.

Not a missile, friendly or enemy.

Not a meteor/space debris.

Not pilot or other crew error.

Not environment/weather factors.

Not air traffic control.

Not other aircraft/midair.

What else is there?

Mechanical/equipment failure.

What failed?

What is the evidence?

Yes, aircraft was in climb.

Yes, visual streak observed at event.

Yes, primary radar return recorded just before event.

Yes, secondary radar return disappeared abruptly.

Yes, sudden loud sound heard on cockpit voice recorder, CVR.

Yes, abrupt power cut to flight data recorder, FDR.

Yes, fifteen never recovered bodies after extensive search.

Yes, nose separated from rest of aircraft.

Yes, one or more engines exhibited foreign object damage, FOD.

Yes, fireball observed.

Yes, center fuel tank exploded.

Yes, explosive damage on wreckage.

Yes, two main wreckage trails.

Yes, nose wreckage was closer to event than rest of aircraft wreckage.

Yes, breakup started at forward part of fuselage, over or just in front of wing.

Yes, aircraft was high time/high cycles Boeing 747-131.

Yes, 230 people died.

What initial mechanical/equipment failure caused the crash and still satisfies the evidence?

There are only two; center fuel tank explosion and inadvertent opening of the forward cargo door. Which is more likely? Let us examine them side by side.

Climb: Fuel tank contents were same as takeoff, climb should have no effect on explosion. Or: Climb is pressure changing mode of flight and might assist in popping cargo door.

Streak: Fuel streaming out of wing and somehow catching fire leading to explosion. Or: Shiny metal cargo door with white fuselage skin attached spinning away at orange dusk on clear summer night at 13700 feet.

Radar blip anomaly just before event: Tank fire doesn't fit. Or: Large metal cargo door with fuselage skin attached spinning away at 13700 feet close to ground radar site.

Secondary radar return disappeared abruptly. Center fuel tank exploded and cut off power to transponder. Or: Cargo door opened and with fuselage skin tore away and allowed 300 knot wind to enter gash on right side which tore off nose severing power to main equipment compartment housing transponder.

Sudden loud sound on CVR. Tank explodes and sound is recorded on cockpit voice recorder before power is severed. Or: Cargo door with fuselage skin tore away causing explosive decompression loud sound to be recorded on cockpit voice recorder before power is severed.

Abrupt power cut to flight data recorder. Center fuel tank exploded and cut off power to FDR. Cargo door with fuselage skin tore away and allowed 300 knot wind to enter gash on right side which tore off nose severing power to main equipment compartment housing FDR.

Fifteen never recovered bodies: Center tank explosion cremated passengers sitting in explosion area. Or: Cargo door and fuselage skin tore away exposing passengers who were ejected in decompression and sucked into number 3 jet engine and cremated.

Nose separated from rest of aircraft: Center tank explosion cuts fuselage in two just forward of the wing. Or: Cargo door with fuselage skin tore away and allowed 300 knot wind to enter gash on right side which tore off nose just forward of the wing.

One or more engines foreign object damage. Center tank explosion ejects debris into running engines. Or: Cargo door tore away exposing baggage compartment which explosive decompression ejects material into engines.

Center fuel tank exploded into fireball. Center tank explodes from unknown ignition source. Or: Cargo door with fuselage skin tore away and allowed 300 knot wind to enter gash on right side which tore off nose allowing rest of wing and fuselage to fall and disintegrate into mass of fuel vapor and spinning jet engines which exploded.

Explosive damage on wreckage. Center tank explodes. Or: Cargo door with fuselage skin tore away allowing explosive decompression to occur in passenger compartment and cargo hold which mimics explosion.

Two main wreckage trails. Center tank explodes, severs nose which falls into tight wreckage pattern and rest of aircraft disintegrates into a larger wreckage trail. Or: Cargo door with fuselage skin tore away and allowed 300 knot wind to enter gash on right side which tore off nose which fell into tight wreckage trail and rest of aircraft fell and disintegrated into larger wreckage trail.

Nose wreckage was closer to event than rest of aircraft wreckage. Center tank explodes, severs nose which falls into tight wreckage pattern and rest of aircraft disintegrates into a larger wreckage trail. Or: Cargo door with fuselage skin tore away and allowed 300 knot wind to enter gash on right side which tore off nose which fell into tight wreckage trail and rest of aircraft fell and disintegrated into larger wreckage trail.

Breakup started at forward part of fuselage, over on just in front of wing. Center tank near forward part of wing explodes. Or: Cargo door and fuselage skin tears away just forward of the wing.

Aircraft was high time/cycles Boeing 747-131.

Two hundred thirty people died.

So, two theories exist which explain much of the evidence. Here is why the cargo door theory is more credible than the center tank explosion theory.

Mechanical/equipment failure. Both are mechanical/equipment failure, Center tank has yet to be discovered essential ignition source which isn't supposed to be ignition source while cargo door is a complicated, previously known to fail and kill, mechanical system with four airworthiness directives against it. Cargo door more likely failure.

Streak at event. Metal door with metal skin spinning away could be reflected orange dusk light and appear as streak. Time of year, altitude, clear night, sun angle, and type of object all fit streak as spinning door. Tank fire with streaming fuel on fire is less likely.

Cargo door more likely streak.

Primary radar return before event. Metal door with metal skin spinning away could be primary radar return recorded on nearby ground radar. Center tank would not give return. Cargo door more likely radar return.

Secondary radar return disappeared abruptly. Center tank explosion and nose separating when nine foot by 15 foot gash appears allowing 300 knot wind to enter and tear off nose would both cause abrupt secondary radar return to disappear. Tie.

Sudden loud sound on CVR. Center tank explosion and cargo door would both give sudden loud sound on CVR. Tie until sound matched to fuel tank explosion or explosive decompression.

Abrupt power cut to FDR. Center tank explosion and cargo door causing nose separation would both cause abrupt to FDR. Tie.

Fifteen missing bodies. Center tank explosion and cargo door would both cause missing never to be recovered bodies. Tie.

Nose separated from rest of aircraft. Center tank explosion would cause nose to separate. Cargo door with fuselage skin tore away and allowed 300 knot wind to enter gash on right side which tore off nose just forward of the wing. Tie.

One or more engines foreign object damage. Center tank explosion and cargo door opening would both cause engines to be foddled. Tie.

Fireball. Center tank explosion and cargo door opening leading to fuselage disintegration would both cause fireball. Tie.

Center fuel tank exploded. Center tank explosion and cargo door would both cause center tank to explode. Tie.

Explosive damage on wreckage. Center tank explosion and cargo door opening would both cause explosive type damage on wreckage. Tie unless no fire explosive damage found on nose section.

Two main wreckage trails. Center tank explosion and cargo

door opening would both cause two main wreckage trails. Tie.

Nose wreckage was closer to event than rest of aircraft wreckage. Center tank explosion and cargo door would both cause nose wreckage to be closer to rest of aircraft wreckage. Tie.

Aircraft was high time/cycles Boeing 747-131. Center tank fire and cargo door more likely on aging aircraft. Tie.

Breakup started at forward part of fuselage, over on just in front of wing. Center tank explosion and cargo door opening would cause breakup at forward part of fuselage. Tie unless breakup is traced to above and forward of the wing on the right side, nearer to the cargo door.

Yes, 230 people died. Center tank explosion and cargo door could both cause the deaths of all passengers. Tie.

Many of the evidence explanations are ties, a few go to cargo door and none alone go to center tank fire. Cargo door theory is more likely.

Additional statements to support cargo door theory.

A structural breakup of a Boeing 747 which is disintegrating in flight can catch fire into a fireball as shown by the Saudi Arabian Airlines Boeing 747 involved in a midair over India. The initial event was not a center tank fire and yet there was fireball.

Eyewitness pilot saw the fireball of TWA 800 and stated altitude of fireball was 7500 feet, initial event for TWA 800 was at 13700 feet. Center tank fire was secondary event.

Foreign object damage can be cowling material or baggage or human material.

Explosive decompression produces loud sound and mimics a bomb for pressure damage on seats and baggage.

NTSB computer simulation traced inflight breakup of TWA 800 to above and forward of the wing on the right side, exactly where the hole is formed when the cargo door tears away with fuselage skin.

Cargo doors opening in flight are more common than inflight fuel tank explosions.

A cargo door accident exists, UAL 811, with much evidence which matches TWA 800. Two other Boeing 747 crashes exist with much evidence which matches TWA 800 and UAL 811, none of which was caused by a center tank fire.

Tank fire accident of Iranian Boeing 747 exists which does not match TWA 800 in wreckage pattern, left wing alone, or extreme weather and lightning.

A Boeing 737 tank fire on the ground does match a Boeing 747 in flight.

Cargo door theory includes center tank explosion. Additional statement to support center tank explosion. It happened, there was a center tank explosion.

Forward cargo door theory can be proved or disproved easily by examination, experiment and observation:

1. examine forward cargo door for steel rods to confirm AD 88-12-04 complied with on TWA 800.
2. examine cargo door for status of cam latches, unlocked or locked.
3. examine cargo door lock sectors, unlocked or locked.
4. examine cargo door lock sectors and cam sectors for wear and gouging.
5. examine cargo door manual locking bar for locking position.
6. examine all door electrical switches for proper operation.
7. check maintenance history of TWA 800 for previous cargo door problems.
8. note condition of cargo door, in how many pieces to match UAL 811.
9. note position of cargo door when found, close to event site or far away indicating time it left aircraft.
9. detect frayed wiring in door control system.
10. examine direction of buckled floor beams, up or down

indicating decompression or explosion.

11. match TWA 800 evidence with other similar crashes leaving similar evidence.

12. check for presence or non presence of evidence of fire/explosion on separated nose.

13. match sudden on loud sound on CVR to sound library of in flight aircraft explosions and decompressions.

14. match abrupt end of tape signals on FDR to two other abrupt end of tape Boeing 747 crashes.

15. confirm by computer simulation that 300 knot wind blowing into nine foot by 15 foot hole in right side of weakened nose will tear nose off in an second.

16. examine wreckage for more severe in flight debris damage on right side of aircraft to include wing fillet, leading edges of wing and horizontal stabilizer and vertical stabilizer, engine cowls and pylons.

A low cost experiment to reproduce the streak and radar anomaly is to take several two car garage doors painted silver and white and push them out the back of a C-130 going as fast as it can at 13700 feet on clear evening with same sun angle as July 17th near New York and look for streak and radar primary return. They will be there, two mysteries explained at reasonable cost.

Analogies:

1. A hole is cut in a balloon. A patch is put on the hole in balloon. The balloon is blown up and deflated 20000 times. The next inflation the balloon pops. The site of the popping is at the patch. The patch has failed before. The patch is a likely cause of the balloon popping.

2. A soda can has a semi cut hole in the top to drink out of. The can is the pressurized hull and quite strong. The semi cut hole can not be opened by pressing on it with fingers. But once the semi cut hole/door seal is broken by pressing on the hole with the metal tab using leverage, the soda fluid/debris escapes in the

explosive decompression and flies into face/engines. Now the semi cut hole can easily be pressed down further with little force from finger because the structural integrity of the soda can/hull has been cracked.

Now is the time to investigate another reasonable mechanical cause theory, with evidence, the real possibility of inadvertent opening cargo door in flight. This event leads to a large gash in nose the size of double car garage door allowing twice hurricane force winds to enter and tear off weakened nose in a second leaving evidence of visual streak, radar blips, FOD, sudden loud sound on tape, abrupt power cut to FDR, same missing bodies in general same seating, damage start location of forward cargo hold in front of the wing on the right side, wreckage trails, and it happened to TWA Flight 800, it happened before to UAL Flight 811, and it will happen again.

Disregard the demeanor of the discoverer/messenger, examine the message of cargo door, and exploit the medium of internet to email barry@corazon.com and study cargo door web site at www.corazon.com. Sincerely, John Barry Smith

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: Bill.Tucker@tsb.gc.ca, ksmart@aaib.gov.uk

Subject: **My email to Mr. Chou for China Airlines Flight 611**

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Ken Smart
Chief Inspector of Accidents,

Air Accident Investigations Branch

AAIB

DRA Farnborough

Hants GU14 6TD

United Kingdom

Dear Mr. Bill Tucker and Mr. Ken Smart, 29 May 2002

Below is email to Mr. Chou regarding China Airlines Flight 611. It looks more and more like the cause is the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. Note the ejected material caught by radar, as reported.

Cheers,

Barry

John Barry Smith

(831) 659 3552

541 Country Club Drive,

Carmel Valley, CA 93924

www.corazon.com

barry@corazon.com

Accident Investigation Division

K.F. Chou

Aviation Safety Council

16th Floor, 99 Fu-Hsing North Road, Taipei 105, Taiwan,

R.O.C.

Dear Mr. Chou, 29 May 2002

Allow me to introduce myself, sir, John Barry Smith,

independent aircraft accident investigator.

For my references, please contact Mr. Bill Tucker of the Transportation Safety Board of Canada and Mr. Ken Smart of the AAIB, UK. They know me and my shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for inflight breakups for early model Boeing 747s which explains China Airlines Flight 611, sadly enough.

Bill.Tucker@tsb.gc.ca

ksmart@aaib.gov.uk

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Mr. Chou, I have been working on the probable cause of early model Boeing 747s that suffer sudden inflight breakups for fourteen years as an independent accident investigator in California. The key finding is that the CVR has a sudden loud sound followed by an abrupt power cut at initial event time.

This is my prediction for China Airlines Flight 611 CVR also. The sound is the air rushing out of the ruptured open forward cargo door. The abrupt power cut is when the nose comes off. The model for China Airlines Flight 611 is United Airlines Flight 811.

The ejected material from China Airlines Flight 611 picked up by radar was probably from the right side forward of the wing in the cargo door area as the skin and baggage is expelled rapidly in an explosive decompression.

Supporting documents are at <http://www.corazon.com>. The match of evidence to United Airlines Flight 811 to China Airlines Flight 611 on <http://www.corazon.com/Smithtable.html%20>

Boeing 747

Early model -100 or -200

Polyimide wiring (Poly X type)

Sudden airframe breakup in flight (partial or total)

High flight time (over 55,000 flight hours)

Aged airframe (over 18 years of service)

Initial event within an hour after takeoff

Initial event at about 300 knots while proceeding normally in all parameters

Initial event has unusual radar contacts

Structural failure considered for probable cause

The other predictions of evidence as it is retrieved from the ocean for China Airlines Flight 611 are in my table: <http://www.corazon.com/Smithtable.html%20>

Mr. Chou, when my predictions come true as the investigation unfolds, please contact me for further information regarding my research, analysis and conclusions.

Significant Direct and Tangible Evidence Obtained for Four
B747 Breakups in Flight
Boeing 747
Early model -100 or -200

Polyimide wiring (Poly X type)

Sudden airframe breakup in flight (partial or total)

Breakup occurs amidships

High flight time (over 55,000 flight hours)

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Initial event within an hour after takeoff

Initial event at about 300 kts
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Initial event has unusual radar contacts

Initial event involves hull rupture in or near forward cargo door
area

Initial event starts with sudden sound

Initial event sound is loud

Initial event sound is audible to humans

Initial event followed immediately by abrupt power cut to data recorders

Initial event sound matched to explosive decompression sound in wide body airliner

Torn off skin on fuselage above forward cargo door area

Unusual paint smears on and above forward cargo door

Evidence of explosion in forward cargo compartment

Foreign object damage to engine or cowling of engine number three

Fire/soot in engine number three

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Rectangular shape of shattered area around forward cargo door

Forward cargo door fractured in two longitudinally

Status of aft cargo door as intact and latched

Passengers suffered decompression type injuries

At least nine missing and never recovered passenger bodies

Structural failure considered for probable cause

Inadvertently opened forward cargo door considered for probable cause

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

Regards,
Barry Smith

John Barry Smith
(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

Commercial pilot, instrument rated, former FAA Part 135 certificate holder.

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: **To Mr. Chou: China Airlines Flight 611 Black Box results**

Date: Wed, 29 May 2002 14:00:32 -0700
To: 611chiefchou <kfchou@asc.gov.tw>
From: John Barry Smith <barry@corazon.com>
Subject: China Airlines Flight 611 Black Box results
Cc:
Bcc:
X-Attachments:
Accident Investigation Division
K.F. Chou
Aviation Safety Council
16th Floor, 99 Fu-Hsing North Road, Taipei 105, Taiwan,
R.O.C.

Dear Mr. Chou, 29 May 2002

**'Black boxes' located along with large chunk of fuselage
(UPDATED AM 12:01)**

2002/5/30

The China Post staff with agencies

The "black boxes" of the crashed China Airlines Boeing 747-200 commercial jet have been located, Taiwan's top transport official confirmed yesterday.

"After searches throughout the morning, we are certain about the site of the black boxes," revealed Transportation and Communications Minister Lin Ling-san.

The plane's flight data and cockpit voice recorders are at longitude 119'40 east, and latitude 23'58 north in waters off the Penghu island, the location where the first of the victims' bodies was recovered, he said.

The printout will look like the below Chart 12 from NTSB public docket for Trans World Airlines Flight 800, a sudden loud sound followed by an abrupt power cut to the recorders.

It's the air rushing out of the ruptured open cargo door and the sudden power cut is when the adjacent main equipment compartment is severed in the explosive decompression. The sound will not be a bomb sound but will match a DC 10 cargo door event.

Below from Kirpal Commission report on Air India Flight 182:

Mr. Chou, please have your staff contact me for further details and well done on finding those boxes so soon, they are very important.

Cheers,
Barry Smith

John Barry Smith

(831) 659 3552
541 Country Club Drive,
Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: ksmart@aaib.gov.uk
Subject: To Mr. Chou: China Airlines Flight 611 Black Box results

To: 611chiefchou <kfchou@asc.gov.tw>
From: John Barry Smith <barry@corazon.com>
Subject: China Airlines Flight 611 Black Box results
Cc:
Bcc:
X-Attachments:
Accident Investigation Division
K.F. Chou
Aviation Safety Council
16th Floor, 99 Fu-Hsing North Road, Taipei 105, Taiwan,
R.O.C.

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Cheers,
Barry Smith

John Barry Smith
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Carmel Valley, CA 93924
www.corazon.com
barry@corazon.com

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: Stay and fight, Bill, you are needed and most important.

POSTED AT 7:17 PM EDT Wednesday, May 29

Canada nation of defeatists, Harper says

Canadian Press

Ottawa Ñ Alliance Leader Stephen Harper called Canada a nation of defeatists on Wednesday as he defended his remark that the woes of Atlantic Canada are linked to a pervasive "can't-do" attitude.

Mr. Harper said there is a "culture of defeat" not just in the eastern provinces, but on the Canadian prairies and among some Quebeckers.

"In parts of the prairies we're increasingly seeing similar views Ñ there is no hope, there is no way forward, and all we can do is kind of negotiate with the party in power," he said.

"I think any region where you have sustained underdevelopment or lack of growth for a long period of time, this starts to develop."

Mr. Harper then went one step further, calling defeatism a "general problem" among Canadians.

"Generally the kind of can't-do attitude is a problem in this country," he said.

"I think this whole country ... should be leapfrogging the United States and there's too many people in this country think that we can't do it.

"This should be the wealthiest country in the world, not a country with a living standard that's 25 per cent lower. So obviously the growth and the attitudes that go with that are different in some parts of the country than others, but it's a general problem."

Mr. Harper said he comes from an "eighth-generation Canadian family that's left the Maritimes because there's no growth."

He argued Tuesday in a newspaper interview that his party's biggest stumbling block to a breakthrough in Atlantic Canada was the "can't-do attitude," fostered by years of federal transfer payments and industry handouts.

Rather than toning down his argument Wednesday by expanding it, Mr. Harper appeared to ratchet up the rhetoric, saying Atlantic politicians outraged by his remarks don't understand their own constituents.

"Frankly, they're out of touch with their own people if they don't think that there isn't a lot more that could be done to get people more optimistic in that part of the country," he said.

"Atlantic Canada can be as wealthy as any other region but that needs to be pursued aggressively and we don't sit around waiting for favours from government"

He said the Alliance would put an end to federal handouts, and that Ñ combined with low taxation and less regulation Ñ would help "have-not" regions flourish.

Other federal leaders also jumped on the remarks Wednesday, saying Mr. Harper was being irresponsible by perpetuating stereotypes.

"You know, the more things change, the more they stay the same with the Alliance party," said NDP Leader Alexa McDonough.

"This is the real Stephen Mr. Harper, who wanted to put up firewalls around Alberta to keep those nasty eastern Canadians out because we're ne'er-do-wells and we're lazy bums.... They've just got it dead wrong.

Tory Leader Joe Clark said the comments were uncalled for.

"It's just an irresponsible thing for a national political leader to say," he said.

"Atlantic Canadians are not defeatist and certainly the people of Saskatchewan are not. Mr. Harper, all of us, should be very careful not to apply false caricatures to people or parts of the country."

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: 182pix/sweet retirement

Hi Barry,

You are getting way ahead of me again with e-mail msgs. I have several replies to write to you, especially about the AI 182 photos.

Bill,

All right! That's great. They are as important as the photos of the forward cargo door area of China Airlines Flight 611.

I hope I can do so today or tomorrow.

Good Luck, please have success.

This one is easy.

As a public servant, referring to comments by a politician, my reaction is "No comment".

Understand fully, Bill. I think he was making the 'can't do' comments to provoke discussion. I have found that the Canadian aviation authorities, at least from 1986, have been 'can do' and have not been pressured by political pressures. They have been

prudent, factual, and matter of fact.

As for my pending retirement, I don't think there is anything that could dissuade me. I am really looking forward to having a better balance to my life - and especially, more time with my wife (who is also going to retire in late June).

All I can say, Bill, is that retirement is the sweetest thing that happened to me. I was finally able to become myself, whatever that is, because I could pursue my interests without interruption or distractions. For intelligent men with curiosity, retirement is a blessing that coupled with income and health, is the pinnacle of human endeavor. I am sure you and your wife will relish every moment.

Standing by for pix, if coming.

Sincerely,
Barry

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: I do consider all alternatives, I ask others do also.

Dear Barry,

Based on what little I know about the China Airlines 611 accident, I would say: "You may well be right". Of course, to be complete one should also add that "You may be wrong".

Dear Bill, 30 May 02

Right.

I am quite sure that you would agree with both of those statements; however, those who don't know you may not realize that.

It may seem to them that you have a focus only on cargo doors.

I consider all and ask others to consider all. I stick with cargo door because it keeps on showing true such as ejected radar reflections of China Airlines Flight 611 which is probably the cargo door and skin ripping loose. There have been several Boeing 747 hull losses since Trans World Airlines Flight 800 and several other airliners, but China Airlines Flight 611 is the only one I'm saying is the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

A wise old investigator taught me, almost 20 years ago, that there is a good reason why accident investigators have two eyes and two ears, but only one mouth.

I agree it's too soon for a definitive answer for China Airlines

Flight 611 and have and will consider all plausible alternatives such as meteor, bomb, missile, metal fatigue, mid-air, and clear air turbulence as well as shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation.

I had to rule out missile for Trans World Airlines Flight 800 long ago based on evidence. And bombs for Air India Flight 182 and Pan Am Flight 103.

I have not gotten the forum I deserve to openly discuss my explanation in the free market of ideas. It seems that I am either denigrated or the explanation ignored. United Airlines Flight 811 is never discussed, only the accidents which absolve the parties. I'm getting desperate. 225 more died in addition to the 270 in Trans World Airlines Flight 800 and all since I have been trying to get my explanation a fair hearing. I see the missile guys and bomb guys get TV time and interviews based on unsupported speculation while I offer facts, data, evidence and ignored. That blind spot has cost another 225 lives.

So, I have to go out on a limb. I have to gamble. I don't like it but...

The way I will do it is to predict what they will find as they investigate. I will be one step ahead because I know what they will find if in fact, that forward cargo door ruptured. The risk is losing my credibility if one of my predictions is wrong.

I was onto that design flaw of cargo door five years before Trans World Airlines Flight 800 and ten years before China Airlines Flight 611. Letters attached below to insurance companies and media from 1992 to 1996.

It does not get easier; vindication is not sweet, it is bitter.

Cheers,
Barry

Article in Flying magazine July 1992.
J. Mac McClellan Editor

'Door bomb?

John Barry Smith, of Carmel Valley, California, wrote with a provocative comment on the Pan Am 103 crash. Smith points out the similarities between the damage caused by the cargo door failure of United Flight 811 over the Pacific and that of Pan Am's 103 over Scotland. Both airplanes involved were Boeing 747s and both suffered massive structural damage to the lower forward fuselage. The United flight made it safely to Hawaii while Pan Am's 747 came down in pieces.

The cargo door from the United airplane was retrieved from very deep water, and examination of the door forced the NTSB to change its probable-cause finding for the accident. The Board had originally concluded that improper latching of the door before takeoff caused the failure; but the minimal damage found on the door now indicates that an

electrical malfunction probably caused electrically operated latches to open in flight.

Smith points out how the cargo door opening at 23,000 feet on the United flight ripped a large hole in the fuselage and sent baggage and other debris into the number-three engine. He notes that the Pan Am flight was at a higher altitude when it suffered massive structural failure and that baggage and debris were also found in the number-three engine. He believes the greater differential cabin pressure of the higher altitude could have been enough to cause loss of the airplane if the cargo door opened on the Pan Am flight.

It's an interesting theory. British and U.S. investigators are working with microscopic evidence of a bomb when in fact damage caused by the failure of the cargo door on the United flight proves door failure could have caused the Pan Am crash. Actual bomb evidence is small and we're told finding it was one of the most astute investigative feats ever. Investigators also tell us that the bomb evidence is incontrovertible. Could they be wrong? The NTSB was wrong about the United cargo door

failure until the actual door was recovered from the ocean floor.
The
bomb on board the Pan Am flight may have been the cargo door
latches,
not plastic explosive hidden in a portable radio. Politics drives
the
investigation to search for terrorists but aviation safety demands
a
totally open mind and the suspicion that the airplane could have
failed
without outside interference. Smith has no evidence that a cargo
door
failed on Pan Am 103-but he gives us something to think about.'

Mr. John Brennan, Esq.
US Aviation
199 Water Street,
New York, New York 10038

Dear Mr. Brennan,

16 August 1995

This is John Barry Smith from Carmel Valley, California. We
spoke on the phone today, 16 August 1995. Thank you again for
the conversation.

The essential point is that I think it was an inadvertent opening
of the cargo door which resulted in explosive decompression and
not a bomb leading to the crash of Pan Am 103. You believe
opposite.

In response to my statement that if there were a picture of the skin peeling back I would be persuaded that it was a bomb, you told me about a picture in Flight International. I immediately went down to the Monterey library which did not carry the magazine but, to my luck, the Naval Postgraduate School did, from 1962 to 1992. As a retired officer, I had access and reviewed the entire bound and unbound back issues. The enclosed copies are some of what I found.

The only visual reference I could find is this drawing. It is a drawing made by someone in a publishing group on assignment to read the report and make a picture. It has several inconsistencies and has very little credibility.

Mr. Brennan, will you consider an alternate cause for the crash of 103? A quality of an intelligent mind is the ability to hold two completely opposite trains of thought at the same time. One would be the bomb theory and the other the door.

The copilot of United Flight 811 reported, "A bomb went off," when the cargo door let loose. He was wrong but based upon what he felt and heard he could have been right. Only later did he change his mind.

Will you follow the hypothetical line that it was an inadvertent opening of the cargo door which resulted in explosive decompression?

Accident investigations must rule out certain possible causes as well as rule in the probable. May we assume that the cause of the explosive decompression was not a mid-air with some foreign object? Yes, because the object should have shown up on radar, and didn't. May we assume human error was not the cause such as a pilot induced sudden pitchup? Yes, because the flight recorder information would have revealed such deviation.

Can we rule out mechanical malfunction? No, although many types of malfunction can be ruled out such as aft bulkhead breaking and shearing of the vertical stab and rudder, or other

known 747 problems. If those mechanical malfunctions had occurred, the disintegration would have taken a few seconds longer and shown up on the flight recorder.

Is there a mechanical malfunction which could cause the sudden explosive decompression and explain the subsequent actions of the crash? Yes. A large hatch opening at high altitude would do it. The plane would pop like an inflated balloon. That possibility then needs to be conclusively ruled out if a different cause is to be believed.

In my opinion, the cargo door mechanical malfunction possibility has not been conclusively ruled out. It doesn't matter how much belief there is that it was something else, this possibility needs to be ruled out for the alternate bomb theory to be believed without doubt.

Mr. Brennan, please persuade me that it could not have been a cargo door.

I will always say it could have been a bomb. In my opinion, however, the scale of reasonable probability tips towards the mundane explanation of a mechanical event that happened before and happened afterward-inadvertent cargo door opening; as opposed to the tortuous, twisted, shadowy, flimsy explanation of Libyan agents, Maltese tailor shops, German bomb factories, botched British security, transferred luggage, traces of explosive on fragments, concealed warnings, and fake cassette recorders.

Let me get back to our conversation by telephone today. Thank you again for your time. I fully realize the possible futile effort of talking about a subject so close to you with a stranger on the telephone. You were gracious and patient. I recall your statement of it's not an economic thing but more important thing to find out the truth. I agree.

Of note in the Flight International article is the the investigating board declared, within a week, the cause of the crash to be a bomb found on traces on a metal pallet and no evidence of

structural failure. That was fine for a quick guess but carries little weight for an accident scene miles wide. In September of 1990, the accident report was released, (which I assume you have access to, where can I get one?,) but did not address the possibility of a cargo door opening, a very curious omission for such an obvious cause, a cause you immediately speculated upon, an aging aircraft with mechanical problems.

Let us examine the drawing and then the picture of the large piece of cockpit.

It doesn't make sense. Why is the cargo door closed? Logic says that when the bomb went off and the fuselage started to disintegrate the tear would have been at a point where the fuselage was already cut, the cargo door.

The size of the bomb hole is much larger than the report stated, 50cm.

The photo picture shows a straight line cut near the cockpit, exactly what the forward fuselage of Flight 811 looked like after it limped home from its 20000 feet, lower altitude, inadvertent door opening. That 747 was also an aging aircraft. The picture shows a line consistent with a shearing action of a door torn off, not an explosive disintegration of jagged edges.

To rule out the cargo door the accident board should have done the following:

1. Where did the door land? Was it near the frame of the door as it would be if it were a bomb and the whole front of the aircraft disintegrated together? Or was it far away indicating it separated first and drifted further away?

2. Was the door found with any of the latches still intact and clasping indicating it was a bomb? Or was the door found with all latches unlatched indicating the door was opened in flight?

3. Was the door compared with the door from Flight 811 which was conclusively proven to be an inadvertent door opening? Dissimilar markings would indicate a bomb. Similar markings

would indicate inadvertent door opening.

4. Was the tape from 103 compared to the tape of 811 during the critical second after the event? Dissimilar would indicate bomb; similar would indicate cargo door opening.

5. Explain debris in starboard engines and not port engines. Port engine FOD indicates bomb, starboard engines indicate door.

Did the board do these steps to rule out an obvious crash cause? If they didn't, they were negligent.

To rule in the bomb I ask;

1. Where is the picture of the peeled back skin in the reconstruction of the aircraft? The omission of the important picture is alarming. As Sherlock Holmes said, "The hound should have barked, but didn't."

2. Where are the pictures of the fragments on which traces of explosive were found? They may be too small to photograph or damaged during testing. Fragments imply very small pieces and traces imply very small amounts. To find a very small amount of something on a very small piece of something among millions of very small pieces of something spread out over many square miles in a few days is not probable, is not likely, and is not believable. I believe it also rained following the crash so that may have washed off any residue.

3. Where is conclusive evidence from the terrorists. Many terrorists want credit for their cause and have code numbers or leave notes. None for Flight 103 because there is none.

4. Explain how the sequence and coincidences and lapses and bad luck could have resulted in the bomb going off when and where it did and remain plausible to a reasonable person.

If the opening of such a small hole that the bomb caused could cause an explosive decompression, why was the possibility not considered of inadvertent opening of other hatches, such as the passenger doors which can be opened from inside?

I can explain why the bomb theory holds such weight but I get into controversial opinion which might be better discussed later. Let us stick to objective facts as much as possible.

Bomb scenario...Too confusing for me but many people can explain the path as well as disagree as to the exact route.

Door scenario...several documented accidental openings on ground, documented accidental opening at 20000 feet, accidental opening at 31000 feet. Boring, sad, and completely plausible.

Which sequence is more probable, more likely, more believable?

If the door can not be ruled out, then the conclusion must be that it could be the cause just as if the bomb can not be ruled out, it must be considered to be the cause.

If the door is the cause, then your company has just saved a billion dollars. I have never written a billion dollars before and in this case, it is a real number. The damage awards are from two to twenty million. If a conservative number is five million and the number is 200 passenger sue out of the 260 killed, then a billion dollars changes hands.

If not a bomb then a cargo door, still misconduct but not wilful and therefore limited to 75000\$.

Why is money important? It should act as an inducement for closed minds to consider other options, even if embarrassing or surprising. The cause of the crash should be reexamined. There are many historical precedents for catastrophes to be blamed on bombs and then later reassessed to be natural phenomena.

Changing a person's mind is the most difficult thing in the world to do. I'm open, sir, persuade me it was not a cargo door and it was a bomb. I will say it could have been a bomb. Will you say it could have been a cargo door inadvertently opening at high altitude causing explosive decompression of Flight 103?

Should you choose to reply by telephone, Mr. Brennan, I'm at 408 659 3552. By email, I'm at meadow@redshift.com. By snail

mail, I'm at 551 Country Club Drive, Carmel Valley, California, 93924. To help put an image for your reply I've enclosed a graphic of me. I'm a commercial pilot, instrument rated, formerly owned a FAR Part 135 charter company, Navy P2V aircrewman, RA5C navigator, squadron legal officer, and now a retired officer with wife and daughter.

Please continue our dialogue.

Sincerely,

John Barry Smith

Mr. John V. Brennan, Esq.
US Aviation Underwriters
One Seaport Plaza
199 Water Street,
New York, New York 10038

Dear Mr. Brennan,

6 September 1995

Well, sir, a polite brush off is better than no brush off. Thank you for reading my letter of 16 August and replying; it could have been ignored. I will followup on your lead of the picture of the bomb caused petalled hole in the side of Pan Am 103 which is said to appear in a later issue of Flight International. I shall drive to San Francisco from Carmel Valley to find a library with the back issues. A 50cm bomb hole is six inches; I hope it's a closeup.

While waiting for your reply I wrote a shorter letter to Mr.

Harold Clark reviewing the essential points supporting my belief that the inadvertent opening of the cargo door caused the explosive decompression of the airframe of the older Boeing 747 leading to its destruction.

Your letter does not rebut any of those suppositions. Nor does it answer my question of how I can get hold of the official accident board investigation report.

The question I have that should be answered in that report is where did the door land? Assuming a bomb, the door falls nearby with the rest of the nose. Assuming the door unlatched, opened up, was torn way, and then drifted down to land, that certain spot can be calculated. Start at 31000 feet, velocity 450 knots, factor in the wind, use a drift angle determined by the United Flight 811 door falling, and the area of probability can be approximated. If the door was found in that far location, then it must be assumed it came off and did not come down with the rest of the forward fuselage.

Easy problem with easy answer with big consequences.

I will seek the book you recommend, "Sky Gods: the Fall of Pan Am," by Robert Gandt. I will keep an open mind although it appears that the book will rule in a bomb, something that has been done, and done poorly, for the last six years.

I'm asking to rule out the accidental opening of a cargo door; something that has happened before, could have happened then, and happened after. This is not a weird request like saying it could have been a midair with a flying saucer, man, check out the autopsy photos. I'm the rational one here with a boring, ordinary, mechanical event. An old airplane gets worn, twisted and its door snaps open. Not very interesting unless you have a billion dollars on the line. And you do.

Much more interesting with shadowy spies with secret weapons concealed duping security, switching airplanes and whatever, the bomb theory just gets too strange for me. I'm very down to earth

when it comes to reality. I also know who killed John F. Kennedy...Lee Harvey Oswald.

The American people do not want to believe that a single twisted person with a gun could kill a beloved symbol or a few simple latches unsnapped and killed hundreds. They want to believe it was a conspiracy of dozens of shadowy secret agents in cahoots doing terrible things. They even tried to blame the Oklahoma bombing on Mideast terrorists until the real culprits showed up.

There is a way for me to stop writing to you....tell me it is in your best interest that the cause of the crash be a bomb. If your company is better off with a bomb cause than a cargo door, I'll go elsewhere. Your mind will not be changed.

If a cargo door, the US government loses 30% of two billion for taxes. They have already issued tax claims against the family members. It wants a bomb.

If a cargo door, the family members don't get their 10 million each from you, just a lousy \$75000 to assuage their grief. They want a bomb.

If a cargo door, Boeing has some questions to answer and may have to pay a lot money to somebody. They want a bomb.

Pan Am is dead and said, as it was dying, "It was a bomb but it wasn't my fault, it got on the plane because of faulty airport security, blame Heathrow, and the government knew about it and should have told me and should share the blame." Blah, blah, blah.

Now it comes down to paying the piper, the insurance company: you. The insurance company is to pay for other's screwups. Is that the way it works?

Mr. Brennan, let us be philosophical. You are the good guys. You correctly judged the risk to loss and assigned a correct premium to insure Pan AM. It was not wilful misconduct. Your company should not pay.

In one sense you are the victim of an enormous insurance fraud by well meaning institutions who are blind to boring truth because they believe it is in their best interest to believe the exciting lie of a bomb. And for hundreds of millions of dollars, in cold cash, I would have trouble believing otherwise myself.

I see your letterhead reads-Chairman of the Executive Committee. What does that mean? What does the Executive Committee do? When I called to find out the correct spelling of your name, the secretary said you were retired but still employed. What does that mean? Do you have a staff? a budget?

Did I detect a New York Irish accent in our conversation? I was born in England and emigrated at age two and a half. My parents have given me a bias against the Irish. I fight against that bias and try to be objective in matters of Ireland and the IRA, etc. (If the Boeing had been British Airways, the cause would have been an IRA bomb. Still wrong.)

Mr. Brennan, put yourself in my position for a few moments., You are a fifty one year old retired military officer who built model airplanes as a kid, then flew model airplanes as a teenager, then soled a real plane at eighteen. Went on to get commercial license and becomes a charter pilot. Went to war as a navigator on Navy carrier jet. Survived an ejection and crash which killed his pilot. And believes that the cause of a world famous crash is not the common belief. The common belief has nations fighting with each other. It has nations refusing to fly into other nations airports, has stopped commerce into another country, has caused barbaric bounties for the capture of foreign citizens. It has caused delayed compensation to grieving family members. It has glossed over a defective apparatus in an aircraft that we may fly in and crash. The common belief is wrong; it happens all the time. What would you do, Mr. Brennan if you believed as I do? Who should I talk to? Where should I write?

Back to objective. Can you assign a lowly staff member a

morning of work to work out the landing spot of the door if it were to come loose at 31000 feet over Lockerbie? I would do it if I had access to the accident reports of Flights 811 and 103. I don't have the data. You do.

Does the Flight 103 door look like the Flight 811 door? I don't have access to the pictures. You do.

Do the flight recorder sounds of Flight 811 match the sounds of Flight 103? I don't have access to the sound tapes. You do.

Please explain the starboard engines FOD. It should be the port engines if a bomb.

Where may I obtain copies of the accident reports of Flight 811 and Flight 103?

Sincerely,

John Barry Smith

email meadow@redshift.com

(408) 659-3552

551

Country Club Drive,

Carmel Valley, CA 93924

Mr. John V. Brennan, Esq.
US Aviation Underwriters
One Seaport Plaza
199 Water Street,
New York, New York 10038

Dear Mr. Brennan,

16 September 1995

Well, sir, I went to the local bookstore, (the Thunderbird, at the mouth of Carmel Valley, you may know it if you have visited the Monterey Peninsula,) and excitedly picked up the book you recommended about Pan Am by Robert Gandt. It has three pages about the crash. Two of the pages are about the cause being structural failure. One page is about a bomb. The rest of the book is tabloid heart-pulling pseudo-dramatic crap.

I shall have to add wild goose chase to polite brush off. But then, a wild goose chase is better than no goose chase.

As you also recommended, I went back to the library and found another visual representation in Flight International of the Pan Am Boeing 747 being blown apart by a bomb. It was the same non-official drawing I sent you; they just repeated it in another later issue. There was no picture.

If you have a picture, please send it. I would think that a company that is about to pay a billion or so dollars because of an event would have a picture of that event displayed prominently in the files with a note, "Here is the bomb! Read it and weep!"

(To quote from a report, "General Re's US Aviation subsidiary was the leader of a 15-member syndicate that carried 30% of the insurance on the plane involved in the 1988 Pan Am 103 crash, about which there has been considerable litigation that may still affect this unit.")

To have no picture in your files is curious. To have no picture at all, even in the British official files, is damning.

I sent a picture to you; it was the 747 lying on its side with a straight line cut on its starboard side, exactly as it would appear

if the cargo door ripped off in flight.

Why the resistance to accept a contrary theory until ruled out, Mr. Brennan?

Our difference in opinion is the cause of the crash; you bomb, me cargo door.

What do we have in common? We are men. We are aviation experienced. We are retired. We are over fifty. We speak English. We are Americans. We respect the truth. Our names are both John. (Check out my web page, <http://www.redshift.com/~coyote>, it includes a story of ejection and a link to my John Smith club.)

Since we are men we know that terrible crimes such as mass murder do exist so it could have been a bomb. Since we are aviation experienced we know that there are an infinite number of causes of crashes so it could have been a bomb or a cargo door. Since we are retired we don't have to kiss ass for money or approval, we can think for ourselves. Since we are over fifty we can look back and see that many events are misunderstood for years and some are never correctly explained. Since we speak English we can talk about all this stuff. Since we are Americans we know that many other cultures hate us for whatever reasons and could kill us with a bomb. We also know we Americans make things that don't often work the way they should and occasionally break, like space shuttles. Since we respect the truth we never give up trying to find out what happened about important events until 100% sure.

Mr. Brennan, are you 100% sure the cause of the crash was a bomb? If so, crush this letter up, hold it over the wastebasket and let it float down to destruction.

If not 100% sure, then read further. What else could it be if not a bomb?

Let's skip the bomb or door theory for now. Let's agree it was a sudden decompression and then go to what happened next. Do

you agree it was a sudden decompression? Is the analogy of a pricked fully inflated balloon satisfactory?

The prick came from inside. Do we agree so far? Then what happened?

How far can we agree before we disagree?

Tomorrow I'm going on a few days motorcycle trip around California. I want to see the high Sierra passes before the snows hit. Then down to the deserts, flat and fast and alone. It's good to get away and just think with no distractions and outside pressures.

Sincerely,

John Barry Smith

email meadow@redshift.com,

web page <http://www.redshift.com/~coyote/>

(408) 659-3552

551

Country Club Drive,

Carmel Valley, CA 93924

Mr. John Brennan, Esq.

US Aviation

199 Water Street,

New York, New York 10038

Dear Mr. Brennan,

Wednesday, 04

December, 1996

Mr. Brennan, John Barry Smith here. We spoke on the phone and exchanged a few letters last summer.

The cause of the crash of Pan Am 103, the inadvertent opening of the forward cargo door in flight, which we spoke about, has happened again, this time to TWA Flight 800.

As the insurer of both, I assume you have a responsibility to investigate a reasonable report of hazard to the things you insure.

I wish again to make a reasonable report of a hazard to the airplane you insure and which has crashed at least two of them, Pan Am 103, and TWA 800.

The reasonable mechanical cause is the inadvertent opening of the forward cargo door in flight.

Full documentation and support for the report of hazard is on web site, www.corazon.com The web site has ADs, NTSB reports, other government reports such as UK AAIB, and news reports.

I wish to thank you for steering me on to the path of documentation by referring me to the Flight International article on Pan Am 103 which was supposed to have a picture of the petalling of the fuselage skin from the bomb but actually had an artist's impression. Once started on documentation, I went to the NTSB and other governments and literature for information on the crashes. The research only made me more firmly believe in the cargo door theory.

By the way, if the proof of bomb on 103 was the same evidence as used for bomb on TWA 800 but later shown to be benign such as heart medicine or planted explosives for dog sniffing tests, why not PA 103 also be benign? It can be and the cause of the crash can be shown by evidence to be that forward cargo door. The weight of evidence for bomb on 103 is lessened by the discovery of innocent evidence on 800. The investigation of 103

should be reopened.

Regardless, the cargo door theory must be investigated for the current crash and for the fact that the hazard still exists and can cause another Boeing 747 crash.

I invite you to turn this over to your investigators by referring them to the web site or calling me at 408 659 3552.

Sincerely,

John Barry Smith

Mr. Harold Clark
Chief Executive Officer
US Aviation Insurance Group
1 Seaport Plaza,
199 Water Street,
New York, New York 10038

Dear Mr. Clark,

30 August

1995

I am John Barry Smith from Carmel Valley, California. The cause of the crash of Pan Am 103 was the inadvertent opening of the starboard cargo door resulting in explosive decompression to the airframe. The cause of the crash of Pan Am 103 was not a bomb.

Why is that important to you? Because that truth will mean that your company does not spend a billion dollars in claims because

the company you insured was not guilty of wilful misconduct by allowing a bomb through security checkpoints. The company you insured did its best to make sure the door was locked but, as documented, many inadvertent openings happened before and happened after December 21, 1988. Your judgment about risk to loss to insure the airline was correct.

For the past six years all interested parties have believed it was in their best interests to believe it was a bomb and spent their time ruling in a bomb and not ruling out the cargo door. Until now.

It is in your interest to try to rule out a cargo door, Mr. Clark. And sir, that can't be done. I've tried to in my hobby/interest of six years and the deeper I go, the more I am persuaded that it was the door. It could have been a bomb but the more reasonable, mundane, tragic cause is the cargo door.

I ask you, Mr. Clark, to use science and open mindedness to try to rule out the cause of the crash being the opening of the cargo door. Ruling in a bomb has been done, and done poorly, but still holds as the consensus opinion. It is a wrong opinion.

A letter to your employee, Mr. John Brennan, is enclosed. As a retired military officer I followed the chain of command. Time is getting short. He has not replied yet so I have come directly to you.

As a commercial licensed, instrument rated pilot I want the causes of crashes to be accurately appraised to prevent a reoccurrence. Truth hurts. We must realize our planes have defects but we are not totally hated with mysterious foreigners trying to bomb us. Let Boeing pay for their design errors which led to death of passengers and crew.

Important questions not answered yet to rule out door:

1. Where did the door land? Close to cockpit means bomb; far away means failure of door.
2. Was the door found with any of the latches still intact? Or

all latches unlatched?

3. Was the door compared with the door from United Flight 811 which was conclusively proven to be an inadvertent cargo door opening? Dissimilar markings would indicate a bomb. Similar markings would indicate inadvertent door opening.

4. Explain FOD in starboard engines and not port engines. Port engine FOD indicates bomb, in starboard engines indicates door.

I welcome discussion; please reply.

Sincerely,

John Barry Smith
Email meadow@redshift.com
551 Country Club Drive,
Carmel Valley CA 93924
408 6593552

Ronald Ferguson
Chairman, President, and CEO,
General Reinsurance
HQ: 695 E. Main St.,
PO Box 10351,
Stamford, CT 06904-2351

Dear Mr. Ferguson

12

October 1995

I'm at the top corresponding with you. Please consider this a billion dollar letter.

Your company should not pay the claims against you for the crash of Pan Am 103 because you are not fairly liable. The cause was not a bomb which was judged wilful misconduct but an inadvertent opening of a cargo door which is not wilful misconduct.

The accident board ruled in a bomb. They should have ruled out the door. If unable, the accident board investigation must be reopened. Current facts prove the door theory possible. Further investigation will prove it correct.

Current facts show foreign object damage (FOD) in the starboard engines, consistent with the cargo door opening. There was no FOD to the port engines, consistent with a bomb theory.

Documentation shows seven previous inadvertent cargo door openings on the ground in early boeing 747s with no damage. A few months after Flight 103, records show one door opening in flight, United Flight 811, with loss of life and heavily foddled starboard engines.

Further investigation will match similarities to the known door opening of Flight 811 to Flight 103 such as sounds on tape, markings on door, number of latches attached, and landing distance from cockpit.

Why you and your company, sir? Because only now is the piper due his payment and you are asked to pay for someone else's tune. You should not pay the billion dollars and should listen to clear reasons why not.

The tune of conspiracy of spy Libyans in Malta buying stuff and going to Germany and hiding bombs etc is not your tune. There is no conspiracy. A stupid boring thing happened. A door opened when it should not have. It's happened before and will happen again. You insured against that door opening and should pay the 75000\$ maximum. You should not pay the 20 million dollars per victim for a phantom bomb. When multiplied by 260 victims and divided by the other companies shares, you still will

pay out a billion of real dollars unnecessarily.

Here's how to avoid that injustice. Attempt to rule out the door opening. When unable, petition to reopen the accident board investigation. The new cause will be the faulty cargo door. Then ask the courts to moot the wilful misconduct decision. There will be no new trial against you because the victims will seek damages against Boeing, the true culprit.

How to reopen the accident investigation? Show it was a cargo door.

Will you go through the thinking with me?

A real event happens and consistent, reasonable events follow.

An imagined event occurs and inconsistent unreasonable events are proposed.

The real event is the cargo door and the imagined event is the bomb.

The imagined event is much more interesting and much more profitable for many people who believe it is in their best interest to believe it. So they do.

The real event is ordinary, boring, and deprives sad people a lot of money who therefore disbelieve it.

Will you agree with me that a 747 cargo door opening at 31000 feet would cause an explosive decompression such as a pricked balloon? We know from Flight 811 that the fuselage is torn apart when the door opens. Flight 811 was at 21000 feet and therefore the door opening had less explosive force which did not destroy the craft, but did tear a large piece of skin off, blew debris into number 3 and 4 engines, and allowed the solo door to float down a far distance away into the water where it was retrieved. In addition, the co-pilot of United Flight 811 said a bomb had gone off. Only upon landing was it discovered that the door had opened and torn off. (If that United 747 had not limped back to Honolulu but crashed into the ocean, there would have been two bomb thought US 747 crashes within three months with terrible

international repercussions.)

If the Pan Am 103 crash could have been the cargo door opening, a competent accident investigation would rule that cause out. That was not done. The board concentrated on ruling a cause in, a bomb.

In the real event of the door coming open and then off, the door would drift to a certain spot on the ground that can be calculated using the United Flight 811 data. Did the Pan Am 103 door land near that spot? That must be determined.

In the imagined bomb explosion, the door would land someplace else. Where? The landing location of the door must be determined.

I can't do that. I don't have access to the board investigation. I have asked your employees, Mr. John Brennan and Mr. Harold Clark of US Aviation Underwriters, for help, but so far, no joy. (Letters attached.)

The door needs to be examined in close detail to determine if it is similar or dissimilar to the United Flight 811 door. The real event of the door opening at altitude would leave similar scratches, snapped latches, twisted hinges, etc. If a bomb, the markings would be dissimilar.

The audio tape needs to be examined closely for similar sounds. A half a second is an eternity to an audio expert. The tape of Flight 811 and Flight 103 may be similar in the critical one half second after the door opened. Or they would be dissimilar if a bomb. If both flights of early 747's suffered inadvertent door openings, there would be a discernible pattern in the half million microseconds before the tape ended for Flight 103 when compared to Flight 811.

If the door theory is to be discounted, a reasonable explanation needs to be provided for the pounds of debris found in the engines on the cargo door side of the plane and no debris found in the engines on the bomb side of the fuselage.

The bomb theory is the flimsiest set of coincidences with improbable discoveries and is easily discarded when a strong, verifiable explanation is presented.

(Just one wildly impossible occurrence which is required for the bomb theory...Within two days of the crash, with twisted, shattered debris scattered over dozens of miles, fragments of a storage pallet were discovered which had traces of explosive on them. Something invisible, traces of explosive, was quickly found on something very small, fragments, in an area of millions of very small pieces, debris, in a very large area, pastures. Possible but improbable, just as are all the other bomb linking clues.)

A competent, non-political, unbiased aircraft accident investigation has to rule out probable causes. The Pan Am 103 investigation was inadequate and only ruled in a cause.

The early conjecture of the cause of the crash was structural failure on an airframe with over 70000 flight hours. That cause was not ruled out. It can't be because that was the cause.

(Other interesting coincidental facts about early 747s: They had the cargo door area worked on as part of a civilian retrofit for military purposes in event of war. That was an opportunity for defective workmanship. After the crash of 103, early 747s were recalled and more structural work was done on the cargo door area. This was an opportunity to fix door problems.)

To review:

1. You should pay for what you agreed to pay...75000\$. You should not pay for what you did not agree to pay...20 million per victim for wilful misconduct of your client.
2. Determine if there is reasonable belief that the cargo door opening could be a cause of the crash by calculating landing spot.
3. Request that investigation be reopened upon further evaluation of facts.

4. When confirmed that door could have and probably did cause the crash, ask the wilful misconduct judgment be set aside.

You will have potent opposition. Everybody except the insurance company loves the bomb theory, especially Boeing. The US government wants the half billion or so in taxes it will collect from the families after you pay them off. (It has already sent tax due notices to families how have yet to be paid off.) The families want the 20 million dollars instead of the 75000\$. The US government and Boeing will be concerned at the sales export drop at the decreased reputation of the 747. Everyone will be upset at the door explanation except you, who saves a billion dollars.

Conspiracy theories abound and are false. Lee Harvey Oswald killed President Kennedy, not a group of ex-CIA agents. A cargo door opened and caused the crash of a 747, not a group of Libyan secret agents working in several countries smuggling a bomb on board a plane. A jealous ex-husband slashed his wife to death, not a group of racist police who planted evidence to frame OJ Simpson.

You may think, who is presenting this idea of cargo door crash cause, which goes against the popular belief? The crash cause should stand on its merits but the messenger is always judged.

I may be a tramp pushing a shopping cart full of carefully selected items picked up from trash cans while talking on a broken cellular telephone to people on another planet. But, even a blind squirrel finds an acorn once in a while. The acorn is the cargo door.

But I am not the person described above although I did see someone just like that. Again, that homeless tramp is more interesting than the reality which is a retired military officer living in own home with wife and daughter.

Here I am. Call me anytime, Mr. Furguson. I have a phone, 408 659 3552, a snail mail address, 551 Country Club Drive, Carmel

Valley, CA, 93924, an email address, meadow@redshift.com, a web site, <http://www.redshift.com/~coyote/>, and an insurance company I have had for thirty years, USAA, account number 0071 03 10. Check me out.

Regarding the crash of Pan Am 103, I have been in a plane crash, ejected and lived to tell about it. The story is on my web page under FCLP. I am a commercial licensed pilot, instrument rated. I have flight time as enlisted crewmember, jet carrier navigator, civilian owner and pilot, and Boeing 747 passenger. On the legal side, I was a Navy squadron legal officer, not an Article 27b lawyer, but a Navy trained legal officer handling summary courts-martial and non-judicial punishments. I've had a few articles published in aviation newspapers, worked on a local newspaper, and finished a novel which can be read at my web page under Valiant Dust. I became an audiologist which examines sound very closely and assists the hard of hearing.

Do you disregard free advice but respect information you pay for? Then send me a dollar.

I can see clearly how a person's perceived best interests rule their beliefs. This individual delusional response applies to aircraft accident boards, corporations, and governments. Truth does not shape administrative reality.

The accident board, Boeing, and the US government all believe a bomb was smuggled on board Pan Am 103 because they believe it is in their best interests to believe in the bomb theory. It's just not true.

A jury in a courtroom ruled Pan Am showed wilful misconduct in allowing the bomb on board. Pan Am paid you premiums to pay off any claims against them. You must now pay a billion or so dollars to fulfill your contract.

But you don't have to, sir. Before payout, take that last gasp and check out the landing spot of the cargo door. Find out if the latches and markings on the door match the documented

defective cargo door of Flight 811. Clutch that last straw and demand to know why the starboard engines of Flight 103 were foddred and the port engines were not. Look under the final stone and examine that audio tape for a frequency pattern similar to Flight 811.

You have that right. You can examine the aircraft pieces for which you are about to pay a billion dollars. Give the case to your fraud squad. Tell them to look at the claim as bogus from claimants who stand to gain much from the flimsy bomb theory and little from the solid cargo door theory.

When the door theory is shown to be correct, your actuarial judgment in assessing premiums against risk will be vindicated. You did not gamble and lose a lot. You gambled and lost a little. General Reinsurance will have re-established the integrity of the insurance risk/premium/claim/payment/ model. It's worth the effort.

Sincerely,

John Barry Smith
551 Country Club Drive,
meadow@redshift.com
Carmel Valley CA 93924
(408) 659-3552

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Conscience/Comet/Wiring/Doors**

Ken Smart
Chief Inspector of Accidents,
Air Accidents Investigations Branch

AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom
Dear Mr. Smart, 3 June 2002

Conscience: It's what safety is all about: Doing the right thing although many would try to dissuade.

By your silence to my Smith AAR for Pan Am Flight 103 and your lack of response to my personal replies to your email regarding the photographs of the torn and twisted forward cargo door, I know you know that there is a very real possibility that the probable cause of the inflight breakup was not a bomb but the shorted wiring/forward cargo door rupture/explosive decompression explanation and that the finding of 'bomb' was probably based on the red herring of a rather large shotgun blast in the compartment after the tremendous explosion of the sudden decompression.

I know you know this because the evidence, the facts, and the data support those conclusions and have been presented to you. You have implied that vertical torn skin above a cargo door proves it opened in flight and indeed, the forward cargo door of Pan Am Flight 103 has those telltale vertical tears. The wreckage distribution shows that ruptured open door occurred at the initial event time which is the sudden loud sound which matches the United Airlines Flight 811 sudden loud sound. You may be stunned by the enormity of the discovery.

Above picture of Pan Am Flight 103 shattered forward cargo door with peeled back skin from aft midspan latch and vertical tear lines above door.

I also know you know the complex political implications of this more accurate mechanical probable cause becoming accepted by aviation professionals and the public. There must be strong pressure to maintain the reputations of the New Scotland Yard, the AAIB, the NTSB, the FBI, and the stature of at least three foreign governments, India, UK, and USA. Literally billions of dollars have and will change hands thereby shifting the fortunes of millions. Based on the non-conspiracy theory for Pan Am Flight 103, apologies may be made to a foreign government. The viability of the largest airliner manufacturer in the world may be in question.

I want you to know that I know of all these political implications and probably ignorant of many more such as promotions and assignments of those involved.

Yet, my purpose is clear: Aviation safety for crew and passengers is paramount and comes before financial or emotional considerations. I feel this way probably because I am a survivor of a sudden night fiery fatal jet airplane crash myself. I've been there. I'm trying to stop others from going there.

The one caught in the middle is you, sir, the Chief Inspector of the branch which investigates Air Accidents.

What to do?

Remain silent? Well, that silence of authorities over the years has apparently resulted in the recent deaths of 225 more passengers and crew in China Airlines Flight 611.

Speak up? What good would that do? What's the use? Why try?

And that's where conscience comes in. Just because the political

forces are aligned against safety and just because the will of the people you represent wants very badly for Pan Am Flight 103 to be a terrorist event and really, really don't want it to be mechanical, are those good enough reasons to ignore the evidence that shows a mechanical cause? Just because the cause to reopen the investigation based on subsequent similar accidents appears to be daunting, is that reason not to try?

Please don't turn a blind eye to the photographs of the shattered door; please don't use a deaf ear to the sudden loud sound on the CVR; and please look and listen to the purest and best evidence of what happened; the CVR and photographs.

Above: Chart 12 from NTSB showing four Boeing 747 sudden loud sounds on the CVR and the abrupt power cut. The sound for Air India Flight 182 has been matched to a DC-10 explosive decompression cargo door event.

Several men are accused or convicted of causing a Boeing 747 to suddenly come apart inflight within an hour of takeoff and yet the similar inflight breakup has happened again...in 1989, and again in 1996...and again in 2002. The serial killer called faulty Poly X wiring is striking again and again and again while others or symptoms such as a fuel tank explosion or shotgun discharge are blamed.

The evidence of similar matching evidence is overwhelming as shown by the SmithTable below with more matches coming for China Airlines Flight 611 as the wreckage is retrieved.

The political pressure and popular will to keep the situation status quo of terrorist bombing is overwhelming also.

I realize I am pleading my case. Not my personal cause because I have little to gain. Pleading as in a legal sense, not for myself but for others such as passengers and for things such as wiring and doors.

Wiring pleads innocent in the sense it was light, strong, good insulation, and designed for fifteen years. It apparently fulfilled its design requirements at the time. Only later did the problems appear: Quote from TWA 800 Public Docket 516A, Exhibit 9A Systems Group Chairman's Factual report of Investigation, Page 47, "A Boeing telefax of June 25, 1997, stated that: The Poly-X wire was used as general purpose wire on the RA164 (TWA 800) aircraft. Wire insulation known as Poly-X had three in-service problems:

- Abrasion of the insulation in bundles installed in high vibration areas.

(This problem was corrected by Boeing Service Bulletin No. 747-71-7105, Dated July 19, 1974)

- Random flaking of the topcoat.

- Insulation radial cracks in tight bend radii.

Radial cracking phenomenon of the Poly-X wire was mainly associated with mechanical stress. Bend radius is the largest contributor to mechanical stress in installed wire or cable.

Presence of moisture in conjunction with mechanical stress is also a contributor."

The Cargo Door pleads innocent in the sense that outward opening nonplug doors to baggage compartments have been the tradition for transportation vehicles for centuries. Stagecoaches, trains, buses, cars, and airplanes have always had baggage doors that opened outward; it's a tradition. The reason is to save internal space, of course. The advent of highly pressurized cabins

which mandated plug type doors were not enough to overcome the tradition of outward opening doors. Ten latches but only eight locking sectors were thought sufficient to overcome any unwanted unlocking signal.

Passengers plead innocent in the sense of wishing to spend the least amount of money to go where they want to go and if that means flying in a plane with cheap tickets with a dangerous door, then they will. The tickets are cheaper because more income can be derived from a larger cargo compartment than one which is taken up by a door that opens inward.

Manufacturers plead innocent in the sense they are in a competitive business that must make a profit to continue to make aircraft and the wiring and doors were deemed to be adequate at the time. Only decades later did the problems appear.

And that's why safety agencies exist; to identify these difficult to prove problems and urge repair. These are plane crashes, not bank robberies. Plane crashes are usually mechanical or pilot error; bank robberies are usually conspiracies.

Mr. Smart, what gives me the assumed right to lecture a senior government aviation safety official on his duty? What allows me to tell you things you already know? It's because I have the arrogance based on experience, the experience of actually being in one sudden night fiery fatal jet airplane crash and specifically talking to you about another sudden night fiery fatal jet airplane crash. I have the right to suggest what you should do because I have earned that right by surviving even though my pilot died during his ejection.

Please reconsider the probable cause of Pan Am Flight 103 to be

mechanical and not sabotage. It's never too late to correct an error of judgment by those who did not have the benefit of hindsight.

The Comet investigation is a good example of history repeating itself. Bombs were suspected for the inflight breakups and the planes grounded. After a while the political pressure exerted itself and the planes flew again only to come apart again with more deaths. Then an objective, comprehensive investigation was conducted and the true culprit of hull rupture by mechanical reason was discovered, metal fatigue in a corner of a squarish ADF window. Bomb cause was ruled out. The Boeing 707 surged into the lead of commercial aviation. Safety improvements were made with round smaller windows and stiffeners and belts installed to prevent the spread of a crack or hole. (The 20 inch 'bomb' hole in Pan Am Flight 103 port side would have stopped at a small manageable size and did.)

I've included the Comet AAR to show that my conclusions on Pan Am Flight 103 are based on solid research and to show that similarities among each Comet accident led to the answers. The Comet probable cause was determined by comparing the similar evidence in similar crashes. I did the same for the Boeing 747. The Comet comparisons were made by safety officials because of the short time (one year and four months) between inflight breakups while the Boeing 747 intervals for inflight breakups have been 1985 to 2002 or seventeen years.

Comments made almost fifty years ago about the Comets are relevant today for Boeing 747s: "Some considerable attention was paid in the Press last weekend to Sir Miles Thomas' statement that the possibility of sabotage in the case of the Elba accident "cannot be overlooked." This statement was natural

enough in the circumstances, since such a cause is always a possibility in any such disaster, and efforts must obviously be made to follow up likely clues.

But the weight of the investigation will, no doubt, continue to be directed towards what I believe to be more practical possible causes. Among these could be the explosion of a kerosene-air mixture, or of hydraulic fluid vapour, and the medical evidence may go a long way towards confirming the likelihood of one or other similar possibility.

Nevertheless, no one imagined it probable that signs of incipient structural failure would actually be found in the Comets under examination. B.O.A.C.'s maintenance and inspection is among the most thorough in the World, and if such signs were to be seen in any of the Comets in service it is likely that they would have been found during previous maintenance checks completed during the past few months.

But a full and careful inspection of all the Corporation's Comets was vital, both as a means of assuring the public and as an essential link in the series of checks which must be made towards a narrowing-down of the possible cause of the accident.

Finally, let us remember, that the Comet is far from being the first or only civil aircraft to have suffered serious trouble, the cause of which could not be immediately diagnosed, in the earlier stages of its service life.

There have been other similar cases of trouble with civil transports which have afterwards continued, during their long lives, to be popular and successful aircraft."

Mr. Smart, meet the new boss of 1988, 1989, 1996, and 2002, same as the old boss of 1954: Explosive decompression caused by pressurized hull rupture inflight; several aircraft destroyed;

errors of judgment by politicians to keep flying; and the Airbus surges into the lead of commercial aviation. China Airlines Flight 611 is the fifth controversial, strange, mysterious inflight breakup of a Boeing 747 and the people who buy airplanes are mindful of this.

Regarding China Airlines Flight 611: A recent news article reports: "Aviation experts have offered several theories on the cause of crash, including metal fatigue, an internal explosion, sudden loss of cabin pressure, a mid-air collision or a military accident. U.S. crash experts who investigated the mid-air explosion of a Trans World Airlines jumbo jet in 1996 are in Taiwan to try to determine why the China Airlines aircraft broke into four pieces at an altitude of 30,000 feet and plunged into the Taiwan Strait. "

History has repeated history.

What to do?

From my point of view, the choice is clear: Investigate fully and let the chips fall where they may. Let the politicians handle the red faces and the attorneys handle the money exchanges. Let the Air Accidents Investigation Branch investigate an air accident which now appears to possibly have been caused by a mechanical cause which has happened before December, 1988, happened in February, 1989, and is still happening again and again.

Based on the preliminary findings for China Airlines Flight 611 and the retrospective of United Airlines Flight 811, there is full justification to reopen/continue the investigation into a probable cause of a disintegration of an airliner which continues to fly thousands of passengers a day in hundreds of planes still in

service which crash cause is now open to question.

Hindsight is valuable and a luxury. To do nothing after United Airlines Flight 811 was wrong. To do nothing after Trans World Airlines Flight 800 was wrong. To do nothing after China Airlines Flight 611 is wrong. To not reconsider the probable cause for Pan Am Flight 103, even at this late date, is to betray the trust of the passengers and crew; to ignore the visual and aural evidence is to betray the aviation safety profession; and to pretend UAL 811 is irrelevant to PA 103 is to make a lie of your career.

Do you need more evidence presented to you, Mr. Smart? I have it and can assist your staff of investigators. There is much to check out in the wreckage at Farnborough. Motivated, informed citizens can have much to offer the experts. I am available at any time to answer any questions you may have. You have access to the answers in your files and in a hangar. I can direct you where to look. You can satisfy your curiosity and the skepticism of the senior government politicians within a few hours of examination of the wreckage which has been saved for exactly this purpose.

Do you need advice on how to proceed politically? I can't help you there and good luck facing the press and the politicians.

All I can do is to go to the authority that have the responsibility and present my evidence and conclusions. They are in my Smith AAR for Pan Am Flight 103 and sent to you earlier as well as other documentation. There is much more if required and is available upon request. There is no dearth of factual support for the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Pan Am Flight 103.

Please, Mr. Smart, let the weight of the investigation continue to be directed towards more practical possible causes. It may be a difficult decision but the right one when it comes to life and death.

Cheers,
Barry

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Significant Direct and Tangible Evidence Obtained for Four
B747 Breakups in Flight
AI 182 PA103 UAL 811 TWA 800 and counting for China
Airlines Flight 611
Boeing 747
Early model -100 or -200

Polyimide wiring (Poly X type)

Sudden airframe breakup in flight (partial or total)

Breakup occurs amidships

High flight time (over 55,000 flight hours)

Aged airframe (over 18 years of service)

Previous maintenance problems with forward cargo door

Initial event within an hour after takeoff

Initial event at about 300 kts
while proceeding normally in all parameters

Initial event has unusual radar contacts

Initial event involves hull rupture in or near forward cargo door
area

Initial event starts with sudden sound

Initial event sound is loud

Initial event sound is audible to humans

Initial event followed immediately by abrupt power cut to data
recorders

Initial event sound matched to explosion of bomb sound

Initial event sound matched to explosive decompression sound
in wide body airliner

Torn off skin on fuselage above forward cargo door area

Unusual paint smears on and above forward cargo door

Evidence of explosion in forward cargo compartment

Foreign object damage to engine or cowling of engine number
three

Fire/soot in engine number three

Foreign object damage to engine or cowling of engine number four

Right wing leading edge damaged in flight

Vertical stabilizer damaged in flight

Right horizontal stabilizer damaged in flight

More severe inflight damage on starboard side than port side

Port side relatively undamaged by inflight debris

Vertical fuselage tear lines just aft or forward of the forward cargo door

Fracture/tear/rupture at a midspan latch of forward cargo door

Midspan latching status of forward cargo door reported as latched

Airworthiness Directive 88-12-04 implemented (stronger lock sectors)

Outwardly peeled skin on upper forward fuselage

Rectangular shape of shattered area around forward cargo door

Forward cargo door fractured in two longitudinally

Status of aft cargo door as intact and latched

Passengers suffered decompression type injuries

At least nine missing and never recovered passenger bodies

Wreckage debris field in two main areas,

forward and aft sections of aircraft

Initial official determination of probable cause as bomb explosion.

Initial official determination modified from bomb explosion

Structural failure considered for probable cause

Inadvertently opened forward cargo door considered for probable cause

Official probable cause as bomb explosion

Official probable cause as 'improvised explosive device'

Official probable cause as explosion by unstated cause

Official probable cause as explosion in center fuel tank with unknown ignition source

Official probable cause as improper latching of forward cargo door

Official probable cause as switch /wiring inadvertently opening forward cargo door

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

AI 182 PA103 UAL 811 TWA 800 and counting for China Airlines Flight 611

THE CIVIL AVIATION ACT, 1949

THE CIVIL AVIATION (INVESTIGATION OF ACCIDENTS)

REGULATIONS 1951

Report of the Public Inquiry into the causes and circumstances of the accident which occurred on the 10th January, 1954, to the Comet aircraft G-ALYP

- * AIRCRAFT: Comet G-ALYP
- * ENGINES: Four de Havilland Ghost 50
- * REGISTERED OWNERS AND OPERATORS: British Overseas Airways Corporation
- * CREW:
 - * Captain A. Gibson - Killed
 - * First Officer W. J. Bury - Killed
 - * Engineer Officer F. C. Macdonald - Killed
 - * Radio Officer L. P. McMahon - Killed
 - * Steward F. L. Saunders - Killed
 - * Stewardess J. E. Clarke - Killed
- * PASSENGERS: 29- All Killed
- * PLACE OF ACCIDENT: Over the Mediterranean off Elba.
- * DATE AND TIME: 10th January, 1954, at about 1000 G.M.T.

All times in this Report are G.M.T.

PART I

INTRODUCTORY

(a) Definitions

1. In this Report the following expressions bear the following meanings:

- * " A.R.B." means the Air Registration Board incorporated as a company limited by guarantee under the Companies Act, 1929,

on the 26th February, 1937.

* " A.S.B." means the Air Safety Board appointed by the Minister of Transport and Civil Aviation.

* " de Havillands " means the de Havilland Aircraft Company Limited.

* " R.A.E." means the Royal Aircraft Establishment controlled by the Minister of Supply.

* " B.O.A.C." means British Overseas Airways Corporation.

(b) The Air Registration Board

2. The primary object of A.R.B. is to carry out such administrative and advisory functions with regard to the design, construction and maintenance of aircraft and matters connected therewith as may from time to time be delegated to A.R.B. by the Minister of Transport and Civil Aviation. Under its Articles of Association A.R.B. is to consist of two members appointed by the Minister and sixteen other members. Of these sixteen four must represent operators of aircraft, four must represent constructors of aircraft, four must represent insurers engaged in aircraft insurance business and the remaining four are co-opted. It is provided that of the two members to be nominated by the Minister one is to be an independent person and the other a person who has had not less than five years' professional experience as a pilot of civil aircraft. It is further provided that the co-opted members are to be persons representative of some interest connected with civil aviation.

3. By section 7 of the Civil Aviation Act, 1949, which reproduces section 2 of the Air Navigation Act, 1936, it is provided that the Minister may by order provide for delegating to a body appearing to him to be constituted as is A.R.B. under its Memorandum and Articles, such of the administrative functions

of the Minister with respect to the matters mentioned in the subsection as may be specified in the order and for entrusting to that body such advisory functions in connection with any of such matters as may be specified.

4. In pursuance of this section the Minister by the Civil Aviation (Air Registration Board) Order of 1951 (which replaces Orders made under the 1936 Act) delegated a number of his administrative functions to A.R.B. and entrusted to it certain advisory functions. Under section 1 of the Order the Minister delegated to A.R.B. the following functions (inter alia):_

- * (a) the formulation and publication of technical requirements as regards the design, construction and maintenance of aircraft and engines, components, accessories, instruments, equipment and apparatus of aircraft;
- * (b) the investigation of aircraft (including their engines, components, accessories, instruments, equipment and apparatus (excluding radio apparatus) and the manner of the installation of the same) for the purposes of the issue and renewal of certificates of airworthiness or of validations of such certificates and for the purposes of the variation of particulars and conditions specified in such certificates of any flight manual or performance schedule issued therewith;
- * (c) the making of recommendations to the Minister as to the issue of certificates of airworthiness and of validations of such certificates and as to the variation of particulars and conditions specified in such certificates or any flight manual or performance schedule issued therewith;
- * (d) the renewal of certificates of airworthiness and of validations of such certificates and to such extent as may be determined by the Minister in writing the variation of particulars and conditions specified in such certificates or any flight manual

or performance schedule issued therewith;

* (e) the making of any investigation required in connection with an application for a special permission for an aircraft to fly without a certificate of airworthiness being in force in respect thereof and the making of recommendations to the Minister as to the giving of such a special permission;

* (f) the approval of engines for aircraft;

* (g) the making of inspections of organisations of persons or firms desiring to furnish reports or certificates as to compliance by aircraft and engines, components, accessories, instruments, equipment and apparatus of aircraft with airworthiness requirements, the approval of any such firm or persons as qualified to furnish such reports or certificates, and the acceptance of such reports or certificates;

5. The chairman of A.R.B. is the Rt. Hon. Lord Brabazon of Tara. The members of the Council are identical with the members of the Board. The Council are advised by a technical staff of about 125 of whom about 84 are employed on inspectional duties. The Chief Executive Officer is Mr. R. E. Hardingham and the Chief Technical Officer of the Board is Mr. W Tye.

6. To enable A.R.B. to discharge its functions it prepares and from time to time publishes detailed requirements which inform manufacturers of the minimum conditions with which, prima facie, they have to conform if they are to obtain a Certificate of Airworthiness. To assist A.R.B. in the preparation of these requirements they have appointed an " Airworthiness Requirements Co-ordinating Committee" which includes representatives of the Ministry of Supply, R.A.E., manufacturers of aircraft, operators of aircraft and A.R.B. itself.

7. Requirements are not, however, treated by A. R. B. as being as immutable as the laws of the Medes and Persians. On the one hand, during the development of a new type, requirements more exacting than those prescribed in the published regulations are often imposed or adopted by the manufacturer concerned. On the other hand, on occasions certain deviations from the prescribed conditions are accepted by A.R.B. provided that they are satisfied that the safety of the aircraft is not thereby jeopardised.

(c) The Air Safety Board

8. A.S.B. is a purely advisory body and has no statutory authority behind it. It was appointed in November, 1946, with the following terms of reference: " To keep under continuous review the needs of safety in British civil aviation and to recommend measures calculated to promote safety in respect of both (a) the operation of British civil aircraft throughout the world, and (b) the efficiency of the system of ground facilities provided for civil aircraft of all nations operating over the United Kingdom." Its members are appointed by the Minister and at the material date consisted of Air Chief Marshal Sir Frederick Bowhill, Lord Brabazon, Sir Leonard Bairstow Air Commodore Banks and Mr. (now Sir) Arnold Hall.

(d) The Royal Aircraft Establishment

9. R.A.E. is controlled by the Minister of Supply. The main establishment is at Farnborough but there are branch establishments in other parts of the country. In this Report I am mainly concerned with the work done at Farnborough. The Director of R.A.E. is Sir Arnold Hall. The Head of the Structures Department is Dr. P. B. Walker. The only other member of the staff who need be mentioned by name is Mr. E L. Ripley who

was responsible for the work in connection with the reconstruction and investigation of the wreckage recovered after the accident. I should, however, add that R.A.E. has its own flight testing facilities which were fully used in the investigations which took place after the accident.

(e) The de Havilland Aircraft Company Limited

10. de Havillands were the manufacturers of the Comet aircraft and the engines were made by a subsidiary company, the de Havilland Engine Company Limited. Mr. R. E. Bishop is the Chief Designer of de Havillands and his Chief Assistant is Mr. C. Wilkins. Mr. R. H. T. Harper is the Chief Structural Engineer and Mr. H. Povey is the Director in charge of Production. de Havillands have an Inspection Department entirely separate from their Production Department and the independence of the Inspection Department is secured by the provision that it reports direct to the Managing Director and is not in any way under the control of the Production Department. de Havillands have been approved under paragraph 1(g) of the Civil Aviation (Air Registration Board) Order of 1951 as qualified to furnish reports and certificates as to compliance with airworthiness requirements.

PART II

HISTORY OF THE COMET PROJECT

11. Mr. Bishop stated that at the end of the war de Havillands were faced with the problem of recommencing the manufacture of civil aircraft. During the war they had been building only military aircraft. They decided that it would be inadvisable merely to build another version of the conventional aircraft; they had had some years' experience with jet fighters and concluded that with the help of their engine company they should be able to

produce a useful civil aircraft which would be a step ahead of the current type. With this end in view they commenced design by the end of September, 1946. Some idea, however, of the amount of work involved is indicated by the fact that it was not until the 27th July 1949, that the first prototype Comet made its first flight. de Havillands were, however, fortunate that B.O.A.C. and the Minister of Supply were willing to enter into a contract for the purchase of Comet aircraft without waiting for the prototype to be available. This enabled de Havillands at once to do preliminary work in the Production Department. The contract was entered into on the 21st January, 1947 and under it B.O.A.C. started their proving, flights in April, 1951.

12. At some date in 1951 it was arranged that the first two prototypes should be delivered to the Ministry of Supply but that the remaining aircraft to be supplied under the contract should be delivered to B.O.A.C. and that the approval of the Ministry of Supply to them should no longer be required.

13. A.R.B. issued a number of special category certificates of airworthiness to enable the requisite tests, both in this country and overseas, to be carried out, but it was not until early in 1952 that a full Certificate of Airworthiness was issued. This enabled the passenger service to be started and it was actually commenced on the 2nd May, 1952. The personnel for the service had received intensive training. B.O.A.C. had established a school for the training of pilots and crews and made full use of a special school which had been established by de Havillands for the training not only of pilots and crews, but also of station engineers. By the 8th April, 1954, when the Comet fleet of B.O.A.C. was grounded after the disaster near Naples, Comet aircraft had flown almost 25,000 hours, representing, on the basis of 400 miles per hour, a mileage of 10,000,000 miles.

14. Dealing more specifically with the technical aspect of the development of the project between September, 1946, and the 2nd May 1952, de Havillands' outlook and practice underwent virtually no change. In order to provide an economically satisfactory payload and range at the high cruising speed which the turbo-jet engines offered, it was essential that the cruising height should be upwards of 35,000 ft. double that of the then current airliners and that the weight of the structure and equipment should be as low as possible.

15. Throughout the design they relied upon well established methods, essentially the same as those in general use by aircraft designers. But they were going, outside the range of previous experience and they decided to make thorough tests of every part of the cabin structure. They had not only to prove to their own satisfaction that their design was basically sound, but also to investigate the effect, on the large variety of materials involved, of the extreme conditions which would be met. They gave special attention to the structural integrity of the pressure cabin. The difference -- This difference is sometimes referred to hereafter as ' P ' -- between the internal and external pressure (8.25 lb./sq. in) was about 50 per cent. greater than that in general use and there was in addition a larger difference between the internal and external temperatures.

16. Their policy of testing in the laboratory was not a novel one, nor indeed were they alone in their belief in it. They recognised, however, that testing alone is not sufficient. Every test is to some extent a compromise, since the conditions to be met in service can seldom be represented completely in the laboratory and in many cases are not accurately known. The result must therefore, be reviewed in the light of calculations based on fundamental

knowledge, and on general experience and practice.

17. For the design of the basic structure of the cabin they adopted a multiple of the Working pressure difference, P , in excess of current requirements in any country. The British Civil Airworthiness Requirements (B.C.A.R.) called for a "proof" pressure of $1.33 P$ (under which the cabin must show no signs of permanent deformation), together with a "design" pressure of $2 P$ (at which the material may reach its ultimate strength). These requirements were the same as those of the International Civil Aviation Organisation (I.C.A.O.) and also those of this country for military transport aircraft. de Havillands used a design pressure of $2.5 P$ and tested the cabin to $2 P$. Two test sections of the cabin were built. The front part, 26 ft. in length, extended from the nose nearly to the front spar of the wing, and included typical windows, hatches and door. The centre part, 24 ft. in length, extended from a few feet in front of the front spar to a few feet aft of the rear spar, covering the large cut-out containing the wine structure .

18. Their reasons for adopting these substantially higher figures were two. They believed, and this belief was shared by A.R.B. and other expert opinion, that a cabin which would survive undamaged a test to double its working pressure, $2 P$, should not fail in service under the action of fatigues -- There is attached hereto as Appendix IV a note on the subject of fatigue in metals and its bearing on the design of engineering structures which has been prepared for my assistance by my Assessors. -- due to the pressurisation to working pressure, P , on each flight, and to other fluctuating loads to which it is subjected in operations.

Secondly, they considered that it would ensure a larger margin of safety against the possible failure of windows, doors, and

hatches. These are contingencies which had been shown by experience to be a serious risk, for even if nothing worse happens, the resulting loss of pressure may be rapid.

19. So much importance did they attach to this latter consideration that they made many tests of window panes to very high pressures in addition, they applied pressures of between P and $2P$ some 30 times to the test section of the front part of the cabin together with a series of 2,000 pressurisations to rather over P . These tests were not intended as a test of the fatigue resisting properties of the structure, but rather as providing an assurance that the cabin would be satisfactory as a pressure vessel. But they undoubtedly contributed to de Havillands' confidence in the soundness of the cabin.

20. Simultaneously With the design and testing of the pressure cabin, all other parts of the structure were receiving treatment based on the same outlook -- design to at least the current requirements, coupled with exhaustive tests. The wing is of special interest, since it is here that requirements specifically directed to resistance to fatigue first became important. During the period 1949 o 1951 there had been growing among all aircraft designers and users a realisation that the life of the essential structure of an aircraft is not unlimited. The effects of atmospheric turbulence had produced unexpected and relatively early failure of the wings of certain transport aircraft. Gusts are most severe near the ground and in the tropics. Methods had been devised, and have since been improved and extended, for determining their frequency and intensity. In the light of this knowledge, repeated loading tests -- In which the appropriate load is applied and removed many times, simulating the effects of gusts, or any other cause of variation of load -- of the wings of transport aircraft became accepted as necessary. Tests of the

Comet's wing were made in close co-operation with R.A.E.

21. Until about the middle of 1952 the likelihood that the fatigue resistance properties of a pressure cabin demanded further precautions, either in design or by test, than were provided by the current static strength requirements had not been realised. The matter first came to de Havillands' notice through Sir. Harper's association with the problem on Service (R.A.F.) transport aircraft, as a member of the Joint Airworthiness Committee (J.A.C.) of the Ministry of Supply. Draft Requirements (Paper 579, Oct., 1952) called for a static test to 2 P, a proof test to 1.33 P, together with repeated loading tests of 1.25 P applied 10,000 times.

22. At about the same time A.R.B. were reviewing the civil position. In due course they issued proposals in Paper No. 230 (19th June 1953) which called for the same static test to 2 P and proof test to 1.33 P but raised the number of applications of 1.25 P to 15,000. At the same time the paper suggested that certain structural parts such as riveted joints, door and window frames etc., might have to be designed to 3 P (on the ultimate strength of the material), in order to meet these requirements. It also stated that the figure of 15,000 was intended to cover the number of applications of P during the life of an aircraft, and that the test pressure of 1.25 P was intended to cover the phenomenon of "scatter" -- see Appendix IV -- in the fatigue strength of different cabins built to the same design.

23. The result of these developments was that in July, 1953 de Havillands reconsidered the position of the Comet's cabin. Up to that time no Comet had exceeded 2,500 hours flying say 800 pressurised flights. In order to satisfy themselves of its safety, and also to discover its probable safe working life, they carried

out repeated loading tests of the test section of the fore part of the cabin, applying the working pressure P about 16,000 times. By September, 1953, this specimen had withstood 18,000 applications of P in addition to some 30 earlier applications of pressures between P and 2P.

24. These tests were ended by a failure of the skin in fatigue at the corner of a window, originating at a small defect in the skin. But the number of pressurisations sustained was so large that, in conjunction with the numerous other tests, it was regarded as establishing the safety of the Comet's cabin with an ample margin.

25. Meanwhile, on the 2nd May, 1953, Comet G-ALYV had crashed in a tropical storm of exceptional severity near Calcutta. An inquiry was directed by the Central Government of India and was held under Rule 75 of the Indian Aircraft Rules 1937. The Court reported on the 26th May, 1953, that the accident was caused by structural failure of the airframe during flight through a thundersquall. In the opinion of the Court the structural failure was due to overstressing which resulted from either :

- * (i) Severe gusts encountered in the thundersquall, or
- * (ii) Overcontrolling or loss of control by the pilot when flying through the thunderstorm.

Fatigue failure of the cabin was not then suspected as a cause and in my opinion the evidence adduced in the course of the present Inquiry affords no sufficient reason for doubting the conclusion of the Indian Court.

PART III THE ACCIDENT

26. Comet G-ALYP (sometimes hereinafter called Yoke Peter) left Ciampino Airport, Rome, at 09:31 hours on the 10th January, 1954, on a flight to London. After taking off the aircraft was in touch with Ciampino control tower by radio telephone and from time to time reported its position. These reports indicated that the flight was proceeding according to the B.O.A.C. flight plan and the last of them, which was received at 09:50 hours, said that the aircraft was over the Orbetello Beacon. The Captain of another B.O.A.C. aircraft, Argonaut G-ALHJ. gave evidence of communications which passed between him and Yoke Peter. The last such message received by the Argonaut began "George How Jig frown George Yoke Peter did you get my" and then broke off. The Captain of the Argonaut gave it as his opinion that the message was not merely interrupted by another aircraft but that transmission ceased after the word "my" and he estimated that the message was received by him at approximately 09:51 hours. Shortly after 10:00 hours the Ciampino Traffic Control Clerk heard a sound which he suggested might have been an unmodulated transmission from Yoke Peter.

27. The evidence of four witnesses from Elba as to things seen and heard by them on the 10th January suggests that Yoke Peter must have crashed into the sea at about 10:00 hours and it therefore appears that something happened to the aircraft with catastrophic suddenness which may have accounted for the interruption of the transmission of the last message to the Argonaut. It is also clear from the evidence of the Elba witnesses that part of Yoke Peter fell into the sea in flames.

28. The chart, which is Figure 1 of this Report, was prepared from all the information available and produced by a Navigating Officer from B.O.A.C. The estimated flight track of the aircraft and the position in which bodies and wreckage were found can be seen on the chart and the witness gave it as his opinion that at

09:51 hours the aircraft was probably approaching a height of 27 000 feet.

PART IV THE AIRCRAFT

29. Yoke Peter was designed and constructed by de Havillands and was of the type properly described as DH106 series 1, commonly known as the Comet 1. It was designed for high speed long distance, passenger and freight transport at high altitude and was propelled by four de Havilland Ghost 50 turbo-jet engines mounted within the wings, each engine developing a static thrust of 5,000 lb. The crew and passenger compartments were pressurised, so that when flying at 40,000 ft. a cabin pressure equivalent to atmospheric pressure at an altitude of 8,000 ft. was maintained. The cabin pressure was regulated to a maximum pressure difference between cabin and outside atmosphere of 8.25 lb/sq. in. and a safety valve was set to open at a pressure difference of 8.5 lb/sq. in. The dual flying controls were power operated by hydraulic servo control units. The fuel for the engines was kerosene carried in a centre section tank made up of four inter-connected bag tanks and in four integral wing tanks. The authorised maximum all-up weight was 107,000 lb. Yoke Peter first flew on the 9th January, 1951, and was granted a Certificate of Registration No. R.3162/1 on the 18th September, 1951, in the name of B.O.A.C. as owner. A Certificate of Airworthiness No. A.3162, valid until the 12th March, 1953, was granted on the 22nd March, 1952. The aircraft was delivered to B.O.A.C. on the 13th March, 1952, and from that date was operated by B.O.A.C. On the 2nd May, 1952, having by then flown a total of 339 flying hours in experimental, test and training flights on behalf of de Havillands and B.O.A.C. it entered scheduled passenger service and was the first jet-

propelled passenger aircraft carrying aircraft in the world to do so.

30. On the 11th March, 1953, the Certificate of Airworthiness was renewed for one year and was therefore, valid at the time of the accident. On the 11th November 1953, after the aircraft had flown 3,207 hours and following a repair to the passenger entrance door the fuselage was subjected to a proving test to 11 lb/sq. in. The airframe and engine log books show that the airframe and engines had been regularly inspected and maintained in accordance with the Approved Maintenance Schedules and that the number of flying hours of each engine since its last complete overhaul was well within the approved life.

31. In accordance with the Approved Maintenance Schedules a Check I inspection was completed on the 6th January, 1954, at London Airport and a Certificate of Maintenance, signed by properly licensed airframe and engine maintenance engineers and valid for 75 flying hours, was issued on the 7th January 1954. At the time of the accident the aircraft had flown only 40 hours since the issue of the Certificate of Maintenance and its total flying life was 3,681 hours. An Aircraft Radio Station Certificate of Serviceability was issued in respect of Yoke Peter on the 7th January, 1954, with the remark "no items unserviceable."

PART V THE CREW

32. Captain Alan Gibson, D.F.C., who was in command of Yoke Peter at the time of the accident was aged 31 years and 3 months. He held Airline Transport Pilot's Licence No. 22713, valid until the 24th February 1954, which entitled him to fly in command of

Comet aircraft and he had a valid Instrument Rating.

Captain Gibson also held Flight Navigator' s Licence No. 1442 which was valid until the 19th February, 1954. He entered the employment of B.O.A.C. under contract in 1946 having previously been employed by B.O.A.C. on secondment from the Royal Air Force. While in the Royal Air Force Captain Gibson had a total flying experience of 1,348 hours of which 1,175 were flown in command. He had flown a total of 4,062 hours by day and 1,165 hours by night with B.O.A.C. and most of these were flown as first pilot. He had flown Comets for 84 hours by day and 48 hours by night as second pilot and for 79 hours by day and 80 hours by night as first pilot. During the six months preceding the accident he had flown 79 hours by day and 80 hours by night as first pilot of Comets and 47 hours by day and 31 hours by night under supervision.

33. While with B.O.A.C. Captain Gibson was concerned in an accident involving the forced landing of a Hermes aircraft in 1951 and was complimented by the Operations Manager for his conduct on that occasion. He was successful in both his flying checks during the period when he was flying Comets and I am satisfied that he was fully equipped to carry out his normal duties as a pilot and as a captain and to deal with emergencies.

34. The second pilot of Yoke Peter was First Officer William John Bury whose age was 33 years and 10 months. He held Airline Transport Pilot's Licence No. 27251 valid until the 8th April, 1954, and a valid Instrument Rating. In addition he held Flight Navigator's Licence No. 2583 valid until the 9th October, 1954. He had flown a total of 1,917 hours in the Royal Air Force of which 1,735 were as first pilot, all in piston engined aircraft. With B.O.A.C. he had flown 2,355 hours by day and 643 by

night as second pilot and 11 hours by day and 1 hour by night as first pilot and altogether had flown 153 hours by day and 109 by night in Comets, all as second pilot. I am satisfied that First Officer Bury was fully equipped to carry out his normal duties and to support his captain in emergencies.

35. The Engineer Officer was Mr. Francis Charles Macdonald who was aged 27 years and 11 months. Since joining B.O.A.C. on the 21st January, 1952, he had 439 hours flying as Engineer Officer in Hermes aircraft and 281 hours in Comets of which 225 hours were flown during the six months preceding the accident. Mr. Macdonald's Flight Engineer's Licence was No. 428 and had expired on the 11th December, 1953. During its validity this licence included Comet aircraft. Had he applied to renew his licence he would have been required to give Log Book evidence of six hours flying as engineer-in-charge including six flights during the 12 months preceding the date of application and would have been required to pass a medical examination.

36. On joining B.O.A.C. Comet Fleet Mr. Macdonald obtained an endorsement to his licence which made it valid in respect of Comet aircraft and he completed a form giving details of his licence. In completing this form he stated, wrongly, though no doubt in good faith, that his licence was valid until the 24th April, 1954. He himself made no application to renew the licence before its expiry nor was he given any reminder to do so by B.O.A.C. This matter is further referred to in paragraph 147 of this Report.

37. I am satisfied that Mr. Macdonald's flying experience was sufficient to support an application for renewal of his licence but I have no evidence as to his medical fitness. However, I have no reason to suppose that he was in fact unfit at the time of the

accident.

38. The Radio Officer was Mr. Luke Patrick Mc Mahon who was aged 32 years and 2 months. He held a First Class Flight Radio Telegraphy Operator's Licence No. 1235 which was valid until the 16th October, 1954, and had done 2,946 flying hours with B.O.A.C. in various aircraft before the 3rd October, 1952, and 629 hours in Comets thereafter. During the six months preceding the accident he had flown 207 hours in Comets. I am satisfied that he was a capable officer.

39. The other members of the crew were Steward Frank Leonard Saunders and Stewardess Jean Evelyn Clarke, both of whose services had at all times been entirely satisfactory.

PART VI

THE PASSENGERS AND CARGO

40. Yoke Peter carried a total of 29 passengers, all of whom were killed in the accident. The cargo carried did not include any items which could have been relevant to the cause of the accident. The comparison between the amount of cargo known to have been carried and that shown in the Load Distribution and Trim Sheet showed a discrepancy of 27 kilograms in hold 2A. Moreover, no load was shown on the Load Distribution and Trim Sheet for hold 3, whereas there was evidence that 15 kilograms of baggage were placed in that hold. I am satisfied, however by the evidence of Mr. B. J. Folliard that these errors in the Load Distribution and Trim Sheet would have left the loading and trim of the aircraft well within the prescribed safe limits.

PART VII

PRE FLIGHT INCIDENTS

41. The last three flights made by Yoke Peter prior to that which ended in disaster were from Karachi to Bahrein, Bahrein to

Beirut and Beirut to Rome. During refuelling at Karachi a defect developed in the port wing tanks the Engineer Officer of Yoke Peter adopted a procedure known as "off-load" refuelling which is authorised for use in such an emergency. It involves holding the refuelling switch in the "off-load" position -- The normal purpose of this position is to enable the tanks to be emptied -- and releasing it when refuelling is complete. In fact the Engineer Officer did not release the switch in time and about five gallons of fuel escaped from the airvent on the under surface of the mainplane. There was no repetition of this incident at Bahrein but at Beirut, after the Engineer Officer had explained to the ground engineer, who was assisting him with the refuelling what had happened at Karachi, a further incident occurred. When the Engineer Officer returned to the port wing after inspecting the starboard tanks he noticed fuel emerging from the port air vent. The refuelling switch was in the neutral position from which fact, and from the fact that fuel was obviously entering the tank, he deduced that somebody, intending to put the switch to the "off-load" position, from which it should automatically have returned to neutral when released must have failed to do so and that the switch, instead of returning to neutral had remained half open. He attempted to close the switch by moving it to the full "off-load" position and releasing it but this had no effect and the flow of fuel was eventually stopped by shutting down the bowser.

42. As a result of this incident the actuator was removed and as no replacement was available it was tested, found satisfactory and refitted. These incidents were reported by the Engineer Officer to Mr. Macdonald when the aircraft was handed over at Rome. The practice of "off-load" refuelling is further referred to in paragraph 111 of this Report.

43. Two other items were also unserviceable during the flights from Karachi to Rome. These were the No. 1 engine hydraulic

flow warning light and the automatic temperature control selector. The former device is designed to draw the attention of the pilot to a possible failure of the engine-operated hydraulic pump. On this occasion, when the flow warning light appeared faulty, the operation of the pump was tested by other means and found satisfactory. The automatic temperature control selector is intended to control automatically the temperature of the crew and passenger compartments. When it was found to be faulty the temperature was controlled manually. I am satisfied that neither of these faults, both of which were drawn to the attention of Mr. Macdonald, can have endangered the aircraft in any way.

PART VIII

WEATHER CONDITIONS AT THE TIME OF THE ACCIDENT

44. From take-off at Rome at 09:31 hours on the 10th January, 1954, to the time of the accident at approximately 27,000 ft. near Elba Comet G-ALYP experienced essentially good weather conditions. The climb was made through only thin and broken layers of cloud with no rain and with negligible icing conditions. At the time and position of the accident it is probable that some turbulence in clear air may have existed due to the proximity of a narrow high velocity wind current called a " jet stream ". Such turbulence, if encountered, would be less than aircraft frequently experience in turbulent cloud conditions. It can, therefore, be assumed that the state of the weather was not a contributory cause of the accident.

PART IX

ACTION TAKEN AFTER THE ACCIDENT AND PRIOR TO THE ACCIDENT TO COMET G-ALYY

(a) Local salvage and medical investigation

45. At 11:50 hours on the 10th January, 1954 the Harbour Authority at Portoferraio in the Isle of Elba was informed of the occurrence of the accident, being told that an aircraft had exploded in the air and crashed in flames into the sea south of Cape Calamita roughly in the direction of the island of Monte Cristo. With commendable promptness Lieutenant-Colonel Lombardi, the Officer Commanding the Harbour Authority of Portoferraio, despatched all available craft to the scene of the accident with a doctor and nurse on board and he himself put to sea after he had made all the necessary arrangements. In these salvage operations 15 bodies, various mail bags and some aircraft wreckage and personal effects were recovered. The ships had been assisted in their search by the collaboration of aircraft. On the two following days the search was continued. No more bodies were found but various pieces of wreckage and articles were recovered.

46. Under Lieutenant-Colonel Lombardi's directions the bodies were taken to the local cemetery at Porto Azzurro and devoutly placed in the chapel there. At the request of the examining magistrate at Portoferraio an examination of the bodies recovered was carried out by Professor Antonio Fornari who was acting under the direction of Dr. Folco Domenici, Director of the Institute of Forensic Medicine in the University of Pisa. Professor Fornari gave evidence before me and he put in a report which had been prepared by him and Dr. Domenici. The substance of their report is to be found in the conclusions at p. 60 of the translation of the report and may be summarised as follows :

(1) Death was caused by impact against parts of the aircraft.

(2) There were serious lesions resulting from explosive decompression and deceleration.

(3) The probable point of impact between the bodies and the structure of the aircraft was the forepart of the fuselage, perhaps in the vicinity of that part of the fuselage which lies above the engines.

(4) There were burns on the bodies of all the victims but they presented post-mortem characteristics from which the inference was that the burns took place after death.

(b) Action taken by the Ministry of Transport and Civil Aviation

47. News of the accident was received by the Accidents Investigation Branch of the Ministry of Transport and Civil Aviation at 12:00 hours on the 10th January, 1954, and both the Senior Inspector of Accidents, Mr. Nelson, and the Senior Investigating Officer, Mr. Morris, left for Italy that evening.

48. On arrival Mr. Nelson got into touch with the Commission which had been convened by the Italian aviation authorities and went with the Commission to Elba. Some days later it was agreed that the responsibility for the investigation of the accident should be handed over to the Accidents Investigation Branch of the British Ministry of Transport and Civil Aviation but Colonel Miniero and Signor Roveri, who have attended this Inquiry, were appointed accredited representatives to the British investigators and gave them every possible assistance. The Minister of Transport and Civil Aviation was also in touch with the

Admiralty and it was arranged that the Commander-in-Chief Mediterranean, Admiral Earl Mountbatten, would cause an intensive search to be made for the wreckage. The Chief Inspector of Accidents, in accordance with normal practice, arranged for the wreckage recovered to be sent to and examined at R.A.E. Mr. Nelson and Mr. Morris remained in Elba, examined the Wreckage recovered and arranged for its transport back from Elba to the mainland and thence to Rome, whence it was flown direct to the United Kingdom, but certain very large pieces had to be sent by sea.

(c) Naval search for wreckage

49. Commander Forsberg was placed in charge of the operations. Special vessels, H.M.S. Barhill and H.M.S. Sea Salvor, were fitted up to carry 200 tons of heavy moving gear. An observation chamber, television gear, all toothed grab and other equipment were obtained from England and the necessary modifications to the vessels were made in the dockyard at Malta. This was all done in under a fortnight and the two vessels and H.M.S. Wakeful, in which the television equipment was installed, arrived off Elba on the 25th January, 1954.

50. The search was prosecuted at depths varying between 70 fathoms and 100 fathoms. It is noteworthy that this was the first occasion on which television equipment had been used for this purpose. The first date on which anything was located on the bottom by television was the 12th February, 1954. I need not recount in detail the history of the search. Suffice is to say that by the 23rd March, 1954, only the floating wreckage, the pressure dome, and parts of the rear fuselage and the engines and wing centre section had been recovered and that thereafter the search continued until by the end of August, 1954, about 70 per cent. of

the empty weight of the aircraft, made up of about 70 per cent. of the structure, 80 per cent. of the power plant and 50 per cent. of the equipment, had been recovered. I have included as Appendix V a table, which was put in evidence, showing the dates of recovery of the main portions of the wreckage and the dates on which they reached Farnborough. Diagrams (Figures 2 and 3) give a striking impression of the amount of material which was ultimately recovered, though they relate only to the external structure. Figure 4 is a photograph showing the reconstruction of the fuselage and tail unit from the wreckage and Figure 5 is a photograph showing the reconstruction of the front fuselage.

51. The amount of wreckage recovered was greatly in excess of the expectations entertained in March, 1954, when the decision to allow the Comets to fly again was taken. A remarkable fact was the small amount of damage which had been caused to the structure either by immersion in sea water or in the process of salvage.

(d) The Abell Committee

52. Immediately on receiving news of the accident B.O.A.C. had decided to suspend their normal Comet passenger services, for the purpose of carrying out a detailed examination of the aircraft of the Comet operational fleet in collaboration with A.R.B. and de Havillands and to this end the Chairman of B.O.A.C. had called a meeting at London Airport for the 11th January, 1954, which was attended by representatives of B.O.A.C., the Accidents Branch of the Ministry of Transport and Civil Aviation, de Havillands, the de Havilland Engine Company Limited and A.R.B. As a result of that meeting a committee under the chairmanship of Mr C. Abell, the Deputy Operations Director (Engineering) of B.O.A.C., and composed of

representatives of A.R.B., B.O.A.C. and de Havillands, was appointed to consider what modifications were necessary before B.O.A.C. could properly seek the agreement of the Minister of Transport and Civil Aviation to the resumption of passenger services by Comet aircraft. The Committee proceeded to consider what possible features or combination of features might have caused the accident. According to the evidence of Mr. Abell. they came to the view that possible main causes of the accident were as follows :

(a) Flutter of control surfaces. This is a term used to describe a type of vibration of a surface, which may be dangerous and may arise from one or more of several causes such as the failure of some part of the mechanism connecting the control surface to the hydraulic power unit which operates it in flight, or to the development of play or backlash in the mechanism. It was decided to make a special inspection of the whole of the mechanism and of the control surfaces and mass-balance arms.

(b) Primary structural failure. They considered, in particular, the possible effects of gusts, in causing abnormally high loads, and surveyed all parts of the structure of which there was any suspicion in the light of previous experience.

(c) Flying controls. For each hydraulic power unit operating a control surface there is an output circuit connected to the control surface, and an input circuit connected to the pilot's control in the cabin. Many possible sources of malfunctioning both of the hydraulic power units themselves and of these mechanical circuits were examined and special investigations initiated.

(d) Fatigue of the structure. They had in mind more particularly

fatigue of the wing, because about the time of the Elba accident cracks had appeared near the edge of the wheel-wells, on the under-surface of the wing of the first prototype which was under test at R.A.E., after the equivalent of about 6,700 flying hours. They re-examined also one or two other parts of the structure at which they felt fatigue effects might be appearing.

(e) Explosive decompression of the pressure cabin. They had no reason to suspect the primary structure of the cabin itself. They reviewed the records of damage by, for example, the steps used to load the aircraft, and the methods of repairing such damage by schemes approved by de Havillands. Their main concern, however, was the window panels, where they thought it necessary to consider possible defects which might cause weakness not revealed in the tests made during design at de Havillands.

(f) Engine installation. Their main preoccupation here was with the possibility of fire and investigations were made at a number of points in order to remove every cause of possible fire risk which they could imagine.

53. As a result of the inspections and tests which followed the meetings of the Committee, a large number of modifications were made both to the power plants and to other parts mentioned above. At the conclusion of their work the Committee still regarded fire as the most likely cause of the accident. But one modification deserves special mention since it shows the care which was taken to avoid the possibly serious consequences of failure of a turbine blade. although there existed no evidence of such a failure in all previous experience. The only recommendation specifically directed to fatigue related to the wing as mentioned above. One modification and two special

inspections were called for. Mr. Abell said that the possibility of fatigue in the wing structure due to gusts was believed to be much more likely than fatigue in the pressure cabin since this is subject to much less frequent chances of load. At this stage neither Mr. Bishop nor Mr. Harper of de Havillands suspected that the failure of the cabin structure by fatigue or otherwise was a primary cause of the accident. They still regarded the 18,000 repeated loadings as removing any doubt about the fatigue life of the cabin.

(e) Resumption of Comet services

54. On the 17th February, 1954, Mr Abell forwarded to the Operations Director of B.O.A.C. a report and papers showing in detail all the inspections, investigations, modifications and other work which had been carried out since the Comet aircraft had been temporarily removed from service by B.O.A.C. on 11th January, 1954. On the 19th February the Chairman of B.O.A.C. forwarded the above-mentioned report and papers to the Minister of Transport and Civil Aviation stating in the course of his letter that, on the assumption that no further indication of the cause of the accident emerged prior to the completion of the inspection and modification work, B.O.A.C. considered that all such steps as were possible before putting the aircraft back into passenger service should have been taken.

55. The position was also considered by A.R.B. On the 4th April Lord Brabazon wrote to the Minister saying :

"Although no definite reason for the accident has been established, modifications are being embodied to cover every possibility that imagination has suggested as a likely cause of the disaster. When these modifications are completed and have been

satisfactorily flight tested, the Board sees no reason why passenger services should not be resumed."

56. In the meantime the Minister of Transport and Civil Aviation, who had not revoked the Certificate of Airworthiness of the Comet fleet had asked A.S.B. for advice on the resumption of the Comet passenger services. On the 5th March Air Chief Marshal Sir Frederick Bowhill, the Chairman of A.S.B., minuted the Minister as follows :

" 2. The Board has considered all the available information resulting from recent investigations and has noted the nature and extent of the modifications planned as a result. It realises that no cause has yet been found that would satisfactorily account for the Elba disaster, and whilst the Calcutta disaster is completely accounted for if the aircraft is supposed to have encountered a gust of very great severity (which would have broken any other aircraft) we cannot eliminate that the accident might have been due to some other cause which was possibly common to both disasters. Nevertheless, the Board realises that everything humanly possible has been done to ensure that the desired standard of safety shall be maintained. This being so, the Board sees no justification for imposing special restrictions on Comet aircraft.

3. The Board therefore recommends that Comet aircraft should return to normal operational use after all the current modifications have been incorporated and the aircraft have been flight tested."

57. Acting on this advice the Minister gave permission for flights to be resumed and the first Comet aircraft to resume passenger service took the air on the 23rd March, 1954.

PART X

THE ACCIDENT TO G-ALYY

58. On the 8th April, 1954, Comet aircraft G-ALYY, which was on charter to South African Airways, crashed near Naples while on a flight from Rome to Cairo. I am making a separate Report on that accident. It is sufficient for the purpose of this Report to record that the accident occurred at approximately the same height and after approximately the same lapse of time after departure from Rome as in the case of Yoke Peter. On receiving news of the accident B.O.A.C. decided immediately to suspend all Comet services until more was known and on the 12th April, 1954, the Parliamentary Secretary to the Ministry of Transport and Civil Aviation informed the House of Commons that the Minister, after consulting A.R.B. and A.S.B. and discussing the matter with the Chairman of A.R.B., had withdrawn the United Kingdom Certificate of Airworthiness from all Comet aircraft.

PART XI

INVESTIGATION OF THE ACCIDENT TO G-ALYP AND G-ALYY

(a) Investigation by R.A.E.

59. The loss of Yoke Peter and Yoke Yoke presented a problem of unprecedented difficulty, the solution of which was clearly of the greatest importance to the future, not only of the Comet, but also of Civil Air Transport in this country and, indeed, throughout the world. Accordingly, shortly after the Naples accident, the Minister of Supply instructed Sir Arnold Hall the Director of R.A.E. to undertake at R.A.E. a complete investigation of the whole problem presented by the accidents and to use all the resources at the disposal of the Establishment. This provided an

opportunity of showing what can be done by a close collaboration between a private firm and R.A.E. with the unique facilities at its disposal. It will be seen hereafter that full use was made of that opportunity by R.A.E. and de Havillands.

60. R.A.E. made a complete review of the conclusions which had been reached by the Abell Committee, and particularly of the implications arising from the fact that there had been two accidents in what appeared to be similar conditions, each occurring at about the time when the aircraft was nearing the top of its climb. They thought it necessary to satisfy themselves about the structural integrity of the aircraft, in particular of the cabin and the tail and to consider in more detail possible sources of explosion and loss of control. They also considered that flight tests would be required in order to investigate the possibility of flutter of control surfaces (see para. 52 (a)). It soon became evident that it was probable that more wreckage would be recovered than had at first been expected. The wing centre section was received on the 5th April (the engines had been recovered and sent by air to de Havillands on the 21st March), and the front part of the cabin arrived on the 15th April. But at the time when their attention became directed to fatigue of the pressure cabin they were influenced chiefly by the apparent similarity of the circumstances of the two accidents, and by the fact that the modifications carried out after Elba seemed to rule out many of the other possible causes.

61. On the 18th April Sir Arnold Hall decided that a repeated loading test of the whole cabin ought to be made. He said that he regarded this as one of a number of lines of inquiry which had to be pursued and that he felt it to be necessary to study every possible cause in detail.

62. The normal method of testing pressure cabins up to the point when they fail under pressure is similar to that used for vessels such as boilers. They are filled with water, and more water is pumped in until the desired difference between the internal and external pressure is reached. This method has two advantages over the use of air. Water is relatively incompressible, so that failure when it occurs produces only a mild form of explosion. The origin of the failure can be determined and the structure can generally be repaired and tested again. If air were used instead of water, the failure would be catastrophic (equivalent in the case of the Comet's cabin to the explosion of a 500 lb bomb). Such a test would be dangerous, the cabin would be destroyed, and the evidence of the origin of the failure should almost certainly be lost. It is however necessary to prevent unrepresentative loading of the cabin structure by the weight of the water. This is ensured in practice by immersing the whole cabin in a tank, and filling the tank and the cabin simultaneously with water. Pressure in the cabin is then raised by pumping in water from the space outside it. Cycles of loading, to the same or different levels of pressure as desired are applied by a suitable routine of pumping.

63. By a remarkable effort, to which de Havillands and the firms who built the tank (see Figure 6) contributed to the full and by the use of all the resources of R.A.E., repeated loading tests began early in June on aircraft G-ALYU (Yoke Uncle). The object of the tests was to simulate the conditions of a series of pressurised flights. To this end the cabin and wings were repeatedly subjected to a cycle of loading as far as possible equivalent to that to which they would be subjected in the period between take-off and landings. In addition to one application of cabin pressure, fluctuating loads were applied to the wings in bending to reproduce the effect of such gusts as might be expected in normal conditions, although the contribution of gust

loads to the stresses in the cabin structure, compared with that made by the internal pressure, was in general small. Moreover, the programme of tests included, at intervals of approximately 1,000 " flights " a proving test in which the pressure was raised to 1.3 P (11 lb./sq. in.). It must be understood that there are other sources of fluctuation, load and, therefore, of fatigue to which no precise value can be attached. No attempt was made to represent these in the test. Examples are vibration due to irregular airflow, vibration due to the engines and the jet efflux and fluctuating loads occurring during take-off and landing.

64. Yoke Uncle had made 1.230 pressurised flights before the test and after the equivalent of a further 1.830 such flights, making a total of 3,060, the cabin structure failed, the starting point of the failure being the corner of one of the cabin windows (see Figures 7 and 8). The fact that the failure occurred during one of the proving tests to 11 lb/sq. in. is not thought significant since the crack would have spread in very much the same way after a few more applications of the working pressure. Examination of the failure provided evidence of fatigue at the point where the crack would be most likely to start, namely near the edge of the skin at the corner of the window (see Figures 9 and 10). This was revealed by the discoloration due to algae in the water which made it clear that the crack had endured several pressurisations before it spread catastrophically. It is important to note here that the sources of fatigue mentioned above, which were not reproduced in the tank test, all tend to increase the burden of fatigue and that, therefore, the life of a fuselage deduced from the test is longer than would be expected in service. It is not possible to do more than estimate the magnitude of this effect but it was suggested by Dr. Walker that a "life" of 3,060 flights in the test might be equivalent to about 2.500 in practice.

65. It is convenient to note here that Comet G-ANAV, which had been sent to R.A.E. to undergo flight tests (unpressurised) on a number of matters which could only be explored in flight, made its first flight on the 23rd June. A large amount of miscellaneous wreckage was arriving at R.A.E. during the whole of this period and was being stored out and examined by the Accidents Investigation Section under Mr. Ripley.

66. The failure of the cabin of Yoke Uncle marks the point at which the character of the investigation changed to one in which the problem of fatigue in the structure of the cabin began to dominate all others, although many possible sources of trouble were continually investigated during the whole of the summer. In the main their results were negative so far as the accidents were concerned though they revealed points which needed and will receive attention. The inference suggested by the tank test, that the primary failure of Yoke Peter was the bursting of the pressure cabin, was confirmed by a close examination of the wreckage and by the experiments referred to in the next following paragraphs of this Report.

67. The character of the damage caused to the structure was such that it became possible to determine with a high degree of probability the manner in which the various fragments struck the sea, mainly because of the very high local pressures produced by the impact with the sea. Moreover, it rapidly became clear that the intense fire which had existed was confined virtually to the centre part of the wing, leaving the outer parts of the wing and the front and rear parts of the cabin untouched. These considerations led to the conclusion that it was probable that the main part of the aircraft fell into the sea in a small number of relatively large pieces, one of which was on fire (see Figure 11). Most of these pieces had fallen in a surprisingly small area. This

conclusion was in agreement with the evidence of the farmer at Elbas who saw fragments, one of which was on fire, falling into the sea. This led to a line of experiment which produced remarkable results. Models were made of the Comet in light wood, suitably ballasted, and projected in the air at the appropriate speed. They were released from a kite balloon at a height above the ground corresponding to that at which it was believed the Comet structure failed, reduced in proportion to the scale of the model. The model was so constructed that it would break at the point where the failure of the cabin was suspected, namely in the neighbourhood of the wing. The outer parts of the wing (only one of which had been recovered), were also separated from the centre part. The descent of the fragments was photographed, and it was found that they fell in a manner which agreed with the deductions which had been made from the evidence mentioned above.

68. Simultaneously with this work, further experiments in the water tank were made on the cabin of Yoke Uncle, after the first failure had been repaired by de Havillands. Until then, owing to the need to discover whether the cabin had, against all previous belief, a relatively short life under repeated loading, no attempt had been made to measure the stress in the material of the skin at points where it might be expected to be higher than the average. One reason for this omission was that the number of places coming within this description is large, and it would have taken a long time to install the necessary strain gauges and other associated equipment. But it now seemed highly probable that the stress near the corners of the windows was higher than had been believed by the designers, and the strain gauges were therefore fixed to the surface of the skin, at various positions near the corners of typical windows, including the windows corresponding to the one which had failed but on the other side

of the cabin.

69. A discussion of the evidence bearing on the reliability of the estimates of the stress at the edge of the window will be found in paragraphs 118 to 129. It is sufficient here to say that I am satisfied that the highest stress in the skin, at the edge near the corner of the window of Yoke Uncle, was probably over 40,000 lb./sq. in. when the pressure difference was 8.25 lb. / sq. in. and that the general level of the stress in the skin in these regions was significantly higher than had been previously believed. In the light of known properties of the aluminium alloy D.T.D. 546 or 746 of which the skin was made and in accordance with the advice I received from my Assessors, I accept the conclusion of R.A.E. that this is a sufficient explanation of the failure of the cabin skin of Yoke Uncle by fatigue after a small number, namely, 3,060 cycles of pressurisation.

70. In considering the possible bearing of this result on the accidents at Elba and Naples, it is necessary to recognise that there are inevitable differences between individual aircraft structures built to the same drawings. The nature and extent of these depend on a number of factors such as variations in the thickness of metal sheet of nominally the same gauge, and local regions of high stress due to the methods employed in joining the various parts, such as rivets, bolts, etc. If a number of such structures are tested under repeated loading, there will be appreciable differences between the number of cycles of application of given loading before failure occurs. Experience suggests that there will be a variation of at least 9 to 1 in the number of cycles necessary to produce failure when the general level of stress is high, and the number of cycles undergone before failure therefore low. If a large number of specimens could be tested, it would undoubtedly be found that the weak and

the strong were relatively few in number, and that the majority would be more or less evenly distributed round a mean value. But it is impossible from a single test to say where, in the total range to be expected from general experience, a particular specimen lies.

71. At the time of the Elba accident Yoke Peter had made 1,290 pressurised flights and at the time of the Naples accident Yoke Yoke had made 900 pressurised flights. Sir Arnold Hall said in evidence that in the light of the experiment on Yoke Uncle, and of the measurements and calculation of stress referred to above he considered that the cabin of Yoke Peter had reached a point in its life when it could be said to be in danger of failure from fatigue, and that the Cabin of Yoke Yoke would similarly be in danger. Dr. Walker said that he did not regard the picture presented by the three failures (on the assumption that these were all due to the same fundamental cause) as surprising, since the three results taken together are consistent with general experience of the strength under repeated loading of a number of nominally identical structures, in which the stress level is high. They lie within a range of just over 3 to 1, whereas experience suggests a total range of at least 9 to 1.

72. At this stage in R.A.E. 's attack on the problem, it seemed unlikely that any more wreckage would be recovered which would throw light on the problem which was now obviously the chief one. But after a further review of the whole of the circumstances of the flight of the aircraft and the distribution of the wreckage on the sea bed, R.A.E. reached the conclusion that search in a wider area was justified. Whatever the cause of the bursting, it seemed probable that the disruption of the aircraft would have resulted in some relatively large pieces of the structure being blown clear. These might well have fallen some

distance away from the main pieces of wreckage, all of which, as mentioned above, were found within a remarkably small area. It was therefore decided to make a search of an area some miles long in the sea below the path of the aircraft working towards Rome from the area where the main items were recovered. As the depth of the sea increased rapidly in this direction, the only practicable method was trawling.

73. As a result of the new search R.A.E. received a piece of cabin skin, which had been found by an Italian fishing boat. It was identified as coming from the centre of the top of the cabin approximately over the front spar of the wing (see Figure 12). It contained the two windows in which lie the aerials which are part of the A.D.F. (Automatic Direction Finding) equipment. At the same time R.A.E. received a part of the aileron of the port wing (see Figures 13 and 16) and a part of the "boundary layer fence" fitted to the leading edge of the port wing not far from the tip (see Figures 14 and 16).

74. The latter parts provided important evidence about the bursting of the cabin. There were marks on them which were identified as made by pieces from the cabin itself. Taken together with the paint mark on the leading edge of the centre section not far from where the outer wing broke off, which was identified as caused by the piece of the cabin wall containing the first window (escape hatch) (see Figures 15, 16 and 12), they established that the cabin burst catastrophically in the neighbourhood of the front spar of the wing when the aircraft was flying substantially normally.

75. By examination of the piece containing the A.D.F. windows and the adjacent pieces (see Figure 12) it was established that it was here that the first fracture of the cabin structure of Yoke

Peter occurred. In general terms, it took the form of a split along the top centre of the cabin along a line approximately fore and aft passing through corners of the windows as shown in Figure 17. The direction in which the fracture spread was determined by examination of the lines of separation of the material.

76. A development drawing of the wreckage recovered from the part of the cabin over the wing spar is shown in Figure 18. Apart from the area on top of the cabin around the A.D.F. windows, which is shown cross-hatched, the remainder was recovered with, and in many cases remained attached to, either the front fuselage, the wing centre section, or the rear fuselage. These three groups are distinguished by different hatchings, as indicated in the diagram. In the light of all this evidence, I accept R.A.E. 's conclusion that the first fracture of the cabin occurred near the rear A.D.F. window and spread fore and aft from it.

77. I do not consider it possible to establish with certainty the point at which the disruption of the skin first began. But I consider that it is probable that it started near the starboard aft corner of the rear A.D.F. window, at a point where examination by experts showed that fatigue had existed, at the edge of the countersunk hole through which a bolt passed (see Figure 19)

78. The only alternative point suggested was the opposite (port forward) corner of the same window. Here the fracture passed through a small crack in the reinforcing plate, about 0.2 in. long, made accidentally during the build, of the aircraft. This had been dealt with by de Havillands in accordance with their procedure for dealing with any departure from the strict requirements of their drawings which might appear during the manufacture of their aircraft. All such matters were required to be reported to the Technical Office, and each was dealt with as a special case by a

qualified expert. In this case approval was given to the use of the normal process of "locating" small cracks in the skin of an aircraft by drilling small holes at their ends. Advised by my Assessors I see no reason to doubt that this would have been a satisfactory method of dealing with the crack in question had it not been for the fact that the stress in this region was relatively high. It was suggested that such a crack might be a possible place of origin of fatigue but no witness was able to identify any evidence of fatigue at the material point.

79. It is my opinion that the fundamental cause of the failure of the cabin structure was that there existed around the corners of the windows and other cut-outs a level of stress higher than is consistent with a long life of the cabin, bearing in mind the unavoidable existence of points, within the areas of generally high stress, at which it will be still further raised by relatively local influences, such as the countersunk hole near the starboard rear corner, and the small crack with its "locating" hole near the port forward corner. I find it impossible to say definitely, on any evidence before me, which of these operated first. But, since the existence of fatigue near the bolt hole is established, I think it the more probable.

(b) Investigation by the de Havilland Engine Company Limited

80. The R.A.E. investigation did not deal with the engines. The history of their recovery and investigation is as follows.

81. The centre section of the wing of Yoke Peter was recovered from the sea on the 15th March. It was severely damaged by fire and by impact with the water. It contained the four Ghost engines substantially intact with the exception that the turbine disc of No. 2 engine (port inner) was missing. The shaft on which it had been

mounted had broken near the hub to which it was bolted and it had escaped through a large gash in the exhaust cone. The disc has not been recovered.

82. The engines were removed and examined superficially by an engineer from de Havillands Engine Company Limited. They were then sent by air to that company's works where they arrived on the 21st March and were dismantled and examined in detail.

83. Dr. Moulton, Chief Engineer of the de Havilland Engine Company Limited, said in evidence that there were no signs consistent with seizure of any engine, or of any excessive internal heat, or of any failure having occurred before the break-up of the aircraft. The extensive fire damage was all external to the engines. The four compressor impellers were intact on their shafts.

84. The turbine discs from Nos. 1, 3 and 4 engines showed no signs of failure. No blades were missing from them. In No. 2 engine, there was no evidence of penetration of the shroud ring surrounding the turbine, either by a blade or by the complete disc. There was no evidence of failure of any blade in any of the engines.

85. Examination of the hubs to which the turbine discs of Nos. 1, 3 and 4 engines were bolted showed that all were on the point of failing. Cracks were found in the same regions as those which had resulted in the fracture of No. 2 engine, which led to the loss of the disc.

86. The remarkable similarity of the damage to the turbine shafts of all four engines pointed to a common cause external to the engines, and further examination showed that the most probable

cause was a sudden and very rapid rotation of the whole wing about a transverse axis, nose downwards, while the engines were still running normally. Such a rotation, being about an axis at right angles to the engine shafts, would produce gyroscopic couples tending to bend the shafts in a sideways direction, that is, in the plane of the wing. Since the clearances between the discs and the stationary parts surrounding them are small, signs of rubbing would be expected in definite regions. Examination showed such signs in each engine.

87. From this evidence the conclusion was reached that the engines had run, though only for a short time, possibly a few hundred revolutions after a sudden nose-down rotation of the wing and had not stopped suddenly. Further examination showed other evidence consistent with this, namely the absence of any deformation in the splines on the turbine shafts. This also suggested that by the time the whole of the centre section, including the engines, hit the surface of the sea, the engines were no longer rotating.

88. The whole of the remaining extensive damage to the engines was considered to be due to impact with the surface of the sea. It was in the main confined to the upper parts of the engines, and was therefore consistent with the deductions from the examination of the centre section of the wing itself, which showed everywhere evidence of the wing having hit the sea upside down.

89. In order to investigate the conditions which were now thought to have caused the failure of the turbine hubs, tests were made on a Ghost engine supported in a framework which was pivoted about a horizontal axis some distance above the engine, so that it could swing in a vertical plane, like a pendulum. The

engine was run at normal speed, and was pulled sideways, thus raising it from its lowest position. When released, it accelerated under the combined influence of its weight and the thrust from the jet. The rate of rotation round the transverse axis could be varied by releasing it from different heights. It was found that when this reached a value of nearly 180° a second (corresponding to the centre section of the wing turning upside down in about one second) the turbine disc hub broke and the engine slowed down and stopped without any further substantial damage. Examination showed the same type of failure and symptoms, as were found on the four engines of Yoke Peter.

90. The examination of the engines, combined with the striking evidence of this experiment, confirmed de Havillands in the view that no part of the engines was in any way the cause of the failure of the aircraft. Dr Moulton said that in their previous experience of Ghost engines of the same type as those used in the Comet, they had had no records of any blade failures. The modifications made to the aircraft as a result of the Abell Committee's discussions, consisting of fitting high tensile steel plate round certain parts of the engines in the plane of the turbine discs, was regarded by him as possibly a wise precaution, in view of the need to guard against every source of trouble which could be imagined. At the time it was put into effect, with the other modifications decided by the Abell Committee, the engines from Yoke Peter had not been examined.

91. In the light of all this evidence and these considerations, I accept Dr. Moulton's conclusion that there was no failure of any part of any engine which could have been the cause of the failure of Yoke Peter. The fire which damaged the engines externally was in my opinion subsequent to and not a cause of the disintegration of the aircraft.

PART XII

THE R.A.E. REPORT

92. The Report (which was part of the evidence before the Court) is divided into 12 parts. The first part contains an outline of the investigation and states the opinion R.A.E. formed as to the cause of the accident. I have included the first part which is intelligible without reference to the other parts, as an appendix to this Report (Appendix VI). Para. 4 thereof which states the opinion of R.A.E. is in the following terms: _

"we have formed the opinion that the accident at Elba was caused by structural failure of the pressure cabin, brought about by fatigue. We reach this opinion for the following reasons: _

- * (i) The low fatigue resistance of the cabin has been demonstrated by the test described in Part 3, and the test result is interpretable as meaning that there was, at the age of the Elba aeroplanes a definite risk of fatigue failure occurring (Part 3).
- * (ii) The cabin was the first part of the aeroplane to fail in the Elba accident (Part 2).
- * (iii) The wreckage indicates that the failure in the cabin was of the same basic type as that produced in the fatigue test (Parts 2 and 3).
- * (iv) This explanation seems to us to be consistent with all the circumstantial evidence.
- * (v) The only other defects found in the aeroplane (listed in Section 3) were not concerned at Elba. as demonstrated by the

wreckage.

Owing to the absence of wreckage, we are unable to form a definite opinion on the cause of the accident near Naples, but we draw attention to the fact that the explanation offered above for the accident at Elba appears to be applicable to that at Naples."

It should be added that the medical evidence as to the state of the bodies recovered was consistent with the conclusion thus reached.

93. The "other defects" mentioned in subpara. (v) quoted above are: _

- * (a) relatively low resistance of the wing to fatigue;
- * (b) possibility of fuel from the fuel tank venting system entering the trailing edge area of the wing near the jet pipe shrouds;
- * (c) risk of internal damage during refuelling to the outer wing tanks under conditions which, though abnormal, may sometimes have occurred in practice.

94. I shall return to these defects after I have stated my opinion on the major conclusion of the Report.

PART XIII

THE COURT'S CONCLUSIONS AS TO THE CAUSE OF THE ACCIDENT

(a) The main finding in the R.A.E. Report

95. The opinions expressed in the Report were supported by the evidence of Sir Arnold Hall, Dr. Walker and Mr. Ripley. Their conclusions were accepted by de Havilland and B.O.A.C. All

parties appearing at the Inquiry paid a warm, and in my opinion well-deserved, tribute to the Report and to all who had co-operated in the work done at R.A.E. As I have already indicated and for the reasons I have given I have accepted the main conclusion of the Report that the cause of the accident to Yoke Peter was the structural failure of the pressure cabin brought about by fatigue.

(b) The alternative suggestion made by Mr. B. Jablonsky

96. The only rival Suggestion was made by Mr. Jablonsky. His experience of structural problems in aeronautics has been concerned mainly with propellers having blades of highly compressed wood. He is, therefore, familiar with adhesives, and with the problems which have to be overcome in using them to make components.

97. In the construction of the Comet wide use is made of a metal-to-metal adhesive known as Redux, mainly for the purpose of attaching members, generally known as "stringers", to the skin both of the wing and of the cabin. In the cabin there are about forty stringers more or less evenly spaced around the circumference and running longitudinally. They are not structurally continuous from end to end, the largest uninterrupted length being about 25 ft. de Havillands were pioneers in using Redux for such purposes in aircraft structures, and have had long experience of it. It is in effect an alternative to the conventional riveting.

98. Mr. Jablonsky's argument proceeded on the following lines:—

* (a) The skin of the cabin is exposed under service conditions to a large variation in temperature. He suggested a range of 80°C

on the ground in the tropics to -55°C at about 40,000 ft. The rate of climb of the Comet is fairly high and the temperature of the skin might change over this range in about 30 minutes. The stringers, however, although inside the skin, are outside the insulating lining of the cabin and therefore not exposed to the full temperature of the warm cabin air. His argument contemplated a difference in temperature between skin and stringer of as much as 60° or 70°C . This would have the result that the skin would contract relative to the stringer in the direction of the cabin's length. The adhesive would therefore, be subjected to a shear stress which might be sufficient to cause it to fail.

* (b) Even if this did not cause the adhesive to fail statically (that is on the first occasion when such a difference of temperature between the skin and the stringers occurred) frequent repetition of the shear stress might produce fatigue in the adhesive, and cause it to fail.

* (c) Mr. Jablonsky recognised that the dependence on temperature level of the properties of Redux is well known. He suggested, however, that frequent and rapid variations of temperature would reduce its strength substantially .

* (d) It is generally recognised that the satisfactory use in engineering structures of any form of adhesive (or, indeed, of processes essentially similar such as the welding or soldering of metals) can be ensured only by the development and maintenance of higher standards of workmanship and process inspection than are necessary in the use of riveting. While Mr. Jablonsky recognised that de Havillands' production technique for Redux had been developed after many years' study of its properties, and that their experience of its use in other aircraft had been highly satisfactory, he suggested that it was not a process sufficiently reliable for use in the primary structure of a pressure cabin.

99. Mr. Jablonsky said in evidence that in his inspection of the wreckage at R.A.E. he had seen examples of failure of the "glue line" which had satisfied him that weakness in it was primarily responsible for the failure of the structure of the cabin.

100. I deal below with these points separately: _

* (a) During the experiments made in flight on Comet G-ANAV at R.A.E., measurements were made of the difference in temperature between the skin and the stringers in typical positions in steady flight at cruising altitude. They led to the conclusion that the maximum probable steady difference in temperature is about 10°C. I am advised that the shear stress in the Redux caused by the relative contraction between the skin and the Stringers due to a temperature difference of this order would be well within its capacity.

Mr. Jablonsky did not agree that any reliable inference about the conditions on an operational climb could be drawn from these experiments. I recognise that this comment has some force but I base my conclusions on this aspect of his criticism on the more general considerations set out in paragraphs 101, 102 and 103 below.

* (b) No evidence was submitted of the effect, on the fatigue strength of a Redux joint, of the level of temperature of the adhesive. But I am advised that the wide experience of its use by de Havillands in the structures of other aircraft, where alternations of load on the glue line have certainly existed in numbers far in excess of any likely to have been experienced in the cabin structure of the Comet, and over a wide range of temperature of the Redux itself, is satisfactory evidence that this is not a probable cause of failure of the Redux joints in the Comet's cabin.

* (c) de Havillands made special tests to investigate the effect

on topical joints of repeated alternation of temperature between 60°C and -50°C. I am advised that these show that alternations of temperature within this range have no appreciable effect on the strength of a Redux joint.

* (d) At my request, de Havillands submitted a statement which summarised the history and present state of their production methods in the use of Redux, with particular reference to its application to the construction of the Comet. Mr. Povey, the Director responsible for production, gave evidence on the point. I am advised that this statement and evidence show that de Havillands fully appreciated the importance of this aspect of the use of an adhesive in essential structural components and that the methods they have devised, including process control and inspection, tests of samples of every joint, and periodic stripping of complete stringers from the skin, provide all the assurance that could reasonably be required.

101. However, the final test of a process of this type is recognised to be experience in service. No evidence was produced of any failure of de Havillands' methods of dealing with the same problem in aircraft such as the Hornet and the Dove, in both of which Redux is widely used. Moreover, inspection of Yoke Uncle at R.A.E., both before and after it was tested under repeated loading, showed no signs of any deficiency in the glue line. It must be remembered that before it was delivered to R.A.E. for tests, this aircraft had done 3,521 hours of flying on B.O.A.C. services, experiencing the conditions of temperature, and of temperature variation between the skin and the stringers, contemplated by Mr. Jablonsky.

102. Finally, examination of the wreckage led Mr. Ripley to conclusions contrary to those inferred by Mr. Jablonsky, for reasons which he explained in detail.

103. It has been established to my satisfaction that the rear part of the fuselage substantially intact, hit the surface of the sea at high speed, open end downwards. This caused the equivalent of an explosion in it, whose effects were naturally most acute near the open end (see Figures 3 and 4). I am advised that the failure, under these circumstances, of the adhesion between the skin and the stringers cannot be regarded as evidence of the failure of the adhesive to meet the requirements of the normal use of the aircraft. There was in this neighbourhood abundant evidence of the failure of all the methods of attaching the various structural components to one another. Moreover, the numerous places where the skin had parted from the stringers exposed the glue line to examination and Mr. Ripley said that he had been unable to find any sign of any unsatisfactory features in the process employed by de Havillands, or of any weakness in the adhesive.

104. In the light of these considerations I have no hesitation in rejecting Mr. Jablonsky's suggested alternative cause of the failure of the cabin.

(c) Mr. Tye's evidence

105. The only other witness who did not completely accept the suggestion advanced in the Report was Mr. Tye. He did not dispute that the primary cause of the accident was the bursting of the cabin structure, but he expressed himself as not entirely satisfied that fatigue was the cause of that disruption. He appears to have proceeded on the basis that the 9,000 hours (3,000 flights) at which Yoke Uncle burst could be regarded as a fair average life for the fuselage and to have been impressed by the improbability, on this basis, of both Yoke Peter and Yoke Yoke failing from fatigue after only about 3,000 hours (1,000 flights).

He was unable, however to suggest any other cause. He admitted that he could find no evidence either (a) of excessive internal pressure in the cabin or (b) of excessive stresses in the cabin structure due to external action such as gusts or failure of the control system. He agreed also that he could not name any alternative cause of the failure which R.A.E. had failed to consider.

106. Bearing in mind that Mr. Tye is the Chief Technical Officer of A.R.B. and as such will be responsible for advising A.R.B. when an application is made for a new Certificate of Airworthiness for Comet aircraft, his caution is understandable, but I have the duty of expressing my conclusion on the evidence. I rely in this connection on an answer given by Mr. Tye to Sir Lionel Heald which seems to me to represent the proper approach for me to adopt in the circumstances of the case. Mr. Tye said "I think in concluding on the likelihood of the cause one has to take the thing as a whole: one has to take the tank test evidence and say that that shows that fatigue is possible, although on my argument not necessarily probable, that is the tank test by itself; one then has to look at the other half of the matters namely, all the other possible causes, and if in the process of eliminating possible causes you become completely confident that you have eliminated every other possible cause, then you are driven to say that the possible fatigue rises to the most probable cause." Applying these observations to what was done in the course of the investigations by R.A.E. and by the de Havilland Engine Company Limited and to the evidence given in the Inquiry before this Court, I unhesitatingly come to the conclusion that R.A.E. were right in their conclusion that the accident at Elba was caused by structural failure of the pressure cabin in the region of the A.D.F. window, brought about by fatigue. In reaching this conclusion I am fortified by the advice I

have received from my Assessors.

(d) The possibility of over-pressurisation

107. I considered nevertheless that although the R.A.E. Report contained a full investigation of the equipment used for controlling the pressure in the cabin, including both an examination of the possible causes of mal-functioning and of the condition of the equipment recovered from the wreckage, de Havillands should be asked to produce further evidence directed towards establishing that the precautions taken in the Comet installation, to ensure that the pressure could not rise appreciably above the normal working pressure, were reliable. Mr. Wilkins, an Assistant Chief Designer of de Havillands, who was responsible for this aspect of the designs gave evidence on the matter, and a statement was produced by de Havillands summarising the method of operation of the essential controlling and safety valves. Messrs. Normalair Limited, the firm responsible for the pressurisation control equipment, also produced full information about the essential parts. Taken together with the R.A.E. Report, this additional evidence satisfies me that the possibility of the development of excessive internal pressure in the cabins of an amount sufficient to endanger its structure, was so remote that it can be excluded as a probable cause of the bursting of the cabin.

(e) Certain defects referred to in the R.A.E. Report

108. I turn now to the other defects discovered by R.A.E. and already referred to in paragraph 93 of this Report, I see no reason to differ from the conclusion reached by R.A.E. that none of these defects was in any way the cause of the accident.

109. It is clear that the separation of both port and starboard outer wings from the centre section (see Figure 11) was not the primary cause of the accident, for there is ample evidence from the distribution of paint marks and scratches on both wings that they were made by parts of the cabin structures and form a pattern (see Figure 16) which is consistent only with the whole wing having been intact when they were made. For the same reason, the known point of fatigue weakness in the wing skin near the edge of the wheel-wells is not suspect. Moreover the fracture of the wings occurred some distance outside this region.

110. As regards escape of fuel from the fuel venting system, examination of the wreckage disclosed that fire did not start until after the disruption of the cabin. It is clear, therefore, that escape of fuel from the tank vents during take-off or climb had nothing to do with the accident.

111. Turning to refuelling, the danger apprehended could only occur by a concatenation of five events. The risk was, therefore, said to be a remote one and in any event in the present case R.A.E. state that examination of the Elba wreckage made it plain that even if the aircraft had sustained damage of the type indicated in Part 6 of the R.A.E. Report (which deals with this subject), such damage was not the cause of the accident to Yoke Peter. There had, however, been a recorded instance of trouble due to this cause and it is to be observed that de Havillands have indicated their intention of devising a method of removing the possibility of damage of this kind (see Appendix VIII).

(f) The possibility of damage by jet efflux

112. During the operation of B.O.A.C. services, there had been some experience of small damage to the cabin skin, due to the

buffeting by the efflux from the jet engines. This damage was partly in front of and partly behind the pressure dome of the cabin. As soon as it was observed, a systematic inspection was made of all Comets, and where any signs of cracking were detected a repair was made according to a scheme specially devised by de Havillands. Internal inspection showed that the buffeting was also causing slight loosening of the joint between the stringers and the skin in this region, and rivets were therefore inserted in order to ensure that this would not give rise to danger.

113. This point of possible weakness was under continuous observation. The steps taken to deal with it may be considered to be satisfactory, particularly since, where the repair had been carried out, no further trouble occurred.

114. It is, however, recognised by de Havillands that a situation in which it is known that such cracks are likely to occur is unsatisfactory, and among the improvements they intend to make on future Comets is one which they believe will reduce the cause of this damage, namely, a slight change in the direction of the jet pipes at their exits, with the object of diverting the jets away from the sides of the cabin.

PART XIV RESPONSIBILITY

(a) Introductory

115. No suggestion was made that any party wilfully disregarded any point which ought to have been considered or wilfully took unnecessary risks. But in the course of the evidence, questions were put which make it necessary for me to consider a number of points in the light of the conclusion I have already expressed as to the cause of the accident.

(b) Criticism of de Havillands' design work

116. Dealing first with the period prior to the commencement of the scheduled passenger service on the 2nd May, 1952, the calculations made by de Havillands were criticised and it was suggested that the tests they carried out were inadequate to guard against the risk of fatigue in the cabin structure. In support of this contention particular reference was made to certain calculations included in paragraph 4 of Part 3 of the R.A.E. Report and to other calculations produced by Sir Arnold Hall in the course of his evidence. It is, however, to be observed that the primary object of de Havillands was to lay the foundation for extensive tests which they regarded as the soundest basis for the development of a project rather than to arrive at a precise assessment of the stress distribution at the corners of the cabin windows.

117. I do not think that they can justly be criticised for this approach to the problem. In arriving, at this conclusion I have been assisted by a Memorandum which has been prepared for me by my Assessors and which confirms the impression I formed from the evidence of the witnesses that de Havillands were proceeding in accordance with what was then regarded as good engineering practice. I am also satisfied that in the then state of knowledge de Havillands cannot be blamed for not making greater use of strain gauges than they actually did or for believing, that the static test that they proposed to apply would, if successful, give the necessary assurance against the risk of fatigue during the working life of the aircraft. The Memorandum to which I have referred is included as paragraphs 118 to 129 of this Report.

(c) Memorandum by Assessors

118. During the design of the Comet de Havillands did not make use of calculations in an attempt to arrive at a close estimate of the stress distribution near the corners of the cabin windows. We have examined such of their calculations as had a bearing on this question; these led to the stress of 28,000 lb./sq. in. mentioned by Mr. Harper. It is clear that this stress refers to an area of the skin in the neighbourhood of the corners, and may fairly be said to be an average value over a width of 2 or 3 inches. de Havillands believed that their method was satisfactory for the purpose they had in mind, namely, the design of a test specimen. They did not consider that a closer estimate of the highest value of the stress could be made by any method which they would regard as reliable. They preferred to rely on tests of specimens designed on the basis of their calculations.

119. Since their estimate of the general level of stress in the region investigated was less than half the ultimate strength of the material (about 65,000 lb/sq. in.) they were confident that they could demonstrate by static test that there would be no failure at twice the working pressure, and that there would be a considerable reserve in hand. Their tests of panels about 3 ft. square, including, a window, substantiated this view.

120. We note, however, that in these tests the panel was supported on the face of a stiff steel "pressure box", and not in conditions truly representative of those which existed near the window in the pressure cabin itself. It is not possible to say what the effect of this would be. de Havillands were reassured by the results of the tests, in which the specimen withstood nearly 20 lb./sq. in. without failure.

121. de Havillands used the same approach to the design of the whole pressure cabin. The static tests which they made on the two parts of the pressure cabin, respectively 26 and 24 ft. long, gave them confidence in the integrity of the whole cabin. Since they believed, with general support from then current practice and opinion, including that of A.R.B., that this basis of design and static tests would give ample assurance against risk of failure under repeated applications of the working pressure, and other known causes of fatigue, they felt that the cabin was good for the life of the aircraft (say 10,000 pressurised flights, or 10 years).

122. Here again, however, we note that the test sections of the cabin differed from the cabin as fitted to the aircraft in several respects. In the first place, each was incomplete, and incapable of sustaining pressure if it had not been fitted with a stiff bulkhead at the open end or ends. It is not possible to say whether the constraint which these bulkheads imposed on the structure would make it stronger or weaker than when it formed part of a complete cabin. But it must be recognised that the stresses in the structure near the bulkheads would be appreciably affected by the constraint, and the reliability of deductions about the strength of the cabin would thereby be reduced. Secondly neither section was fitted with the complete number of windows, etc. Moreover, the windows of special interest in this Inquiry, which were in the front test section, were rather near the bulkhead mentioned, so that the stresses in the skin round them might have been appreciably different from those in similar places in the complete cabin.

123. The increasing attention which de Havillands gave, during the period mid 1952 to end 1953, to the fatigue life of pressure cabins has been mentioned in paragraphs 21 to 24. In their repeated loading tests the front test section of the cabin survived

16,000 applications of just over the working pressure. They felt confident that the Comet's cabin would have a safe life well beyond their target of 10 years in service.

124. The repeated loading test on Yoke Uncle at R.A.E. led to an unexpected failure after some 3,000 applications of load. Though this was about three times the life of Yoke Peter at Elba or Yoke Yoke at Naples it was surprisingly short and led directly to the inference that there were high local stresses. Steps were, therefore, taken at R.A.E. to measure the stresses near the corner of the window, using strain gauges placed as near as possible to the edge of the skin where the failure started. These measurements led to an estimated stress of 43,000 lb/sq. in. at the edge at the normal pressure difference of 8.25 lb./sq. in.

125. This estimate of the stress was regarded by de Havillands as unreliable, partly because the process of deriving it from the experimental measurements involved some extrapolation, but also because it would imply that in their own test to twice the working pressure, there was a local stress of double this amount, namely 86,000 lb/sq. in., which is some 30 per cent. above the ultimate strength of the material. This apparent paradox can be explained by recognising that it neglects to take account of the effect of the ductility of the material in relieving "stress concentrations" (see on this subject paras. 148 to 153 below).

126. Calculations were made by Sir Arnold Hall to explore the problem in the light of such theoretical solutions as were known of the problem of stress distributions round a cut-out of the shape of the cabin windows, in a cylindrical shell of metal under pressure. These calculations were not put forward as exact, but, with due allowance for the fact that the window frame, and the cabin stringers and hoop frames, would influence the result they

supported the reasonableness of the estimate made from measurements on Yoke Uncle.

127. It is our view that the two results taken together point strongly to the conclusion that the stress in the skin at the edge of the window near the corner was far higher than had been suspected by de Havillands, and was probably over 40,000 lb/sq. in. under the normal pressure difference.

128. In the course of the Inquiry much attention was paid to an estimate, given in Part 3, para. 6 of the R.A.E. Report on the tests on Yoke Uncle, of the stress which might be predicted on the basis of their measurements by strain gauges, as probably existing in flight. The figure "70 per cent. of the ultimate strength" was obtained by adding to the 43,000 lb/sq. in. (mentioned above) due to the working pressure, another 2,700 lb / sq. in. due to other known loads, leading to a total of 45,700 lb/sq. in. This was contrasted with de Havillands' own estimate of 28,000 lb/sq. in. It has already been pointed out that de Havillands' figure relates to an average over a considerable distance near the corner of the window, and due only to the working pressure, whereas the estimate made by R.A.E. relates to a particular point where the stress would be expected, on general grounds, to reach a maximum. A direct comparison between them is therefore misleading. Having regard to the different approach the two figures cannot be said to be inconsistent.

129. It is natural that de Havillands and R.A.E. should have approached the problem of the "safe life" of the pressure cabin of the Comet from different points of view. de Havillands were the designers and looked at the problem as designers would, having confidence in their methods based on their experience. R.A.E.

had had virtually no previous knowledge of the design background of the Comet, since it is a civil aircraft and their connection with it before the 8th April, 1954, was primarily advisory in character and was wholly concerned with fatigue of the wings. In the early stages of the Inquiry there was, therefore, a sharp disagreement between them on the interpretation of their calculations and tests. These differences of opinion diminished in the course of the Inquiry as greater mutual understanding developed. While there are still minor points on which they do not quite see eye to eye, a situation which is by no means unusual in technical problems of such difficulty, there is now no longer any substantial disagreement between them. Our own interpretation of the situation, so far as it can be determined by existing evidence, is set out above, and we believe that it would be accepted by de Havillands and R.A.E.

(d) Criticism of de Havillands repeated loading tests in 1953

130. Another criticism of de Havillands was connected with the repeated loading tests carried out by them in 1953. When the R.A.E. test revealed the short life of the cabin structure of Yoke Uncle the question arose as to how to reconcile the result of that test with the result of these earlier repeated loading tests. Sir Arnold Hall suggested that the explanation might well be that the 1953 tests were carried out on a nose section which had previously been subjected to static tests up to a differential pressure of 16.5 lb/sq. in. and that the effect of such a test might be to prolong the life of the specimen subjected to it. Mr. Harper said that he was aware of this possibility but he considered that if there was any increase in life of the nose section attributable to pre-loading the tests so amply covered the life of the aircraft both at the time of the tests and for the immediate future that de Havillands could safely accept the test as satisfactory. In the then

state of knowledge I think this conclusion was reasonable.

(e) de Havillands' method of dealing with cracks

131. There is one other question bearing on responsibility to which I must refer. This concerns certain cracks, revealed by the examination of the wreckage (see para. 78), which had occurred in the process of manufacture and had been dealt with by location. Sir Arnold Hall said that such manufacturing cracks might form foci for fatigue and thus shorten the life of the structure. It was suggested in cross-examination that the fatigue which led to the disintegration of Yoke Peter had originated in these cracks, that they ought not to have been dealt with as they were and that accordingly some responsibility ought to attach to de Havillands for allowing the aircraft which contained them to be put into service.

132. It will be convenient to deal with the subject of cracks generally before giving my opinion on the specific question of responsibility mentioned above. This course may also enable the whole matter to be viewed in proper perspective. Public concern may have been aroused by what was said during the Inquiry and it is important that groundless fears should be allayed.

133. I am advised that it has been the general experience that certain parts of the structure of aircraft develop cracks as the result of fluctuation of load, vibration or casual damage and that the external skin, whether in the wings, tail or fuselage is particularly vulnerable. Cracks which occur during manufacture do not differ materially, in their significance, from those which may develop subsequently save, of course, that their presence may indicate an unsatisfactory manufacturing process.

134. It is the ordinary practice to make careful inspection of the structure, both during manufacture and subsequently, particularly in regions known to be specially susceptible and, if cracks are found, to deal with each case on its merits in the light of a now very wide experience of the problem. Where frequent inspection shows that a particular crack is likely to spread, it is dealt with by a carefully considered repair scheme, either prepared by the designers or by the operators in collaboration with the designers. However if after such repair the crack continues to spread it is considered as a matter of major concern possibly requiring a radical modification to the design to reduce the stress which gave rise to it.

135. For small cracks in regions not highly stressed the method of location is generally found to prevent further spread, provided that care is taken to ensure the inclusion of the end of the crack in the hole drilled. All witnesses who dealt with this matter in the Inquiry were agreed that location was a reasonable method of dealing with such cracks.

136. I am also advised that most aircraft experience cracks due to one or more of the causes mentioned above and that it would, indeed be hardly practicable to insist on a standard of design and construction which would preclude completely the possibility of any crack in the skin.

137. The methods employed by de Havillands in dealing with manufacturing cracks were in no way different from those used to deal with other deviations from the strict requirements of the drawings to which the aircraft was being built. Defects whether discovered by the workman or the inspector would be dealt with by the procedure known as "Concession" procedure which varied according to whether the defect was classed as major or minor.

Mr. Povey said that manufacturing cracks were required to be dealt with as major defects with the result that "Concession Notes" containing the proposals for dealing, with them would have to go forward to the Chief Inspector and, if approved by him, would have to be submitted to the Design Department for final approval. In the case of Yoke Peter three cracks were discovered in the reinforcing plates of the A.D.F. windows. The action taken, which was approved by the Chief Inspector and the Design Department, was "splints have been located with a 1/16th dia. drill hole". According to the then current engineering practice this action would have been appropriate had the stresses been as low as de Havillands believed them to be, but was, in fact inappropriate as the region concerned was one in which there were high stresses. However, as I have already stated in paragraphs 116 and 117 my opinion that de Havillands cannot be blamed for their ignorance of the true state of affairs, it follows that no responsibility attaches to them.

138. The evidence disclosed other cracks in Comet aircraft. Thus in the wreckage of Yoke Peter there was a crack in the skin at the starboard front corner of the rear A.D.F. window. This had been located at both ends. No Concession Note was available in relation to this crack and it would appear that there had been a defect in the operation of the Concession procedure. Although this crack had spread during the life of the aircraft beyond one of the points at which it had been located, the actual fracture did not take place there nor was there any sign of fatigue. Other cracks were referred to in Yoke Uncle and Yoke Yoke but in no case was there any evidence that the crack had contributed to the failure of the aircraft.

139. I need not pursue further the question of manufacturing cracks of this type since the statement put in on behalf of de Havillands (see Appendix VIII) records that if in future a crack

does occur at any time either in manufacture or subsequently during the life of an aircraft no repair scheme for such a crack will be sanctioned unless it ensures that, after it has been carried out, the part of the aircraft concerned will be as strong and will have as long a life as it would have had, had there been no crack.

PART XV FUTURE

(a) Statements on behalf of the Attorney-General and de Havillands

140. By s. 9 (12) of the Civil Aviation (Investigation of Accidents) Regulations 1951 the duty is imposed on me of making such recommendations as I think fit with a view to the preservation of life and the avoidance of similar accidents in future. I have been greatly assisted in that part of my task (a) by the statement as to future policy made by Sir Lionel Heald on the 12th November, 1954 on behalf of the Attorney-General after consultation with the Ministry of Transport and Civil Aviation and A.R.B.: (b) by the statement put in by Sir Hartley Shawcross on the 23rd November, 1954 recording the action which de Havillands now propose to take to deal with the problem of fatigue and with the other defects referred to in the Report of R.A.E. These statements are of such importance that I have attached them to this Report as Appendices VII and VIII. I respectfully agree with the course therein proposed to be adopted.

(b) Further suggestions directed to guarding against fatigue

141. The problem of securing an economically satisfactory safe life of the pressure cabin of an aircraft needs more study, both in

design and by experiments if the lightest possible safe structure is to be achieved. This is recognised by de Havillands in their policy in regard to the future of the Comet (Appendix VIII).

142. In Appendix IV para. 4 (iii), reference is made to the problem which arises owing to the variation among the lives, under a given loading cycle, of nominally identical parts, known as "scatter". In the pressure cabins of aircraft there are probably a number of causes of scatter. Tests of a large number of specimens are however virtually impracticable and, in order to ensure a safe life well above the minimum that is economically acceptable to an operator, methods must be devised of ensuring that design combined with a reasonable programme of tests can guarantee that the pressure cabins of transport aircraft will be entirely safe.

143. The policy which de Havillands propose to adopt for the Comet is directed to achieving this end, primarily by reducing both the general level of stress and the local excesses, due to all known causes, above the general level of stress. The knowledge which has been acquired as a result of the investigation of the accident to Yoke Peter, and the tests made on Yoke Uncle at R.A.E., strongly suggests that steps should be taken to determine by calculation, by tests of typical parts of the cabin, and by tests on one or more complete cabins, both the distribution of stress throughout the structure in considerable detail, the influences which determine both the highest static load which it will sustain, and its life to failure under repeated loading. In the present state of knowledge, it is likely that two complete cabins will have to be tested one under static loads and one under cycles of repeated loads.

144. From the evidence of Sir Arnold Hall and from advice I have received from my Assessors it became clear that there exist

methods of calculating, the stress distribution in the structure of a pressure cabin which could with advantage be employed more widely. Moreover the result of R.A.E.'s investigation satisfied me that in tests of pressure cabins or parts of them the stress distribution should be determined by wide use of strain gauges. This procedure will enable the calculations used in the design to be verified or amended, and will lead to a fuller understanding of the problem.

145. When these measures have been applied and the tests completed, de Havillands will no doubt ask A.R.B. to recommend the grant of a Certificate of Airworthiness to the re-designed Comet aircraft. It would not be desirable for me to say anything which might in any way limit the discretion of A.R.B. but I may perhaps appropriately express the hope that this procedure will reassure the public as to the integrity of pressure cabins and will justify Sir Arnold Hall's confidence that the Comet aircraft will fly again.

(c) Use of available Government facilities

146. In the course of the evidence there was some suggestion that prior to 1954 inadequate use was made in the development of the Comet of the unrivalled facilities available at R.A.E. to the civil aircraft industry. This may have been exaggerated. Be that as it may, in view of the importance of that industry to the national economy it is essential that in future manufacturers should be aware of, and should make full use of, such facilities as the research establishments of the Ministry of Supply can offer. The Court was informed that in practice there had been close personal association between members of the staffs of A.R.B. and R.A.E. and that R.A.E. was represented on the Airworthiness Requirements Co-ordinating Committee of A.R.B. It is desirable,

nonetheless, to strengthen the liaison between A.R.B. and all the research establishments of the Ministry of Supply and it might be worth considering whether, when the Council of A.R.B. is being strengthened in accordance with the statement made by Sir Lionel Heald (see Appendix VII), it should not also receive such additional reinforcement as will encourage the full use by manufacturers, operators and A.R.B of all available facilities.

(d) Avoidance of flight by unlicensed crew

147. Reference has been made in paragraphs 35 and 36 to the fact that the Engineer Officer of Yoke Peter was not in possession of a valid licence at the time of the accident. I was informed by Counsel for B.O.A.C. that their system for ensuring the prompt renewal of licences had been overhauled and that adequate steps have been taken to prevent a recurrence of this lapse. It is clearly of the first importance to ensure that no aircraft flies save with a crew not only fully qualified in knowledge and experience but also properly licensed.

(e) Suggested scientific and technical investigations

148. There are certain scientific and technical matters on which, acting on the advice of my Assessors, I recommend that research can usefully be undertaken, in the interest of increasing knowledge of the problems of the design of pressure cabins. The first arises from the influence of the ductility of the aluminium alloy from which the skin of the cabin is made, on the manner in which the stress distribution in the skin is related to the difference between the internal and external pressure on the cabin. It is perhaps simplest to look at this problem in the light of the situation which develops as the pressure in the cabin is increased from the working pressure P up to the value somewhat

below that at which it fails under a static test.

149. In the first place it is essential to appreciate that, although it would from many points of view be desirable that the stress in the skin should be the same everywhere, in practice considerable variations are unavoidable. There will, therefore, be points, generally near to the cut-outs, where the stress is appreciably higher than the average, and it is on these points that the designer's attention is naturally focussed when considering, the strength of the structure.

150. As the pressure difference in the cabin rises from P to, say, $1.5 P$ the stresses everywhere will rise in the same proportion. But as the pressure difference approaches, say, $2 P$ the stress in the more highly stressed regions will reach that at which the material is no longer elastic. Its extension will then be of a plastic nature, that is to say, one which does not disappear when the stress which caused it is removed. Over most of the skin the stress will remain within the range in which the material is still elastic and the removal of the pressure will restore this part of the skin to its original dimensions. But in areas where the stress was high there will remain a permanent stretch. The pre-loaded cabin is therefore physically different from a new one, if the pre-load has exceeded a certain level.

151. Although the permanent extension of the material in the areas where it has stretched plastically, but without fracture, is small and undetectable by visual inspection, it may have a profound effect on the distribution of stress in the material when the working pressure is applied a second time. Without going into details, the general nature of this will be to reduce markedly the stress in the areas where it was previously greatest. The stress concentration in such areas is therefore relieved.

152. This is a process whose general nature is understood, and there are examples where it has been deliberately used in order to improve resistance to fatigue. It has indeed been suggested that it might be used in such structures as a pressure cabin. But there are obvious difficulties, not to say dangers, in applying it. Nevertheless, the subject should undoubtedly receive more study, if only to ensure that tests during design are not rendered unreliable by failure to appreciate its significance.

153. Though there can be no direct proof, there is no doubt that the phenomenon described above provides at any rate a partial explanation of the apparent anomaly presented by the failure of the pressure cabin of Yoke Uncle at R.A.E. after 3,000 cycles, in spite of the survival of the test specimen of the forepart of the cabin to over 16,000 cycles when tested by de Havillands. The maximum pressure difference which had ever been applied to Yoke Uncle was 1.33 P. whereas the test specimen had been subjected to two applications of 2 P in addition to nearly twenty of between P and 2 P.

154. The second question which needs study may be put shortly as follows: what is the true static strength of the complete Comet cabin ? Reasons have been given in paras. 120 and 122 why the tests made on sections of the cabin may have been somewhat misleading. A test conducted in the tank at R.A.E., with the most comprehensive exploration of the stress distribution, would be invaluable. Not only would it clear up such uncertainties as remain from our Inquiry, but, in conjunction with the repeated loading, tests already made on Yoke Uncle, would provide an invaluable body of information for the basis of design of future pressure cabins

155. The remaining question which requires study relates to the system used to operate the aircraft controls. Most of the evidence on this subject was concerned with the alleged excessive "break-out" force and indicated a difference of opinion, among pilots, as to whether the existing system was satisfactory in this respect, though none suggested that the alleged defect had in any way contributed to the accident. A different criticism was made by one of the Assessors to the Indian Court of Inquiry into the accident to G-ALYV and apparently prompted that Court's second recommendation, which was as follows: "That consideration should be given to the desirability of modifying the flying control system of the Comet aircraft in order to give the pilot a positive 'feel' of airloads exerted on the control surfaces." Only a passing reference was made to this before me. As advised by my Assessors, I am satisfied that the characteristics of the control system of the Comet should be reconsidered by de Havillands and by A.R.B. in the light of both the criticisms which have been made.

(f) Observations on certain suggestions made in the course of the Inquiry

156. I cannot conclude this part of my Report without mentioning two suggestions made during the Inquiry which, after full consideration, I feel unable to recommend.

157. The first of these arose out of some criticism which was made of the system whereby inspection of aircraft parts is delegated by A.R.B. to manufacturers. By this system, the operation of which is set out in an A.R.B. pamphlet on "The Approval of Inspection Organisations and the Maintenance of Airworthiness", manufacturers' own inspectors have the duty of supervising all the work done in building civil aircraft. This

inspection organisation is supervised by A.R.B. through their own inspectors to ensure that it is adequate. A.R.B. inspectors do only such detailed inspection of work as is needed to assure themselves that the system is working satisfactorily. Evidence was given by Mr. Povey illustrating how this system worked at de Havillands.

158. The suggestion was made that the system for inspection would be more satisfactory if all the Inspectors were responsible direct to A.R.B. and not to manufacturers, or alternatively that there should be a duplicate system of inspection whereby both manufacturers and A.R.B. would have inspectors. Reference was also made to the method of inspection of shipping by Lloyd's as an example of how such a system might work but no evidence was produced as to this method. I cannot, therefore, form any conclusion on the suggested analogy.

159. It is plain that there would be inherent dangers in duplication. Responsibility for the quality of his product must rest with the producer. It is, therefore, essential for the producer to have his own system of inspection. Any additional system would add to expense, but not, it was argued to safety.

160. I have come to the conclusion that the present system of inspection by manufacturers approved and supervised by A.R.B. is essentially satisfactory. It is, of course subject to human errors, but it has the beneficial effect of creating a sense of responsibility in manufacturers without which aircraft could not be designed and built to the requisite standard of reliability and safety.

161. The second suggestion arose out of some criticism which was levelled at A.R.B. on the ground that their flight testing organisation is relatively small compared with similar flight test

teams at aircraft firms and at the Ministry of Supply Experimental Establishments. A suggestion was, therefore, put forward that A.R.B. flight testing and aircraft approval would be made more effective if an active pilot were appointed to their Council and if civil aircraft were sent to a Ministry of Supply test establishment where a much wider and more experienced opinion on flying qualities could be obtained from a larger organisation, instead of the somewhat restricted assessment at present available to A.R.B.

162. Although I am satisfied that there is no reason to criticise the flight testing of the Comet I as carried out by de Havillands and A.R.B., I think serious consideration should be given to the possibility of obtaining the best available opinion on the flight characteristics of future airliners particularly when they incorporate novel features in design which effect those characteristics. As I have mentioned in para. 146 of this Report, such facilities are available in Ministry of Supply Establishments, and the importance of the civil aircraft industry to the economy of this country seems to warrant making the fullest use of those facilities.

163. With reference to the suggested appointment of an active pilot to the Council of A.R.B., there are clearly difficulties in such an arrangement since the pilot would be unable to do his job as an airline pilot and at the same time be available to give his advice to the Council. I have no reason to believe that the present representation on the Council has been in any way lacking in the past and I hesitate to recommend any change. If an active pilot were to be appointed the post would have to be made a whole time paid employment and it would not be long, before he ceased to possess the qualifications upon which those who advocated the appointment laid stress. On the whole I think it is better to rely

on the Minister to secure that the person he nominates to the Council as possessing professional experience as a pilot of civil aircraft is always someone who is reasonably up-to-date.

PART XVI QUESTIONS AND ANSWERS

My answers to the questions submitted on behalf of the Attorney-General are as follows: _

Question 1

What was the cause of the accident?

Answer.

The cause of the accident was the structural failure of the pressure cabin brought about by fatigue. See para. 95.

Question 2.

If several factors caused the accident what were such factors and to what extent was each contributory?

Answer.

This does not arise.

Question 3.

Was the accident due to the act or default or negligence of any party or of any person in the employment of that party?

Answer.

The accident was not due to the wrongful act or default or to the negligence of any party or of any person in the employment of any party.

Question 4.

At the time of the accident:

Question 4 (a).

Had the aircraft been maintained in accordance with the current approved maintenance schedules? If not, did any defect in maintenance affect the safety of the aircraft or contribute to the accident?

Answer.

Yes. The second part of the question does not arise.

Question 4 (b).

Was the aircraft airworthy so far as could reasonably have been then ascertained ?

Answer.

Yes.

Question 4 (c).

Was there a valid Certificate of Airworthiness in respect of the

aircraft?

Answer.

Yes.

Question 4 (d).

Was there a valid Certificate of Maintenance in respect of the aircraft?

Answer.

Yes

Question 4 (e).

Was the radio station of the aircraft serviceable and was there a valid Certificate of Serviceability in respect thereof ?

Answer.

Yes.

Question 4 (f).

Was the aircraft properly loaded and trimmed within the limits specified in the Flight Manual?

Answer.

Yes.

Question 4 (g).

Were all members of the crew properly licensed and adequately experienced to make the flight? If not, did any defect in the licence of any member of the crew affect the safety of the aircraft or contribute to the accident?

Answer.

All members of the crew were adequately experienced to make the flight but the flight engineers Engineer Officer F. C. Macdonald was not properly licensed to make the flight (see paragraph 35). This defect did not affect the safety of the aircraft or contribute to the accident.

Question 5.

Upon consideration of all facts disclosed by this Inquiry what steps should be taken to increase the safety of civil aircraft?

Answer.

See Paragraphs 140-155 of this Report.

Report by COHEN., W. S. FARREN., W. J. DUNCAN., A. H. WHEELER.

1st February, 1955.

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Aviation and may not be distributed without their written approval.

Official accident report of Comet IV G-APDN

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Civil aircraft accident report 1/72

Accident investigation branch - Department of Trade and Industry

Dan Air Comet 4 G-APDN.

Report on the accident which occurred in the Sierra del Montseny, in the Municipal District of Arbucias (Gerona) Spain on 3 July 1970.

Translation of the report published by the Spanish Air Ministry, Madrid October 1971

London : Her Majesty,s stationery office 1972

0. Figures

Flight pad of G-APDN

1. Investigation

1.1. History of flight

The aircraft was operating a regular Dan-Air charter flight from Manchester to Barcelona. It took off from Manchester for Barcelona at 1608 hrs. The routing specified on the flight plan was via Airways UA1, UA34, UB31 and Point Berga. Because of ATC delays in the Paris area the aircraft was cleared to proceed via UA25 to the Cognac VOR (1725 hrs) - Agen VOR - Toulouse VOR (1743 hrs), joining UB31 at point 'B'. G-APDN was then cleared by French ATC to descend from FL370 to FL220. At 1753 hrs the pilot established contact with Barcelona ACC on 124.7 MHz and after reporting that he had passed the Spanish frontier requested clearance to descend further; it was cleared to descend from FL220 to FL90.

At 1757 hrs G-APDN reported passing the Barcelona FIR boundary and that it was leaving FL160, and gave an ETA of 1801 hrs for Point Berga. At 1759 hrs the pilot received instructions to contact Barcelona Approach (APP) on 119.1 MHz; a few seconds after changing to that frequency G-APDN

was instructed to turn left on to heading 140°. The pilot acknowledged the turn and reported that he was leaving FL130, and immediately afterwards gave an ETA for Sabadell of 1807 hrs.

At 1800 hrs APP requested confirmation of this estimate and the pilot corrected it to 1805 hrs. On receiving this information, APP cancelled the turn on to 140° and told the pilot to proceed to Sabadell. At 1801 hrs, G-APDN reported leaving FL100 for FL90. APP enquired whether it had DME on board and the pilot replied that it did not. G-APDN was then cleared to descend to FL60.

At 1802 hrs, APP instructed the pilot to turn left on to 140°. The pilot acknowledged this instruction and informed ATC that he was leaving FL85 for FL60. Immediately after this transmission, APP requested confirmation that G-APDN was passing Sabadell, and the pilot replied 'in about 30 seconds'; 15 seconds later the pilot said 'Barcelona, G-APDN passing Sabadell'. APP acknowledged the message and added 'radar contact, continue descent to 2,800 feet, altimeter 1017, transition level five zero'.

At 1803 hrs G-APDN requested information on the duty runway, APP replying that the duty runway was 25, which the pilot acknowledged. At 1805 hrs, APP requested aircraft altitude and G-APDN reported passing 4,000 feet. At 1807 hrs APP called the aircraft for confirmation that it was still on course; G-APDN did not reply to this transmission, nor to other calls which were subsequently made.

The site of the accident was: Latitude 41°47'45" North, Longitude 02°27'34" East, and it occurred between 1805 and 1806 hrs, in daylight. The altitude of the site is about 3,900 feet.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	7	105	-
Non-fatal	-	-	-
None	-	-	-

1.3 Damage to aircraft The aircraft was destroyed.

1.4 Other damage Destruction of 125 acres of a privately owned beech wood, valued at approximately 25,000 pesetas.

1.5 Crew information

Captain Alexander George Neal, aged 48, held a valid British Airline Transport Pilot's Licence, with a current instrument rating, endorsed to fly Comet, Britannia and HS 104 aircraft in command. His licence was issued on 6 February 1967 and was valid until 5 February 1972. He passed his last instrument rating renewal flight test on 17 March 1970. He passed his last periodic medical examination on 3 March 1970 and there were no medical restrictions on his licence. Captain Neal was trained as a pilot in the Royal Air Force and had previously been employed as a first officer by British Eagle. He joined Dan-Air as a first officer in March 1969 and was promoted to captain in May 1970. At the time of the accident he had flown a total of 7,427 hours as a pilot. He had accrued a total of 605 hours on Comet aircraft, 29 hours being in command. The flight on which the accident occurred was his first flight to Barcelona as commander. Previously he had made one flight into Barcelona, on 19 May 1970 during his command and route check.

First Officer David Shorrock, aged 41, held a valid British Airline Transport Pilot's Licence endorsed for Comet, Britannia and BAC 1-11. His licence was issued on 18 July 1968 and was

valid until 17 July 1973. He passed his last instrument rating renewal flight test on 18 March 1970. He passed his last periodic medical examination on 26 June 1970. He was required to wear spectacles to correct his near vision when exercising the privileges of his licence. Mr Shorrocks was trained as pilot at a civilian flying school and had previously been employed by British Eagle. He joined Dan-Air as a first officer on BAC 1-11 aircraft in April 1969 and converted to the Comet in March 1970. At the time of the accident he had flown a total of 4,765 hours as a pilot of which 189 had been in Comet aircraft.

The flight engineer, Mr David Walter Stanley Sayer, aged 40, held a British Flight Engineer's Licence endorsed for Comet 4 and DC-7B aircraft. His licence was issued on 20 August 1969 and was valid until 21 August 1970. He passed his last periodic medical examination on 7 August 1969. Mr Sayer was originally a ground engineer with Dan-Air before qualifying as a flight engineer on DC-7B aircraft in July 1967. He converted to the Comet 4 in December 1969. At the time of the accident he had flown a total of 1,275 hours as a flight engineer, 218 hours being in the Comet 4. He was considered to be a very competent engineer.

Air Hostesses: Miss S Hinde, Miss H P Barber, Miss C A Maddock and Miss A Vickers.

1.6 Aircraft information

G-APDN was a standard production HS Comet 4 originally acquired by BOAC in April 1959; Dan-Air bought it from that company in 1969. The certificate of airworthiness was last renewed in the transport category (passenger) on 13 May 1970 and was valid until 12 May 1971. Although the original of the aircraft's certificate of airworthiness could not be recovered, the

British commission states that the certificate was in order.

A certificate of maintenance was issued by Dan-Air Engineering on 11 June 1970, after a Check 1 inspection, valid for 62 days or 638 hours. At the time of the accident the aircraft had flown 257 hours since the certificate of maintenance was issued. The total airborne hours of the aircraft were 25,786 since manufacture the aircraft had been maintained in accordance with an ARB approved schedule. It has been calculated that at the time of the impact the weight was below the maximum total weight authorised and that the centre of gravity was within the prescribed limits.

The aircraft was equipped with duplicated flight instruments, both general flight instruments and the Smiths flight director system. Each pilot had two radio magnetic indicators (RMI), one for presenting VOR information and the other for ADF. The commander's altimeter was of the three-pointer barometric type, whereas the copilot's was of the direct reading digital type incorporating a flasher unit and an altitude switch when the height indicated was below 10,000 feet.

The radio equipment carried by the aircraft was as follows:

Marconi AD 307	HF/RT	duplicated
Marconi AD 305/704	VHF COM	duplicated
Marconi AD 712	ADF	duplicated
Marconi AD 704/706	ILS/VOR	duplicated
Marconi AD 708	MARKER	single
Echo E 160	SEARCH RADAR	single
Marconi AD 2300A	DOPPLER	single
Bendix TRA 61 AL	TRANSPONDER	single
Marconi 28800	SELCAL	single

Ultra UA 56 INTERCOM single

Examination of the company records shows that the Doppler had been out of action since 20 June 1970. This equipment is classified as an allowable deficiency and is not a mandatory requirement.

There had apparently been a series of defects on number 1 VOR set. On 1 July 1970 a controller socket was replaced. A continuity check revealed an open circuit. This was rectified and the VOR was again serviceable. On 2 July 1970 number 1 VOR would not change frequency. The set was changed and the installation then worked normally, according to information received from the British sources. Although it is impossible to be certain that the VOR set was working properly at the time of the accident, it is certain that after the set was changed the aircraft flew four consecutive sectors, apparently without any defect in the equipment.

1.7 Meteorological information

The Sierra del Montseny, lying some 65 kilometres to the NE of Barcelona Airport, was covered by cloud, due to the phenomenon known as 'barrage' effect. The cloud mass showed little vertical development, consisting of stratus and stratocumulus. On the mountain top, known as Turo de l'Home (1,712 metres) situated about 4 kilometres in a straight line to the south of the accident site, and 500 metres higher, there is a meteorological observatory at which the following data were recorded at the time of the accident: pressure at sea level, 1,018 mbs, falling; temperature 9°C; dew-point temperature, 9°C; wind SW, 10 knots; mist, visibility nil; sky not visible on account of mist; orographic precipitation in the form of intermittent drizzle, 1 litre/metre² having been recorded in the last twelve hours.

The condensation level to windward was 600 meters and the cloud clinging to the mountain extending on the leeward side down to levels of between 800 and 1,000 metres. The surrounding valleys, away from the direct influence of the high mountains, showed light to medium cloud cover, with scattered cumulus; visibility was reduced by haze, except towards the coastal regions where visibility could be described as good. Because of the nature and type of the observed cloud, the light southerly winds both at the lowest atmospheric levels and at mountain-top level, and because of the standard distributions which gave the following upper winds and temperatures 850 mbs 340° 20 knots 9°; 700 mbs 330° 25 knots 5°; 500 mbs 310° 30 knots 9° and 300 mbs 290° 40 knots 20°; the question of the formation of turbulent air movements and mountain waves has not been taken into account because if they did exist they would have been weak and of no importance to air navigation.

1.8 Navigation aids

There are various aids available in the region for an instrument approach to Barcelona Airport. Those relevant to the accident now being investigated are: Sabadell NDB, Barcelona VOR, Perpignan VOR and Gerona VOR. All these aids were operating normally on the day of the accident.

Barcelona ACC/APP also had ASR-5 radar equipment in use, the main characteristics of which are:

- * range 60 nm
- * accuracy in azimuth: +- 0.5° error
- * accuracy in range within 3%
- * theoretical coverage up to 40,000 feet and from 20,000 feet at

60 nm; 12,000 feet at 50 nm; 5,000 feet at 35 nm; 2,000 feet at 20 nm and 1,000 feet at 10 nm.

* The usable range scales are: up to 6 nm with range circles of 2 nm; up to 10 nm with 2 nm; up to 20 with 2 nm, up to 40 with 5 nm and up to 60 nm with 10 nm.

The obstacle clearance chart (MOCA) is attached as Annex 1.

Local instructions for use of the radar are attached as Annex 2.

Barcelona VOR underwent routine inspections in flight on 2 April 1970 and 9 September 1970, without any corrective measures being required, as stated in the records of the Calibration Service (Servicio de Calibracion). Sabadell NDB was also inspected in flight as a routine measure on 5 June 1969 and 31 July 1970, its condition being regarded as GOOD by the aforementioned service, only some interference from the NDB CST (Costix)(MAJORCA) being observed in the first of these inspections.

1.9 Communications

Communications between G-APDN and Barcelona Control Centre were clear, with the appropriate terminology being used throughout. According to data exchanged, neither Barcelona ACC nor Barcelona APP noticed any abnormality in the flight of the aircraft. Defects have been observed in the tape recording when ACC was talking on 124.7 MHz. When the frequency was changed to 119.1 MHz communications between G-APDN and APP were properly recorded on the Barcelona Control tape.

1.10 Aerodrome and ground facilities

These are not a factor.

1.11 Flight recorders

The aircraft carried a MIDAS type CMT/SC flight recorder. Using all the traces of the parameters of time, speed, altitude,

pitch attitude, heading and vertical acceleration, during the last eight or nine minutes of the flight, the track of the aircraft was reconstructed on the map (Annex 3). This showed a close correlation between the aircraft's manoeuvres and the information exchanged between Barcelona Control and the aircraft, and that the track of the aircraft was not correct, deviating the whole time to the east of airway UB31. The accident occurred at 1805.30 hrs and the aircraft was descending, operating completely normally, at a true airspeed of 410 km/h.

1.12 Wreckage of the aircraft

The accident site was on the beech-covered north-east slopes of the Les Angudes peak (1,704 metres), at an altitude of about 3,800 feet, in the municipal district of Arbucias (Gerona). The heading of the aircraft before impact was approximately 145° , and its flight path was descending between 5° and 10° as indicated by the path cut through the trees by the aircraft. Later, two goniometers (direction finders) were found which indicated a heading of 142° . On detailed examination of the crash it was ascertained that the longitudinal axis of the aircraft at the moment of impact was at an angle of approximately 45° up from the horizontal, ie roughly equal to the angle of the mountain slope, it being noted that the main side marks were produced by the auxiliary fuel tanks and not by the fuselage. The fuel tanks exploded and started a fire.

1.13 Fire

There was an explosion and fire on impact with the ground.

1.14 Survival

As soon as the site of the disaster was known, amongst those who went to the spot were forces of the Civil Guard of 413

Command, Gerona; No 13 Company of the Fourth Group Ninth Brigade of the Red Cross, Barcelona; 110 firemen from the Municipality of Barcelona, 38 militiamen from the Municipality of Barcelona, 25 Red Cross volunteers from the Barcelona Mobile Squad, personnel from the near-by townships of Viladrau and Arbucias (Gerona) and San Celoni (Barcelona). There were also civil and military authorities from the Provinces of Barcelona and Gerona, and an examining magistrate from Santa Coloma de Farnes (Gerona), provincial medical officers from Barcelona and Gerona and members of the staff of Dan-Air Limited. A British commission was appointed to collaborate with the Spanish authorities in investigating the cause of the accident. There were also British technicians and a pathologist, an Anglican priest, the British Consul and Vice-Consul in Barcelona, along with 77 soldiers with NCO's and Officers of CIR No 9 from San Clemente de Sasebas (Gerona).

Due to the uneven terrain, the steepness of the slope and the dense vegetation, a bulldozer and excavator shovels had to be used to widen paths and open up a new one to facilitate evacuation of the victims. Since the Spanish health authorities reported that "it was technically impossible for the remains of the bodies to be embalmed and preserved, due to the extreme mutilation and scattering of the remains as a result of injuries of exceptional violence caused by an explosive shock-wave, and that death was presumably instantaneous in every case", the court ordered the bodies to be removed and taken to the municipal cemetery at Arbucias where they were burned.

1.15 Tests and investigations

One spoiler (air brake) was extended and the other was retracted, but it was impossible to establish whether the latter had been closed by the impact although this appears most likely in view of

the manner of operation of these brakes.

The main landing gear was retracted. No flaps were extended. Safety belts were in use. The life-jackets were not removed from their normal position. The turbine and compressor blades showed evidence of heavy abrasion as a result of their having been functioning normally. The accident took place at 1805.30 hrs this figure being obtained from data in the flight recorder.

1.16 Procedure followed by Barcelona APP

When the aircraft established radio contact with Barcelona APP on a frequency of 119.1 MHz, the latter in order to identify the aircraft instructed it to turn on to 140°, then cancelled this turn when the aircraft revised its ETA for the Sabadell beacon; this took place between 1759 hrs and 1800 hrs. Later, at 1802.20 hrs, and for identification purposes, APP again instructed G-APDN to turn on to 140° and the aircraft did so. At about 1802.25 hrs APP asked the aircraft if it was over Sabadell - since APP radar showed an echo with characteristics similar to those which the Comet should produce in terms of direction and speed - and the aircraft confirmed 'passing Sabadell', where upon the controller authorised descent to 2,800 feet, this altitude being authorised on the 'minimum radar altitudes chart' of Barcelona Control Centre.

1.17

In the investigation into the causes of the accident current ICAO regulations have been borne in mind, particularly paragraphs 3.5.2.2 of Annex 2 and Part II, 1, Note 2 and Part X, 1.6 of ICAO Doc. 4444 (RAC/501/9).

2. Analysis and Conclusions

2.1 Analysis

From a study of the recording tape from Barcelona Control; from the plan obtained from the graph taken from the transcription of the flight data recorder tape (black box) from the wrecked Comet 4, G-APDN (Annex 3); from the reports on the aircraft and its crew; and from the UIR chart for south west France and other documents relating to the flight, it is deduced:

That due to heavy traffic in the Paris area, the aircraft was diverted from the route laid down in the flight plan drawn up in Manchester (UA1, UA34, UB31 and Point Berga), and, on the instructions of French ATC, followed the route Nantes VOR - Agen VOR - Toulouse VOR - Point 'B.' (situated on the axis of the airway UB31) - Barcelona VOR. Take-off from Manchester was planned for 1600 hrs, but took place at 1608 hrs.

The aircraft did not follow airway UB31, which is the route to Barcelona for that zone, since at 1756.18 hrs it was still in the Bordeaux FIR on a heading of 193° , the direction of the above airway being 181° .

At 1757 hrs, the aircraft reported 'over the boundary', which was taken to mean that it was entering the Barcelona FIR (it had already reported this at 1753 hrs, according to the Barcelona ACC tape) and did so approximately 30 km to the east of the centre of airway UB31, still on the previous heading of 193° and giving at that time an ETA for Point Berga at 1801 hrs. This estimate would have been correct if it had been 'ABEAM BERGA' since at its calculated speed of 8 kilometres per minute (according to data from the flight recorder) it would have been 4 minutes away if it had been heading towards Berga; but it was impossible for the aircraft to reach that reporting point, since at 1801.30 hrs it was level with Point Berga and 26 kilometres to the left, still on a heading of 193° .

When radio contact was established on a frequency of 119.1 MHz with APP, the controller instructed the aircraft to turn on to 140°; the aircraft began the turn as shown on the map at Annex 3, only covering a distance of approximately 4.5 kilometres. The pilot revised his ETA for Sabadell, making it 2 minutes earlier. The controller cancelled the turn and it will be observed from Annex 3 that the aircraft gradually cancelled the turn, proceeding on its previous heading from 1802.18 hrs.

At 1802.30 hrs, for identification purposes, APP Barcelona again instructed G-APDN to turn to the left on to 140°; the pilot of the aircraft confirmed this instruction and reported that he was leaving FL85 for FL60. At approximately 1802.48 hrs, at the request of APP, the aircraft reported passing Sabadell, without having reached that point, since it can be observed on the map at Annex 3 that it was still 52 kilometres away. This message, 'passing Sabadell', transmitted by the aircraft, and also the fact that by coincidence the APP controller had observed an echo on the radar screen over Sabadell, led to the aircraft being informed that radar contact had been made. Neither Barcelona ACC nor the Aeroclub of Sabadell have been able to clarify the reasons for the above-mentioned echo, but this does not rule out the possibility that it was caused by an aircraft flying over Sabadell on a VFR flight plan. At this time the controller authorised descent to 2,800 feet, the minimum altitude indicated on the radar chart for this sector.

The bearing and speed of the echo were similar to those expected from a Comet.

At 1803 hrs, G-APDN requested the duty runway and APP replied that No. 25 was in service. This the pilot acknowledged.

At 1805 hrs, APP requested an altitude reading and the aircraft replied 'passing 4,000 feet'. At 1807 hrs, APP requested G-APDN to confirm it was maintaining its heading, but the aircraft did not reply.

The displacement of the aircraft's track to the east cannot be attributed to deviations of the Barcelona VOR signals, since if such a considerable defect had existed it would have been detected by numerous flights which have used and continue to use this VOR. Furthermore as has previously been stated, on 2 April 1970 the appropriate official service carried out a check and found the equipment within the permitted tolerances and therefore no adjustments were made.

2.2 Conclusions and probable causes

2.2.1

From the time the aircraft reported passing Toulouse VOR (if correct) it can be seen that it did not continue on UB31 after the BRAVO intersection point, but followed a line considerably to the east of that airway. This error persisted right up to the moment of the accident, and the information on ETAs and times of passing Point Berga and Sabadell NDB was also incorrect, as was the time given for passing the UIR boundary which was given twice with an interval of some 3 minutes.

2.2.2

Barcelona VOR was functioning correctly according to information from the Flight Air Inspecting Services, and from the absence of unfavourable reports on the functioning of the radio

aid in question.

2.2.3

Consequently, the aircraft's continuing displacement to the east could have come about as a result of some defect of the aircraft equipment, bearing in mind that from Toulouse VOR positions had to be determined by intersection of radials.

2.2.4

The pilots should have reported to Barcelona APP that they were passing to the east and not above Point Berga. The fact that this information was not given, together with an inexact ETA for Sabadell, made it difficult for the controller to identify correctly the aircraft on the radar screen.

2.2.5

To sum up, it can be deduced that the combination of erroneous information regarding reporting points, together with the existence of a radar echo over Sabadell NDB (coinciding with the report from the aircraft of passing that reporting point), led both the aircraft and APP to believe, erroneously, that the aircraft was already over Sabadell; this was an involuntary error (on both sides: ATC and aircraft) which was physically impossible to correct when Air Traffic Control realised it.

3. Recommendations

3.1

Emphasis should be given to the need for commanders of aircraft flying on a new route to verify successive positions of the aircraft

using all the aids available on board, rather than relying on the evidence of any one of them.

3.2

It would perhaps be desirable that the rules laid down by ICAO for radar identification should be revised, to prevent similar situations occurring. The Spanish authorities, for their part, have already made suitable provision in this respect, so that identification can be properly checked by more than one method.

3.3

Radio installation charts which are used for navigation purposes (radio navigation charts) should incorporate spot heights of the significant points along the route to be followed.

Madrid October 1971

IMPORTANT NOTE : The information contained in this report remains the property of the Spanish Air Ministry and may not be distributed without their written approval.

Official accident report of Comet IV LV-AHR

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[Last part of flight]
[Probable cause]
[Observations of the Government of Argentina]

Aerolineas Argentinas, Comet IV, LV-AHR,
accident at Campinas Airport, Sao Paulo, Brazil,
23 November 1961,
Report released by The Brazilian Air Ministry

Circumstances

The flight had originated at Buenos Aires, Argentina. At Vira Copos (Campinas) Airport, Brazil, the engines were started at 05:20 hours and the aircraft took off for Trinidad (alternately Barbados) at 0538 hours. After reaching an altitude of about 100 m, the aircraft lost altitude, collided with a eucalyptus forest and was destroyed. Twelve crew and forty passengers died in the accident, which occurred at approximately 05:40 hours .

Investigation and Evidence

The Aircraft

It had flown a total of 5 242 hours, 2 242 of which had been flown since the last overhaul and about 6 hours since the last 90-hour inspection. It was not possible to check the maintenance reports regarding the 30 days prior to the accident.

The Crew

A pilot-in-command, co-pilot and ten other crew members were aboard the flight . The pilot-in-command was sitting in the right-hand seat, presumably acting as instructor at the time of the

accident.

He had flown the following hours:

total flight time : 12 550 hours

as pilot-in-command or instructor : 11 246 hours

by night : 5 791 hours

in the same type aircraft : 1 612 hours

as pilot-in-command or instructor in the same type of aircraft :
584 hours

He held a valid IFR rating.

The co-pilot was sitting in the lefthand seat and had no flight time registered as pilot-in-command on this type of aircraft. It was, therefore, believed that he was receiving instruction as such. His previous experience was:

total flight time : 13 427 hours

in the same type of aircraft : 1 074 hours

as pilot-in-command in this type of aircraft : zero hours

by night : 2 833 hours

instrument flight : unknown

He also held a valid IFR rating.

It was not believed that the accident was caused by fatigue as the crew had only flown about 3 hours during the preceding 24 hours .

Weather conditions

It was not believed that the weather situation contributed to the accident. It was a dark night due to 7/8 stratocumulus at 400 m and to 8/8 coverage by altostratus at 2 100 m.

Weight at take-off

At time of take-off the aircraft was estimated to weigh 71488 kg. The maximum authorised weight was 72575 kg, i.e. 1087 kg below the maximum allowed.

The centre of gravity was within the prescribed limits. From the time of starting the turbines to the actual take-off about 528 kg of fuel were consumed thus increasing to 1 615 kg the balance in favour of safety. According to the control tower's testimony the take-off run was approximately 2 000 m. According to the dispatch estimate it should have been 2 240 m.

Take-off run

From tests with LV-AHU, another aircraft the same type as LV-AHR, it was concluded that the take-off run took about 40 seconds.

Climbing angle

In view of the control tower operator's testimony, the conclusion was reached that the aircraft's climbing angle was around 4.5 deg. The aircraft reached an estimated altitude of 100 m. Taking into account the minimum climbing angle of 4.5 deg, the aircraft should have reached an altitude of 120 m, which corroborates the control tower operator's statements.

Comparing the above with the results obtained during the LV-AHU test flight, it was concluded that from the beginning of the take-off run up to 120m, LV-AHR took about 55 seconds. Then it should have reached the indicated airspeed of 170 kts. At that moment LV-AHR was midway between the take-off point and the first impact point. So taking into consideration the remaining runway (1 240 m and the distance from the end of the runway to the first impact point (1 930 m), the aircraft flew 3 170 m.

The point where the aircraft started losing altitude could not precisely be stated ... however, it may be estimated as the middle distance between the point where the aircraft became airborne and the first impact point.

Comet IV flight instructions

According to the instructions, when a speed of 170 kts is reached, the pilot must control the "elevator change gear". When changed from "coarse" to "fine" the aircraft's nose has a tendency to drop, which has to be counteracted by using the manual trim tab. It was believed that the unit was under control when the accident occurred.

From analysis it was deduced that the aircraft, LV-AHR, hit the eucalyptus tree in a nearly horizontal attitude, which leads to the conclusion that the pilot, a short time before, when noting the loss of altitude, attempted to regain climbing attitude but due to the action of the elevator travel limiting unit in the "fine" position, the aircraft took longer to regain it. This must have been the reason why, at the moment of collision with the tree, the aircraft was still flying in a horizontal attitude.

Reconstruction of the last part of the flight

One hundred and twenty meters after the first impact point the pilot put the aircraft in a climbing angle of approximately 25 deg. This conclusion was reached as the eucalyptus trees were burned from the top down, probably by turbine exhaust gas, and the elevator counterbalance collided with a eucalyptus tree and was then torn off. About 145 m after the first impact point the aircraft collided with a larger eucalyptus tree and fire in the left wing pod tank resulted.

Moments later a further impact occurred with another eucalyptus in the No. 1 reactor area. The aircraft began sinking . Due to terrain declivity the aircraft touched the ground about 303 m from the first impact point. The aircraft slipped, ultimately collided with a ground obstacle, and exploded. Many fuselage parts found 120 m from the first impact point showed no signs of fire.

Probable Cause

It was presumed that the co-pilot was under flight instruction. If such was the case, the instructor, who was pilot-in command, may have failed to brief or supervise the co-pilot properly.

Observations of the Government of Argentina as the State of Registry of the Aircraft Concerned

Argentina has determined in the light of information it has gathered, that the cause of the accident was "Failure to operate under IFR during a take-off by night in weather conditions requiring IFR operation and failure to follow the climb procedure for this type of aircraft; a contributory cause was the lack of vigilance by the pilot-in-command during the operations."

IMPORTANT NOTE : The information contained in this report remains the property of the Brazilian Air Ministry and may not be distributed without their written approval.

Official accident report of Comet IVB G-ARJM

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British European Airways Corporation, Comet IVB, G-ARJM,
accident at Esenboga Airport, Ankara, Turkey,
21 December 1961,

Report released by The Ministry of Communications, Turkey
and by the UK Ministry of Aviation

Circumstances

The aircraft was on a scheduled flight from London to Rome, Athens, Istanbul, Ankara, Nicosia and Tel Aviv. From Istanbul the flight was operated by British European Airways on behalf of Cyprus Airways. The operating crew, employed by BEA, consisted of a captain and two first officers. Also aboard were four cabin staff employed by Cyprus Airways and 27 passengers.

The trip to Ankara was normal. The time between landing and starting engines at Ankara was 46 minutes during which light snow was falling. (At take-off the aircraft had a light covering of snow on the upper surface of its wings, however, this deposit had no bearing on the accident).

The radio-telephony tape recording showed that the aircraft taxied out along the short taxiway, then back-tracked up the runway to its take-off position on runway 21 at the intersection with the longer taxiway. The runway length available from this

position was 9 027 ft. Take-off weight was 53 465 kg, i.e. 18 185 kg below maximum permissible weight or 1 085 kg below the regulated take-off weight.

The takeoff run as to distance and time was quite normal, as also were rotation and unstick. The first abnormality occurred a second or two after unstick when the aircraft rapidly assumed an excessively steep climbing angle. One witness put the angle achieved as about twice the normal, another as 45 deg to 50 deg. There was also evidence from witnesses of a wing drop and of variations in the engine noise during this climb. The aircraft stalled with the left wing down at a height of about 450 ft then sank to the ground in a relatively flat attitude. The accident site was 1 600 m and on a bearing of 214 degT from Esenboga Tower. The accident occurred at 21:43 hours GMT. G-ARJM was almost completely destroyed by impact and fire. All 7 crew and 20 passengers were killed. Six passengers were seriously injured.

Investigation and Evidence

The Crew

The operating crew held valid licences. The captain had flown a total of 13 240 hours including 785 hours on Comet aircraft.

The Aircraft

It had valid certificates of airworthiness, registration and maintenance and had been maintained in accordance with the approved maintenance schedule. The aircraft's weight and centre of gravity were within the permissible limits.

There was no record of any defect or repair during the recent

operation of the aircraft which could be considered to have any bearing on the accident.

Weather conditions

At 21:50 hours GMT (i.e. 7 minutes after the accident) the weather conditions were
surface wind: calm; visibility: 2 km;
weather: snow; 6/8 stratus at 600 ft.; 6/8 Ns at 2 500 ft; 8/8 As at 7 000 ft.;
temperature 0 degC,

Navigational Aids

All the ground navigational aids and radio-telephony channels were checked after the accident and were found to be functioning satisfactorily. The ILS was not operational and had been notified as such by Notam.

The Accident Site

The ground at the scene of the accident sloped up at an angle of 2 or 3 deg, and the aircraft struck on a heading of 180 degM without yaw with the left wing down and the fuselage parallel to the ground. The nature of the damage, the marks on the ground and the disposition of the wreckage all indicated that the aircraft had a low forward speed coupled with a high rate of descent at the moment of impact.

Technical Examination

External examination of all flying control surfaces revealed no evidence of any damage or abnormality. No evidence was found of any control or electrical failure or emergency such as pilot's seat slippage or fouling of the control column, nor was there any

evidence of fire or structural failure prior to the impact with the ground.

Flaps were in the take-off position (i.e. 20 deg) dive brakes were in, and the landing gear "down" and locked. No evidence of any malfunction of the engines was found, however two of the three booster pumps in each of the No. 4 fuel tanks should have been switched on for take-off but all were found switched off. This failure to follow the fuel management drill may have brought about fuel starvation of the two outer engines when the climb became steeper than normal, but it did not contribute to the accident as a stall was by then inevitable and any subsequent recovery impossible because of lack of height,

The captain's director horizon was examined by the Royal Aircraft Establishment, Farnborough (England). it was found that the pitch pointer "spider" was being obstructed by the upper left dial mask screw, which had unscrewed sufficiently for its head to be in the plane of movement of the "spider". To attain this position, the screw had to be three and a half turns from the fully tightened condition. Examination of the screw head, the washer and the surface around the screw hole in the dial mask flange showed that the screw had not been tightened down fully during the assembly of the instrument. Local disturbance of the paint of the flange suggested that the assembly was tightened to within about half a turn from the fully tightened state.

Checks have shown that complete obstruction to "spider" upward movement would have first occurred when the screw was one full turn from the condition as found. At this time the "spider" had to be below the screw position and since the "spider", and hence the pitch pointer, gives a direct indication of aircraft pitch attitude, then the aircraft had to be below 7.5 deg of pitch (the

aircraft angle equivalent to the obstructed position of the pitch pointer).

The instrument had been installed in the aircraft during construction of the latter and there had been no reports of any malfunctioning of it since 12 October 1961 when the left vertical gyro was changed.

The inspection records showed that this instrument had been inspected at all the requested stages of manufacture. In the inspection procedure laid down by the manufacturers there is a specific item "check that MAIN MASK fixing screws are secure".

Analysis

The position of the impact point in relation to the unstick point, the fact that the aircraft did not begin to assume an abnormally nose-up attitude until a second or two after unstick, and the fact that the landing gear was not selected up, together gave a strong indication that something unusual occurred immediately after unstick. From unstick the aircraft assumed an increasingly steep angle which reached about 45 deg, that is about twice the normal, before it stalled. The exact sequence of events and the actions of the crew during the brief flight cannot be established.

The only fault in the aircraft and its equipment that could account for the abnormally steep climb was the obstruction of the pitch pointer in the captain's director horizon, It is believed probable that the captain looked at this instrument for attitude information immediately after unstick and seeing the pitch pointer only about half way to the normal nose-up position on the pitch scale, applied more up elevator. Although this would have at once steepened his climbs there would have been no indication of it

from the pitch pointer, It has been calculated that the time interval between unstick and the stall was approximately 8 to 10 seconds.

The evidence suggests that the outer engines may have begun to fail due to fuel starvation after the angle became excessive. But as the fuel starvation would have occurred very close to the stall and when recovery was impossible in the height available, it is not considered a contributory cause of the accident.

In the event that the co-pilot was at the controls for the take-off the accident would then have been brought about by the captain either telling the co-pilot to increase the climb or himself pulling back the control column, basing his action upon glance at his own director horizon.

Safety harness of the crew

Only the lap straps of the crew's safety harness were fastened at impact, it is probable that the three pilots would have survived had they used the shoulder straps of their harnesses.

Probable Cause

The probable cause of the accident was the obstruction of the pitch pointer in the captain's director horizon which led him to make an excessively steep climb immediately following unstick.

IMPORTANT NOTE : The information contained in this report remains the property of the Turkish Ministry of Communications and may not be distributed without their written approval.

Official accident report of Comet I G-ALYY

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Ministry of Transport and Civil Aviation

Civil Aircraft Accident

Report of the Court of Inquiry into the accident to
Comet G-ALYY on 08th April, 1954

THE CIVIL AVIATION ACT, 1949

THE CIVIL AVIATION (INVESTIGATION OF ACCIDENTS)
REGULATIONS 1951

Report of the Public Inquiry into the causes and circumstances of
the accident which occurred on the 8th April, 1954, to Comet
aircraft G-ALYY

- * AIRCRAFT: Comet G-ALYY
- * ENGINES: Four de Havilland Ghost 50
- * REGISTERED OWNERS: British Overseas Airways

Corporation

- * OPERATORS: South African Airways (under charter)
- * CREW:
 - * Senior Captain W. K. Mostert - Killed
 - * First Officer B. J. Grove - Killed
 - * Navigation Officer A. E. Sissing - Killed
 - * Flight Engineer Officer A. R. Lagesen - Killed
 - * Radio Officer B. E. Webbstock - Killed
 - * Steward J. B. Kok - Killed
 - * Air Hostess P. Reitz - Killed
- * PASSENGERS: 14 - All Killed
- * PLACE OF ACCIDENT: Over the Mediterranean, S.E. of Naples.
- * TIME OF ACCIDENT: 8th April, 1954, at about 19:10 G.M.T.

All times in this Report are G.M.T.

PART I

INTRODUCTORY

(a) Matters in common with the Report on G-ALYP

1. In my Report of today on the accident to Comet aircraft G-ALYP (sometimes called Yoke Peter) I gave a short explanation of the constitution and functions of the Air Registration Board (A.R.B.) and of the Air Safety Board (A.S.B.) which I need not repeat here. It is also unnecessary for me to repeat the account I gave in that Report of the origin and history of the Comet aircraft.

2. As the two Inquiries were conducted together, the evidence in the Inquiry into the loss of Yoke Peter is the evidence in the present Inquiry. I need not, therefore, append any lists of the

witnesses or parties represented at the hearings or the dates of such hearings.

(b) Arrangements with South African Airways

3. South African Airways are the national operators of the Government of the Union of South Africa. Air communication between London and South Africa was carried on under arrangements made between British Overseas Airways Corporation (hereinafter called " B.O.A.C. ") and South African Airways. I need not go in full into the history of the arrangements between the two operators. Suffice it to say that the arrangements were revised on the 3rd October, 1953 and it was agreed, amongst other things, that South African Airways should participate with B.O.A.C. in the operation of the standard class services between England and the Union of South Africa by operating Comet aircraft chartered from B.O.A.C. The Corporation trained the necessary South African Airways crews to carry out this arrangement. Amongst the aircraft so chartered to South African Airways was Comet G-ALYY (sometimes hereinafter called Yoke Yoke).

PART II

THE ACCIDENT

4. Yoke Yoke left Ciampino Airport, Rome, at 18:32 hours on the 8th April, 1954 on a flight to Cairo. After taking off the aircraft from time to time gave its position by radio telephone to Rome Air Control at Ciampino and on the last such occasion at about 18:57 hours reported that it was abeam Naples and climbing to 35,000 ft. This position and those given earlier indicated that the flight was proceeding according to the B.O.A.C. flight plan. At 19:05 hours Cairo received a signal from the aircraft reporting its

departure from Rome and giving its estimated time of arrival at Cairo. Thereafter no message was received from Yoke Yoke and all attempts to make contact failed.

5. A chart, which is Figure 1 of my Report on Yoke Peter, was prepared by a Navigating Officer of B.O.A.C. from all the information available, and shows the probable flight track of the aircraft. It also indicates the position in which bodies and wreckage were found on the day following the accident. It is evident from the chart that something catastrophic happened to the aircraft at about 19:10 hours when it must have been at or near the end of its climb to 35,000 ft.

PART III THE AIRCRAFT

6. Yoke Yoke was the same in all relevant respects as Yoke Peter. Details of Yoke Peter are given in my Report thereon and I need not repeat them here.

7. Yoke Yoke was granted a Certificate of Registration No. R. 3221/1 on the 18th September, 1951 in the name of B.O.A.C. as owners and first flew on the 10th September, 1952. On the 23rd September, 1952 it was certified and approved by A.R.B. for the issue of its Certificate of Airworthiness and this Certificate, No. A.3221, was issued by the Ministry of Civil Aviation on the 30th September, 1952. After approval by A.R.B. on the 21st September, 1953 the Certificate of Airworthiness was renewed on the 23rd September, 1953 and was valid at the time of the accident.

8. After the accident to Yoke Peter on the 10th January, 1954, special checks, in addition to the routine Check 4 in accordance with the Approved Maintenance Schedules, were carried out on

Yoke Yoke and a number of modifications were made affecting the airframe the controls and the fire detection and protection at the engines. On the 15th February, 1954, the fuselage was subjected to a proving test to 11 lb/sq. in. The aircraft was returned available for service on the 24th February, 1954.

9. On the 2nd April, 1954, following a Check 1 inspection in accordance with the Approved Maintenance Schedules, carried out at London Airport, a Certificate of Maintenance signed by duly licensed airframe and engine maintenance engineers and expressed to be valid for 75 flying hours, was issued. Further reference to this Certificate is made in paragraphs 21 and 22 of this Report. On the 7th April, 1954, an Aircraft Radio Station Certificate of Serviceability was issued and showed no items unserviceable.

10. At the time of the accident Yoke Yoke had had a total flying life of about 2,704 hours including 841 since the renewal of its Certificate of Airworthiness and including less than 75 hours since the issue of the Certificate of Maintenance on the 2nd April, 1954.

11. From examination of the airframe and engine log books and maintenance records it appeared that all routine inspections of airframe and engines had been regularly carried out within the limits of time specified by the Approved Maintenance Schedules and that the flying life of each of the engines since its last complete overhaul was within, and in two cases very well within, the approved life between complete overhauls. Save as mentioned in paragraphs 21 and 22 of this Report the evidence disclosed no irregularity in connection with any such inspection.

PART IV THE CREW

12. Senior Captain Willem Karel Mostert, who was in command of Yoke Yoke was born on the 27th April, 1916. Before joining South African Airways he had flown 2,812 hours in the South African Air Force and had served as a flying instructor. He joined South African Airways on the 10th June, 1946, was promoted Captain on the 1st November, 1946 and on the 15th June, 1949 became a Flying Instructor. On the 15th May, 1953, he became Senior Flying Instructor and on the same day was promoted to the rank of Senior Captain.

In June, 1953, Captain Mostert was transferred to the Comet Line of South African Airways and became the Comet Line Instructor. In South African Airways, captains who are appointed Line Instructors have to spend two-thirds of their time on route flying and one-third on instruction within the line. During his service with South African Airways Captain Mostert flew a total of 8,159 hours of which about 51 hours by day and 35 hours by night were flown in Comets within the six months preceding the accident.

13. Captain Mostert's last "six monthly check" prior to the accident was carried out on the 19th December, 1953 and his report was: "Proficient. (Very well executed flight)". He had not been involved in any previous accident. Captain Mostert was the holder of a Union of South Africa Air Line Transport Pilot's Licence No. 65A valid until the 11th June, 1954. A rating for Comet aircraft had been added to this licence by the British Ministry of Transport and Civil Aviation. I am satisfied that Captain Mostert was fully equipped to carry out his normal duties as a pilot and as a captain and to deal with emergencies.

14. The second pilot was First Officer Barent Jacobus Grove who

was born on the 15th July, 1922. After service in the South African Air Force, in which he had flown a total of 1,640 hours, he joined South African Airways on the 29th January, 1953, as a First Officer and was posted to the Comet Line on the 26th February 1953. While with South African Airways First Officer Grove flew for a total of 54 hours, including about 47 hours in Comets during the 90 days preceding the accident.

There was no evidence of First Officer Grove having been involved in any previous accidents save as a result of enemy action. His last check took place on the 20th February, 1954, when he obtained a satisfactory pass. First Officer Grove was the holder of a Union of South Africa Senior Commercial Pilot's Licence No. 48 (S), valid until the 11th June, 1954, to which a Comet rating had been added on the 2nd March, 1954. I am satisfied that he was fully equipped to carry out his normal duties and to support his captain in emergencies.

15. Navigation Officer Albert Escourt Sissing was born on the 1st January, 1917. After training in the South African Air Force he joined South African Airways on the 16th October, 1946 and from then until his death had 4,840 hours flying experience including about 155 hours in Comets in 1953 and about 51 hours in Comets during 1954, all of the latter during the 90 days preceding the accident. At his last six monthly check, in March, 1954, he passed in Comet Refresher Flight Planning and Plotting. Navigation Officer Sissing was the holder of a Union of South Africa Navigator's Licence No. 17(N) valid until 1st December, 1954 and I am satisfied that he was a capable officer.

16. Radio Officer Bertram Ernest Webstock was born on the 17th June, 1917. He joined South African Airways on the 23rd April, 1946 and after spending some time on the London service

passed a Comet course on the 20th June, 1953 and thereafter flew only in Comets. His total flying hours were 4,373 of which about 98 hours were during the 90 days preceding the accident. He was passed as proficient in his Comet check on the 5th October, 1953. Radio Officer Webbstock was the holder of a Union of South Africa First Class Flight Radio Operator's Licence No. 348 valid until the 30th April, 1954 and I am satisfied that he was a capable officer.

17. Flight Engineer Officer August Ranwald Lagesen was born on the 22nd May, 1920. He had wide experience of several types of aircraft both during the war and after rejoining South African Airways on the 16th February, 1945. There was no positive evidence relating to his flying hours prior to the 11th May, 1950 but such records as were available suggested that up to that date he had flown a total of about 4,300 hours. After the 11th May, 1950 he had a total flying time of 2,290 hours 35 minutes. He had flown about 203 hours in Comets including about 141 hours during the 90 days preceding the accident and had completed a Comet Conversion Course on the 2nd September, 1953, a Comet Refresher Course on the 19th December, 1953 and a further refresher course and flight training programme on the 21st March, 1954. He was examined on the 19th December, 1953 and found proficient. Flight Engineer Officer Lagesen was the holder of a Union of South Africa Aircraft Maintenance Engineer's Licence No. 387, valid until the 26th February, 1955, and Flight Engineer's Licence No. 10 valid until the 22nd February, 1955. I am satisfied that he was a capable officer.

18. Air Hostess Pamela Reitz, who was born on the 16th February, 1932 and Steward Jacobus Bruwer Kok, who was born on the 18th December, 1918 had both flown extensively with South African Airways.

PART V

THE PASSENGERS AND CARGO

19. Yoke Yoke carried 14 passengers all of whom were killed in the accident. There was nothing in the cargo which could have been relevant to the cause of the accident and I am satisfied that, despite the off-loading of a small bag of aircraft spares at London after the Load Sheet had been completed, the aircraft was loaded and trimmed within the prescribed limits.

PART VI

PRE-FLIGHT INCIDENTS

20. Yoke Yoke, in common with the rest of the Comet fleet of B.O.A.C., had been grounded by B.O.A.C. after the accident to Yoke Peter. The circumstances in which Comet services were resumed are fully stated in paragraphs 54 to 57 of my Report on the accident to Yoke Peter and I need not repeat them here.

21. Yoke Yoke arrived at Ciampino on the 7th April from London and was due to depart from Ciampino the same evening. However, on completion of refuelling it was discovered that the centre tank contents gauge showed no reading although the tank was full. The fault was eventually traced to a co-axial cable for which a replacement had to be flown from England and the departure of the aircraft was consequently delayed for about 24 hours.

While the fault was being traced a number of bolts were found lying about in the port wing of the aircraft and further inspection revealed that an equal number of bolts were missing from the inspection panel providing access between the rear spar and the wheel-well wall and that the remainder of the bolts securing the

panel, though in position, were not properly tightened. The missing bolts were replaced and all were properly tightened. The maintenance engineer who supervised this work was satisfied from visual examination and from the readiness with which the missing bolts were refitted that no distortion of the panel or adjacent structure had occurred during the absence of the bolts.

22. As has been stated in paragraph 9 a Check 1 inspection was carried out on Yoke Yoke before the issue of the Certificate of Maintenance on the 2nd April. It is quite clear that it must have been during that inspection that the panel was removed and incorrectly refitted and I was informed that disciplinary action had been taken against the inspectors concerned.

23. The arrangements for safeguarding the aircraft during its stay at Ciampino were the subject of a great deal of evidence. For the greater part of this period Yoke Yoke was under observation by B.O.A.C. officials whose duties, however, were not primarily concerned with security. For the rest of the time it was guarded by an Italian Finance Guard whose main duty was to prevent smuggling. In all the circumstances I consider it unlikely that any unauthorised person gained access to the aircraft.

24. Apart from the above-mentioned defects, the Refuel and Departure checks disclosed nothing unusual.

PART VII

WEATHER CONDITIONS AT THE TIME OF THE ACCIDENT

25. From the take-off at Rome at 18:32 hours on the 8th April, 1954 until the time of the accident, which was approximately 19:10 hours, Yoke Yoke climbed through three moderately thick layers of cloud. In the top layer there may have been slight to moderate icing conditions but these would have been insufficient

to cause anxiety. It is unlikely that any severe turbulence was encountered either during the climb through the cloud layers or in the clear air above. It can, therefore, be assumed that the state of the weather was not a contributory cause of the accident.

PART VIII

ACTION TAKEN AFTER THE ACCIDENT

26. As in the case of the accident to Yoke Peter the assistance of the Royal Navy was invoked and on the 9th April, 1954, H.M.S. Eagle and H.M.S. Daring, proceeded to search for Yoke Yoke. Avenger aircraft of H.M.S. Eagle were used to assist in the search as also were certain United States aircraft. A number of dead bodies as well as some aircraft seats and other wreckage were identified in the water and in due course recovered. The depth of water where the bodies and Wreckage were found varied between approximately 520 fathoms and 580 fathoms and the evidence established that at that depth the prospect of further recovery was hopeless.

27. The six bodies recovered were not examined by Professor Fornari, who had examined the bodies recovered at Elba, but four of them were examined at Uxbridge on the 12th April, 1954 by Dr. Teare, one was not subjected to autopsy and the other was examined by the Italian authorities.

These examinations did not disclose anything inconsistent with the view that the accident to Yoke Yoke was attributable to the same cause as the accident to Yoke Peter.

28. As a result of the accident to Yoke Yoke the Royal Aircraft Establishment (hereinafter referred to as R.A.E.) were directed to conduct a full investigation into it and the accident to Yoke Peter. In the absence of any wreckage from Yoke Yoke R.A.E. could

only proceed with their investigations in the light of a priori reasoning and experiments and of conclusions to be drawn from the wreckage of Yoke Peter. I have dealt at length with the R.A.E. investigations and Report in my Report on the accident to Yoke Peter.

PART IX

THE COURT'S CONCLUSION AS TO CAUSE OF ACCIDENT

29. R.A.E.'s conclusion as regards the cause of the accident to Yoke Yoke is expressed in the following paragraph: "Owing to the absence of wreckage, we are unable to form a definite opinion on the cause of the accident near Naples, but we draw attention to the fact that the explanation offered for the accident at Elba appears to be applicable to that at Naples". I agree with this conclusion and have only to add that it is impossible in the case of the Naples accident to be dogmatic that defects of the kind considered in paras. 108-144 of my Report on Yoke Peter were not contributory causes to the Naples accident. I am therefore glad to note that the programme of future action outlined by the de Havilland Aircraft Company Limited and set forth in Appendix VIII to my Report on Yoke Peter includes measures to deal with those defects.

PART X

RESPONSIBILITY

30. I have dealt at length with this question in my Report on the accident to Yoke Peter. There is, however, one matter on which criticism was made which is applicable only to Yoke Yoke and that is the decision, after the accident to Yoke Peter, to allow the Comet passenger services to be resumed on the 23rd March, 1954. I have set out in paras. 52 and 53 of my Report on the

accident to Yoke Peter the nature of the full investigation carried out by the Committee under the chairmanship of Mr. Abell, the Deputy Operations Director (Engineering) of B.O.A.C. and the modifications made on the recommendation of that Committee.

31. Before deciding to authorise the resumption of the Comet passenger services the Minister of Transport and Civil Aviation consulted A.R.B. and A.S.B. Both of these bodies recommended that consent should be given. When they did so, there had been only one accident to a Comet aircraft for which no explanation had been furnished. According to the evidence it was certainly not the practice either in the United Kingdom or elsewhere to ground all aircraft of a type because of an unexplained accident to one aircraft of that type. The evidence indicated that steps had been taken to deal with what the experts then considered to be all potentially dangerous features. In these circumstances I am of the opinion that no blame can be attached to any one for permitting the resumption of the services.

PART XI

FUTURE

32. I cannot usefully add anything to what I have said on this branch of the Inquiry in my Report on the accident to Yoke Peter.

PART XII

QUESTIONS AND ANSWERS

My answers to the questions submitted on behalf of the Attorney-General are as follows:

Question 1.

What was the cause of the accident?

Answer.

Owing to the impossibility of salvaging any appreciable part of the wreckage of the aircraft no positive answer can be given to this question but the fact that this accident occurred in similar weather conditions, at approximately the same height and after approximately the same lapse of time after take-off from Rome as that to G-ALYP makes it at least possible that the cause was the same as in that case. The state of the bodies recovered was, as in the case of G-ALYP, consistent with the accident being due to failure of the cabin structure owing to metal fatigue.

Question 2.

If several factors caused the accident what were such factors and to what extent was each contributory?

Answer.

I cannot usefully add anything to my answer to Question 1.

Question 3.

Was the accident due to the act or default or negligence of any party or of any person in the employment of that party?

Answer.

There was no evidence on which I could attribute the accident to the wrongful act or default or negligence of any party or of any person in the employment of any party.

Question 4.

At the time of the accident:

Question 4 (a).

Had the aircraft been properly maintained in accordance with the current approved maintenance schedules? If not did any defect in maintenance affect the safety of the aircraft or contribute to the

accident?

Answer.

The aircraft had been properly maintained save that on arrival at Rome a number of bolts were found lying in the port wing of the aircraft and further inspection revealed that an equal number of bolts were missing from the inspection panel providing access between the rear spar and the wheel well wall and that the remainder of the bolts securing the panel though in position were not properly tightened. The missing bolts were replaced and all were properly tightened and I am satisfied that this defect in maintenance did not affect the safety of the aircraft or contribute to the accident.

Question 4 (b).

Was the aircraft airworthy so far as could reasonably have been then ascertained?

Answer.

Yes.

Question 4 (c).

Was there a valid Certificate of Airworthiness in respect of the aircraft?

Answer.

Semble yes. I do not find it necessary to deal with the legal question whether the default in reassembly referred to in paras. 21 and 22 of this Report had any effect on the validity of the Certificate of Airworthiness since I am satisfied that this default did not contribute to the accident.

Question 4 (d).

Was there a valid Certificate of Maintenance in respect of the aircraft?

Answer.

Semble yes. see my answer to Question 4 (c) on Certificate of Airworthiness.

Question 4 (e).

Was the radio station of the aircraft serviceable and was there a valid Certificate of Serviceability in respect thereof?

Answer.

Yes.

Question 4 (f).

Was the aircraft properly loaded and trimmed within the limits specified in the Flight Manual?

Answer.

Yes.

Question 4 (g).

Were all members of the crew properly licensed and adequately experienced to make the flight? If not did any defect in the licence of any member of the crew affect the safety of the aircraft or contribute to the accident?

Answer.

Yes. The second part of the question does not arise.

Question 5.

Was the Minister of Transport and Civil Aviation properly advised in March, 1954 that Comet services should be resumed?

Answer.

Yes. See paragraph 31 of this Report.

Question 6.

Upon consideration of all facts disclosed by this Inquiry what steps should be taken to increase the safety of civil aircraft?

Answer.

See paragraphs 140-155 of my Report on Yoke Peter.

Report by COHEN., W. S. FARREN., W. J. DUNCAN., A. H. WHEELER.

1st February, 1955.

IMPORTANT NOTE : The information contained in this report remains the property of the Ministry of Transport and Civil Aviation and may not be distributed without their written approval.

Official accident report of Comet I G-ALYZ

B.O.A.C., Comet I, G-ALYZ,
accident at Ciampino Airport, Rome, Italy,

26 October 1952,

Report released by I.C.A.O.

Circumstances

The aircraft was operating a scheduled passenger service from London to Johannesburg. The flight from London Airport to Rome was without incident. During the take-off from Rome on the second stage, the aircraft's normal speed failed to build up and after becoming airborne for a few seconds the Captain's immediate reaction was that there was a lack of engine thrust. He throttled back the engines at the same time as the aircraft came to

rest near the airport boundary, and the aircraft sustained considerable damage and two passengers were slightly injured.

Investigation and Evidence

For take-off the aircraft was taxied to Runway 16 and lined up on the centre line; all pre-take-off checks were made and the elevator, aileron and rudder trim were set at the neutral position. The Captain's estimation of runway visibility was 5 miles but with no horizon. The flaps were lowered to 15 deg. and the windscreen wipers were both operating. The engines were opened up to full power and the isolation switches were set to "Isolate". The RPM were checked at 10.250 on all engines; fuel flows, engine temperatures and pressures were reported to be correct. The brakes were released and the aircraft made a normal acceleration. At an IAS of 75-80 knots, the nose wheel was lifted from the runway and a slight tendency to swing to starboard was corrected. At an IAS of 112 knots the Captain lifted the aircraft from the ground by a positive backward movement of the control column and when he considered that the aircraft had reached a safe height he called for "undercarriage up". At about the same instant the port wing dropped rather violently and the aircraft swung to port; the controls gave normal response and lateral level was regained. At this point the Captain realised that the aircraft's speed was not building up, although he made no reference to the ASI. A pronounced buffeting was felt which he associated with the onset of a stall and in spite of two corrective movements of the control column the buffeting continued. Before the First Officer had time to select undercarriage up, the aircraft came down on its main landing wheels and bounced. It was now plainly evident to the Captain that the aircraft's speed was not increasing and he was convinced that there was a considerable loss of engine thrust. He was also aware that the

aircraft was rapidly approaching the end of the runway and a decision to abandon the take-off was made. The undercarriage struck a mound of earth as he was closing the throttles and the aircraft slid for some 270 yards over rough ground. The main undercarriages were wrenched off and considerable damage resulted; a large spillage of fuel occurred but fire did not break out. One passenger suffered slight shock and another sustained a cut finger.

Subsequent interrogation of the crew confirmed that all engines had given their maximum power and that fuel flows, temperatures and pressures had all been normal during the take-off. It was the belief of the First Officer that the nose wheel was lifted from the ground in the usual manner although the control column appeared to be "a fair way back". He also thought that the "unstick" was made by moving the control half way back from the neutral position and that it was held there until the port wing dropped. He also stated that he was unable to determine the attitude of the aircraft after the bounce as no runway lights were visible to him.

Due to darkness and due also to rain, no ground witness had a clear view of the take-off. One, however, who observed it from a point opposite the half-way position of the runway, considered that the aircraft's attitude was critical as it passed him. He continued to observe it as the nose was exceptionally high and he was not aware that the aircraft became airborne.

An inspection carried out at the scene of the accident showed that the aircraft came to rest about 270 yards from the upwind end of runway 16 and 10 yards from the boundary fence; considerable damage had resulted. A large spillage of fuel from the port wing integral tanks had occurred but fire did not break out. Both

inertia switches had tripped. The two crash switch operating levers functioned correctly and the methyl fire extinguisher bottles had discharged. The seats and their attachments in the crew and passengers compartments were undamaged. The crew's forward entrance door and the passenger's entrance door functioned normally as also did the emergency hatches.

The flaps were: in the lowered position of about 15 deg. and this corresponded to that indicated in the cockpit, The elevator, aileron and rudder trim indicators were in the neutral position. Wheel marks on the runway showed that the main landing wheels had been in contact with the runway over the last 30 feet of its length. The next contact was made on two mounds of earth, when this occurred the undercarriages were wrenched off and parts of these units damaged the tailplane. The port main plane hit the runway direction indicator which is mounted on concrete blocks and the wing tip and pitot head were torn off. The starboard inner engine steady strut had become detached at its forward end when the attachment bracket rivets had sheared due to impact forces. This detachment allowed the engine to rotate on its mounting trunnions through the mainplane skin and in a nose-down direction.

The nose wheel was forced upwards into its housing and the tail bumper unit was torn from the rear portion of the fuselage. The bumper attachment bracket was subsequently found in the wreckage trail, An examination of this bracket showed that the shoe was missing and that the bracket was deeply scarred. A search made along the runway revealed evidence of tail bumper marks which varied in length from 3 feet to 40 feet. These marks extended along the last 650 yards of the runway and showed that the aircraft's track was inclined a few degrees to starboard of the runway centre line.

The BOAC Training Manual recommends the following take-off technique:

"At 80 knots the nose should be lifted until the rumble of the nose wheel ceases. Care should be taken not to overdo this and adopt an exaggerated tail-down attitude with a consequent poor acceleration."

The normal fuselage incidence during the take-off ground run is about 2 to 3 deg. after the nose wheel has been raised just clear of the runway. To do this a backward stick movement of about 4 inches is required which is then reduced to 1 to 1.5 inches. The attitude of "unstick" is approximately 6 deg. to 6.5 deg. and to attain this the required stick movement at the time of leaving the ground is of the order of 6 inches back from the neutral position, after which the stick must be returned towards the pre-take-off position.

Take-off by the manufacturers have shown that a constant 6 deg. incidence of fuselage during the ground run gives good results for distance run and for climb-away behaviour. They have also shown that an increase of incidence to 9 deg. results in a partially stalled wing giving high drag which appreciably affects the aircraft's acceleration, and that the symptoms are noticeable to the pilot as low frequency buffet. The aircraft recovers from its semi-stalled position if the nose is pushed well down.

Figure shows a diagrammatic representation of the nose-up attitude of the aircraft in the correct position of unstick, i.e., 6 deg. to 6.5 deg. nose up. The Appendix also shows that for the tail bumper to touch the ground an angle of at least 11 deg. is required.

Probable Cause

The accident was due to an error of judgement by the Captain in not appreciating the excessive nose-up attitude of the aircraft during the takeoff.

Summary of all D.H. Comet crashes

In this table you will find the most important information related to all De Havilland DH106 Comet crashes. To compile this page, I used different sources. The detailed descriptions of the accidents are listed in separate sections.

Nr	Date	Type	Registration	SN	Operator	Fatalities	Location	Cause	
1	26 Oct 52	Comet 1	G-ALYZ	6012	B.O.A.C.	0/8 + 0/35	Rome, Italy	Aircraft	
2	03 Mar 53	Comet 1A		CF-CUN	6014	Canadian Pacific	5/5 + 6/6	Karachi, Pakistan	Aircraft
3	02 May 53	Comet 1	G-ALYV	6008	B.O.A.C.	6/6 + 37/37	Calcutta, India	Aircraft	
4	25 Jun 53	Comet 1A		F-BGSC	6019	UAT	0/7 + 0/10	Dakar, Senegal	Pilot
5	10 Jan 54	Comet 1	G-ALYP	6003	B.O.A.C.	6/6 + 29/29	Elba, Italy	Aircraft	
6	08 Apr 54	Comet 1	G-ALYY	6011	South African Airways	7/7 + 14/14	Stromboli,		

Italy Aircraft

- 7 27 Aug 59 Comet 4 LV-AHP 6411 Aerolineas
Argentinas 1/6 + 1/44 Asuncion,
Paraguay Pilot
- 8 20 Feb 60 Comet 4 LV-AHO 6410 Aerolineas
Argentinas 0/6 + 0/0 Buenos Aires,
Argentina Pilot
- 9 23 Nov 61 Comet 4 LV-AHR 6430 Aerolineas
Argentinas 12/12 + 40/40 Sao Paulo,
Brazil Pilot
- 10 21 Dec 61 Comet 4B G-ARJM 6456 British
European
Airways 7/7 + 20/27 Ankara,
Turkey Aircraft
- 11 19 Jul 62 Comet 4C SU-AMW 6464 United
Arab
Airlines 8/8 + 18/18 Mt Kao Yai,
Thailand Pilot
- 12 20 Mar 63 Comet 4C SA-R-7 6461 Saudi Arabian
Government 9/9 + 9/9 Cuneo,
Italy Pilot
- 13 27 Jul 63 Comet 4C SU-ALD 6441 United Arab
Airlines 8/8 + 55/55 Madh,
India Pilot
- 14 22 Mar 64 Comet 4 G-APDH 6409 Malaysian Airlines
System 0/8 + 0/60 Singapore,
Singapore Aircraft
- 15 12 Oct 67 Comet 4 G-ARCO 6449 British European
Airways 7/7 + 59/59 Nicosia,
Zypria Bomb
- 16 14 Jan 70 Comet 4C SU-ANI 6475 United Arab
Airlines 0/9 + 0/5 Addis Ababa,
Ethiopia Pilot

17 09 Feb 70 Comet 4C SU-ALE 6444 United Arab
Airlines 0/9 + 0/14 Munchen-Riem,
Germany Pilot

18 03 Jul 70 Comet 4 G-APDN 6415 Dan-Air
Services 7/7 + 105/105 Sierra Montensy,
Spain ATC
Aircraft

19 07 Oct 70 Comet 4 G-APDL 6413 Dan-Air
Services 0/4 + 0/5 Newcastle,
GB Pilot

20 02 Jan 71 Comet 4C SU-ALC 6439 United Arab
Airlines 8/8 + 8/8 Tripoli,
Libya Pilot

Nr	Date	Type	Registration	SN	Operator	Fatalities	Location	Cause
A	25 Jul 53	Comet 1	G-ALYR	6004	B.O.A.C.	0/0	Calcutta, India	Pilot
B	13 Sep 57	Comet 2R	XK663	6027	RAF 192 sqn	0/0	Wyton, GB	Fire
C	01 Jan 68	Comet C2	7926M	6028	RAF	0/0	Lyneham, GB	Fire
D	28 Dec 68	Comet 4C	OD-ADR	6445	Middle East Airlines	0/0	Beirut, Lebanon	Bomb
E	28 Dec 68	Comet 4C	OD-ADS	6448	Middle East Airlines	0/0	Beirut, Lebanon	Bomb
F	28 Dec 68	Comet 4C	OD-ADQ	6446	Middle East Airlines	0/0	Beirut,	

Lebanon Bomb

G ?? ??? 70 Comet 4C XM829 06021 Stansted
Airport 0/0 Stansted,
GB Fire

Details about all D.H. Comet crashes

1. G-ALYZ / 6012 crash in Rome (Crew 0/8 & Passengers 0/35)

G-ALYZ was the last Comet 1 which was delivered to B.O.A.C. and the first one to be involved in a major incident. The plane with 35 passengers and 8 crew was in the takeoff phase and didn't get altitude. The plane overshoot the runway and stopped finally with broken landing gears. The plane was a hull loss. Initially Captain Foote was made responsible for this incident. It was stated that the plane was pulled up too fast, leading to an interruption of the airflow on the wings.

After the crash of CF-CUN it was found out that a considerable part of the wing lost its lift if the plane was pulled up too fast. A design change of the leading edge of the Comet wings was the solution to this problem. This change proved to be sufficient.

Photo Credit: Aeroplane Monthly [Sep-89]. Thanks to Trevor Friend for contributing this picture. Added [15-Nov-98]

Cause of the accident: design fault

[Official accident report of G-ALYZ]

F-CUN / 6014 crash in Karachi (Crew 5/5 & Passengers 6/6)

CF-CUN was the first Comet 1A for Canadian Pacific. On its delivery flight from England to Sydney the first fatal Comet crash occurred. In the early morning the 'Empress of Hawaii' didn't takeoff in Karachi. The plane collided with a bridge and

took fire. None of the 11 people, including Captain Pentland survived this crash.

Initially the Captain was made responsible, but flight tests found out that a considerable part of the wing lost its lift if the plane was pulled up too fast. A design change of the leading edge of the Comet wings was the solution to this problem. This change proved to be sufficient.

Cause of the accident: design fault
[Accident description of CF-CUN]

3. G-ALYV / 6008 crash in Calcutta (Crew 6/6 & Passengers 37/37)

G-ALYV was on a flight from Singapore to London. The aircraft was in the initial climb phase and at 10Kft it flew in a heavy tropical thunderstorm. The plane disintegrated in this thunderstorm. The remains of the Comet were found in an area of 20 km².

The cause of the crash was an overload of the tail of the aircraft. Other crashes of the Comet make the weak structure of the aircraft a more likely reason.

Cause of the accident: design fault
See also the comments about this crash in the YP accident report.

4. F-BGSC / 6019 crash in Dakar (Crew 0/7 & Passengers 0/10)

The Comet 1A registered, F-BGSC of the French company UAT -- Union Aeromaritime de Transport -- was as scheduled passenger flight in the landing phase to Dakar airport. It overshot

the runway and crossed a -- 0.7 m deep and 22 m wide -- sandy culvert. As a result it came to rest 38.4 m later with a sheared landing gear. None of the passengers was injured.

Cause of the accident: pilot error

5. G-ALYP / 6003 crash in Elba (Crew 6/6 & Passengers 29/29)

G-ALYP was as flight BA781 on the way from Singapore to London. A fuel stop was made in Rome. Captain Gibson was in the command when the aircraft crashed at 25Kft. Since the crash occurred in daylight, witnesses could report three explosions. The remains of the aircraft were 150 meters deep in the sea.

Initially an engine explosion or a bomb was assumed to have led to this tragic event. All flights of Comet's were suspended. More than sixty modifications were done on existing Comet aircrafts, all possible causes were eliminated. At least that's what the experts thought at the time. Protections were added in the case of an engine explosion. New fuel pipes, fire and smoke detectors were added. On the 23 Mar 54 the Comet's were again allowed to takeoff.

Only the next Comet crash allowed to find out the real reason of this tragic event. More about it in the next section.

Cause of the accident: design fault

[Official accident report of G-ALYP]

6. G-ALYY / 6011 crash in Stromboli (Crew 7/7 & Passengers 14/14)

G-ALYY was leased from B.O.A.C. to South African Airways. Flight SA201 was on its way from London to Johannesburg.

After a fuel stop in Rome the plane took-off, but only 36 minutes later the radio-contact was interrupted in the area of Stromboli.

The next morning remains were found in the sea. Since the sea was at this place as deep as 1000 meters, no parts of the aircraft could be inspected. Only four days after the crash the Comet flights were again suspended, one of the reasons being the similarities to the YP crash. G-ALYY had only performed 2704 flight hours. A very intensive flight test program was performed in order to find out the reason of the YY and YP crashes, with no special conclusion.

Only after a very long expensive investigations, which included the assembly of the remains of the crashed YP and the underwater stress test of the YU Comet which came from B.O.A.C. Finally the fuselage of YU broke up on a sharp edge of the forward escape-hatch. After that this rupture was repaired the tests were restarted, but only shortly afterwards the fuselage broke up. This time the rupture started at the upper edge of a window and was three meters long.

The YP and YY crashes were due to metal fatigue, which took place because of the crystalline changes in the fuselage skin. They were amplified by the high speed and altitude the Comets were operated. The metal fatigue resulted in ruptures of the fuselage, this had as a consequence a terrible decompression at 33Kft, tearing up the plane with all known consequences.

Cause of the accident: design fault
[Official accident report of G-ALYY]

7. LV-AHP / 6411 crash in Asuncion (Crew 1/6 & Passengers 1/44)

LV-AHP a Comet 4 of Aerolineas Argentinas was on final approach to Asuncion, Paraguay when it hit a hill top. One passenger and one crew member died. Further information is missing.

Cause of the accident: pilot error

8. LV-AHO / 6410 crash in Buenos Aires (Crew 0/6 & Passengers 0/0)

LV-AHO a Comet 4 of Aerolineas Argentinas was in the landing phase of a training flight. The aircraft was damaged beyond repair, due to a heavy landing, but none of the six crewmembers was killed.

Cause of the accident: pilot error

LV-AHR / 6430 crash in Sao Paulo (Crew 12/12 & Passengers 40/40)

The flight had originated at Buenos Aires, Argentina. At Vira Copos (Campinas) Airport, Brazil, the engines were started at 05:20 hours and the aircraft took off for Trinidad (alternately Barbados) at 05:38 hours. After reaching an altitude of about 100 m, the aircraft lost altitude, collided with a eucalyptus forest and was destroyed. Twelve crew and forty passengers died in the accident, which occurred at approximately 05:40 hours .

It was presumed that the co-pilot was under flight instruction. If such was the case, the instructor, who was pilot-in command, may have failed to brief or supervise the co-pilot properly.

Cause of the accident: pilot error

[Official accident report of LV-AHR]

10. G-ARJM / 6456 crash in Ankara (Crew 7/7 & Passengers 20/27)

The probable cause of the accident was the obstruction of the pitch pointer in the captain's director horizon which led him to make an excessively steep climb immediately following unstick.

Cause of the accident: instrument failure
[Official accident report of G-ARJM]

11. SU-AMW / 6464 crash in Bangkok (Crew 8/8 & Passengers 18/18)

SU-AMW, a Comet 4C of UAA -- United Arab Airlines -- was supposed to land as scheduled passenger a/c to Bangkok when it made a premature descent and struck Mt Kao Yai. None of the passengers survived this CFIT crash.

Cause of the accident: pilot error

12. SA-R-7 / 6461 crash in Cueno (Crew 9/9 & Passengers 9/9)

SA-R-7 was the private a/c of the Saudi Arabian Royal family. During a flight from Geneva to Nice the plane struck during the descent phase a mountain at 900 m. The crash occurred at Cuneo in Italy. Everybody on board of the a/c -- including members of the royal family -- died.

Cause of the accident: pilot error

13. SU-ALD / 6441 crash in Bombay (Crew 8/8 & Passengers 55/55)

SU-ALD was supposed to land in Bombay, India. The plane crashed at 20h20 in the sea while approaching the Bombay

airport. This crash during the initial approach was probably due to a loss of control caused by the heavy rain and severe turbulence which took place at the moment of the crash. None of the passengers survived this crash.

Cause of the accident: pilot error

14. G-APDH / 6409 crash in Singapore (Crew 0/8 & Passengers 0/60)

G-APDH, a Comet 4 of MAS -- Malaysian Airlines Systems -- was as scheduled passenger plane on a flight from Kuala Lumpur to Singapore. Shortly after landing the right gear forging broke because of a fatigue failure. The Comet remained on the runway but fire broke out. None of the passengers was killed.

This crash was caused by a fatigue failure of the right gear forging.

Cause of the accident: fatigue failure

15. G-ARCO / 6449 crash off Nicosia (Crew 7/7 & Passengers 59/59)

G-ARCO, a Comet 4 of British European Airways was flying Athens - Cyprus when it disappeared from the radar screens 10 minutes after it took off from Nicosia. Captain Gordon Blackwood had previously not informed of any technical difficulties. Since there were a lot of similarities to the YP and YY crashes, rumours were saying that this crash was again due to fatigue.

The analysis of the wreckage allowed to detect that the Comet 6449 was indeed teared up, following the detonation of a highly explosive device within the cabin. In addition this theory was

reinforced by the fact that initially the General in command of the Cyprus army should have been on board. He cancelled in the last moment his flight. The political problems which existed at the time on the island make a terrorist act highly possible. The official accident report concluded therefore to a bombing.

Cause of the accident: bomb explosion

16. SU-ANI / 6475 crash in Ethiopia (Crew 0/9 & Passengers 0/5)

SU-ANI was as flight MS755 on a flight from Khartoum to Addis Ababa-Bole in the final approach phase. The aircraft broke through clouds at 150ft, but was 200-300ft to the right of Runway 32. The Comet banked left, made some shallow turns and made a higher than normal landing flare half way down the runway. This caused the aircraft to stall; the left wing and pod fuel tank struck the runway and the Comet crashed.

This crash was caused by the fact that the pilot attempted to land from an unfavourable position, brought about by the fact that he had descended below weather minima before being able to establish visual ground contact.

Cause of the accident: pilot error

17. SU-ALE / 6444 crash in Munchen (Crew 0/9 & Passengers 0/14)

SU-ALE was taking off from Munchen-Riem, but due to buffeting, the take-off had to be rejected at a height of 30ft. The aircraft landed back, overran the runway and struck a fence. The undercarriage was torn off and a small fire started.

This crash was caused by buffeting probably caused by icing on the wings. In addition due to improper operation of the flight controls, the Comet over-rotated.

Cause of the accident: pilot error

18. G-APDN / 6415 crash in Spain (Crew 7/7 & Passengers 105/105)

G-APDN, a Comet 4 of Dan-Air Services was as a charter flight in the descent phase when it hit a mountain. All passengers and crewmembers died.

Cause of the accident: ATC and instrument failure

[Official accident report of G-APDN]

19. G-APDL / 6413 crash in Newcastle (Crew 0/4 & Passengers 0/5)

G-APDL, a Comet 4 of Dan-Air Services was on a training flight when it landed wheels up. The aircraft was damaged beyond repair.

This crash was caused by the fact that the crew omitted to carry out the pre-landing checks while practising a flapless landing.

Cause of the accident: pilot error

20. SU-ALC / 6439 crash in Tripoli (Crew 8/8 & Passengers 8/8)

SU-ALC was as flight MS844 on a flight from Alger-Houari Boumediene to Tripoli and made its initial approach. The Comet struck sand dunes at 395ft while making an ADF approach procedure turn for Runway 18.

This crash was caused by the fact that the captain decided to land while prevailing visibility was below company-minimum for that airport at night.

Cause of the accident: pilot error

Details about all D.H. Comet incidents

In this section I summarized the information of the hull-losses which I collected from different sources. However errors are human, if you think that some information is not correct feel free to post me an . Don't forget to tell me your source.

A. G-ALYR / 6004 hull-loss in Calcutta (Crew 0/0 & Passengers 0/0)

G-ALYR, a Comet 1 operated by B.O.A.C. was damaged beyond repair because the aircraft was being taxied off a curving taxiway. Capt Willerton was faced with a design defect. At night the taxi lights were too dim to use safely, and the crews had to use the landing lights, which were high power, and got hot. So they had to be alternated left and right to avoid a meltdown. The switches to do this were fitted on the left flight deck wall low down, and behind the captain's seat. The taxi light switches were also there, and the layout was poor. It was easy to find the wrong switch. Also the nosewheel steering wheel was self centering, and if the hand was taken off it then the aircraft would turn.

In a left hand turn Capt. Willerton took his left hand off the steering wheel to select another landing light. The steering centered, and then the aircraft right wheel bogies ran off the paved surface. Capt. Willerton made the mistake of trying to get

the aircraft back onto the paved surface, and when it did not respond he applied engine power on the two right engines. This caused the bogie struts to be forced up and into the wing structure causing much damage. Willerton was blamed, and lost seniority. Soon afterwards the switches were relocated to the upper front panel. Note that G-ALYR was returned to the UK for repairs.

Thanks to Capt. Peter Duffey for the details of the report listed above.

Photo Credit: Aeroplane Monthly [Sep-89]. Thanks to Trevor Friend for contributing this picture. Added [15-Nov-98]

B. XK663 / 6027 hull-loss in Wyton (Crew 0/0 & Passengers 0/0)

XK663, a Comet 2R of the 192th RAF sqn was damaged beyond repair during a hangar fire. Unfortunately further details are missing.

C. 7926M / 06028 hull-loss in Lyneham (Crew 0/0 & Passengers 0/0)

7926M, a Comet C2 of the RAF burnt during fire rescue training in 1968. Unfortunately further details are missing.

D. OD-ADR / 6445 hull-loss in Beirut (Crew 0/0 & Passengers 0/0)

The Comet 4C of MEA registered OD-ADR was one of three destroyed by an Israeli commando attack on the 28th December 68.

E. OD-ADS / 6448 hull-loss in Beirut (Crew 0/0 & Passengers 0/0)

The Comet 4C of MEA registered OD-ADS was one of three

destroyed by an Israeli commando attack on the 28th December 68.

F. OD-ADQ / 6446 hull-loss in Beirut (Crew 0/0 & Passengers 0/0)

The Comet 4C of MEA registered OD-ADQ was one of three destroyed by an Israeli commando attack on the 28th December 68.

G. XM829 / 06021 hull-loss in Stansted (Crew 0/0 & Passengers 0/0)

Frame 06021, the former Air France Comet 1A, which was converted to 1XB specifications and last served as XM829 was donated to the Stansted airport fire services and destroyed by fire at Stansted in 1970. Sorry I don't have the precise date.

Radical thoughts on the Comet

Now that the Ministry of Transport and Civil Aviation has announced that there is to be a public inquiry into the causes of the accident to the Comet on January 10, it will be both useful and astringent to look back for a moment. By so doing some of the misfortunes suffered by this Comet which means so much to us may be viewed again as rationally as possible and brought into perspective in the light of present information.

There would be no point in minimizing the seriousness of this latest accident, but, at the same time, any tendency to connect it too closely in our minds with previous accidents must, at this difficult time, be prevented. It is true that of the 19 Comet 1s and 1As which have entered, or been about to enter, air-line service, five have been written off. Two of the accidents concerned involved no loss of life, and, more important still, three of the five were the result of known and fully understood causes.

Only two of the five accidents, therefore, need to have any air of mystery about them, but, unfortunately, the causes of two of the three fully understood accidents may tend to remain a little hazy in the eyes of the public. This should not be, but, at the time when the headlines were at their biggest and the public were most interested, no authoritative explanatory information could be made available about the aircraft's accepted characteristics. To ordinary people, a couple of Comets simply failed, for some reason or other, to become airborne.

Even though an official report about the first of these two accidents had already been issued when the second one occurred, the wording of this report was not such as to lead any reader straight to an understanding of both accidents.

U.A.T. Comet 1A F-BGSC

The third of these "understood" accidents received little attention in this country and concerned one of Union Aéromaritime de Transport's Comets. It was a mishap on the landing run at an African aerodrome and need only be mentioned here because the aircraft was considered, from the insurance point of view, to be damaged beyond repair.

So, before considering the two more recent tragedies, let us try to remove any remaining mystery from the sequence of these take-off accidents.

The Take-off Accidents

B.O.A.C. Comet 1 G-ALYZ

The first was suffered by a B.O.A.C. Comet, G-ALYZ, at Ciampino Airport, Rome, on October 26, 1952. It was dark and it was raining. The Comet failed to accelerate adequately, or even to become properly airborne, and the captain, considering that

there must be a lack of thrust, abandoned the take-off.

No one was seriously hurt, but the aircraft was irrevocably damaged in the resultant crash landing. The report showed that the attitude of the Comet had, unknown to the crew, become very nose-high during the takeoff run, so much so that the wing was stalled or semi-stalled.

In the Corporation's Training Manual, as quoted in the report at that time, it was noted that "an increase of incidence to 9 deg. results in a partially stalled wing giving a high drag which appreciably affects the aircraft's acceleration " In fact, the tail-bumper of G-ALYZ had been scoring the runway, so the Comet's attitude was of the order of 11 deg., or more, noseup. At the take-off weight of 100,370 lb. it would never have flown at all in that attitude.

Following this accident a new take-off technique was apparently recommended for B.O.A.C. pilots and more attention was paid to this particular problem during the training of Comet pilots. The modified system involved lifting the nosewheel at the appropriate speed and afterwards letting it touch again, so that it could be felt on the runway until take-off safety speed had been reached. The Comet's controls are power-operated, and "feel" is provided by spring-loading from a neutral trimming datum.

Canadian Pacific Air Lines Comet 1A CF-CUN

The second of the two take-off accidents followed the same form, but the conditions were much more difficult this time and the accident disastrous. It occurred at Karachi on March 3, 1953, during the delivery flight of the first of the Canadian Pacific Air Lines' Comet 1As to its service base at Sydney.

No official report was published after the accident, but a

summary was issued. This made it clear that the aircraft was at its limit of weight for the conditions existing. It was being taken off at 114.816 lb., which was very nearly the permissible maximum for the 1A Series, and the hours of darkness had been chosen so that the air temperature should be as low as possible. Even so, this was about 8 degC. above International Standard Atmosphere and water-methanol injection was being used to regain the power from the Ghosts for the take-off. There was no wind--and the Comet's take-off distance is sensitive to wind conditions.

In the words of the report summary, "the aircraft continued along nearly the whole length of the runway in a very nose-high attitude and never left the ground." The summary concluded with the words: "at this high weight strict compliance with the take-off technique would be necessary for a successful take-off." It is tragic that good and experienced pilots should have been defeated, as they were at Rome and Karachi, by a new type of aircraft, but the Comets characteristics and power-operated controls were known and its technique of take-off understood. Later history has shown the Comet to be a "different" aircraft, but far from being a difficult one.

Calcutta and Elba

Long afterwards it was learnt that de Havillands had started experimenting with a new wing section before even the accident at Rome in 1952. No doubt this re-design was primarily intended as a development to permit the use of higher weights for a later Comet Series, but its advantages in the take-off case must have been much in the designers' and test pilots' minds. Meantime they had, supported by B.O.A.C. Comet pilots, adamantly resisted any suggestion that the control system should be altered. Its simplicity and other advantages apparently outweighed, in

their view, any risks of over-control it might involve.

The two take-off accidents and the one almost unrecorded landing accident can now be put on one side in the knowledge that their reasons are well understood.

But the Elba accident--and, to a lesser degree, the Calcutta accident--are still in the present. They must be understood and explained as thoroughly as possible so that we can go on to the next stage of progress with clear minds and a full understanding of the means by which such accidents can be prevented in future. There will always be aeroplane accidents, but even the most timid traveller will accept this prospect-- just as he or she accepts the possibility of a train accident or of a sinking ship--so long as the reasons are known and action known to have been taken.

B.O.A.C. Comet 1 G-ALYV

The sequence of events leading up to, and following, the Calcutta accident on May 2, 1953, will be remembered by the majority of people and only certain features need to be mentioned here.

The report of the Indian Court of Inquiry which had investigated the accident --and which included one experienced British assessor amongst the three who were appointed-- gave the "probable" cause of the Comets disintegration as: "severe gusts encountered in the thundersquall: or over-controlling or loss of control by the pilot when flying through the thunderstorm." An appendix, written by one of the assessors and giving a suggested sequence of events leading to the disaster, was described by the Court as being "plausible" but unproven.

Concurrently with the issue of this report B.O.A.C. and de Havillands, in a combined statement, made it clear that they did not agree that over-control or loss of control was a likely cause,

and stressed the theoretical nature of any findings before a more detailed examination of the wreckage had been made.

The Indian report had, in fact, recommended that such an examination should be made.

No further information has yet been made publicly available about the results of this continued examination. So, following this very' natural resistance to the findings of the Court. This leaves the Calcutta accident still in the "unsolved" category. Since they each occurred on the climb it may be natural for many people interested in the Comet to tend to connect the Calcutta accident with that near Elba twelve days ago.

B.O.A.C. Comet 1 G-ALYP

Some considerable attention was paid in the Press last weekend to Sir Miles Thomas' statement that the possibility of sabotage in the case of the Elba accident "cannot be overlooked." This statement was natural enough in the circumstances, since such a cause is always a possibility in any such disaster, and efforts must obviously be made to follow up likely clues.

But the weight of the investigation will, no doubt, continue to be directed towards hat I believe to more practical possible causes. Among these could be the explosion of a kerosene-air mixture, or of hydraulic fluid vapour, and the medical evidence may go a long way towards confirming the likelihood of one or other similar possibility.

The very difficult feature of the Elba accident--that the aircraft fell into water--has also provided medical evidence which might not have been available if the wreckage had fallen on land. Unfortunately, latest reports say that the wreckage of G-ALYP is

lying at a depth of the order of 600 ft. and salvage may not be practicable.

The fact that the Comets had been taken out of service by B.O.A.C. was a voluntary move so there was no reason why these aircraft should not be returned to service when they had been thoroughly examined.

Nevertheless, no one imagined it probable that signs of incipient structural failure would actually be found in the Comets under examination. B.O.A.C.'s maintenance and inspection is among the most thorough in the World, and if such signs were to be seen in any of the Comets in service it is likely that they would have been found during previous maintenance checks completed during the past few months.

But a full and careful inspection of all the Corporation's Comets was vital, both as a means of assuring the public and as an essential link in the series of checks which must be made towards a narrowing-down of the possible cause of the accident.

Air France and Union Aéromaritime de Transport had also removed their Comets temporarily from service last week and the former was making a thorough examination of at least one aircraft. The Royal Canadian Air Force, as military operators, were taking no action for the time being.

Last week-end Mr. A. T. Lennox-Boyd, Minister of Transport and Civil Aviation, flew out to Rome to observe the progress of the investigation there. He was due to return on Tuesday for the opening of Parliament.

Finally, let us remember, that the Comet is far from being the

first or only civil aircraft to have suffered serious trouble, the cause of which could not be immediately diagnosed, in the earlier stages of its service life.

There was the case, for instance, of the DC-6. After one of these aircraft had been lost, with all its passengers and crew, following a fire in the air (October 24, 1947) another, flown by a different U.S. operator, was successfully force-landed after suffering similar trouble (November 11, 1947).

All DC-6s were then grounded while investigations were made. It was discovered that if, after transferring fuel between certain tanks, the immersion pumps were accidentally left "on," the resultant pressure build-up caused fuel to vent. This could be carried by the airflow straight into the air-intake of a combustion heater, causing a continuous fire which could not be controlled.

There have been other similar cases of trouble with civil transports which have afterwards continued, during their long lives, to be popular and successful aircraft.---H.n.w.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Sent to Mr. Smart: Last ditch effort, clutching at straws, hoping against hope...

Ken Smart

Chief Inspector of Accidents,

Air Accidents Investigations Branch

AAIB

DRA Farnborough

Hants GU14 6TD

United Kingdom

Dear Mr. Smart, 3 June 2002

Conscience: It's what safety is all about: Doing the right thing although many would try to dissuade.

By your silence to my Smith AAR for Pan Am Flight 103 and your lack of response to my personal replies to your email regarding the photographs of the torn and twisted forward cargo door, I know you know that there is a very real possibility that the probable cause of the inflight breakup was not a bomb but the shorted wiring/forward cargo door rupture/explosive decompression explanation and that the finding of 'bomb' was probably based on the red herring of a rather large shotgun blast in the compartment after the tremendous explosion of the sudden decompression.

I know you know this because the evidence, the facts, and the data support those conclusions and have been presented to you. You have implied that vertical torn skin above a cargo door proves it opened in flight and indeed, the forward cargo door of Pan Am Flight 103 has those telltale vertical tears. The wreckage distribution shows that ruptured open door occurred at the initial event time which is the sudden loud sound which matches the United Airlines Flight 811 sudden loud sound. You may be stunned by the enormity of the discovery.

Above picture of Pan Am Flight 103 shattered forward cargo door with peeled back skin from aft midspan latch and vertical tear lines above door.

I also know you know the complex political implications of this more accurate mechanical probable cause becoming accepted by

aviation professionals and the public. There must be strong pressure to maintain the reputations of the New Scotland Yard, the AAIB, the NTSB, the FBI, and the stature of at least three foreign governments, India, UK, and USA. Literally billions of dollars have and will change hands thereby shifting the fortunes of millions. Based on the non-conspiracy theory for Pan Am Flight 103, apologies may be made to a foreign government. The viability of the largest airliner manufacturer in the world may be in question.

I want you to know that I know of all these political implications and probably ignorant of many more such as promotions and assignments of those involved.

Yet, my purpose is clear: Aviation safety for crew and passengers is paramount and comes before financial or emotional considerations. I feel this way probably because I am a survivor of a sudden night fiery fatal jet airplane crash myself. I've been there. I'm trying to stop others from going there.

The one caught in the middle is you, sir, the Chief Inspector of the branch which investigates Air Accidents.

What to do?

Remain silent? Well, that silence of authorities over the years has apparently resulted in the recent deaths of 225 more passengers and crew in China Airlines Flight 611.

Speak up? What good would that do? What's the use? Why try?

And that's where conscience comes in. Just because the political forces are aligned against safety and just because the will of the people you represent wants very badly for Pan Am Flight 103 to

be a terrorist event and really, really don't want it to be mechanical, are those good enough reasons to ignore the evidence that shows a mechanical cause? Just because the cause to reopen the investigation based on subsequent similar accidents appears to be daunting, is that reason not to try?

Please don't turn a blind eye to the photographs of the shattered door; please don't use a deaf ear to the sudden loud sound on the CVR; and please look and listen to the purest and best evidence of what happened; the CVR and photographs.

Above: Chart 12 from NTSB showing four Boeing 747 sudden loud sounds on the CVR and the abrupt power cut. The sound for Air India Flight 182 has been matched to a DC-10 explosive decompression cargo door event.

Several men are accused or convicted of causing a Boeing 747 to suddenly come apart inflight within an hour of takeoff and yet the similar inflight breakup has happened again...in 1989, and again in 1996...and again in 2002. The serial killer called faulty Poly X wiring is striking again and again and again while others or symptoms such as a fuel tank explosion or shotgun discharge are blamed.

The evidence of similar matching evidence is overwhelming as shown by the SmithTable below with more matches coming for China Airlines Flight 611 as the wreckage is retrieved.

The political pressure and popular will to keep the situation status quo of terrorist bombing is overwhelming also.

I realize I am pleading my case. Not my personal cause because I

have little to gain. Pleading as in a legal sense, not for myself but for others such as passengers and for things such as wiring and doors.

Wiring pleads innocent in the sense it was light, strong, good insulation, and designed for fifteen years. It apparently fulfilled its design requirements at the time. Only later did the problems appear: Quote from TWA 800 Public Docket 516A, Exhibit 9A Systems Group Chairman's Factual report of Investigation, Page 47, "A Boeing telefax of June 25, 1997, stated that: The Poly-X wire was used as general purpose wire on the RA164 (TWA 800) aircraft. Wire insulation known as Poly-X had three in-service problems:

- Abrasion of the insulation in bundles installed in high vibration areas.

(This problem was corrected by Boeing Service Bulletin No. 747-71-7105, Dated July 19, 1974)

- Random flaking of the topcoat.

- Insulation radial cracks in tight bend radii.

Radial cracking phenomenon of the Poly-X wire was mainly associated with mechanical stress. Bend radius is the largest contributor to mechanical stress in installed wire or cable.

Presence of moisture in conjunction with mechanical stress is also a contributor."

The Cargo Door pleads innocent in the sense that outward opening nonplug doors to baggage compartments have been the tradition for transportation vehicles for centuries. Stagecoaches, trains, buses, cars, and airplanes have always had baggage doors that opened outward; it's a tradition. The reason is to save internal space, of course. The advent of highly pressurized cabins which mandated plug type doors were not enough to overcome the tradition of outward opening doors. Ten latches but only eight

locking sectors were thought sufficient to overcome any unwanted unlocking signal.

Passengers plead innocent in the sense of wishing to spend the least amount of money to go where they want to go and if that means flying in a plane with cheap tickets with a dangerous door, then they will. The tickets are cheaper because more income can be derived from a larger cargo compartment than one which is taken up by a door that opens inward.

Manufacturers plead innocent in the sense they are in a competitive business that must make a profit to continue to make aircraft and the wiring and doors were deemed to be adequate at the time. Only decades later did the problems appear.

And that's why safety agencies exist; to identify these difficult to prove problems and urge repair. These are plane crashes, not bank robberies. Plane crashes are usually mechanical or pilot error; bank robberies are usually conspiracies.

Mr. Smart, what gives me the assumed right to lecture a senior government aviation safety official on his duty? What allows me to tell you things you already know? It's because I have the arrogance based on experience, the experience of actually being in one sudden night fiery fatal jet airplane crash and specifically talking to you about another sudden night fiery fatal jet airplane crash. I have the right to suggest what you should do because I have earned that right by surviving even though my pilot died during his ejection.

Please reconsider the probable cause of Pan Am Flight 103 to be mechanical and not sabotage. It's never too late to correct an error of judgment by those who did not have the benefit of

hindsight.

The Comet investigation is a good example of history repeating itself. Bombs were suspected for the inflight breakups and the planes grounded. After a while the political pressure exerted itself and the planes flew again only to come apart again with more deaths. Then an objective, comprehensive investigation was conducted and the true culprit of hull rupture by mechanical reason was discovered, metal fatigue in a corner of a squarish ADF window. Bomb cause was ruled out. The Boeing 707 surged into the lead of commercial aviation. Safety improvements were made with round smaller windows and stiffeners and belts installed to prevent the spread of a crack or hole. (The 20 inch 'bomb' hole in Pan Am Flight 103 port side would have stopped at a small manageable size and did.)

I've included the Comet AAR to show that my conclusions on Pan Am Flight 103 are based on solid research and to show that similarities among each Comet accident led to the answers. The Comet probable cause was determined by comparing the similar evidence in similar crashes. I did the same for the Boeing 747. The Comet comparisons were made by safety officials because of the short time (one year and four months) between inflight breakups while the Boeing 747 intervals for inflight breakups have been 1985 to 2002 or seventeen years.

Comments made almost fifty years ago about the Comets are relevant today for Boeing 747s: "Some considerable attention was paid in the Press last weekend to Sir Miles Thomas' statement that the possibility of sabotage in the case of the Elba accident "cannot be overlooked." This statement was natural enough in the circumstances, since such a cause is always a possibility in any such disaster, and efforts must obviously be

made to follow up likely clues.

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Finally, let us remember, that the Comet is far from being the first or only civil aircraft to have suffered serious trouble, the cause of which could not be immediately diagnosed, in the earlier stages of its service life.

There have been other similar cases of trouble with civil transports which have afterwards continued, during their long lives, to be popular and successful aircraft."

Mr. Smart, meet the new boss of 1988, 1989, 1996, and 2002, same as the old boss of 1954: Explosive decompression caused by pressurized hull rupture in flight; several aircraft destroyed; errors of judgment by politicians to keep flying; and the Airbus surges into the lead of commercial aviation. China Airlines Flight

611 is the fifth controversial, strange, mysterious in-flight breakup of a Boeing 747 and the people who buy airplanes are mindful of this.

Regarding China Airlines Flight 611: A recent news article reports: "Aviation experts have offered several theories on the cause of crash, including metal fatigue, an internal explosion, sudden loss of cabin pressure, a mid-air collision or a military accident. U.S. crash experts who investigated the mid-air explosion of a Trans World Airlines jumbo jet in 1996 are in Taiwan to try to determine why the China Airlines aircraft broke into four pieces at an altitude of 30,000 feet and plunged into the Taiwan Strait. "

History has repeated history.

What to do?

From my point of view, the choice is clear: Investigate fully and let the chips fall where they may. Let the politicians handle the red faces and the attorneys handle the money exchanges. Let the Air Accidents Investigation Branch investigate an air accident which now appears to possibly have been caused by a mechanical cause which has happened before December, 1988, happened in February, 1989, and is still happening again and again.

Based on the preliminary findings for China Airlines Flight 611 and the retrospective of United Airlines Flight 811, there is full justification to reopen/continue the investigation into a probable cause of a disintegration of an airliner which continues to fly thousands of passengers a day in hundreds of planes still in service which crash cause is now open to question.

Hindsight is valuable and a luxury. To do nothing after United Airlines Flight 811 was wrong. To do nothing after Trans World Airlines Flight 800 was wrong. To do nothing after China Airlines Flight 611 is wrong. To not reconsider the probable cause for Pan Am Flight 103, even at this late date, is to betray the trust of the passengers and crew; to ignore the visual and aural evidence is to betray the aviation safety profession; and to pretend UAL 811 is irrelevant to PA 103 is to make a lie of your career.

Do you need more evidence presented to you, Mr. Smart? I have it and can assist your staff of investigators. There is much to check out in the wreckage at Farnborough. Motivated, informed citizens can have much to offer the experts. I am available at any time to answer any questions you may have. You have access to the answers in your files and in a hangar. I can direct you where to look. You can satisfy your curiosity and the skepticism of the senior government politicians within a few hours of examination of the wreckage which has been saved for exactly this purpose.

Do you need advice on how to proceed politically? I can't help you there and good luck facing the press and the politicians.

All I can do is to go to the authority that have the responsibility and present my evidence and conclusions. They are in my Smith AAR for Pan Am Flight 103 and sent to you earlier as well as other documentation. There is much more if required and is available upon request. There is no dearth of factual support for the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Pan Am Flight 103.

Please, Mr. Smart, let the weight of the investigation continue to

be directed towards more practical possible causes. It may be a difficult decision but the right one when it comes to life and death.

Cheers,
Barry

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Significant Direct and Tangible Evidence Obtained for Four
B747 Breakups in Flight
AI 182 PA103 UAL 811 TWA 800 and counting for China
Airlines Flight 611
Boeing 747
Early model -100 or -200

Polyimide wiring (Poly X type)

Sudden airframe breakup in flight (partial or total)

Breakup occurs amidships

High flight time (over 55,000 flight hours)

Aged airframe (over 18 years of service)

Previous maintenance problems with forward cargo door

Initial event within an hour after takeoff

Initial event at about 300 kts
while proceeding normally in all parameters

Initial event has unusual radar contacts

Initial event involves hull rupture in or near forward cargo door
area

Initial event starts with sudden sound

Initial event sound is loud

Initial event sound is audible to humans

Initial event followed immediately by abrupt power cut to data
recorders

Initial event sound matched to explosion of bomb sound

Initial event sound matched to explosive decompression sound
in wide body airliner

Torn off skin on fuselage above forward cargo door area

Unusual paint smears on and above forward cargo door

Evidence of explosion in forward cargo compartment

Foreign object damage to engine or cowling of engine number
three

Fire/soot in engine number three

Foreign object damage to engine or cowling of engine number
four

Right wing leading edge damaged in flight

Vertical stabilizer damaged in flight

Right horizontal stabilizer damaged in flight

More severe inflight damage on starboard side than port side

Port side relatively undamaged by inflight debris

Vertical fuselage tear lines just aft or forward of the forward cargo door

Fracture/tear/rupture at a midspan latch of forward cargo door

Midspan latching status of forward cargo door reported as latched

Airworthiness Directive 88-12-04 implemented (stronger lock sectors)

Outwardly peeled skin on upper forward fuselage

Rectangular shape of shattered area around forward cargo door

Forward cargo door fractured in two longitudinally

Status of aft cargo door as intact and latched

Passengers suffered decompression type injuries

At least nine missing and never recovered passenger bodies

Wreckage debris field in two main areas,
forward and aft sections of aircraft

Initial official determination of probable cause as bomb explosion.

Initial official determination modified from bomb explosion

Structural failure considered for probable cause

Inadvertently opened forward cargo door considered for probable cause

Official probable cause as bomb explosion

Official probable cause as 'improvised explosive device'

Official probable cause as explosion by unstated cause

Official probable cause as explosion in center fuel tank with unknown ignition source

Official probable cause as improper latching of forward cargo door

Official probable cause as switch /wiring inadvertently opening forward cargo door

Significant Direct and Tangible Evidence Obtained for Four B747 Breakups in Flight

AI 182 PA103 UAL 811 TWA 800 and counting for China Airlines Flight 611

THE CIVIL AVIATION ACT, 1949

THE CIVIL AVIATION (INVESTIGATION OF ACCIDENTS) REGULATIONS 1951

Report of the Public Inquiry into the causes and circumstances of the accident which occurred on the 10th January, 1954, to the Comet aircraft G-ALYP

- * AIRCRAFT: Comet G-ALYP
- * ENGINES: Four de Havilland Ghost 50
- * REGISTERED OWNERS AND OPERATORS: British Overseas Airways Corporation
- * CREW:
 - * Captain A. Gibson - Killed
 - * First Officer W. J. Bury - Killed
 - * Engineer Officer F. C. Macdonald - Killed
 - * Radio Officer L. P. McMahon - Killed
 - * Steward F. L. Saunders - Killed
 - * Stewardess J. E. Clarke - Killed
- * PASSENGERS: 29- All Killed
- * PLACE OF ACCIDENT: Over the Mediterranean off Elba.
- * DATE AND TIME: 10th January, 1954, at about 1000 G.M.T.

All times in this Report are G.M.T.

PART I INTRODUCTORY

(a) Definitions

1. In this Report the following expressions bear the following meanings:

- * " A.R.B." means the Air Registration Board incorporated as a company limited by guarantee under the Companies Act, 1929, on the 26th February, 1937.
- * " A.S.B." means the Air Safety Board appointed by the

Minister of Transport and Civil Aviation.

* " de Havillands " means the de Havilland Aircraft Company Limited.

* " R.A.E." means the Royal Aircraft Establishment controlled by the Minister of Supply.

* " B.O.A.C." means British Overseas Airways Corporation.

(b) The Air Registration Board

2. The primary object of A.R.B. is to carry out such administrative and advisory functions with regard to the design, construction and maintenance of aircraft and matters connected therewith as may from time to time be delegated to A.R.B. by the Minister of Transport and Civil Aviation. Under its Articles of Association A.R.B. is to consist of two members appointed by the Minister and sixteen other members. Of these sixteen four must represent operators of aircraft, four must represent constructors of aircraft, four must represent insurers engaged in aircraft insurance business and the remaining four are co-opted. It is provided that of the two members to be nominated by the Minister one is to be an independent person and the other a person who has had not less than five years' professional experience as a pilot of civil aircraft. It is further provided that the co-opted members are to be persons representative of some interest connected with civil aviation.

3. By section 7 of the Civil Aviation Act, 1949, which reproduces section 2 of the Air Navigation Act, 1936, it is provided that the Minister may by order provide for delegating to a body appearing to him to be constituted as is A.R.B. under its Memorandum and Articles, such of the administrative functions of the Minister with respect to the matters mentioned in the subsection as may be specified in the order and for entrusting to

that body such advisory functions in connection with any of such matters as may be specified.

4. In pursuance of this section the Minister by the Civil Aviation (Air Registration Board) Order of 1951 (which replaces Orders made under the 1936 Act) delegated a number of his administrative functions to A.R.B. and entrusted to it certain advisory functions. Under section 1 of the Order the Minister delegated to A.R.B. the following functions (inter alia):_

- * (a) the formulation and publication of technical requirements as regards the design, construction and maintenance of aircraft and engines, components, accessories, instruments, equipment and apparatus of aircraft;
- * (b) the investigation of aircraft (including their engines, components, accessories, instruments, equipment and apparatus (excluding radio apparatus) and the manner of the installation of the same) for the purposes of the issue and renewal of certificates of airworthiness or of validations of such certificates and for the purposes of the variation of particulars and conditions specified in such certificates of any flight manual or performance schedule issued therewith;
- * (c) the making of recommendations to the Minister as to the issue of certificates of airworthiness and of validations of such certificates and as to the variation of particulars and conditions specified in such certificates or any flight manual or performance schedule issued therewith;
- * (d) the renewal of certificates of airworthiness and of validations of such certificates and to such extent as may be determined by the Minister in writing the variation of particulars and conditions specified in such certificates or any flight manual or performance schedule issued therewith;
- * (e) the making of any investigation required in connection

with an application for a special permission for an aircraft to fly without a certificate of airworthiness being in force in respect thereof and the making of recommendations to the Minister as to the giving of such a special permission;

* (f) the approval of engines for aircraft;

* (g) the making of inspections of organisations of persons or firms desiring to furnish reports or certificates as to compliance by aircraft and engines, components, accessories, instruments, equipment and apparatus of aircraft with airworthiness requirements, the approval of any such firm or persons as qualified to furnish such reports or certificates, and the acceptance of such reports or certificates;

5. The chairman of A.R.B. is the Rt. Hon. Lord Brabazon of Tara. The members of the Council are identical with the members of the Board. The Council are advised by a technical staff of about 125 of whom about 84 are employed on inspectional duties. The Chief Executive Officer is Mr. R. E. Hardingham and the Chief Technical Officer of the Board is Mr. W Tye.

6. To enable A.R.B. to discharge its functions it prepares and from time to time publishes detailed requirements which inform manufacturers of the minimum conditions with which, prima facie, they have to conform if they are to obtain a Certificate of Airworthiness. To assist A.R.B. in the preparation of these requirements they have appointed an " Airworthiness Requirements Co-ordinating Committee" which includes representatives of the Ministry of Supply, R.A.E., manufacturers of aircraft, operators of aircraft and A.R.B. itself.

7. Requirements are not, however. treated by A. R. B. as being as immutable as the laws of the Medes and Persians. On the one

hand, during the development of a new type, requirements more exacting than those prescribed in the published regulations are often imposed or adopted by the manufacturer concerned. On the other hand, on occasions certain deviations from the prescribed conditions are accepted by A.R.B. provided that they are satisfied that the safety of the aircraft is not thereby jeopardised.

(c) The Air Safety Board

8. A.S.B. is a purely advisory body and has no statutory authority behind it. It was appointed in November, 1946, with the following terms of reference: " To keep under continuous review the needs of safety in British civil aviation and to recommend measures calculated to promote safety in respect of both (a) the operation of British civil aircraft throughout the world, and (b) the efficiency of the system of ground facilities provided for civil aircraft of all nations operating over the United Kingdom." Its members are appointed by the Minister and at the material date consisted of Air Chief Marshal Sir Frederick Bowhill, Lord Brabazon, Sir Leonard Bairstow Air Commodore Banks and Mr. (now Sir) Arnold Hall.

(d) The Royal Aircraft Establishment

9. R.A.E. is controlled by the Minister of Supply. The main establishment is at Farnborough but there are branch establishments in other parts of the country. In this Report I am mainly concerned with the work done at Farnborough. The Director of R.A.E. is Sir Arnold Hall. The Head of the Structures Department is Dr. P. B. Walker. The only other member of the staff who need be mentioned by name is Mr. E L. Ripley who was responsible for the work in connection with the reconstruction and investigation of the wreckage recovered after

the accident. I should, however, add that R.A.E. has its own flight testing facilities which were fully used in the investigations which took place after the accident.

(e) The de Havilland Aircraft Company Limited

10. de Havillands were the manufacturers of the Comet aircraft and the engines were made by a subsidiary company, the de Havilland Engine Company Limited. Mr. R. E. Bishop is the Chief Designer of de Havillands and his Chief Assistant is Mr. C. Wilkins. Mr. R. H. T. Harper is the Chief Structural Engineer and Mr. H. Povey is the Director in charge of Production. de Havillands have an Inspection Department entirely separate from their Production Department and the independence of the Inspection Department is secured by the provision that it reports direct to the Managing Director and is not in any way under the control of the Production Department. de Havillands have been approved under paragraph 1(g) of the Civil Aviation (Air Registration Board) Order of 1951 as qualified to furnish reports and certificates as to compliance with airworthiness requirements.

PART II

HISTORY OF THE COMET PROJECT

11. Mr. Bishop stated that at the end of the war de Havillands were faced with the problem of recommencing the manufacture of civil aircraft. During the war they had been building only military aircraft. They decided that it would be inadvisable merely to build another version of the conventional aircraft; they had had some years' experience with jet fighters and concluded that with the help of their engine company they should be able to produce a useful civil aircraft which would be a step ahead of the current type. With this end in view they commenced design by

the end of September, 1946. Some idea, however, of the amount of work involved is indicated by the fact that it was not until the 27th July 1949, that the first prototype Comet made its first flight. de Havillands were, however, fortunate that B.O.A.C. and the Minister of Supply were willing to enter into a contract for the purchase of Comet aircraft without waiting for the prototype to be available. This enabled de Havillands at once to do preliminary work in the Production Department. The contract was entered into on the 21st January, 1947 and under it B.O.A.C. started their proving, flights in April, 1951.

12. At some date in 1951 it was arranged that the first two prototypes should be delivered to the Ministry of Supply but that the remaining aircraft to be supplied under the contract should be delivered to B.O.A.C. and that the approval of the Ministry of Supply to them should no longer be required.

13. A.R.B. issued a number of special category certificates of airworthiness to enable the requisite tests, both in this country and overseas, to be carried out, but it was not until early in 1952 that a full Certificate of Airworthiness was issued. This enabled the passenger service to be started and it was actually commenced on the 2nd May, 1952. The personnel for the service had received intensive training. B.O.A.C. had established a school for the training of pilots and crews and made full use of a special school which had been established by de Havillands for the training not only of pilots and crews, but also of station engineers. By the 8th April, 1954, when the Comet fleet of B.O.A.C. was grounded after the disaster near Naples, Comet aircraft had flown almost 25,000 hours, representing, on the basis of 400 miles per hour, a mileage of 10,000,000 miles.

14. Dealing more specifically with the technical aspect of the

development of the project between September, 1946, and the 2nd May 1952, de Havillands' outlook and practice underwent virtually no change. In order to provide an economically satisfactory payload and range at the high cruising speed which the turbo-jet engines offered, it was essential that the cruising height should be upwards of 35,000 ft. double that of the then current airliners and that the weight of the structure and equipment should be as low as possible.

15. Throughout the design they relied upon well established methods, essentially the same as those in general use by aircraft designers. But they were going, outside the range of previous experience and they decided to make thorough tests of every part of the cabin structure. They had not only to prove to their own satisfaction that their design was basically sound, but also to investigate the effect, on the large variety of materials involved, of the extreme conditions which would be met. They gave special attention to the structural integrity of the pressure cabin. The difference -- This difference is sometimes referred to hereafter as ' P ' -- between the internal and external pressure (8.25 lb./sq. in) was about 50 per cent. greater than that in general use and there was in addition a larger difference between the internal and external temperatures.

16. Their policy of testing in the laboratory was not a novel one, nor indeed were they alone in their belief in it. They recognised, however, that testing alone is not sufficient. Every test is to some extent a compromise, since the conditions to be met in service can seldom be represented completely in the laboratory and in many cases are not accurately known. The result must therefore, be reviewed in the light of calculations based on fundamental knowledge, and on general experience and practice.

17. For the design of the basic structure of the cabin they adopted a multiple of the Working pressure difference, P , in excess of current requirements in any country. The British Civil Airworthiness Requirements (B.C.A.R.) called for a "proof" pressure of $1.33 P$ (under which the cabin must show no signs of permanent deformation), together with a "design" pressure of $2 P$ (at which the material may reach its ultimate strength). These requirements were the same as those of the International Civil Aviation Organisation (I.C.A.O.) and also those of this country for military transport aircraft. de Havillands used a design pressure of $2.5 P$ and tested the cabin to $2 P$. Two test sections of the cabin were built. The front part, 26 ft. in length, extended from the nose nearly to the front spar of the wing, and included typical windows, hatches and door. The centre part, 24 ft. in length, extended from a few feet in front of the front spar to a few feet aft of the rear spar, covering the large cut-out containing the wine structure .

18. Their reasons for adopting these substantially higher figures were two. They believed, and this belief was shared by A.R.B. and other expert opinion, that a cabin which would survive undamaged a test to double its working pressure, $2 P$, should not fail in service under the action of fatigues -- There is attached hereto as Appendix IV a note on the subject of fatigue in metals and its bearing on the design of engineering structures which has been prepared for my assistance by my Assessors. -- due to the pressurisation to working pressure, P , on each flight, and to other fluctuating loads to which it is subjected in operations.

Secondly, they considered that it would ensure a larger margin of safety against the possible failure of windows, doors, and hatches. These are contingencies which had been shown by experience to be a serious risk, for even if nothing worse

happens, the resulting loss of pressure may be rapid.

19. So much importance did they attach to this latter consideration that they made many tests of window panes to very high pressures in addition, they applied pressures of between P and $2P$ some 30 times to the test section of the front part of the cabin together with a series of 2,000 pressurisations to rather over P . These tests were not intended as a test of the fatigue resisting properties of the structure, but rather as providing an assurance that the cabin would be satisfactory as a pressure vessel. But they undoubtedly contributed to de Havillands' confidence in the soundness of the cabin.

20. Simultaneously With the design and testing of the pressure cabin, all other parts of the structure were receiving treatment based on the same outlook -- design to at least the current requirements, coupled with exhaustive tests. The wing is of special interest, since it is here that requirements specifically directed to resistance to fatigue first became important. During the period 1949 o 1951 there had been growing among all aircraft designers and users a realisation that the life of the essential structure of an aircraft is not unlimited. The effects of atmospheric turbulence had produced unexpected and relatively early failure of the wings of certain transport aircraft. Gusts are most severe near the ground and in the tropics. Methods had been devised, and have since been improved and extended, for determining their frequency and intensity. In the light of this knowledge, repeated loading tests -- In which the appropriate load is applied and removed many times, simulating the effects of gusts, or any other cause of variation of load -- of the wings of transport aircraft became accepted as necessary. Tests of the Comet's wing were made in close co-operation with R.A.E.

21. Until about the middle of 1952 the likelihood that the fatigue resistance properties of a pressure cabin demanded further precautions, either in design or by test, than were provided by the current static strength requirements had not been realised. The matter first came to de Havillands' notice through Sir. Harper's association with the problem on Service (R.A.F.) transport aircraft, as a member of the Joint Airworthiness Committee (J.A.C.) of the Ministry of Supply. Draft Requirements (Paper 579, Oct., 1952) called for a static test to 2 P, a proof test to 1.33 P, together with repeated loading tests of 1.25 P applied 10,000 times.

22. At about the same time A.R.B. were reviewing the civil position. In due course they issued proposals in Paper No. 230 (19th June 1953) which called for the same static test to 2 P and proof test to 1.33 P but raised the number of applications of 1.25 P to 15,000. At the same time the paper suggested that certain structural parts such as riveted joints, door and window frames etc., might have to be designed to 3 P (on the ultimate strength of the material), in order to meet these requirements. It also stated that the figure of 15,000 was intended to cover the number of applications of P during the life of an aircraft, and that the test pressure of 1.25 P was intended to cover the phenomenon of "scatter" -- see Appendix IV -- in the fatigue strength of different cabins built to the same design.

23. The result of these developments was that in July, 1953 de Havillands reconsidered the position of the Comet's cabin. Up to that time no Comet had exceeded 2,500 hours flying say 800 pressurised flights. In order to satisfy themselves of its safety, and also to discover its probable safe working life, they carried out repeated loading tests of the test section of the fore part of the cabin, applying the working pressure P about 16,000 times. By

September, 1953, this specimen had withstood 18.000 applications of P in addition to some 30 earlier applications of pressures between P and 2P.

24. These tests were ended by a failure of the skin in fatigue at the corner of a window, originating at a small defect in the skin. But the number of pressurisations sustained was so large that, in conjunction with the numerous other tests, it was regarded as establishing the safety of the Comet's cabin with an ample margin.

25. Meanwhile, on the 2nd May, 1953, Comet G-ALYV had crashed in a tropical storm of exceptional severity near Calcutta. An inquiry was directed by the Central Government of India and was held under Rule 75 of the Indian Aircraft Rules 1937. The Court reported on the 26th May, 1953, that the accident was caused by structural failure of the airframe during flight through a thundersquall. In the opinion of the Court the structural failure was due to overstressing which resulted from either :

- * (i) Severe gusts encountered in the thundersquall, or
- * (ii) Overcontrolling or loss of control by the pilot when flying through the thunderstorm.

Fatigue failure of the cabin was not then suspected as a cause and in my opinion the evidence adduced in the course of the present Inquiry affords no sufficient reason for doubting the conclusion of the Indian Court.

PART III THE ACCIDENT

26. Comet G-ALYP (sometimes hereinafter called Yoke Peter) left Ciampino Airport, Rome, at 09:31 hours on the 10th January,

1954, on a flight to London. After taking off the aircraft was in touch with Ciampino control tower by radio telephone and from time to time reported its position. These reports indicated that the flight was proceeding according to the B.O.A.C. flight plan and the last of them, which was received at 09:50 hours, said that the aircraft was over the Orbetello Beacon. The Captain of another B.O.A.C. aircraft, Argonaut G-ALHJ, gave evidence of communications which passed between him and Yoke Peter. The last such message received by the Argonaut began "George How Jig frown George Yoke Peter did you get my" and then broke off. The Captain of the Argonaut gave it as his opinion that the message was not merely interrupted by another aircraft but that transmission ceased after the word "my" and he estimated that the message was received by him at approximately 09:51 hours. Shortly after 10:00 hours the Ciampino Traffic Control Clerk heard a sound which he suggested might have been an unmodulated transmission from Yoke Peter.

27. The evidence of four witnesses from Elba as to things seen and heard by them on the 10th January suggests that Yoke Peter must have crashed into the sea at about 10:00 hours and it therefore appears that something happened to the aircraft with catastrophic suddenness which may have accounted for the interruption of the transmission of the last message to the Argonaut. It is also clear from the evidence of the Elba witnesses that part of Yoke Peter fell into the sea in flames.

28. The chart, which is Figure 1 of this Report, was prepared from all the information available and produced by a Navigating Officer from B.O.A.C. The estimated flight track of the aircraft and the position in which bodies and wreckage were found can be seen on the chart and the witness gave it as his opinion that at 09:51 hours the aircraft was probably approaching a height of 27 000 feet.

PART IV THE AIRCRAFT

29. Yoke Peter was designed and constructed by de Havillands and was of the type properly described as DH106 series 1, commonly known as the Comet 1. It was designed for high speed long distance, passenger and freight transport at high altitude and was propelled by four de Havilland Ghost 50 turbo-jet engines mounted within the wings, each engine developing a static thrust of 5,000 lb. The crew and passenger compartments were pressurised, so that when flying at 40,000 ft. a cabin pressure equivalent to atmospheric pressure at an altitude of 8,000 ft. was maintained. The cabin pressure was regulated to a maximum pressure difference between cabin and outside atmosphere of 8.25 lb/sq. in. and a safety valve was set to open at a pressure difference of 8.5 lb/sq. in. The dual flying control were power operated by hydraulic servo control units. The fuel for the engines was kerosene carried in a centre section tank made up of four inter-connected bag tanks and in four integral wing tanks. The authorised maximum all-up weight was 107,000 lb. Yoke Peter first flew on the 9th January, 1951, and was granted a Certificate of Registration No. R.3162/1 on the 18th September, 1951, in the name of B.O.A.C. as owner. A Certificate of Airworthiness No. A.3162, valid until the 12th March, 1953, was granted on the 22nd March, 1952. The aircraft was delivered to B.O.A.C. on the 13th March, 1952, and from that date was operated by B.O.A.C. On the 2nd May, 1952, having by then flown a total of 339 flying hours in experimental, test and training flights on behalf of de Havillands and B.O.A.C. it entered scheduled passenger service and was the first jet-propelled passenger aircraft carrying aircraft in the world to do so.

30. On the 11th March, 1953. the Certificate of Airworthiness was renewed for one year and was therefore, valid at the time of the accident. On the 11th November 1953, after the aircraft had flown 3,207 hours and following a repair to the passenger entrance door the fuselage was subjected to a proving test to 11 lb/sq. in. The airframe and engine log books show that the airframe and engines had been regularly inspected and maintained in accordance with the Approved Maintenance Schedules and that the number of flying hours of each engine since its last complete overhaul was well within the approved life.

31. In accordance with the Approved Maintenance Schedules a Check I inspection was completed on the 6th January, 1954, at London Airport and a Certificate of Maintenance, signed by properly licensed airframe and engine maintenance engineers and valid for 75 flying hours, was issued on the 7th January 1954. At the time of the accident the aircraft had flown only 40 hours since the issue of the Certificate of Maintenance and its total flying life was 3,681 hours. An Aircraft Radio Station Certificate of Serviceability was issued in respect of Yoke Peter on the 7th January, 1954, with the remark "no items unserviceable."

PART V THE CREW

32. Captain Alan Gibson, D.F.C., who was in command of Yoke Peter at the time of the accident was aged 31 years and 3 months. He held Airline Transport Pilot's Licence No. 22713, valid until the 24th February 1954, which entitled him to fly in command of Comet aircraft and he had a valid Instrument Rating.

Captain Gibson also held Flight Navigator's Licence No. 1442 which was valid until the 19th February, 1954. He entered the employment of B.O.A.C. under contract in 1946 having previously been employed by B.O.A.C. on secondment from the Royal Air Force. While in the Royal Air Force Captain Gibson had a total flying experience of 1,348 hours of which 1,175 were flown in command. He had flown a total of 4,062 hours by day and 1,165 hours by night with B.O.A.C. and most of these were flown as first pilot. He had flown Comets for 84 hours by day and 48 hours by night as second pilot and for 79 hours by day and 80 hours by night as first pilot. During the six months preceding the accident he had flown 79 hours by day and 80 hours by night as first pilot of Comets and 47 hours by day and 31 hours by night under supervision.

33. While with B.O.A.C. Captain Gibson was concerned in an accident involving the forced landing of a Hermes aircraft in 1951 and was complimented by the Operations Manager for his conduct on that occasion. He was successful in both his flying checks during the period when he was flying Comets and I am satisfied that he was fully equipped to carry out his normal duties as a pilot and as a captain and to deal with emergencies.

34. The second pilot of Yoke Peter was First Officer William John Bury whose age was 33 years and 10 months. He held Airline Transport Pilot's Licence No. 27251 valid until the 8th April, 1954, and a valid Instrument Rating. In addition he held Flight Navigator's Licence No. 2583 valid until the 9th October, 1954. He had flown a total of 1,917 hours in the Royal Air Force of which 1,735 were as first pilot, all in piston engined aircraft. With B.O.A.C. he had flown 2,355 hours by day and 643 by night as second pilot and 11 hours by day and 1 hour by night as first pilot and altogether had flown 153 hours by day and 109 by

night in Comets, all as second pilot. I am satisfied that First Officer Bury was fully equipped to carry out his normal duties and to support his captain in emergencies.

35. The Engineer Officer was Mr. Francis Charles Macdonald who was aged 27 years and 11 months. Since joining B.O.A.C. on the 21st January, 1952, he had 439 hours flying as Engineer Officer in Hermes aircraft and 281 hours in Comets of which 225 hours were flown during the six months preceding the accident Mr. Macdonald's Flight Engineer's Licence was No. 428 and had expired on the 11th December, 1953. During its validity this licence included Comet aircraft. Had he applied to renew his licence he would have been required to give Log Book evidence of six hours flying as engineer-in-charge including six flights during the 12 months preceding the date of application and would have been required to pass a medical examination.

36. On joining B.O.A.C. Comet Fleet Mr. Macdonald obtained an endorsement to his licence which made it valid in respect of Comet aircraft and he completed a form giving details of his licence. In completing this form he stated, wrongly, though no doubt in good faith, that his licence was valid until the 24th April, 1954. He himself made no application to renew the licence before its expiry nor was he given any reminder to do so by B. O.A.C. This matter is further referred to in paragraph 147 of this Report.

37. I am satisfied that Mr. Macdonald's flying experience was sufficient to support an application for renewal of his licence but I have no evidence as to his medical fitness. However, I have no reason to suppose that he was in fact unfit at the time of the accident.

38. The Radio Officer was Mr. Luke Patrick Mc Mahon who was aged 32 years and 2 months. He held a First Class Flight Radio Telegraphy Operator's Licence No. 1235 which was valid until the 16th October, 1954, and had done 2,946 flying hours with B.O.A.C. in various aircraft before the 3rd October, 1952, and 629 hours in Comets thereafter. During the six months preceding the accident he had flown 207 hours in Comets. I am satisfied that he was a capable officer.

39. The other members of the crew were Steward Frank Leonard Saunders and Stewardess Jean Evelyn Clarke, both of whose services had at all times been entirely satisfactory.

PART VI

THE PASSENGERS AND CARGO

40. Yoke Peter carried a total of 29 passengers, all of whom were killed in the accident. The cargo carried did not include any items which could have been relevant to the cause of the accident. The comparison between the amount of cargo known to have been carried and that shown in the Load Distribution and Trim Sheet showed a discrepancy of 27 kilograms in hold 2A. Moreover, no load was shown on the Load Distribution and Trim Sheet for hold 3, whereas there was evidence that 15 kilograms of baggage were placed in that hold. I am satisfied, however by the evidence of Mr. B. J. Folliard that these errors in the Load Distribution and Trim Sheet would have left the loading and trim of the aircraft well within the prescribed safe limits.

PART VII

PRE FLIGHT INCIDENTS

41. The last three flights made by Yoke Peter prior to that which ended in disaster were from Karachi to Bahrein, Bahrein to Beirut and Beirut to Rome. During refuelling at Karachi a defect developed in the port wing tanks the Engineer Officer of Yoke

Peter adopted a procedure known as "off-load" refuelling which is authorised for use in such an emergency. It involves holding the refuelling switch in the "off-load" position -- The normal purpose of this position is to enable the tanks to be emptied -- and releasing it when refuelling is complete. In fact the Engineer Officer did not release the switch in time and about five gallons of fuel escaped from the airvent on the under surface of the mainplane. There was no repetition of this incident at Bahrein but at Beirut, after the Engineer Officer had explained to the ground engineer, who was assisting him with the refuelling what had happened at Karachi, a further incident occurred. When the Engineer Officer returned to the port wing after inspecting the starboard tanks he noticed fuel emerging from the port air vent. The refuelling switch was in the neutral position from which fact, and from the fact that fuel was obviously entering the tank, he deduced that somebody, intending to put the switch to the "off-load" position, from which it should automatically have returned to neutral when released must have failed to do so and that the switch, instead of returning to neutral had remained half open. He attempted to close the switch by moving it to the full "off-load" position and releasing it but this had no effect and the flow of fuel was eventually stopped by shutting down the bowser.

42. As a result of this incident the actuator was removed and as no replacement was available it was tested, found satisfactory and refitted. These incidents were reported by the Engineer Officer to Mr. Macdonald when the aircraft was handed over at Rome. The practice of "off-load" refuelling is further referred to in paragraph 111 of this Report.

43. Two other items were also unserviceable during the flights from Karachi to Rome. These were the No. 1 engine hydraulic flow warning light and the automatic temperature control selector. The former device is designed to draw the attention of

the pilot to a possible failure of the engine-operated hydraulic pump. On this occasion, when the flow warning light appeared faulty, the operation of the pump was tested by other means and found satisfactory. The automatic temperature control selector is intended to control automatically the temperature of the crew and passenger compartments. When it was found to be faulty the temperature was controlled manually. I am satisfied that neither of these faults, both of which were drawn to the attention of Mr. Macdonald, can have endangered the aircraft in any way.

PART VIII

WEATHER CONDITIONS AT THE TIME OF THE ACCIDENT

44. From take-off at Rome at 09:31 hours on the 10th January, 1954, to the time of the accident at approximately 27,000 ft. near Elba Comet G-ALYP experienced essentially good weather conditions. The climb was made through only thin and broken layers of cloud with no rain and with negligible icing conditions. At the time and position of the accident it is probable that some turbulence in clear air may have existed due to the proximity of a narrow high velocity wind current called a " jet stream ". Such turbulence, if encountered, would be less than aircraft frequently experience in turbulent cloud conditions. It can, therefore, be assumed that the state of the weather was not a contributory cause of the accident.

PART IX

ACTION TAKEN AFTER THE ACCIDENT AND PRIOR TO THE ACCIDENT TO COMET G-ALYY

(a) Local salvage and medical investigation

45. At 11:50 hours on the 10th January, 1954 the Harbour Authority at Portoferraio in the Isle of Elba was informed of the occurrence of the accident, being told that an aircraft had exploded in the air and crashed in flames into the sea south of Cape Calamita roughly in the direction of the island of Monte Cristo. With commendable promptness Lieutenant-Colonel Lombardi, the Officer Commanding the Harbour Authority of Portoferraio, despatched all available craft to the scene of the accident with a doctor and nurse on board and he himself put to sea after he had made all the necessary arrangements. In these salvage operations 15 bodies, various mail bags and some aircraft wreckage and personal effects were recovered. The ships had been assisted in their search by the collaboration of aircraft. On the two following days the search was continued. No more bodies were found but various pieces of wreckage and articles were recovered.

46. Under Lieutenant-Colonel Lombardi's directions the bodies were taken to the local cemetery at Porto Azzurro and devoutly placed in the chapel there. At the request of the examining magistrate at Portoferraio an examination of the bodies recovered was carried out by Professor Antonio Fornari who was acting under the direction of Dr. Folco Domenici, Director of the Institute of Forensic Medicine in the University of Pisa. Professor Fornari gave evidence before me and he put in a report which had been prepared by him and Dr. Domenici. The substance of their report is to be found in the conclusions at p. 60 of the translation of the report and may be summarised as follows :

(1) Death was caused by impact against parts of the aircraft.

(2) There was serious lesions resulting from explosive decompression and deceleration.

(3) The probable point of impact between the bodies and the structure of the aircraft was the forepart of the fuselage, perhaps in the vicinity of that part of the fuselage which lies above the engines.

(4) There were burns on the bodies of all the victims but they presented post-mortem characteristics from which the inference was that the burns took place after death.

(b) Action taken by the Ministry of Transport and Civil Aviation

47. News of the accident was received by the Accidents Investigation Branch of the Ministry of Transport and Civil Aviation at 12:00 hours on the 10th January, 1954, and both the Senior Inspector of Accidents, Mr. Nelson, and the Senior Investigating Officer, Mr. Morris. left for Italy that evening.

48. On arrival Mr. Nelson got into touch with the Commission which had been convened by the Italian aviation authorities and went with the Commission to Elba. Some days later it was agreed that the responsibility for the investigation of the accident should be handed over to the Accidents Investigation Branch of the British Ministry of Transport and Civil Aviation but Colonel Miniero and Signor Roveri, who have attended this Inquiry, were appointed accredited representatives to the British investigators and gave them every possible assistance. The Minister of Transport and Civil Aviation was also in touch with the Admiralty and it was arranged that the Commander-in-Chief Mediterranean, Admiral Earl Mountbatten, would cause an

intensive search to be made for the wreckage. The Chief Inspector of Accidents, in accordance with normal practice, arranged for the wreckage recovered to be sent to and examined at R.A.E. Mr. Nelson and Mr. Morris remained in Elba, examined the Wreckage recovered and arranged for its transport back from Elba to the mainland and thence to Rome, whence it was flown direct to the United Kingdom, but certain very large pieces had to be sent by sea.

(c) Naval search for wreckage

49. Commander Forsberg was placed in charge of the operations. Special vessels, H.M.S. Barhill and H.M.S. Sea Salvor, were fitted up to carry 200 tons of heavy moving gear. An observation chamber, television gear, all toothed grab and other equipment were obtained from England and the necessary modifications to the vessels were made in the dockyard at Malta. This was all done in under a fortnight and the two vessels and H.M.S. Wakeful, in which the television equipment was installed, arrived off Elba on the 25th January, 1954.

50. The search was prosecuted at depths varying between 70 fathoms and 100 fathoms. It is noteworthy that this was the first occasion on which television equipment had been used for this purpose. The first date on which anything was located on the bottom by television was the 12th February, 1954. I need not recount in detail the history of the search. Suffice is to say that by the 23rd March, 1954, only the floating wreckage, the pressure dome, and parts of the rear fuselage and the engines and wing centre section had been recovered and that thereafter the search continued until by the end of August, 1954, about 70 per cent. of the empty weight of the aircraft, made up of about 70 per cent. of the structure, 80 per cent. of the power plant and 50 per cent. of

the equipment, had been recovered. I have included as Appendix V a table, which was put in evidence, showing the dates of recovery of the main portions of the wreckage and the dates on which they reached Farnborough. Diagrams (Figures 2 and 3) give a striking impression of the amount of material which was ultimately recovered, though they relate only to the external structure. Figure 4 is a photograph showing the reconstruction of the fuselage and tail unit from the wreckage and Figure 5 is a photograph showing the reconstruction of the front fuselage.

51. The amount of wreckage recovered was greatly in excess of the expectations entertained in March, 1954, when the decision to allow the Comets to fly again was taken. A remarkable fact was the small amount of damage which had been caused to the structure either by immersion in sea water or in the process of salvage.

(d) The Abell Committee

52. Immediately on receiving news of the accident B.O.A.C. had decided to suspend their normal Comet passenger services, for the purpose of carrying out a detailed examination of the aircraft of the Comet operational fleet in collaboration with A.R.B. and de Havillands and to this end the Chairman of B.O.A.C. had called a meeting at London Airport for the 11th January, 1954, which was attended by representatives of B.O.A.C., the Accidents Branch of the Ministry of Transport and Civil Aviation, de Havillands, the de Havilland Engine Company Limited and A.R.B. As a result of that meeting a committee under the chairmanship of Mr C. Abell, the Deputy Operations Director (Engineering) of B.O.A.C., and composed of representatives of A.R.B., B.O.A.C. and de Havillands, was appointed to consider what modifications were necessary before

B.O.A.C. could properly seek the agreement of the Minister of Transport and Civil Aviation to the resumption of passenger services by Comet aircraft. The Committee proceeded to consider what possible features or combination of features might have caused the accident. According to the evidence of Mr. Abell, they came to the view that possible main causes of the accident were as follows :

(a) Flutter of control surfaces. This is a term used to describe a type of vibration of a surface, which may be dangerous and may arise from one or more of several causes such as the failure of some part of the mechanism connecting the control surface to the hydraulic power unit which operates it in flight, or to the development of play or backlash in the mechanism. It was decided to make a special inspection of the whole of the mechanism and of the control surfaces and mass-balance arms.

(b) Primary structural failure. They considered, in particular, the possible effects of gusts, in causing abnormally high loads, and surveyed all parts of the structure of which there was any suspicion in the light of previous experience.

(c) Flying controls. For each hydraulic power unit operating a control surface there is an output circuit connected to the control surface, and an input circuit connected to the pilot's control in the cabin. Many possible sources of malfunctioning both of the hydraulic power units themselves and of these mechanical circuits were examined and special investigations initiated.

(d) Fatigue of the structure. They had in mind more particularly fatigue of the wing, because about the time of the Elba accident cracks had appeared near the edge of the wheel-wells, on the

under-surface of the wing of the first prototype which was under test at R.A.E., after the equivalent of about 6,700 flying hours. They re-examined also one or two other parts of the structure at which they felt fatigue effects might be appearing.

(e) Explosive decompression of the pressure cabin. They had no reason to suspect the primary structure of the cabin itself. They reviewed the records of damage by, for example, the steps used to load the aircraft, and the methods of repairing such damage by schemes approved by de Havillands. Their main concern, however, was the window panels, where they thought it necessary to consider possible defects which might cause weakness not revealed in the tests made during design at de Havillands.

(f) Engine installation. Their main preoccupation here was with the possibility of fire and investigations were made at a number of points in order to remove every cause of possible fire risk which they could imagine.

53. As a result of the inspections and tests which followed the meetings of the Committee, a large number of modifications were made both to the power plants and to other parts mentioned above. At the conclusion of their work the Committee still regarded fire as the most likely cause of the accident. But one modification deserves special mention since it shows the care which was taken to avoid the possibly serious consequences of failure of a turbine blade, although there existed no evidence of such a failure in all previous experience. The only recommendation specifically directed to fatigue related to the wing as mentioned above. One modification and two special inspections were called for. Mr. Abell said that the possibility of fatigue in the wing structure due to gusts was believed to be

much more likely than fatigue in the pressure cabin since this is subject to much less frequent chances of load. At this stage neither Mr. Bishop nor Mr. Harper of de Havillands suspected that the failure of the cabin structure by fatigue or otherwise was a primary cause of the accident. They still regarded the 18,000 repeated loadings as removing any doubt about the fatigue life of the cabin.

(e) Resumption of Comet services

54. On the 17th February, 1954, Mr Abell forwarded to the Operations Director of B.O.A.C. a report and papers showing in detail all the inspections, investigations, modifications and other work which had been carried out since the Comet aircraft had been temporarily removed from service by B.O.A.C. on 11th January, 1954. On the 19th February the Chairman of B.O.A.C. forwarded the above-mentioned report and papers to the Minister of Transport and Civil Aviation stating in the course of his letter that, on the assumption that no further indication of the cause of the accident emerged prior to the completion of the inspection and modification work, B.O.A.C. considered that all such steps as were possible before putting the aircraft back into passenger service should have been taken.

55. The position was also considered by A.R.B. On the 4th April Lord Brabazon wrote to the Minister saying :

"Although no definite reason for the accident has been established, modifications are being embodied to cover every possibility that imagination has suggested as a likely cause of the disaster. When these modifications are completed and have been satisfactorily flight tested, the Board sees no reason why passenger services should not be resumed."

56. In the meantime the Minister of Transport and Civil Aviation, who had not revoked the Certificate of Airworthiness of the Comet fleet had asked A.S.B. for advice on the resumption of the Comet passenger services. On the 5th March Air Chief Marshal Sir Frederick Bowhill, the Chairman of A.S.B., minuted the Minister as follows :

" 2. The Board has considered all the available information resulting from recent investigations and has noted the nature and extent of the modifications planned as a result. It realises that no cause has yet been found that would satisfactorily account for the Elba disaster, and whilst the Calcutta disaster is completely accounted for if the aircraft is supposed to have encountered a gust of very great severity (which would have broken any other aircraft) we cannot eliminate that the accident might have been due to some other cause which was possibly common to both disasters. Nevertheless, the Board realises that everything humanly possible has been done to ensure that the desired standard of safety shall be maintained. This being so, the Board sees no justification for imposing special restrictions on Comet aircraft.

3. The Board therefore recommends that Comet aircraft should return to normal operational use after all the current modifications have been incorporated and the aircraft have been flight tested."

57. Acting on this advice the Minister gave permission for flights to be resumed and the first Comet aircraft to resume passenger service took the air on the 23rd March, 1954.

PART X

THE ACCIDENT TO G-ALYY

58. On the 8th April, 1954, Comet aircraft G-ALYY, which was on charter to South African Airways, crashed near Naples while on a flight from Rome to Cairo. I am making a separate Report on that accident. It is sufficient for the purpose of this Report to record that the accident occurred at approximately the same height and after approximately the same lapse of time after departure from Rome as in the case of Yoke Peter. On receiving news of the accident B.O.A.C. decided immediately to suspend all Comet services until more was known and on the 12th April, 1954, the Parliamentary Secretary to the Ministry of Transport and Civil Aviation informed the House of Commons that the Minister, after consulting A.R.B. and A.S.B. and discussing the matter with the Chairman of A.R.B., had withdrawn the United Kingdom Certificate of Airworthiness from all Comet aircraft.

PART XI

INVESTIGATION OF THE ACCIDENT TO G-ALYP AND G-ALYY

(a) Investigation by R.A.E.

59. The loss of Yoke Peter and Yoke Yoke presented a problem of unprecedented difficulty, the solution of which was clearly of the greatest importance to the future, not only of the Comet, but also of Civil Air Transport in this country and, indeed, throughout the world. Accordingly, shortly after the Naples accident, the Minister of Supply instructed Sir Arnold Hall the Director of R.A.E. to undertake at R.A.E. a complete investigation of the whole problem presented by the accidents and to use all the resources at the disposal of the Establishment. This provided an opportunity of showing what can be done by a close collaboration between a private firm and R.A.E. with the unique

facilities at its disposal. It will be seen hereafter that full use was made of that opportunity by R.A.E. and de Havillands.

60. R.A.E. made a complete review of the conclusions which had been reached by the Abell Committee, and particularly of the implications arising from the fact that there had been two accidents in what appeared to be similar conditions, each occurring at about the time when the aircraft was nearing the top of its climb. They thought it necessary to satisfy themselves about the structural integrity of the aircraft, in particular of the cabin and the tail and to consider in more detail possible sources of explosion and loss of control. They also considered that flight tests would be required in order to investigate the possibility of flutter of control surfaces (see para. 52 (a)). It soon became evident that it was probable that more wreckage would be recovered than had at first been expected. The wing centre section was received on the 5th April (the engines had been recovered and sent by air to de Havillands on the 21st March), and the front part of the cabin arrived on the 15th April. But at the time when their attention became directed to fatigue of the pressure cabin they were influenced chiefly by the apparent similarity of the circumstances of the two accidents, and by the fact that the modifications carried out after Elba seemed to rule out many of the other possible causes.

61. On the 18th April Sir Arnold Hall decided that a repeated loading test of the whole cabin ought to be made. He said that he regarded this as one of a number of lines of inquiry which had to be pursued and that he felt it to be necessary to study every possible cause in detail.

62. The normal method of testing pressure cabins up to the point when they fail under pressure is similar to that used for vessels

such as boilers. They are filled with water, and more water is pumped in until the desired difference between the internal and external pressure is reached. This method has two advantages over the use of air. Water is relatively incompressible, so that failure when it occurs produces only a mild form of explosion. The origin of the failure can be determined and the structure can generally be repaired and tested again. If air were used instead of water, the failure would be catastrophic (equivalent in the case of the Comet's cabin to the explosion of a 500 lb bomb). Such a test would be dangerous, the cabin would be destroyed, and the evidence of the origin of the failure should almost certainly be lost. It is however necessary to prevent unrepresentative loading of the cabin structure by the weight of the water. This is ensured in practice by immersing the whole cabin in a tank, and filling the tank and the cabin simultaneously with water. Pressure in the cabin is then raised by pumping in water from the space outside it. Cycles of loading, to the same or different levels of pressure as desired are applied by a suitable routine of pumping.

63. By a remarkable effort, to which de Havillands and the firms who built the tank (see Figure 6) contributed to the full and by the use of all the resources of R.A.E., repeated loading tests began early in June on aircraft G-ALYU (Yoke Uncle). The object of the tests was to simulate the conditions of a series of pressurised flights. To this end the cabin and wings were repeatedly subjected to a cycle of loading as far as possible equivalent to that to which they would be subjected in the period between take-off and landings. In addition to one application of cabin pressure, fluctuating loads were applied to the wings in bending to reproduce the effect of such gusts as might be expected in normal conditions, although the contribution of gust loads to the stresses in the cabin structure, compared with that made by the internal pressure, was in general small. Moreover,

the programme of tests included, at intervals of approximately 1,000 " flights " a proving test in which the pressure was raised to 1.3 P (11 lb./sq. in.). It must be understood that there are other sources of fluctuation, load and, therefore, of fatigue to which no precise value can be attached. No attempt was made to represent these in the test. Examples are vibration due to irregular airflow, vibration due to the engines and the jet efflux and fluctuating loads occurring during take-off and landing.

64. Yoke Uncle had made 1.230 pressurised flights before the test and after the equivalent of a further 1.830 such flights, making a total of 3,060, the cabin structure failed, the starting point of the failure being the corner of one of the cabin windows (see Figures 7 and 8). The fact that the failure occurred during one of the proving tests to 11 lb/sq. in. is not thought significant since the crack would have spread in very much the same way after a few more applications of the working pressure. Examination of the failure provided evidence of fatigue at the point where the crack would be most likely to start, namely near the edge of the skin at the corner of the window (see Figures 9 and 10). This was revealed by the discoloration due to algae in the water which made it clear that the crack had endured several pressurisations before it spread catastrophically. It is important to note here that the sources of fatigue mentioned above, which were not reproduced in the tank test, all tend to increase the burden of fatigue and that, therefore, the life of a fuselage deduced from the test is longer than would be expected in service. It is not possible to do more than estimate the magnitude of this effect but it was suggested by Dr. Walker that a "life" of 3,060 flights in the test might be equivalent to about 2.500 in practice.

65. It is convenient to note here that Comet G-ANAV, which had been sent to R.A.E. to undergo flight tests (unpressurised) on a

number of matters which could only be explored in flight, made its first flight on the 23rd June. A large amount of miscellaneous wreckage was arriving at R.A.E. during the whole of this period and was being stored out and examined by the Accidents Investigation Section under Mr. Ripley.

66. The failure of the cabin of Yoke Uncle marks the point at which the character of the investigation changed to one in which the problem of fatigue in the structure of the cabin began to dominate all others, although many possible sources of trouble were continually investigated during the whole of the summer. In the main their results were negative so far as the accidents were concerned though they revealed points which needed and will receive attention. The inference suggested by the tank test, that the primary failure of Yoke Peter was the bursting of the pressure cabin, was confirmed by a close examination of the wreckage and by the experiments referred to in the next following paragraphs of this Report.

67. The character of the damage caused to the structure was such that it became possible to determine with a high degree of probability the manner in which the various fragments struck the sea, mainly because of the very high local pressures produced by the impact with the sea. Moreover, it rapidly became clear that the intense fire which had existed was confined virtually to the centre part of the wing, leaving the outer parts of the wing and the front and rear parts of the cabin untouched. These considerations led to the conclusion that it was probable that the main part of the aircraft fell into the sea in a small number of relatively large pieces, one of which was on fire (see Figure 11). Most of these pieces had fallen in a surprisingly small area. This conclusion was in agreement with the evidence of the farmer at Elbas who saw fragments, one of which was on fire, falling into

the sea. This led to a line of experiment which produced remarkable results. Models were made of the Comet in light wood, suitably ballasted, and projected in the air at the appropriate speed. They were released from a kite balloon at a height above the ground corresponding to that at which it was believed the Comet structure failed, reduced in proportion to the scale of the model. The model was so constructed that it would break at the point where the failure of the cabin was suspected, namely in the neighbourhood of the wing. The outer parts of the wing (only one of which had been recovered), were also separated from the centre part. The descent of the fragments was photographed, and it was found that they fell in a manner which agreed with the deductions which had been made from the evidence mentioned above.

68. Simultaneously with this work, further experiments in the water tank were made on the cabin of Yoke Uncle, after the first failure had been repaired by de Havillands. Until then, owing to the need to discover whether the cabin had, against all previous belief, a relatively short life under repeated loading, no attempt had been made to measure the stress in the material of the skin at points where it might be expected to be higher than the average. One reason for this omission was that the number of places coming within this description is large, and it would have taken a long time to install the necessary strain gauges and other associated equipment. But it now seemed highly probable that the stress near the corners of the windows was higher than had been believed by the designers, and the strain gauges were therefore fixed to the surface of the skin, at various positions near the corners of typical windows, including the windows corresponding to the one which had failed but on the other side of the cabin.

69. A discussion of the evidence bearing on the reliability of the estimates of the stress at the edge of the window will be found in paragraphs 118 to 129. It is sufficient here to say that I am satisfied that the highest stress in the skin, at the edge near the corner of the window of Yoke Uncle, was probably over 40,000 lb./sq. in. when the pressure difference was 8.25 lb. / sq. in. and that the general level of the stress in the skin in these regions was significantly higher than had been previously believed. In the light of known properties of the aluminium alloy D.T.D. 546 or 746 of which the skin was made and in accordance with the advice I received from my Assessors, I accept the conclusion of R.A.E. that this is a sufficient explanation of the failure of the cabin skin of Yoke Uncle by fatigue after a small number, namely, 3.060 cycles of pressurisation.

70. In considering the possible bearing of this result on the accidents at Elba and Naples, it is necessary to recognise that there are inevitable differences between individual aircraft structures built to the same drawings. The nature and extent of these depend on a number of factors such as variations in the thickness of metal sheet of nominally the same gauge, and local regions of high stress due to the methods employed in joining the various parts, such as rivets, bolts, etc. If a number of such structures are tested under repeated loading, there will be appreciable differences between the number of cycles of application of given loading before failure occurs. Experience suggests that there will be a variation of at least 9 to 1 in the number of cycles necessary to produce failure when the general level of stress is high, and the number of cycles undergone before failure therefore low. If a large number of specimens could be tested, it would undoubtedly be found that the weak and the strong were relatively few in number, and that the majority would be more or less evenly distributed round a mean value.

But it is impossible from a single test to say where, in the total range to be expected from general experience, a particular specimen lies.

71. At the time of the Elba accident Yoke Peter had made 1,290 pressurised flights and at the time of the Naples accident Yoke Yoke had made 900 pressurised flights. Sir Arnold Hall said in evidence that in the light of the experiment on Yoke Uncle, and of the measurements and calculation of stress referred to above he considered that the cabin of Yoke Peter had reached a point in its life when it could be said to be in danger of failure from fatigue, and that the Cabin of Yoke Yoke would similarly be in danger. Dr. Walker said that he did not regard the picture presented by the three failures (on the assumption that these were all due to the same fundamental cause) as surprising, since the three results taken together are consistent with general experience of the strength under repeated loading of a number of nominally identical structures, in which the stress level is high. They lie within a range of just over 3 to 1, whereas experience suggests a total range of at least 9 to 1.

72. At this stage in R.A.E. 's attack on the problem, it seemed unlikely that any more wreckage would be recovered which would throw light on the problem which was now obviously the chief one. But after a further review of the whole of the circumstances of the flight of the aircraft and the distribution of the wreckage on the sea bed, R.A.E. reached the conclusion that search in a wider area was justified. Whatever the cause of the bursting, it seemed probable that the disruption of the aircraft would have resulted in some relatively large pieces of the structure being blown clear. These might well have fallen some distance away from the main pieces of wreckage, all of which, as mentioned above, were found within a remarkably small area. It

was therefore decided to make a search of an area some miles long in the sea below the path of the aircraft working towards Rome from the area where the main items were recovered. As the depth of the sea increased rapidly in this direction, the only practicable method was trawling.

73. As a result of the new search R.A.E. received a piece of cabin skin, which had been found by an Italian fishing boat. It was identified as coming from the centre of the top of the cabin approximately over the front spar of the wing (see Figure 12). It contained the two windows in which lie the aerials which are part of the A.D.F. (Automatic Direction Finding) equipment. At the same time R.A.E. received a part of the aileron of the port wing (see Figures 13 and 16) and a part of the "boundary layer fence" fitted to the leading edge of the port wing not far from the tip (see Figures 14 and 16).

74. The latter parts provided important evidence about the bursting of the cabin. There were marks on them which were identified as made by pieces from the cabin itself. Taken together with the paint mark on the leading edge of the centre section not far from where the outer wing broke off, which was identified as caused by the piece of the cabin wall containing the first window (escape hatch) (see Figures 15, 16 and 12), they established that the cabin burst catastrophically in the neighbourhood of the front spar of the wing when the aircraft was flying substantially normally.

75. By examination of the piece containing the A.D.F. windows and the adjacent pieces (see Figure 12) it was established that it was here that the first fracture of the cabin structure of Yoke Peter occurred. In general terms, it took the form of a split along the top centre of the cabin along a line approximately fore and aft

passing through corners of the windows as shown in Figure 17. The direction in which the fracture spread was determined by examination of the lines of separation of the material.

76. A development drawing of the wreckage recovered from the part of the cabin over the wing spar is shown in Figure 18. Apart from the area on top of the cabin around the A.D.F. windows, which is shown cross-hatched, the remainder was recovered with, and in many cases remained attached to, either the front fuselage, the wing centre section, or the rear fuselage. These three groups are distinguished by different hatchings, as indicated in the diagram. In the light of all this evidence, I accept R.A.E. 's conclusion that the first fracture of the cabin occurred near the rear A.D.F. window and spread fore and aft from it.

77. I do not consider it possible to establish with certainty the point at which the disruption of the skin first began. But I consider that it is probable that it started near the starboard aft corner of the rear A.D.F. window, at a point where examination by experts showed that fatigue had existed, at the edge of the countersunk hole through which a bolt passed (see Figure 19)

78. The only alternative point suggested was the opposite (port forward) corner of the same window. Here the fracture passed through a small crack in the reinforcing plate, about 0.2 in. long, made accidentally during the build, of the aircraft. This had been dealt with by de Havillands in accordance with their procedure for dealing with any departure from the strict requirements of their drawings which might appear during the manufacture of their aircraft. All such matters were required to be reported to the Technical Office, and each was dealt with as a special case by a qualified expert. In this case approval was given to the use of the normal process of "locating" small cracks in the skin of an

aircraft by drilling small holes at their ends. Advised by my Assessors I see no reason to doubt that this would have been a satisfactory method of dealing with the crack in question had it not been for the fact that the stress in this region was relatively high. It was suggested that such a crack might be a possible place of origin of fatigue but no witness was able to identify any evidence of fatigue at the material point.

79. It is my opinion that the fundamental cause of the failure of the cabin structure was that there existed around the corners of the windows and other cut-outs a level of stress higher than is consistent with a long life of the cabin, bearing in mind the unavoidable existence of points, within the areas of generally high stress, at which it will be still further raised by relatively local influences, such as the countersunk hole near the starboard rear corner, and the small crack with its "locating" hole near the port forward corner. I find it impossible to say definitely, on any evidence before me, which of these operated first. But, since the existence of fatigue near the bolt hole is established, I think it the more probable.

(b) Investigation by the de Havilland Engine Company Limited

80. The R.A.E. investigation did not deal with the engines. The history of their recovery and investigation is as follows.

81. The centre section of the wing of Yoke Peter was recovered from the sea on the 15th March. It was severely damaged by fire and by impact with the water. It contained the four Ghost engines substantially intact with the exception that the turbine disc of No. 2 engine (port inner) was missing. The shaft on which it had been mounted had broken near the hub to which it was bolted and it had escaped through a large gash in the exhaust cone. The disc

has not been recovered.

82. The engines were removed and examined superficially by an engineer from de Havillands Engine Company Limited. They were then sent by air to that company's works where they arrived on the 21st March and were dismantled and examined in detail.

83. Dr. Moulton, Chief Engineer of the de Havilland Engine Company Limited, said in evidence that there were no signs consistent with seizure of any engine, or of any excessive internal heat, or of any failure having occurred before the break-up of the aircraft. The extensive fire damage was all external to the engines. The four compressor impellers were intact on their shafts.

84. The turbine discs from Nos. 1, 3 and 4 engines showed no signs of failure. No blades were missing from them. In No. 2 engine, there was no evidence of penetration of the shroud ring surrounding the turbine, either by a blade or by the complete disc. There was no evidence of failure of any blade in any of the engines.

85. Examination of the hubs to which the turbine discs of Nos. 1, 3 and 4 engines were bolted showed that all were on the point of failing. Cracks were found in the same regions as those which had resulted in the fracture of No. 2 engine, which led to the loss of the disc.

86. The remarkable similarity of the damage to the turbine shafts of all four engines pointed to a common cause external to the engines, and further examination showed that the most probable cause was a sudden and very rapid rotation of the whole wing about a transverse axis, nose downwards, while the engines were

still running normally. Such a rotation, being about an axis at right angles to the engine shafts, would produce gyroscopic couples tending to bend the shafts in a sideways direction, that is, in the plane of the wing. Since the clearances between the discs and the stationary parts surrounding them are small, signs of rubbing would be expected in definite regions. Examination showed such signs in each engine.

87. From this evidence the conclusion was reached that the engines had run, though only for a short time, possibly a few hundred revolutions after a sudden nose-down rotation of the wing and had not stopped suddenly. Further examination showed other evidence consistent with this, namely the absence of any deformation in the splines on the turbine shafts. This also suggested that by the time the whole of the centre section, including the engines, hit the surface of the sea, the engines were no longer rotating.

88. The whole of the remaining extensive damage to the engines was considered to be due to impact with the surface of the sea. It was in the main confined to the upper parts of the engines, and was therefore consistent with the deductions from the examination of the centre section of the wing itself, which showed everywhere evidence of the wing having hit the sea upside down.

89. In order to investigate the conditions which were now thought to have caused the failure of the turbine hubs, tests were made on a Ghost engine supported in a framework which was pivoted about a horizontal axis some distance above the engine, so that it could swing in a vertical plane, like a pendulum. The engine was run at normal speed, and was pulled sideways, thus raising it from its lowest position. When released, it accelerated

under the combined influence of its weight and the thrust from the jet. The rate of rotation round the transverse axis could be varied by releasing it from different heights. It was found that when this reached a value of nearly 180° a second (corresponding to the centre section of the wing turning upside down in about one second) the turbine disc hub broke and the engine slowed down and stopped without any further substantial damage. Examination showed the same type of failure and symptoms, as were found on the four engines of Yoke Peter.

90. The examination of the engines, combined with the striking evidence of this experiment, confirmed de Havillands in the view that no part of the engines was in any way the cause of the failure of the aircraft. Dr Moulton said that in their previous experience of Ghost engines of the same type as those used in the Comet, they had had no records of any blade failures. The modifications made to the aircraft as a result of the Abell Committee's discussions, consisting of fitting high tensile steel plate round certain parts of the engines in the plane of the turbine discs, was regarded by him as possibly a wise precaution, in view of the need to guard against every source of trouble which could be imagined. At the time it was put into effect, with the other modifications decided by the Abell Committee, the engines from Yoke Peter had not been examined.

91. In the light of all this evidence and these considerations, I accept Dr. Moulton's conclusion that there was no failure of any part of any engine which could have been the cause of the failure of Yoke Peter. The fire which damaged the engines externally was in my opinion subsequent to and not a cause of the disintegration of the aircraft.

PART XII

THE R.A.E. REPORT

92. The Report (which was part of the evidence before the Court) is divided into 12 parts. The first part contains an outline of the investigation and states the opinion R.A.E. formed as to the cause of the accident. I have included the first part which is intelligible without reference to the other parts, as an appendix to this Report (Appendix VI). Para. 4 thereof which states the opinion of R.A.E. is in the following terms:—

"we have formed the opinion that the accident at Elba was caused by structural failure of the pressure cabin, brought about by fatigue. We reach this opinion for the following reasons:—

- * (i) The low fatigue resistance of the cabin has been demonstrated by the test described in Part 3, and the test result is interpretable as meaning that there was, at the age of the Elba aeroplanes a definite risk of fatigue failure occurring (Part 3).
- * (ii) The cabin was the first part of the aeroplane to fail in the Elba accident (Part 2).
- * (iii) The wreckage indicates that the failure in the cabin was of the same basic type as that produced in the fatigue test (Parts 2 and 3).
- * (iv) This explanation seems to us to be consistent with all the circumstantial evidence.
- * (v) The only other defects found in the aeroplane (listed in Section 3) were not concerned at Elba. as demonstrated by the wreckage.

Owing to the absence of wreckage, we are unable to form a definite opinion on the cause of the accident near Naples, but we draw attention to the fact that the explanation offered above for the accident at Elba appears to be applicable to that at Naples."

It should be added that the medical evidence as to the state of the bodies recovered was consistent with the conclusion thus reached.

93. The "other defects" mentioned in subpara. (v) quoted above are: _

- * (a) relatively low resistance of the wing to fatigue;
- * (b) possibility of fuel from the fuel tank venting system entering the trailing edge area of the wing near the jet pipe shrouds;
- * (c) risk of internal damage during refuelling to the outer wing tanks under conditions which, though abnormal, may sometimes have occurred in practice.

94. I shall return to these defects after I have stated my opinion on the major conclusion of the Report.

PART XIII

THE COURT'S CONCLUSIONS AS TO THE CAUSE OF THE ACCIDENT

(a) The main finding in the R.A.E. Report

95. The opinions expressed in the Report were supported by the evidence of Sir Arnold Hall, Dr. Walker and Mr. Ripley. Their conclusions were accepted by de Havilland and B.O.A.C. All parties appearing at the Inquiry paid a warm, and in my opinion well-deserved, tribute to the Report and to all who had co-

operated in the work done at R.A.E. As I have already indicated and for the reasons I have given I have accepted the main conclusion of the Report that the cause of the accident to Yoke Peter was the structural failure of the pressure cabin brought about by fatigue.

(b) The alternative suggestion made by Mr. B. Jablonsky

96. The only rival Suggestion was made by Mr. Jablonsky. His experience of structural problems in aeronautics has been concerned mainly with propellers having blades of highly compressed wood. He is, therefore, familiar with adhesives, and with the problems which have to be overcome in using them to make components.

97. In the construction of the Comet wide use is made of a metal-to-metal adhesive known as Redux, mainly for the purpose of attaching members, generally known as "stringers", to the skin both of the wing and of the cabin. In the cabin there are about forty stringers more or less evenly spaced around the circumference and running longitudinally. They are not structurally continuous from end to end, the largest uninterrupted length being about 25 ft. de Havillands were pioneers in using Redux for such purposes in aircraft structures, and have had long experience of it. It is in effect an alternative to the conventional riveting.

98. Mr. Jablonsky's argument proceeded on the following lines: _

* (a) The skin of the cabin is exposed under service conditions to a large variation in temperature. He suggested a range of 80°C on the ground in the tropics to -55°C at about 40,000 ft. The rate of climb of the Comet is fairly high and the temperature of the

skin might change over this range in about 30 minutes. The stringers, however, although inside the skin, are outside the insulating lining of the cabin and therefore not exposed to the full temperature of the warm cabin air. His argument contemplated a difference in temperature between skin and stringer of as much as 60° or 70°C. This would have the result that the skin would contract relative to the stringer in the direction of the cabin's length. The adhesive would therefore, be subjected to a shear stress which might be sufficient to cause it to fail.

* (b) Even if this did not cause the adhesive to fail statically (that is on the first occasion when such a difference of temperature between the skin and the stringers occurred) frequent repetition of the shear stress might produce fatigue in the adhesive, and cause it to fail.

* (c) Mr. Jablonsky recognised that the dependence on temperature level of the properties of Redux is well known. He suggested, however, that frequent and rapid variations of temperature would reduce its strength substantially .

* (d) It is generally recognised that the satisfactory use in engineering structures of any form of adhesive (or, indeed, of processes essentially similar such as the welding or soldering of metals) can be ensured only by the development and maintenance of higher standards of workmanship and process inspection than are necessary in the use of riveting. While Mr. Jablonsky recognised that de Havillands' production technique for Redux had been developed after many years' study of its properties, and that their experience of its use in other aircraft had been highly satisfactory, he suggested that it was not a process sufficiently reliable for use in the primary structure of a pressure cabin.

99. Mr. Jablonsky said in evidence that in his inspection of the wreckage at R.A.E. he had seen examples of failure of the "glue

line" which had satisfied him that weakness in it was primarily responsible for the failure of the structure of the cabin.

100. I deal below with these points separately: _

* (a) During the experiments made in flight on Comet G-ANAV at R.A.E., measurements were made of the difference in temperature between the skin and the stringers in typical positions in steady flight at cruising altitude. They led to the conclusion that the maximum probable steady difference in temperature is about 10°C. I am advised that the shear stress in the Redux caused by the relative contraction between the skin and the Stringers due to a temperature difference of this order would be well within its capacity.

Mr. Jablonsky did not agree that any reliable inference about the conditions on an operational climb could be drawn from these experiments. I recognise that this comment has some force but I base my conclusions on this aspect of his criticism on the more general considerations set out in paragraphs 101, 102 and 103 below.

* (b) No evidence was submitted of the effect, on the fatigue strength of a Redux joint, of the level of temperature of the adhesive. But I am advised that the wide experience of its use by de Havillands in the structures of other aircraft, where alternations of load on the glue line have certainly existed in numbers far in excess of any likely to have been experienced in the cabin structure of the Comet, and over a wide range of temperature of the Redux itself, is satisfactory evidence that this is not a probable cause of failure of the Redux joints in the Comet's cabin.

* (c) de Havillands made special tests to investigate the effect on topical joints of repeated alternation of temperature between 60°C and -50°C. I am advised that these show that alternations of

temperature within this range have no appreciable effect on the strength of a Redux joint.

* (d) At my request, de Havillands submitted a statement which summarised the history and present state of their production methods in the use of Redux, with particular reference to its application to the construction of the Comet Mr. Povey, the Director responsible for production, gave evidence on the point. I am advised that this statement and evidence show that de Havillands fully appreciated the importance of this aspect of the use of an adhesive in essential structural components and that the methods they have devised, including process control and inspection. tests of samples of every joint, and periodic stripping of complete stringers from the skin, provide all the assurance that could reasonably be required.

101. However, the final test of a process of this type is recognised to be experience in service. No evidence was produced of any failure of de Havillands' methods of dealing with the same problem in aircraft such as the Hornet and the Dove, in both of which Redux is widely used. Moreover, inspection of Yoke Uncle at R.A.E., both before and after it was tested under repeated loading, showed no signs of any deficiency in the glue line. It must be remembered that before it was delivered to R.A.E. for tests, this aircraft had done 3,521 hours of flying on B.O.A.C. services, experiencing the conditions of temperature, and of temperature variation between the skin and the stringers, contemplated by Mr. Jablonsky.

102. Finally. examination of the wreckage led Mr. Ripley to conclusions contrary to those inferred by Mr. Jablonsky. for reasons which he explained in detail.

103. It has been established to my satisfaction that the rear part

of the fuselage substantially intact, hit the surface of the sea at high speed, open end downwards. This caused the equivalent of an explosion in it, whose effects were naturally most acute near the open end (see Figures 3 and 4). I am advised that the failure, under these circumstances, of the adhesion between the skin and the stringers cannot be regarded as evidence of the failure of the adhesive to meet the requirements of the normal use of the aircraft. There was in this neighbourhood abundant evidence of the failure of all the methods of attaching the various structural components to one another. Moreover, the numerous places where the skin had parted from the stringers exposed the glue line to examination and Mr. Ripley said that he had been unable to find any sign of any unsatisfactory features in the process employed by de Havillands, or of any weakness in the adhesive.

104. In the light of these considerations I have no hesitation in rejecting Mr. Jablonsky's suggested alternative cause of the failure of the cabin.

(c) Mr. Tye's evidence

105. The only other witness who did not completely accept the suggestion advanced in the Report was Mr. Tye. He did not dispute that the primary cause of the accident was the bursting of the cabin structure, but he expressed himself as not entirely satisfied that fatigue was the cause of that disruption. He appears to have proceeded on the basis that the 9,000 hours (3,000 flights) at which Yoke Uncle burst could be regarded as a fair average life for the fuselage and to have been impressed by the improbability, on this basis, of both Yoke Peter and Yoke Yoke failing from fatigue after only about 3,000 hours (1,000 flights). He was unable, however to suggest any other cause. He admitted that he could find no evidence either (a) of excessive internal

pressure in the cabin or (b) of excessive stresses in the cabin structure due to external action such as gusts or failure of the control system. He agreed also that he could not name any alternative cause of the failure which R.A.E. had failed to consider.

106. Bearing in mind that Mr. Tye is the Chief Technical Officer of A.R.B. and as such will be responsible for advising A.R.B. when an application is made for a new Certificate of Airworthiness for Comet aircraft, his caution is understandable, but I have the duty of expressing my conclusion on the evidence. I rely in this connection on an answer given by Mr. Tye to Sir Lionel Heald which seems to me to represent the proper approach for me to adopt in the circumstances of the case. Mr. Tye said "I think in concluding on the likelihood of the cause one has to take the thing as a whole: one has to take the tank test evidence and say that that shows that fatigue is possible, although on my argument not necessarily probable, that is the tank test by itself; one then has to look at the other half of the matters namely, all the other possible causes, and if in the process of eliminating possible causes you become completely confident that you have eliminated every other possible cause, then you are driven to say that the possible fatigue rises to the most probable cause." Applying these observations to what was done in the course of the investigations by R.A.E. and by the de Havilland Engine Company Limited and to the evidence given in the Inquiry before this Court, I unhesitatingly come to the conclusion that R.A.E. were right in their conclusion that the accident at Elba was caused by structural failure of the pressure cabin in the region of the A.D.F. window, brought about by fatigue. In reaching this conclusion I am fortified by the advice I have received from my Assessors.

(d) The possibility of over-pressurisation

107. I considered nevertheless that although the R.A.E. Report contained a full investigation of the equipment used for controlling the pressure in the cabin, including both an examination of the possible causes of mal-functioning and of the condition of the equipment recovered from the wreckage, de Havillands should be asked to produce further evidence directed towards establishing that the precautions taken in the Comet installation, to ensure that the pressure could not rise appreciably above the normal working pressure, were reliable. Mr. Wilkins, an Assistant Chief Designer of de Havillands, who was responsible for this aspect of the designs gave evidence on the matter, and a statement was produced by de Havillands summarising the method of operation of the essential controlling and safety valves. Messrs. Normalair Limited, the firm responsible for the pressurisation control equipment, also produced full information about the essential parts. Taken together with the R.A.E. Report, this additional evidence satisfies me that the possibility of the development of excessive internal pressure in the cabins of an amount sufficient to endanger its structure, was so remote that it can be excluded as a probable cause of the bursting of the cabin.

(e) Certain defects referred to in the R.A.E. Report

108. I turn now to the other defects discovered by R.A.E. and already referred to in paragraph 93 of this Report, I see no reason to differ from the conclusion reached by R.A.E. that none of these defects was in any way the cause of the accident.

109. It is clear that the separation of both port and starboard outer wings from the centre section (see Figure 11) was not the

primary cause of the accident, for there is ample evidence from the distribution of paint marks and scratches on both wings that they were made by parts of the cabin structures and form a pattern (see Figure 16) which is consistent only with the whole wing having been intact when they were made. For the same reason, the known point of fatigue weakness in the wing skin near the edge of the wheel-wells is not suspect. Moreover the fracture of the wings occurred some distance outside this region.

110. As regards escape of fuel from the fuel venting system, examination of the wreckage disclosed that fire did not start until after the disruption of the cabin. It is clear, therefore, that escape of fuel from the tank vents during take-off or climb had nothing to do with the accident.

111. Turning to refuelling, the danger apprehended could only occur by a concatenation of five events. The risk was, therefore, said to be a remote one and in any event in the present case R.A.E. state that examination of the Elba wreckage made it plain that even if the aircraft had sustained damage of the type indicated in Part 6 of the R.A.E. Report (which deals with this subject), such damage was not the cause of the accident to Yoke Peter. There had, however, been a recorded instance of trouble due to this cause and it is to be observed that de Havillands have indicated their intention of devising a method of removing the possibility of damage of this kind (see Appendix VIII).

(f) The possibility of damage by jet efflux

112. During the operation of B.O.A.C. services, there had been some experience of small damage to the cabin skin, due to the buffeting by the efflux from the jet engines. This damage was partly in front of and partly behind the pressure dome of the

cabin. As soon as it was observed, a systematic inspection was made of all Comets, and where any signs of cracking were detected a repair was made according to a scheme specially devised by de Havillands. Internal inspection showed that the buffeting was also causing slight loosening of the joint between the stringers and the skin in this region, and rivets were therefore inserted in order to ensure that this would not give rise to danger.

113. This point of possible weakness was under continuous observation. The steps taken to deal with it may be considered to be satisfactory, particularly since, where the repair had been carried out, no further trouble occurred.

114. It is, however, recognised by de Havillands that a situation in which it is known that such cracks are likely to occur is unsatisfactory, and among the improvements they intend to make on future Comets is one which they believe will reduce the cause of this damage, namely, a slight change in the direction of the jet pipes at their exits, with the object of diverting the jets away from the sides of the cabin.

PART XIV RESPONSIBILITY

(a) Introductory

115. No suggestion was made that any party wilfully disregarded any point which ought to have been considered or wilfully took unnecessary risks. But in the course of the evidence, questions were put which make it necessary for me to consider a number of points in the light of the conclusion I have already expressed as to the cause of the accident.

(b) Criticism of de Havillands' design work

116. Dealing first with the period prior to the commencement of the scheduled passenger service on the 2nd May, 1952, the calculations made by de Havillands were criticised and it was suggested that the tests they carried out were inadequate to guard against the risk of fatigue in the cabin structure. In support of this contention particular reference was made to certain calculations included in paragraph 4 of Part 3 of the R.A.E. Report and to other calculations produced by Sir Arnold Hall in the course of his evidence. It is, however, to be observed that the primary object of de Havillands was to lay the foundation for extensive tests which they regarded as the soundest basis for the development of a project rather than to arrive at a precise assessment of the stress distribution at the corners of the cabin windows.

117. I do not think that they can justly be criticised for this approach to the problem. In arriving, at this conclusion I have been assisted by a Memorandum which has been prepared for me by my Assessors and which confirms the impression I formed from the evidence of the witnesses that de Havillands were proceeding in accordance with what was then regarded as good engineering practice. I am also satisfied that in the then state of knowledge de Havillands cannot be blamed for not making greater use of strain gauges than they actually did or for believing, that the static test that they proposed to apply would, if successful, give the necessary assurance against the risk of fatigue during the working life of the aircraft. The Memorandum to which I have referred is included as paragraphs 118 to 129 of this Report.

(c) Memorandum by Assessors

118. During the design of the Comet de Havillands did not make use of calculations in an attempt to arrive at a close estimate of the stress distribution near the corners of the cabin windows. We have examined such of their calculations as had a bearing on this question; these led to the stress of 28,000 lb./sq. in. mentioned by Mr. Harper. It is clear that this stress refers to an area of the skin in the neighbourhood of the corners, and may fairly be said to be an average value over a width of 2 or 3 inches. de Havillands believed that their method was satisfactory for the purpose they had in mind, namely, the design of a test specimen. They did not consider that a closer estimate of the highest value of the stress could be made by any method which they would regard as reliable. They preferred to rely on tests of specimens designed on the basis of their calculations.

119. Since their estimate of the general level of stress in the region investigated was less than half the ultimate strength of the material (about 65,000 lb/sq. in.) they were confident that they could demonstrate by static test that there would be no failure at twice the working pressure, and that there would be a considerable reserve in hand. Their tests of panels about 3 ft. square, including, a window, substantiated this view.

120. We note, however, that in these tests the panel was supported on the face of a stiff steel "pressure box", and not in conditions truly representative of those which existed near the window in the pressure cabin itself. It is not possible to say what the effect of this would be. de Havillands were reassured by the results of the tests, in which the specimen withstood nearly 20 lb./sq. in. without failure.

121. de Havillands used the same approach to the design of the whole pressure cabin. The static tests which they made on the

two parts of the pressure cabin, respectively 26 and 24 ft. long, gave them confidence in the integrity of the whole cabin. Since they believed, with general support from then current practice and opinion, including that of A.R.B., that this basis of design and static tests would give ample assurance against risk of failure under repeated applications of the working pressure, and other known causes of fatigue, they felt that the cabin was good for the life of the aircraft (say 10,000 pressurised flights, or 10 years).

122. Here again, however, we note that the test sections of the cabin differed from the cabin as fitted to the aircraft in several respects. In the first place, each was incomplete, and incapable of sustaining pressure if it had not been fitted with a stiff bulkhead at the open end or ends. It is not possible to say whether the constraint which these bulkheads imposed on the structure would make it stronger or weaker than when it formed part of a complete cabin. But it must be recognised that the stresses in the structure near the bulkheads would be appreciably affected by the constraint, and the reliability of deductions about the strength of the cabin would thereby be reduced. Secondly neither section was fitted with the complete number of windows, etc. Moreover, the windows of special interest in this Inquiry, which were in the front test section, were rather near the bulkhead mentioned, so that the stresses in the skin round them might have been appreciably different from those in similar places in the complete cabin.

123. The increasing attention which de Havillands gave, during the period mid 1952 to end 1953, to the fatigue life of pressure cabins has been mentioned in paragraphs 21 to 24. In their repeated loading tests the front test section of the cabin survived 16,000 applications of just over the working pressure. They felt confident that the Comet's cabin would have a safe life well

beyond their target of 10 years in service.

124. The repeated loading test on Yoke Uncle at R.A.E. led to an unexpected failure after some 3,000 applications of load. Though this was about three times the life of Yoke Peter at Elba or Yoke Yoke at Naples it was surprisingly short and led directly to the inference that there were high local stresses. Steps were, therefore, taken at R.A.E. to measure the stresses near the corner of the window, using strain gauges placed as near as possible to the edge of the skin where the failure started. These measurements led to an estimated stress of 43,000 lb/sq. in. at the edge at the normal pressure difference of 8.25 lb./sq. in.

125. This estimate of the stress was regarded by de Havillands as unreliable, partly because the process of deriving it from the experimental measurements involved some extrapolation, but also because it would imply that in their own test to twice the working pressure, there was a local stress of double this amount, namely 86,000 lb/sq. in., which is some 30 per cent. above the ultimate strength of the material. This apparent paradox can be explained by recognising that it neglects to take account of the effect of the ductility of the material in relieving "stress concentrations" (see on this subject paras. 148 to 153 below).

126. Calculations were made by Sir Arnold Hall to explore the problem in the light of such theoretical solutions as were known of the problem of stress distributions round a cut-out of the shape of the cabin windows, in a cylindrical shell of metal under pressure. These calculations were not put forward as exact, but, with due allowance for the fact that the window frame, and the cabin stringers and hoop frames, would influence the result they supported the reasonableness of the estimate made from measurements on Yoke Uncle.

127. It is our view that the two results taken together point strongly to the conclusion that the stress in the skin at the edge of the window near the corner was far higher than had been suspected by de Havillands, and was probably over 40,000 lb/sq. in. under the normal pressure difference.

128. In the course of the Inquiry much attention was paid to an estimate, given in Part 3, para. 6 of the R.A.E. Report on the tests on Yoke Uncle, of the stress which might be predicted on the basis of their measurements by strain gauges, as probably existing in flight. The figure "70 per cent. of the ultimate strength" was obtained by adding to the 43,000 lb/sq. in. (mentioned above) due to the working pressure, another 2,700 lb / sq. in. due to other known loads, leading to a total of 45,700 lb/sq. in. This was contrasted with de Havillands' own estimate of 28,000 lb/sq. in. It has already been pointed out that de Havillands' figure relates to an average over a considerable distance near the corner of the window, and due only to the working pressure, whereas the estimate made by R.A.E. relates to a particular point where the stress would be expected, on general grounds, to reach a maximum. A direct comparison between them is therefore misleading. Having regard to the different approach the two figures cannot be said to be inconsistent.

129. It is natural that de Havillands and R.A.E. should have approached the problem of the "safe life" of the pressure cabin of the Comet from different points of view. de Havillands were the designers and looked at the problem as designers would, having confidence in their methods based on their experience. R.A.E. had had virtually no previous knowledge of the design background of the Comet, since it is a civil aircraft and their

connection with it before the 8th April, 1954, was primarily advisory in character and was wholly concerned with fatigue of the wings. In the early stages of the Inquiry there was, therefore, a sharp disagreement between them on the interpretation of their calculations and tests. These differences of opinion diminished in the course of the Inquiry as greater mutual understanding developed. While there are still minor points on which they do not quite see eye to eye, a situation which is by no means unusual in technical problems of such difficulty, there is now no longer any substantial disagreement between them. Our own interpretation of the situation, so far as it can be determined by existing evidence, is set out above, and we believe that it would be accepted by de Havillands and R.A.E.

(d) Criticism of de Havillands repeated loading tests in 1953

130. Another criticism of de Havillands was connected with the repeated loading tests carried out by them in 1953. When the R.A.E. test revealed the short life of the cabin structure of Yoke Uncle the question arose as to how to reconcile the result of that test with the result of these earlier repeated loading tests. Sir Arnold Hall suggested that the explanation might well be that the 1953 tests were carried out on a nose section which had previously been subjected to static tests up to a differential pressure of 16.5 lb/sq. in. and that the effect of such a test might be to prolong the life of the specimen subjected to it. Mr. Harper said that he was aware of this possibility but he considered that if there was any increase in life of the nose section attributable to pre-loading the tests so amply covered the life of the aircraft both at the time of the tests and for the immediate future that de Havillands could safely accept the test as satisfactory. In the then state of knowledge I think this conclusion was reasonable.

(e) de Havillands' method of dealing with cracks

131. There is one other question bearing on responsibility to which I must refer. This concerns certain cracks, revealed by the examination of the wreckage (see para. 78), which had occurred in the process of manufacture and had been dealt with by location. Sir Arnold Hall said that such manufacturing cracks might form foci for fatigue and thus shorten the life of the structure. It was suggested in cross-examination that the fatigue which led to the disintegration of Yoke Peter had originated in these cracks, that they ought not to have been dealt with as they were and that accordingly some responsibility ought to attach to de Havillands for allowing the aircraft which contained them to be put into service.

132. It will be convenient to deal with the subject of cracks generally before giving my opinion on the specific question of responsibility mentioned above. This course may also enable the whole matter to be viewed in proper perspective. Public concern may have been aroused by what was said during the Inquiry and it is important that groundless fears should be allayed.

133. I am advised that it has been the general experience that certain parts of the structure of aircraft develop cracks as the result of fluctuation of load, vibration or casual damage and that the external skin, whether in the wings, tail or fuselage is particularly vulnerable. Cracks which occur during manufacture do not differ materially, in their significance, from those which may develop subsequently save, of course, that their presence may indicate an unsatisfactory manufacturing process.

134. It is the ordinary practice to make careful inspection of the structure, both during manufacture and subsequently, particularly

in regions known to be specially susceptible and, if cracks are found, to deal with each case on its merits in the light of a now very wide experience of the problem. Where frequent inspection shows that a particular crack is likely to spread, it is dealt with by a carefully considered repair scheme, either prepared by the designers or by the operators in collaboration with the designers. However if after such repair the crack continues to spread it is considered as a matter of major concern possibly requiring a radical modification to the design to reduce the stress which gave rise to it.

135. For small cracks in regions not highly stressed the method of location is generally found to prevent further spread, provided that care is taken to ensure the inclusion of the end of the crack in the hole drilled. All witnesses who dealt with this matter in the Inquiry were agreed that location was a reasonable method of dealing with such cracks.

136. I am also advised that most aircraft experience cracks due to one or more of the causes mentioned above and that it would, indeed be hardly practicable to insist on a standard of design and construction which would preclude completely the possibility of any crack in the skin.

137. The methods employed by de Havillands in dealing with manufacturing cracks were in no way different from those used to deal with other deviations from the strict requirements of the drawings to which the aircraft was being built. Defects whether discovered by the workman or the inspector would be dealt with by the procedure known as "Concession" procedure which varied according to whether the defect was classed as major or minor. Mr. Povey said that manufacturing cracks were required to be dealt with as major defects with the result that "Concession

Notes" containing the proposals for dealing, with them would have to go forward to the Chief Inspector and, if approved by him, would have to be submitted to the Design Department for final approval. In the case of Yoke Peter three cracks were discovered in the reinforcing plates of the A.D.F. windows. The action taken, which was approved by the Chief Inspector and the Design Department, was "splints have been located with a 1/16th dia. drill hole". According to the then current engineering practice this action would have been appropriate had the stresses been as low as de Havillands believed them to be, but was, in fact inappropriate as the region concerned was one in which there were high stresses. However, as I have already stated in paragraphs 116 and 117 my opinion that de Havillands cannot be blamed for their ignorance of the true state of affairs, it follows that no responsibility attaches to them.

138. The evidence disclosed other cracks in Comet aircraft. Thus in the wreckage of Yoke Peter there was a crack in the skin at the starboard front corner of the rear A.D.F. window. This had been located at both ends. No Concession Note was available in relation to this crack and it would appear that there had been a defect in the operation of the Concession procedure. Although this crack had spread during the life of the aircraft beyond one of the points at which it had been located, the actual fracture did not take place there nor was there any sign of fatigue. Other cracks were referred to in Yoke Uncle and Yoke Yoke but in no case was there any evidence that the crack had contributed to the failure of the aircraft.

139. I need not pursue further the question of manufacturing cracks of this type since the statement put in on behalf of de Havillands (see Appendix VIII) records that if in future a crack does occur at any time either in manufacture or subsequently during the life of an aircraft no repair scheme for such a crack

will be sanctioned unless it ensures that, after it has been carried out, the part of the aircraft concerned will be as strong and will have as long a life as it would have had, had there been no crack.

PART XV FUTURE

(a) Statements on behalf of the Attorney-General and de Havillands

140. By s. 9 (12) of the Civil Aviation (Investigation of Accidents) Regulations 1951 the duty is imposed on me of making such recommendations as I think fit with a view to the preservation of life and the avoidance of similar accidents in future. I have been greatly assisted in that part of my task (a) by the statement as to future policy made by Sir Lionel Heald on the 12th November, 1954 on behalf of the Attorney-General after consultation with the Ministry of Transport and Civil Aviation and A.R.B.: (b) by the statement put in by Sir Hartley Shawcross on the 23rd November, 1954 recording the action which de Havillands now propose to take to deal with the problem of fatigue and with the other defects referred to in the Report of R.A.E. These statements are of such importance that I have attached them to this Report as Appendices VII and VIII. I respectfully agree with the course therein proposed to be adopted.

(b) Further suggestions directed to guarding against fatigue

141. The problem of securing an economically satisfactory safe life of the pressure cabin of an aircraft needs more study, both in design and by experiments if the lightest possible safe structure is to be achieved. This is recognised by de Havillands in their

policy in regard to the future of the Comet (Appendix VIII).

142. In Appendix IV para. 4 (iii), reference is made to the problem which arises owing to the variation among the lives, under a given loading cycle, of nominally identical parts, known as "scatter". In the pressure cabins of aircraft there are probably a number of causes of scatter. Tests of a large number of specimens are however virtually impracticable and, in order to ensure a safe life well above the minimum that is economically acceptable to an operator, methods must be devised of ensuring that design combined with a reasonable programme of tests can guarantee that the pressure cabins of transport aircraft will be entirely safe.

143. The policy which de Havillands propose to adopt for the Comet is directed to achieving this end, primarily by reducing both the general level of stress and the local excesses, due to all known causes, above the general level of stress. The knowledge which has been acquired as a result of the investigation of the accident to Yoke Peter, and the tests made on Yoke Uncle at R.A.E., strongly suggests that steps should be taken to determine by calculation, by tests of typical parts of the cabin, and by tests on one or more complete cabins, both the distribution of stress throughout the structure in considerable detail, the influences which determine both the highest static load which it will sustain, and its life to failure under repeated loading. In the present state of knowledge, it is likely that two complete cabins will have to be tested one under static loads and one under cycles of repeated loads.

144. From the evidence of Sir Arnold Hall and from advice I have received from my Assessors it became clear that there exist methods of calculating, the stress distribution in the structure of a pressure cabin which could with advantage be employed more

widely. Moreover the result of R.A.E.'s investigation satisfied me that in tests of pressure cabins or parts of them the stress distribution should be determined by wide use of strain gauges. This procedure will enable the calculations used in the design to be verified or amended, and will lead to a fuller understanding of the problem.

145. When these measures have been applied and the tests completed, de Havillands will no doubt ask A.R.B. to recommend the grant of a Certificate of Airworthiness to the re-designed Comet aircraft. It would not be desirable for me to say anything which might in any way limit the discretion of A.R.B. but I may perhaps appropriately express the hope that this procedure will reassure the public as to the integrity of pressure cabins and will justify Sir Arnold Hall's confidence that the Comet aircraft will fly again.

(c) Use of available Government facilities

146. In the course of the evidence there was some suggestion that prior to 1954 inadequate use was made in the development of the Comet of the unrivalled facilities available at R.A.E. to the civil aircraft industry. This may have been exaggerated. Be that as it may, in view of the importance of that industry to the national economy it is essential that in future manufacturers should be aware of, and should make full use of, such facilities as the research establishments of the Ministry of Supply can offer. The Court was informed that in practice there had been close personal association between members of the staffs of A.R.B. and R.A.E. and that R.A.E. was represented on the Airworthiness Requirements Co-ordinating Committee of A.R.B. It is desirable, nonetheless, to strengthen the liaison between A.R.B. and all the research establishments of the Ministry of Supply and it might be

worth considering whether, when the Council of A.R.B. is being strengthened in accordance with the statement made by Sir Lionel Heald (see Appendix VII), it should not also receive such additional reinforcement as will encourage the full use by manufacturers, operators and A.R.B of all available facilities.

(d) Avoidance of flight by unlicensed crew

147. Reference has been made in paragraphs 35 and 36 to the fact that the Engineer Officer of Yoke Peter was not in possession of a valid licence at the time of the accident. I was informed by Counsel for B.O.A.C. that their system for ensuring the prompt renewal of licences had been overhauled and that adequate steps have been taken to prevent a recurrence of this lapse. It is clearly of the first importance to ensure that no aircraft flies save with a crew not only fully qualified in knowledge and experience but also properly licensed.

(e) Suggested scientific and technical investigations

148. There are certain scientific and technical matters on which, acting on the advice of my Assessors, I recommend that research can usefully be undertaken, in the interest of increasing knowledge of the problems of the design of pressure cabins. The first arises from the influence of the ductility of the aluminium alloy from which the skin of the cabin is made, on the manner in which the stress distribution in the skin is related to the difference between the internal and external pressure on the cabin. It is perhaps simplest to look at this problem in the light of the situation which develops as the pressure in the cabin is increased from the working pressure P up to the value somewhat below that at which it fails under a static test.

149. In the first place it is essential to appreciate that, although it would from many points of view be desirable that the stress in the skin should be the same everywhere, in practice considerable variations are unavoidable. There will, therefore, be points, generally near to the cut-outs, where the stress is appreciably higher than the average, and it is on these points that the designer's attention is naturally focussed when considering, the strength of the structure.

150. As the pressure difference in the cabin rises from P to, say, $1.5 P$ the stresses everywhere will rise in the same proportion. But as the pressure difference approaches, say, $2 P$ the stress in the more highly stressed regions will reach that at which the material is no longer elastic. Its extension will then be of a plastic nature, that is to say, one which does not disappear when the stress which caused it is removed. Over most of the skin the stress will remain within the range in which the material is still elastic and the removal of the pressure will restore this part of the skin to its original dimensions. But in areas where the stress was high there will remain a permanent stretch. The pre-loaded cabin is therefore physically different from a new one, if the pre-load has exceeded a certain level.

151. Although the permanent extension of the material in the areas where it has stretched plastically, but without fracture, is small and undetectable by visual inspection, it may have a profound effect on the distribution of stress in the material when the working pressure is applied a second time. Without going into details, the general nature of this will be to reduce markedly the stress in the areas where it was previously greatest. The stress concentration in such areas is therefore relieved.

152. This is a process whose general nature is understood, and

there are examples where it has been deliberately used in order to improve resistance to fatigue. It has indeed been suggested that it might be used in such structures as a pressure cabin. But there are obvious difficulties, not to say dangers, in applying it. Nevertheless, the subject should undoubtedly receive more study, if only to ensure that tests during design are not rendered unreliable by failure to appreciate its significance.

153. Though there can be no direct proof, there is no doubt that the phenomenon described above provides at any rate a partial explanation of the apparent anomaly presented by the failure of the pressure cabin of Yoke Uncle at R.A.E. after 3,000 cycles, in spite of the survival of the test specimen of the forepart of the cabin to over 16,000 cycles when tested by de Havillands. The maximum pressure difference which had ever been applied to Yoke Uncle was 1.33 P. whereas the test specimen had been subjected to two applications of 2 P in addition to nearly twenty of between P and 2 P.

154. The second question which needs study may be put shortly as follows: what is the true static strength of the complete Comet cabin? Reasons have been given in paras. 120 and 122 why the tests made on sections of the cabin may have been somewhat misleading. A test conducted in the tank at R.A.E., with the most comprehensive exploration of the stress distribution, would be invaluable. Not only would it clear up such uncertainties as remain from our Inquiry, but, in conjunction with the repeated loading, tests already made on Yoke Uncle, would provide an invaluable body of information for the basis of design of future pressure cabins

155. The remaining question which requires study relates to the system used to operate the aircraft controls. Most of the evidence

On this subject was concerned with the alleged excessive "break-out" force and indicated a difference of opinion, among pilots, as to whether the existing system was satisfactory in this respect, though none suggested that the alleged defect had in any way contributed to the accident. A different criticism was made by one of the Assessors to the Indian Court of Inquiry into the accident to G-ALYV and apparently prompted that Court's second recommendation, which was as follows: "That consideration should be given to the desirability of modifying the flying control system of the Comet aircraft in order to give the pilot a positive 'feel' of airloads exerted on the control surfaces." Only a passing reference was made to this before me. As advised by my Assessors, I am satisfied that the characteristics of the control system of the Comet should be reconsidered by de Havillands and by A.R.B. in the light of both the criticisms which have been made.

(f) Observations on certain suggestions made in the course of the Inquiry

156. I cannot conclude this part of my Report without mentioning two suggestions made during the Inquiry which, after full consideration, I feel unable to recommend.

157. The first of these arose out of some criticism which was made of the system whereby inspection of aircraft parts is delegated by A.R.B. to manufacturers. By this system, the operation of which is set out in an A.R.B. pamphlet on "The Approval of Inspection Organisations and the Maintenance of Airworthiness", manufacturers' own inspectors have the duty of supervising all the work done in building civil aircraft. This inspection organisation is supervised by A.R.B. through their own inspectors to ensure that it is adequate. A.R.B. inspectors do

only such detailed inspection of work as is needed to assure themselves that the system is working satisfactorily. Evidence was given by Mr. Povey illustrating how this system worked at de Havillands.

158. The suggestion was made that the system for inspection would be more satisfactory if all the Inspectors were responsible direct to A.R.B. and not to manufacturers, or alternatively that there should be a duplicate system of inspection whereby both manufacturers and A.R.B. would have inspectors. Reference was also made to the method of inspection of shipping by Lloyd's as an example of how such a system might work but no evidence was produced as to this method. I cannot, therefore, form any conclusion on the suggested analogy.

159. It is plain that there would be inherent dangers in duplication. Responsibility for the quality of his product must rest with the producer. It is, therefore, essential for the producer to have his own system of inspection. Any additional system would add to expense, but not, it was argued to safety.

160. I have come to the conclusion that the present system of inspection by manufacturers approved and supervised by A.R.B. is essentially satisfactory. It is, of course subject to human errors, but it has the beneficial effect of creating a sense of responsibility in manufacturers without which aircraft could not be designed and built to the requisite standard of reliability and safety.

161. The second suggestion arose out of some criticism which was levelled at A.R.B. on the ground that their flight testing organisation is relatively small compared with similar flight test teams at aircraft firms and at the Ministry of Supply Experimental Establishments. A suggestion was, therefore, put

forward that A.R.B. flight testing and aircraft approval would be made more effective if an active pilot were appointed to their Council and if civil aircraft were sent to a Ministry of Supply test establishment where a much wider and more experienced opinion on flying qualities could be obtained from a larger organisation, instead of the somewhat restricted assessment at present available to A.R.B.

162. Although I am satisfied that there is no reason to criticise the flight testing of the Comet I as carried out by de Havillands and A.R.B., I think serious consideration should be given to the possibility of obtaining the best available opinion on the flight characteristics of future airliners particularly when they incorporate novel features in design which effect those characteristics. As I have mentioned in para. 146 of this Report, such facilities are available in Ministry of Supply Establishments, and the importance of the civil aircraft industry to the economy of this country seems to warrant making the fullest use of those facilities.

163. With reference to the suggested appointment of an active pilot to the Council of A.R.B., there are clearly difficulties in such an arrangement since the pilot would be unable to do his job as an airline pilot and at the same time be available to give his advice to the Council. I have no reason to believe that the present representation on the Council has been in any way lacking in the past and I hesitate to recommend any change. If an active pilot were to be appointed the post would have to be made a whole time paid employment and it would not be long, before he ceased to possess the qualifications upon which those who advocated the appointment laid stress. On the whole I think it is better to rely on the Minister to secure that the person he nominates to the Council as possessing professional experience as a pilot of civil

aircraft is always someone who is reasonably up-to-date.

PART XVI QUESTIONS AND ANSWERS

My answers to the questions submitted on behalf of the Attorney-General are as follows: _

Question 1

What was the cause of the accident?

Answer.

The cause of the accident was the structural failure of the pressure cabin brought about by fatigue. See para. 95.

Question 2.

If several factors caused the accident what were such factors and to what extent was each contributory?

Answer.

This does not arise.

Question 3.

Was the accident due to the act or default or negligence of any party or of any person in the employment of that party?

Answer.

The accident was not due to the wrongful act or default or to the negligence of any party or of any person in the employment of any party.

Question 4.

At the time of the accident:

Question 4 (a).

Had the aircraft been maintained in accordance with the current approved maintenance schedules? If not, did any defect in maintenance affect the safety of the aircraft or contribute to the accident?

Answer.

Yes. The second part of the question does not arise.

Question 4 (b).

Was the aircraft airworthy so far as could reasonably have been then ascertained ?

Answer.

Yes.

Question 4 (c).

Was there a valid Certificate of Airworthiness in respect of the aircraft?

Answer.

Yes.

Question 4 (d).

Was there a valid Certificate of Maintenance in respect of the aircraft?

Answer.

Yes

Question 4 (e).

Was the radio station of the aircraft serviceable and was there a valid Certificate of Serviceability in respect thereof ?

Answer.

Yes.

Question 4 (f).

Was the aircraft properly loaded and trimmed within the limits specified in the Flight Manual?

Answer.

Yes.

Question 4 (g).

Were all members of the crew properly licensed and adequately experienced to make the flight? If not, did any defect in the licence of any member of the crew affect the safety of the aircraft or contribute to the accident?

Answer.

All members of the crew were adequately experienced to make the flight but the flight engineers Engineer Officer F. C. Macdonald was not properly licensed to make the flight (see paragraph 35). This defect did not affect the safety of the aircraft or contribute to the accident.

Question 5.

Upon consideration of all facts disclosed by this Inquiry what steps should be taken to increase the safety of civil aircraft?

Answer.

See Paragraphs 140-155 of this Report.

Report by COHEN., W. S. FARREN., W. J. DUNCAN., A. H. WHEELER.

1st February, 1955.

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Official accident report of Comet IV G-APDN

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Civil aircraft accident report 1/72

Accident investigation branch - Department of Trade and
Industry

Dan Air Comet 4 G-APDN.

Report on the accident which occurred in the Sierra del

Montseny, in the Municipal District of Arbucias (Gerona) Spain on 3 July 1970.

Translation of the report published by the Spanish Air Ministry, Madrid October 1971

London : Her Majesty,s stationery office 1972

0. Figures

Flight pad of G-APDN

1. Investigation

1.1. History of flight

The aircraft was operating a regular Dan-Air charter flight from Manchester to Barcelona. It took off from Manchester for Barcelona at 1608 hrs. The routing specified on the flight plan was via Airways UA1, UA34, UB31 and Point Berga. Because of ATC delays in the Paris area the aircraft was cleared to proceed via UA25 to the Cognac VOR (1725 hrs) - Agen VOR - Toulouse VOR (1743 hrs), joining UB31 at point 'B'. G-APDN was then cleared by French ATC to descend from FL370 to FL220. At 1753 hrs the pilot established contact with Barcelona ACC on 124.7 MHz and after reporting that he had passed the Spanish frontier requested clearance to descend further; it was cleared to descend from FL220 to FL90.

At 1757 hrs G-APDN reported passing the Barcelona FIR boundary and that it was leaving FL160, and gave an ETA of 1801 hrs for Point Berga. At 1759 hrs the pilot received instructions to contact Barcelona Approach (APP) on 119.1 MHz; a few seconds after changing to that frequency G-APDN was instructed to turn left on to heading 140°. The pilot acknowledged the turn and reported that he was leaving FL130,

and immediately afterwards gave an ETA for Sabadell of 1807 hrs.

At 1800 hrs APP requested confirmation of this estimate and the pilot corrected it to 1805 hrs. On receiving this information, APP cancelled the turn on to 140° and told the pilot to proceed to Sabadell. At 1801 hrs, G-APDN reported leaving FL100 for FL90. APP enquired whether it had DME on board and the pilot replied that it did not. G-APDN was then cleared to descend to FL60.

At 1802 hrs, APP instructed the pilot to turn left on to 140°. The pilot acknowledged this instruction and informed ATC that he was leaving FL85 for FL60. Immediately after this transmission, APP requested confirmation that G-APDN was passing Sabadell, and the pilot replied 'in about 30 seconds'; 15 seconds later the pilot said 'Barcelona, G-APDN passing Sabadell'. APP acknowledged the message and added 'radar contact, continue descent to 2,800 feet, altimeter 1017, transition level five zero'.

At 1803 hrs G-APDN requested information on the duty runway, APP replying that the duty runway was 25, which the pilot acknowledged. At 1805 hrs, APP requested aircraft altitude and G-APDN reported passing 4,000 feet. At 1807 hrs APP called the aircraft for confirmation that it was still on course; G-APDN did not reply to this transmission, nor to other calls which were subsequently made.

The site of the accident was: Latitude 41°47'45" North, Longitude 02°27'34" East, and it occurred between 1805 and 1806 hrs, in daylight. The altitude of the site is about 3,900 feet.

1.2 Injuries to persons

Injuries Crew Passengers Others

Fatal	7	105	-
Non-fatal	-	-	-
None	-	-	-

1.3 Damage to aircraft The aircraft was destroyed.

1.4 Other damage Destruction of 125 acres of a privately owned beech wood, valued at approximately 25,000 pesetas.

1.5 Crew information

Captain Alexander George Neal, aged 48, held a valid British Airline Transport Pilot's Licence, with a current instrument rating, endorsed to fly Comet, Britannia and HS 104 aircraft in command. His licence was issued on 6 February 1967 and was valid until 5 February 1972. He passed his last instrument rating renewal flight test on 17 March 1970. He passed his last periodic medical examination on 3 March 1970 and there were no medical restrictions on his licence. Captain Neal was trained as a pilot in the Royal Air Force and had previously been employed as a first officer by British Eagle. He joined Dan-Air as a first officer in March 1969 and was promoted to captain in May 1970. At the time of the accident he had flown a total of 7,427 hours as a pilot. He had accrued a total of 605 hours on Comet aircraft, 29 hours being in command. The flight on which the accident occurred was his first flight to Barcelona as commander. Previously he had made one flight into Barcelona, on 19 May 1970 during his command and route check.

First Officer David Shorrocks, aged 41, held a valid British Airline Transport Pilot's Licence endorsed for Comet, Britannia and BAC 1-11. His licence was issued on 18 July 1968 and was valid until 17 July 1973. He passed his last instrument rating renewal flight test on 18 March 1970. He passed his last periodic

medical examination on 26 June 1970. He was required to wear spectacles to correct his near vision when exercising the privileges of his licence. Mr Shorrocks was trained as pilot at a civilian flying school and had previously been employed by British Eagle. He joined Dan-Air as a first officer on BAC 1-11 aircraft in April 1969 and converted to the Comet in March 1970. At the time of the accident he had flown a total of 4,765 hours as a pilot of which 189 had been in Comet aircraft.

The flight engineer, Mr David Walter Stanley Sayer, aged 40, held a British Flight Engineer's Licence endorsed for Comet 4 and DC-7B aircraft. His licence was issued on 20 August 1969 and was valid until 21 August 1970. He passed his last periodic medical examination on 7 August 1969. Mr Sayer was originally a ground engineer with Dan-Air before qualifying as a flight engineer on DC-7B aircraft in July 1967. He converted to the Comet 4 in December 1969. At the time of the accident he had flown a total of 1,275 hours as a flight engineer, 218 hours being in the Comet 4. He was considered to be a very competent engineer.

Air Hostesses: Miss S Hinde, Miss H P Barber, Miss C A Maddock and Miss A Vickers.

1.6 Aircraft information

G-APDN was a standard production HS Comet 4 originally acquired by BOAC in April 1959; Dan-Air bought it from that company in 1969. The certificate of airworthiness was last renewed in the transport category (passenger) on 13 May 1970 and was valid until 12 May 1971. Although the original of the aircraft's certificate of airworthiness could not be recovered, the British commission states that the certificate was in order.

A certificate of maintenance was issued by Dan-Air Engineering on 11 June 1970, after a Check 1 inspection, valid for 62 days or 638 hours. At the time of the accident the aircraft had flown 257 hours since the certificate of maintenance was issued. The total airborne hours of the aircraft were 25,786 since manufacture the aircraft had been maintained in accordance with an ARB approved schedule. It has been calculated that at the time of the impact the weight was below the maximum total weight authorised and that the centre of gravity was within the prescribed limits.

The aircraft was equipped with duplicated flight instruments, both general flight instruments and the Smiths flight director system. Each pilot had two radio magnetic indicators (RMI), one for presenting VOR information and the other for ADF. The commander's altimeter was of the three-pointer barometric type, whereas the copilot's was of the direct reading digital type incorporating a flasher unit and an altitude switch when the height indicated was below 10,000 feet.

The radio equipment carried by the aircraft was as follows:

Marconi AD 307	HF/RT	duplicated
Marconi AD 305/704	VHF COM	duplicated
Marconi AD 712	ADF	duplicated
Marconi AD 704/706	ILS/VOR	duplicated
Marconi AD 708	MARKER	single
Echo E 160	SEARCH RADAR	single
Marconi AD 2300A	DOPPLER	single
Bendix TRA 61 AL	TRANSPONDER	single
Marconi 28800	SELCAL	single
Ultra UA 56	INTERCOM	single

Examination of the company records shows that the Doppler had been out of action since 20 June 1970. This equipment is classified as an allowable deficiency and is not a mandatory requirement.

There had apparently been a series of defects on number 1 VOR set. On 1 July 1970 a controller socket was replaced. A continuity check revealed an open circuit. This was rectified and the VOR was again serviceable. On 2 July 1970 number 1 VOR would not change frequency. The set was changed and the installation then worked normally, according to information received from the British sources. Although it is impossible to be certain that the VOR set was working properly at the time of the accident, it is certain that after the set was changed the aircraft flew four consecutive sectors, apparently without any defect in the equipment.

1.7 Meteorological information

The Sierra del Montseny, lying some 65 kilometres to the NE of Barcelona Airport, was covered by cloud, due to the phenomenon known as 'barrage' effect. The cloud mass showed little vertical development, consisting of stratus and stratocumulus. On the mountain top, known as Turo de l'Home (1,712 metres) situated about 4 kilometres in a straight line to the south of the accident site, and 500 metres higher, there is a meteorological observatory at which the following data were recorded at the time of the accident: pressure at sea level, 1,018 mbs, falling; temperature 9°C; dew-point temperature, 9°C; wind SW, 10 knots; mist, visibility nil; sky not visible on account of mist; orographic precipitation in the form of intermittent drizzle, 1 litre/metre² having been recorded in the last twelve hours.

The condensation level to windward was 600 meters and the

cloud clinging to the mountain extending on the leeward side down to levels of between 800 and 1,000 metres. The surrounding valleys, away from the direct influence of the high mountains, showed light to medium cloud cover, with scattered cumulus; visibility was reduced by haze, except towards the coastal regions where visibility could be described as good. Because of the nature and type of the observed cloud, the light southerly winds both at the lowest atmospheric levels and at mountain-top level, and because of the standard distributions which gave the following upper winds and temperatures 850 mbs 340° 20 knots 9°; 700 mbs 330° 25 knots 5°; 500 mbs 310° 30 knots 9° and 300 mbs 290° 40 knots 20°; the question of the formation of turbulent air movements and mountain waves has not been taken into account because if they did exist they would have been weak and of no importance to air navigation.

1.8 Navigation aids

There are various aids available in the region for an instrument approach to Barcelona Airport. Those relevant to the accident now being investigated are: Sabadell NDB, Barcelona VOR, Perpignan VOR and Gerona VOR. All these aids were operating normally on the day of the accident.

Barcelona ACC/APP also had ASR-5 radar equipment in use, the main characteristics of which are:

- * range 60 nm
- * accuracy in azimuth: +- 0.5° error
- * accuracy in range within 3%
- * theoretical coverage up to 40,000 feet and from 20,000 feet at 60 nm; 12,000 feet at 50 nm; 5,000 feet at 35 nm; 2,000 feet at 20 nm and 1,000 feet at 10 nm.

* The usable range scales are: up to 6 nm with range circles of 2 nm; up to 10 nm with 2 nm; up to 20 with 2 nm, up to 40 with 5 nm and up to 60 nm with 10 nm.

The obstacle clearance chart (MOCA) is attached as Annex 1. Local instructions for use of the radar are attached as Annex 2. Barcelona VOR underwent routine inspections in flight on 2 April 1970 and 9 September 1970, without any corrective measures being required, as stated in the records of the Calibration Service (Servicio de Calibracion). Sabadell NDB was also inspected in flight as a routine measure on 5 June 1969 and 31 July 1970, its condition being regarded as GOOD by the aforementioned service, only some interference from the NDB CST (Costix)(MAJORCA) being observed in the first of these inspections.

1.9 Communications

Communications between G-APDN and Barcelona Control Centre were clear, with the appropriate terminology being used throughout. According to data exchanged, neither Barcelona ACC nor Barcelona APP noticed any abnormality in the flight of the aircraft. Defects have been observed in the tape recording when ACC was talking on 124.7 MHz. When the frequency was changed to 119.1 MHz communications between G-APDN and APP were properly recorded on the Barcelona Control tape.

1.10 Aerodrome and ground facilities

These are not a factor.

1.11 Flight recorders

The aircraft carried a MIDAS type CMT/SC flight recorder. Using all the traces of the parameters of time, speed, altitude, pitch attitude, heading and vertical acceleration, during the last eight or nine minutes of the flight, the track of the aircraft was

reconstructed on the map (Annex 3). This showed a close correlation between the aircraft's manoeuvres and the information exchanged between Barcelona Control and the aircraft, and that the track of the aircraft was not correct, deviating the whole time to the east of airway UB31. The accident occurred at 1805.30 hrs and the aircraft was descending, operating completely normally, at a true airspeed of 410 km/h.

1.12 Wreckage of the aircraft

The accident site was on the beech-covered north-east slopes of the Les Angudes peak (1,704 metres), at an altitude of about 3,800 feet, in the municipal district of Arbucias (Gerona). The heading of the aircraft before impact was approximately 145°, and its flight path was descending between 5° and 10° as indicated by the path cut through the trees by the aircraft. Later, two goniometers (direction finders) were found which indicated a heading of 142°. On detailed examination of the crash it was ascertained that the longitudinal axis of the aircraft at the moment of impact was at an angle of approximately 45° up from the horizontal, ie roughly equal to the angle of the mountain slope, it being noted that the main side marks were produced by the auxiliary fuel tanks and not by the fuselage. The fuel tanks exploded and started a fire.

1.13 Fire

There was an explosion and fire on impact with the ground.

1.14 Survival

As soon as the site of the disaster was known, amongst those who went to the spot were forces of the Civil Guard of 413 Command, Gerona; No 13 Company of the Fourth Group Ninth Brigade of the Red Cross, Barcelona; 110 firemen from the

Municipality of Barcelona, 38 militiamen from the Municipality of Barcelona, 25 Red Cross volunteers from the Barcelona Mobile Squad, personnel from the near-by townships of Viladrau and Arbucias (Gerona) and San Celoni (Barcelona). There were also civil and military authorities from the Provinces of Barcelona and Gerona, and an examining magistrate from Santa Coloma de Farnes (Gerona), provincial medical officers from Barcelona and Gerona and members of the staff of Dan-Air Limited. A British commission was appointed to collaborate with the Spanish authorities in investigating the cause of the accident. There were also British technicians and a pathologist, an Anglican priest, the British Consul and Vice-Consul in Barcelona, along with 77 soldiers with NCO's and Officers of CIR No 9 from San Clemente de Sasebas (Gerona).

Due to the uneven terrain, the steepness of the slope and the dense vegetation, a bulldozer and excavator shovels had to be used to widen paths and open up a new one to facilitate evacuation of the victims. Since the Spanish health authorities reported that "it was technically impossible for the remains of the bodies to be embalmed and preserved, due to the extreme mutilation and scattering of the remains as a result of injuries of exceptional violence caused by an explosive shock-wave, and that death was presumably instantaneous in every case", the court ordered the bodies to be removed and taken to the municipal cemetery at Arbucias where they were burned.

1.15 Tests and investigations

One spoiler (air brake) was extended and the other was retracted, but it was impossible to establish whether the latter had been closed by the impact although this appears most likely in view of the manner of operation of these brakes.

The main landing gear was retracted. No flaps were extended.

Safety belts were in use. The life-jackets were not removed from their normal position. The turbine and compressor blades showed evidence of heavy abrasion as a result of their having been functioning normally. The accident took place at 1805.30 hrs this figure being obtained from data in the flight recorder.

1.16 Procedure followed by Barcelona APP

When the aircraft established radio contact with Barcelona APP on a frequency of 119.1 MHz, the latter in order to identify the aircraft instructed it to turn on to 140°, then cancelled this turn when the aircraft revised its ETA for the Sabadell beacon; this took place between 1759 hrs and 1800 hrs. Later, at 1802.20 hrs, and for identification purposes, APP again instructed G-APDN to turn on to 140° and the aircraft did so. At about 1802.25 hrs APP asked the aircraft if it was over Sabadell - since APP radar showed an echo with characteristics similar to those which the Comet should produce in terms of direction and speed - and the aircraft confirmed 'passing Sabadell', where upon the controller authorised descent to 2,800 feet, this altitude being authorised on the 'minimum radar altitudes chart' of Barcelona Control Centre.

1.17

In the investigation into the causes of the accident current ICAO regulations have been borne in mind, particularly paragraphs 3.5.2.2 of Annex 2 and Part II, 1, Note 2 and Part X, 1.6 of ICAO Doc. 4444 (RAC/501/9).

2. Analysis and Conclusions

2.1 Analysis

From a study of the recording tape from Barcelona Control; from the plan obtained from the graph taken from the transcription of

the flight data recorder tape (black box) from the wrecked Comet 4, G-APDN (Annex 3); from the reports on the aircraft and its crew; and from the UIR chart for south west France and other documents relating to the flight, it is deduced:

That due to heavy traffic in the Paris area, the aircraft was diverted from the route laid down in the flight plan drawn up in Manchester (UA1, UA34, UB31 and Point Berga), and, on the instructions of French ATC, followed the route Nantes VOR - Agen VOR - Toulouse VOR - Point 'B.' (situated on the axis of the airway UB31) - Barcelona VOR. Take-off from Manchester was planned for 1600 hrs, but took place at 1608 hrs.

The aircraft did not follow airway UB31, which is the route to Barcelona for that zone, since at 1756.18 hrs it was still in the Bordeaux FIR on a heading of 193°, the direction of the above airway being 181°.

At 1757 hrs, the aircraft reported 'over the boundary', which was taken to mean that it was entering the Barcelona FIR (it had already reported this at 1753 hrs, according to the Barcelona ACC tape) and did so approximately 30 km to the east of the centre of airway UB31, still on the previous heading of 193° and giving at that time an ETA for Point Berga at 1801 hrs. This estimate would have been correct if it had been 'ABEAM BERGA' since at its calculated speed of 8 kilometres per minute (according to data from the flight recorder) it would have been 4 minutes away if it had been heading towards Berga; but it was impossible for the aircraft to reach that reporting point, since at 1801.30 hrs it was level with Point Berga and 26 kilometres to the left, still on a heading of 193°.

When radio contact was established on a frequency of 119.1

MHz with APP, the controller instructed the aircraft to turn on to 140°; the aircraft began the turn as shown on the map at Annex 3, only covering a distance of approximately 4.5 kilometres. The pilot revised his ETA for Sabadell, making it 2 minutes earlier. The controller cancelled the turn and it will be observed from Annex 3 that the aircraft gradually cancelled the turn, proceeding on its previous heading from 1802.18 hrs.

At 1802.30 hrs, for identification purposes, APP Barcelona again instructed G-APDN to turn to the left on to 140°; the pilot of the aircraft confirmed this instruction and reported that he was leaving FL85 for FL60. At approximately 1802.48 hrs, at the request of APP, the aircraft reported passing Sabadell, without having reached that point, since it can be observed on the map at Annex 3 that it was still 52 kilometres away. This message, 'passing Sabadell', transmitted by the aircraft, and also the fact that by coincidence the APP controller had observed an echo on the radar screen over Sabadell, led to the aircraft being informed that radar contact had been made. Neither Barcelona ACC nor the Aeroclub of Sabadell have been able to clarify the reasons for the above-mentioned echo, but this does not rule out the possibility that it was caused by an aircraft flying over Sabadell on a VFR flight plan. At this time the controller authorised descent to 2,800 feet, the minimum altitude indicated on the radar chart for this sector.

The bearing and speed of the echo were similar to those expected from a Comet.

At 1803 hrs, G-APDN requested the duty runway and APP replied that No. 25 was in service. This the pilot acknowledged. At 1805 hrs, APP requested an altitude reading and the aircraft replied 'passing 4,000 feet'. At 1807 hrs, APP requested G-APDN

to confirm it was maintaining its heading, but the aircraft did not reply.

The displacement of the aircraft's track to the east cannot be attributed to deviations of the Barcelona VOR signals, since if such a considerable defect had existed it would have been detected by numerous flights which have used and continue to use this VOR. Furthermore as has previously been stated, on 2 April 1970 the appropriate official service carried out a check and found the equipment within the permitted tolerances and therefore no adjustments were made.

2.2 Conclusions and probable causes

2.2.1

From the time the aircraft reported passing Toulouse VOR (if correct) it can be seen that it did not continue on UB31 after the BRAVO intersection point, but followed a line considerably to the east of that airway. This error persisted right up to the moment of the accident, and the information on ETAs and times of passing Point Berga and Sabadell NDB was also incorrect, as was the time given for passing the UIR boundary which was given twice with an interval of some 3 minutes.

2.2.2

Barcelona VOR was functioning correctly according to information from the Flight Air Inspecting Services, and from the absence of unfavourable reports on the functioning of the radio aid in question.

2.2.3

Consequently, the aircraft's continuing displacement to the east could have come about as a result of some defect of the aircraft equipment, bearing in mind that from Toulouse VOR positions had to be determined by intersection of radials.

2.2.4

The pilots should have reported to Barcelona APP that they were passing to the east and not above Point Berga. The fact that this information was not given, together with an inexact ETA for Sabadell, made it difficult for the controller to identify correctly the aircraft on the radar screen.

2.2.5

To sum up, it can be deduced that the combination of erroneous information regarding reporting points, together with the existence of a radar echo over Sabadell NDB (coinciding with the report from the aircraft of passing that reporting point), led both the aircraft and APP to believe, erroneously, that the aircraft was already over Sabadell; this was an involuntary error (on both sides: ATC and aircraft) which was physically impossible to correct when Air Traffic Control realised it.

3. Recommendations

3.1

Emphasis should be given to the need for commanders of aircraft flying on a new route to verify successive positions of the aircraft using all the aids available on board, rather than relying on the evidence of any one of them.

3.2

It would perhaps be desirable that the rules laid down by ICAO for radar identification should be revised, to prevent similar situations occurring. The Spanish authorities, for their part, have already made suitable provision in this respect, so that identification can be properly checked by more than one method.

3.3

Radio installation charts which are used for navigation purposes (radio navigation charts) should incorporate spot heights of the significant points along the route to be followed.

Madrid October 1971

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Official accident report of Comet IV LV-AHR

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Aerolineas Argentinas, Comet IV, LV-AHR,
accident at Campinas Airport, Sao Paulo, Brazil,
23 November 1961,
Report released by The Brazilian Air Ministry

Circumstances

The flight had originated at Buenos Aires, Argentina. At Vira Copos (Campinas) Airport, Brazil, the engines were started at 05:20 hours and the aircraft took off for Trinidad (alternately Barbados) at 0538 hours. After reaching an altitude of about 100 m, the aircraft lost altitude, collided with a eucalyptus forest and was destroyed. Twelve crew and forty passengers died in the accident, which occurred at approximately 05:40 hours .

Investigation and Evidence

The Aircraft

It had flown a total of 5 242 hours, 2 242 of which had been flown since the last overhaul and about 6 hours since the last 90-hour inspection. It was not possible to check the maintenance reports regarding the 30 days prior to the accident.

The Crew

A pilot-in-command, co-pilot and ten other crew members were aboard the flight . The pilot-in-command was sitting in the right-hand seat, presumably acting as instructor at the time of the accident.

He had flown the following hours:

total flight time : 12 550 hours
as pilot-in-command or instructor : 11 246 hours
by night : 5 791 hours
in the same type aircraft : 1 612 hours
as pilot-in-command or instructor in the same type of aircraft :
584 hours
He held a valid IFR rating.

The co-pilot was sitting in the lefthand seat and had no flight time registered as pilot-in-command on this type of aircraft. It was, therefore, believed that he was receiving instruction as such. His previous experience was:

total flight time : 13 427 hours
in the same type of aircraft : 1 074 hours
as pilot-in-command in this type of aircraft : zero hours
by night : 2 833 hours
instrument flight : unknown
He also held a valid IFR rating.

It was not believed that the accident was caused by fatigue as the crew had only flown about 3 hours during the preceding 24 hours .

Weather conditions

It was not believed that the weather situation contributed to the accident. It was a dark night due to 7/8 stratocumulus at 400 m and to 8/8 coverage by altostratus at 2 100 m.

Weight at take-off

At time of take-off the aircraft was estimated to weigh 71488 kg. The maximum authorised weight was 72575 kg, i.e. 1087 kg below the maximum allowed.

The centre of gravity was within the prescribed limits. From the time of starting the turbines to the actual take-off about 528 kg of fuel were consumed thus increasing to 1 615 kg the balance in favour of safety. According to the control tower's testimony the take-off run was approximately 2 000 m. According to the dispatch estimate it should have been 2 240 m.

Take-off run

From tests with LV-AHU, another aircraft the same type as LV-AHR, it was concluded that the take-off run took about 40 seconds.

Climbing angle

In view of the control tower operator's testimony, the conclusion was reached that the aircraft's climbing angle was around 4.5 deg. The aircraft reached an estimated altitude of 100 m. Taking into account the minimum climbing angle of 4.5 deg, the aircraft should have reached an altitude of 120 m, which corroborates the control tower operator's statements.

Comparing the above with the results obtained during the LV-AHU test flight, it was concluded that from the beginning of the take-off run up to 120m, LV-AHR took about 55 seconds. Then it should have reached the indicated airspeed of 170 kts. At that moment LV-AHR was midway between the take-off point and the first impact point. So taking into consideration the remaining runway (1 240 m and the distance from the end of the runway to the first impact point (1 930 m), the aircraft flew 3 170 m. The point where the aircraft started losing altitude could not precisely be stated ... however, it may be estimated as the middle distance between the point where the aircraft became airborne

and the first impact point.

Comet IV flight instructions

According to the instructions, when a speed of 170 kts is reached, the pilot must control the "elevator change gear". When changed from "coarse" to "fine" the aircraft's nose has a tendency to drop, which has to be counteracted by using the manual trim tab. It was believed that the unit was under control when the accident occurred.

From analysis it was deducted that the aircraft, LV-AHR, hit the eucalyptus tree in a nearly horizontal attitude, which leads to the conclusion that the pilot, a short time before, when noting the loss of altitude, attempted to regain climbing attitude but due to the action of the elevator travel limiting unit in the "fine" position, the aircraft took longer to regain it. This must have been the reason why, at the moment of collision with the tree, the aircraft was still flying in a horizontal attitude.

Reconstruction of the last part of the flight

One hundred and twenty meters after the first impact point the pilot put the aircraft in a climbing angle of approximately 25 deg. This conclusion was reached as the eucalyptus trees were burned from the top down, probably by turbine exhaust gas, and the elevator counterbalance collided with a eucalyptus tree and was then torn off. About 145 m after the first impact point the aircraft collided with a larger eucalyptus tree and fire in the left wing pod tank resulted.

Moments later a further impact occurred with another eucalyptus in the No. 1 reactor area. The aircraft began sinking . Due to terrain declivity the aircraft touched the ground about 303 m

from the first impact point. The aircraft slipped, ultimately collided with a ground obstacle, and exploded. Many fuselage parts found 120 m from the first impact point showed no signs of fire.

Probable Cause

It was presumed that the co-pilot was under flight instruction. If such was the case, the instructor, who was pilot-in command, may have failed to brief or supervise the co-pilot properly.

Observations of the Government of Argentina as the State of Registry of the Aircraft Concerned

Argentina has determined in the light of information it has gathered, that the cause of the accident was "Failure to operate under IFR during a take-off by night in weather conditions requiring IFR operation and failure to follow the climb procedure for this type of aircraft; a contributory cause was the lack of vigilance by the pilot-in-command during the operations."

IMPORTANT NOTE : The information contained in this report remains the property of the Brazilian Air Ministry and may not be distributed without their written approval.

Official accident report of Comet IVB G-ARJM

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British European Airways Corporation, Comet IVB, G-ARJM,
accident at Esenboga Airport, Ankara, Turkey,
21 December 1961,

Report released by The Ministry of Communications, Turkey
and by the UK Ministry of Aviation

Circumstances

The aircraft was on a scheduled flight from London to Rome, Athens, Istanbul, Ankara, Nicosia and Tel Aviv. From Istanbul the flight was operated by British European Airways on behalf of Cyprus Airways. The operating crew, employed by BEA, consisted of a captain and two first officers. Also aboard were four cabin staff employed by Cyprus Airways and 27 passengers.

The trip to Ankara was normal. The time between landing and starting engines at Ankara was 46 minutes during which light snow was falling. (At take-off the aircraft had a light covering of snow on the upper surface of its wings, however, this deposit had no bearing on the accident).

The radio-telephony tape recording showed that the aircraft taxied out along the short taxiway, then back-tracked up the runway to its take-off position on runway 21 at the intersection with the longer taxiway. The runway length available from this position was 9 027 ft. Take-off weight was 53 465 kg, i.e. 18 185 kg below maximum permissible weight or 1 085 kg below the regulated take-off weight.

The takeoff run as to distance and time was quite normal, as also were rotation and unstick. The first abnormality occurred a second or two after unstick when the aircraft rapidly assumed an excessively steep climbing angle. One witness put the angle achieved as about twice the normal, another as 45 deg to 50 deg. There was also evidence from witnesses of a wing drop and of variations in the engine noise during this climb. The aircraft stalled with the left wing down at a height of about 450 ft then sank to the ground in a relatively flat attitude. The accident site was 1 600 m and on a bearing of 214 degT from Esenboga Tower. The accident occurred at 21:43 hours GMT. G-ARJM was almost completely destroyed by impact and fire. All 7 crew and 20 passengers were killed. Six passengers were seriously injured.

Investigation and Evidence

The Crew

The operating crew held valid licences. The captain had flown a total of 13 240 hours including 785 hours on Comet aircraft.

The Aircraft

It had valid certificates of airworthiness, registration and maintenance and had been maintained in accordance with the approved maintenance schedule. The aircraft's weight and centre of gravity were within the permissible limits.

There was no record of any defect or repair during the recent operation of the aircraft which could be considered to have any bearing on the accident.

Weather conditions

At 21:50 hours GMT (i.e. 7 minutes after the accident) the weather conditions were
surface wind: calm; visibility: 2 km;
weather: snow; 6/8 stratus at 600 ft.; 6/8 Ns at 2 500 ft; 8/8 As at 7 000 ft.;
temperature 0 degC,

Navigational Aids

All the ground navigational aids and radio-telephony channels were checked after the accident and were found to be functioning satisfactorily. The ILS was not operational and had been notified as such by Notam.

The Accident Site

The ground at the scene of the accident sloped up at an angle of 2 or 3 deg, and the aircraft struck on a heading of 180 degM without yaw with the left wing down and the fuselage parallel to the ground. The nature of the damage, the marks on the ground and the disposition of the wreckage all indicated that the aircraft had a low forward speed coupled with a high rate of descent at the moment of impact.

Technical Examination

External examination of all flying control surfaces revealed no evidence of any damage or abnormality. No evidence was found of any control or electrical failure or emergency such as pilot's seat slippage or fouling of the control column, nor was there any evidence of fire or structural failure prior to the impact with the ground.

Flaps were in the take-off position (i.e. 20 deg) dive brakes were

in, and the landing gear "down" and locked. No evidence of any malfunction of the engines was found, however two of the three booster pumps in each of the No. 4 fuel tanks should have been switched on for take-off but all were found switched off. This failure to follow the fuel management drill may have brought about fuel starvation of the two outer engines when the climb became steeper than normal, but it did not contribute to the accident as a stall was by then inevitable and any subsequent recovery impossible because of lack of height,

The captain's director horizon was examined by the Royal Aircraft Establishment, Farnborough (England). It was found that the pitch pointer "spider" was being obstructed by the upper left dial mask screw, which had unscrewed sufficiently for its head to be in the plane of movement of the "spider". To attain this position, the screw had to be three and a half turns from the fully tightened condition. Examination of the screw head, the washer and the surface around the screw hole in the dial mask flange showed that the screw had not been tightened down fully during the assembly of the instrument. Local disturbance of the paint of the flange suggested that the assembly was tightened to within about half a turn from the fully tightened state.

Checks have shown that complete obstruction to "spider" upward movement would have first occurred when the screw was one full turn from the condition as found. At this time the "spider" had to be below the screw position and since the "spider", and hence the pitch pointer, gives a direct indication of aircraft pitch attitude, then the aircraft had to be below 7.5 deg of pitch (the aircraft angle equivalent to the obstructed position of the pitch pointer).

The instrument had been installed in the aircraft during

construction of the latter and there had been no reports of any malfunctioning of it since 12 October 1961 when the left vertical gyro was changed.

The inspection records showed that this instrument had been inspected at all the requested stages of manufacture. In the inspection procedure laid down by the manufacturers there is a specific item "check that MAIN MASK fixing screws are secure".

Analysis

The position of the impact point in relation to the unstick point, the fact that the aircraft did not begin to assume an abnormally nose-up attitude until a second or two after unstick, and the fact that the landing gear was not selected up, together gave a strong indication that something unusual occurred immediately after unstick. From unstick the aircraft assumed an increasingly steep angle which reached about 45 deg, that is about twice the normal, before it stalled. The exact sequence of events and the actions of the crew during the brief flight cannot be established.

The only fault in the aircraft and its equipment that could account for the abnormally steep climb was the obstruction of the pitch pointer in the captain's director horizon, It is believed probable that the captain looked at this instrument for attitude information immediately after unstick and seeing the pitch pointer only about half way to the normal nose-up position on the pitch scale, applied more up elevator. Although this would have at once steepened his climbs there would have been no indication of it from the pitch pointer, It has been calculated that the time interval between unstick and the stall was approximately 8 to 10 seconds.

The evidence suggests that the outer engines may have begun to fail due to fuel starvation after the angle became excessive. But as the fuel starvation would have occurred very close to the stall and when recovery was impossible in the height available, it is not considered a contributory cause of the accident.

In the event that the co-pilot was at the controls for the take-off the accident would then have been brought about by the captain either telling the co-pilot to increase the climb or himself pulling back the control column, basing his action upon glance at his own director horizon.

Safety harness of the crew

Only the lap straps of the crew's safety harness were fastened at impact, it is probable that the three pilots would have survived had they used the shoulder straps of their harnesses.

Probable Cause

The probable cause of the accident was the obstruction of the pitch pointer in the captain's director horizon which led him to make an excessively steep climb immediately following unstuck.

IMPORTANT NOTE : The information contained in this report remains the property of the Turkish Ministry of Communications and may not be distributed without their written approval.

Official accident report of Comet I G-ALYY

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Ministry of Transport and Civil Aviation

Civil Aircraft Accident

Report of the Court of Inquiry into the accident to
Comet G-ALYY on 08th April, 1954

THE CIVIL AVIATION ACT, 1949

THE CIVIL AVIATION (INVESTIGATION OF ACCIDENTS)
REGULATIONS 1951

Report of the Public Inquiry into the causes and circumstances of
the accident which occurred on the 8th April, 1954, to Comet
aircraft G-ALYY

- * AIRCRAFT: Comet G-ALYY
- * ENGINES: Four de Havilland Ghost 50
- * REGISTERED OWNERS: British Overseas Airways Corporation
- * OPERATORS: South African Airways (under charter)
- * CREW:
- * Senior Captain W. K. Mostert - Killed

- * First Officer B. J. Grove - Killed
 - * Navigation Officer A. E. Sissing - Killed
 - * Flight Engineer Officer A. R. Lagesen - Killed
 - * Radio Officer B. E. Webbstock - Killed
 - * Steward J. B. Kok - Killed
 - * Air Hostess P. Reitz - Killed
 - * PASSENGERS: 14 - All Killed
 - * PLACE OF ACCIDENT: Over the Mediterranean, S.E. of Naples.
 - * TIME OF ACCIDENT: 8th April, 1954, at about 19:10 G.M.T.
- All times in this Report are G.M.T.

PART I INTRODUCTORY

(a) Matters in common with the Report on G-ALYP

1. In my Report of today on the accident to Comet aircraft G-ALYP (sometimes called Yoke Peter) I gave a short explanation of the constitution and functions of the Air Registration Board (A.R.B.) and of the Air Safety Board (A.S.B.) which I need not repeat here. It is also unnecessary for me to repeat the account I gave in that Report of the origin and history of the Comet aircraft.

2. As the two Inquiries were conducted together, the evidence in the Inquiry into the loss of Yoke Peter is the evidence in the present Inquiry. I need not, therefore, append any lists of the witnesses or parties represented at the hearings or the dates of such hearings.

(b) Arrangements with South African Airways

3. South African Airways are the national operators of the Government of the Union of South Africa. Air communication between London and South Africa was carried on under arrangements made between British Overseas Airways Corporation (hereinafter called " B.O.A.C. ") and South African Airways. I need not go in full into the history of the arrangements between the two operators. Suffice it to say that the arrangements were revised on the 3rd October, 1953 and it was agreed, amongst other things, that South African Airways should participate with B.O.A.C. in the operation of the standard class services between England and the Union of South Africa by operating Comet aircraft chartered from B.O.A.C. The Corporation trained the necessary South African Airways crews to carry out this arrangement. Amongst the aircraft so chartered to South African Airways was Comet G-ALYY (sometimes hereinafter called Yoke Yoke).

PART II THE ACCIDENT

4. Yoke Yoke left Ciampino Airport, Rome, at 18:32 hours on the 8th April, 1954 on a flight to Cairo. After taking off the aircraft from time to time gave its position by radio telephone to Rome Air Control at Ciampino and on the last such occasion at about 18:57 hours reported that it was abeam Naples and climbing to 35,000 ft. This position and those given earlier indicated that the flight was proceeding according to the B.O.A.C. flight plan. At 19:05 hours Cairo received a signal from the aircraft reporting its departure from Rome and giving its estimated time of arrival at Cairo. Thereafter no message was received from Yoke Yoke and all attempts to make contact failed.

5. A chart, which is Figure 1 of my Report on Yoke Peter, was

prepared by a Navigating Officer of B.O.A.C. from all the information available, and shows the probable flight track of the aircraft. It also indicates the position in which bodies and wreckage were found on the day following the accident. It is evident from the chart that something catastrophic happened to the aircraft at about 19:10 hours when it must have been at or near the end of its climb to 35,000 ft.

PART III THE AIRCRAFT

6. Yoke Yoke was the same in all relevant respects as Yoke Peter. Details of Yoke Peter are given in my Report thereon and I need not repeat them here.

7. Yoke Yoke was granted a Certificate of Registration No. R. 3221/1 on the 18th September, 1951 in the name of B.O.A.C. as owners and first flew on the 10th September, 1952. On the 23rd September, 1952 it was certified and approved by A.R.B. for the issue of its Certificate of Airworthiness and this Certificate, No. A.3221, was issued by the Ministry of Civil Aviation on the 30th September, 1952. After approval by A.R.B. on the 21st September, 1953 the Certificate of Airworthiness was renewed on the 23rd September, 1953 and was valid at the time of the accident.

8. After the accident to Yoke Peter on the 10th January, 1954, special checks, in addition to the routine Check 4 in accordance with the Approved Maintenance Schedules, were carried out on Yoke Yoke and a number of modifications were made affecting the airframe the controls and the fire detection and protection at the engines. On the 15th February, 1954, the fuselage was subjected to a proving test to 11 lb/sq. in. The aircraft was

returned available for service on the 24th February, 1954.

9. On the 2nd April, 1954, following a Check 1 inspection in accordance with the Approved Maintenance Schedules, carried out at London Airport, a Certificate of Maintenance signed by duly licensed airframe and engine maintenance engineers and expressed to be valid for 75 flying hours, was issued. Further reference to this Certificate is made in paragraphs 21 and 22 of this Report. On the 7th April, 1954, an Aircraft Radio Station Certificate of Serviceability was issued and showed no items unserviceable.

10. At the time of the accident Yoke Yoke had had a total flying life of about 2,704 hours including 841 since the renewal of its Certificate of Airworthiness and including less than 75 hours since the issue of the Certificate of Maintenance on the 2nd April, 1954.

11. From examination of the airframe and engine log books and maintenance records it appeared that all routine inspections of airframe and engines had been regularly carried out within the limits of time specified by the Approved Maintenance Schedules and that the flying life of each of the engines since its last complete overhaul was within, and in two cases very well within, the approved life between complete overhauls. Save as mentioned in paragraphs 21 and 22 of this Report the evidence disclosed no irregularity in connection with any such inspection.

PART IV THE CREW

12. Senior Captain Willem Karel Mostert, who was in command of Yoke Yoke was born on the 27th April, 1916. Before joining South African Airways he had flown 2,812 hours in the South

African Air Force and had served as a flying instructor. He joined South African Airways on the 10th June, 1946, was promoted Captain on the 1st November, 1946 and on the 15th June, 1949 became a Flying Instructor. On the 15th May, 1953, he became Senior Flying Instructor and on the same day was promoted to the rank of Senior Captain.

In June, 1953, Captain Mostert was transferred to the Comet Line of South African Airways and became the Comet Line Instructor. In South African Airways, captains who are appointed Line Instructors have to spend two-thirds of their time on route flying and one-third on instruction within the line. During his service with South African Airways Captain Mostert flew a total of 8,159 hours of which about 51 hours by day and 35 hours by night were flown in Comets within the six months preceding the accident.

13. Captain Mostert's last "six monthly check" prior to the accident was carried out on the 19th December, 1953 and his report was: "Proficient. (Very well executed flight)". He had not been involved in any previous accident. Captain Mostert was the holder of a Union of South Africa Air Line Transport Pilot's Licence No. 65A valid until the 11th June, 1954. A rating for Comet aircraft had been added to this licence by the British Ministry of Transport and Civil Aviation. I am satisfied that Captain Mostert was fully equipped to carry out his normal duties as a pilot and as a captain and to deal with emergencies.

14. The second pilot was First Officer Barent Jacobus Grove who was born on the 15th July, 1922. After service in the South African Air Force, in which he had flown a total of 1,640 hours, he joined South African Airways on the 29th January, 1953, as a First Officer and was posted to the Comet Line on the 26th

February 1953. While with South African Airways First Officer Grove flew for a total of 54 hours, including about 47 hours in Comets during the 90 days preceding the accident.

There was no evidence of First Officer Grove having been involved in any previous accidents save as a result of enemy action. His last check took place on the 20th February, 1954, when he obtained a satisfactory pass. First Officer Grove was the holder of a Union of South Africa Senior Commercial Pilot's Licence No. 48 (S), valid until the 11th June, 1954, to which a Comet rating had been added on the 2nd March, 1954. I am satisfied that he was fully equipped to carry out his normal duties and to support his captain in emergencies.

15. Navigation Officer Albert Escourt Sissing was born on the 1st January, 1917. After training in the South African Air Force he joined South African Airways on the 16th October, 1946 and from then until his death had 4,840 hours flying experience including about 155 hours in Comets in 1953 and about 51 hours in Comets during 1954, all of the latter during the 90 days preceding the accident. At his last six monthly check, in March, 1954, he passed in Comet Refresher Flight Planning and Plotting. Navigation Officer Sissing was the holder of a Union of South Africa Navigator's Licence No. 17(N) valid until 1st December, 1954 and I am satisfied that he was a capable officer.

16. Radio Officer Bertram Ernest Webstock was born on the 17th June, 1917. He joined South African Airways on the 23rd April, 1946 and after spending some time on the London service passed a Comet course on the 20th June, 1953 and thereafter flew only in Comets. His total flying hours were 4,373 of which about 98 hours were during the 90 days preceding the accident. He was passed as proficient in his Comet check on the 5th October, 1953.

Radio Officer Webstock was the holder of a Union of South Africa First Class Flight Radio Operator's Licence No. 348 valid until the 30th April, 1954 and I am satisfied that he was a capable officer.

17. Flight Engineer Officer August Ranwald Lagesen was born on the 22nd May, 1920. He had wide experience of several types of aircraft both during the war and after rejoining South African Airways on the 16th February, 1945. There was no positive evidence relating to his flying hours prior to the 11th May, 1950 but such records as were available suggested that up to that date he had flown a total of about 4,300 hours. After the 11th May, 1950 he had a total flying time of 2,290 hours 35 minutes. He had flown about 203 hours in Comets including about 141 hours during the 90 days preceding the accident and had completed a Comet Conversion Course on the 2nd September, 1953, a Comet Refresher Course on the 19th December, 1953 and a further refresher course and flight training programme on the 21st March, 1954. He was examined on the 19th December, 1953 and found proficient. Flight Engineer Officer Lagesen was the holder of a Union of South Africa Aircraft Maintenance Engineer's Licence No. 387, valid until the 26th February, 1955, and Flight Engineer's Licence No. 10 valid until the 22nd February, 1955. I am satisfied that he was a capable officer.

18. Air Hostess Pamela Reitz, who was born on the 16th February, 1932 and Steward Jacobus Bruwer Kok, who was born on the 18th December, 1918 had both flown extensively with South African Airways.

PART V

THE PASSENGERS AND CARGO

19. Yoke Yoke carried 14 passengers all of whom were killed in

the accident. There was nothing in the cargo which could have been relevant to the cause of the accident and I am satisfied that, despite the off-loading of a small bag of aircraft spares at London after the Load Sheet had been completed, the aircraft was loaded and trimmed within the prescribed limits.

PART VI PRE-FLIGHT INCIDENTS

20. Yoke Yoke, in common with the rest of the Comet fleet of B.O.A.C., had been grounded by B.O.A.C. after the accident to Yoke Peter. The circumstances in which Comet services were resumed are fully stated in paragraphs 54 to 57 of my Report on the accident to Yoke Peter and I need not repeat them here.

21. Yoke Yoke arrived at Ciampino on the 7th April from London and was due to depart from Ciampino the same evening. However, on completion of refuelling it was discovered that the centre tank contents gauge showed no reading although the tank was full. The fault was eventually traced to a co-axial cable for which a replacement had to be flown from England and the departure of the aircraft was consequently delayed for about 24 hours.

While the fault was being traced a number of bolts were found lying about in the port wing of the aircraft and further inspection revealed that an equal number of bolts were missing from the inspection panel providing access between the rear spar and the wheel-well wall and that the remainder of the bolts securing the panel, though in position, were not properly tightened. The missing bolts were replaced and all were properly tightened. The maintenance engineer who supervised this work was satisfied from visual examination and from the readiness with which the

missing bolts were refitted that no distortion of the panel or adjacent structure had occurred during the absence of the bolts.

22. As has been stated in paragraph 9 a Check 1 inspection was carried out on Yoke Yoke before the issue of the Certificate of Maintenance on the 2nd April. It is quite clear that it must have been during that inspection that the panel was removed and incorrectly refitted and I was informed that disciplinary action had been taken against the inspectors concerned.

23. The arrangements for safeguarding the aircraft during its stay at Ciampino were the subject of a great deal of evidence. For the greater part of this period Yoke Yoke was under observation by B.O.A.C. officials whose duties, however, were not primarily concerned with security. For the rest of the time it was guarded by an Italian Finance Guard whose main duty was to prevent smuggling. In all the circumstances I consider it unlikely that any unauthorised person gained access to the aircraft.

24. Apart from the above-mentioned defects, the Refuel and Departure checks disclosed nothing unusual.

PART VII

WEATHER CONDITIONS AT THE TIME OF THE ACCIDENT

25. From the take-off at Rome at 18:32 hours on the 8th April, 1954 until the time of the accident, which was approximately 19:10 hours, Yoke Yoke climbed through three moderately thick layers of cloud. In the top layer there may have been slight to moderate icing conditions but these would have been insufficient to cause anxiety. It is unlikely that any severe turbulence was encountered either during the climb through the cloud layers or in the clear air above. It can, therefore, be assumed that the state of the weather was not a contributory cause of the accident.

PART VIII

ACTION TAKEN AFTER THE ACCIDENT

26. As in the case of the accident to Yoke Peter the assistance of the Royal Navy was invoked and on the 9th April, 1954, H.M.S. Eagle and H.M.S. Daring, proceeded to search for Yoke Yoke. Avenger aircraft of H.M.S. Eagle were used to assist in the search as also were certain United States aircraft. A number of dead bodies as well as some aircraft seats and other wreckage were identified in the water and in due course recovered. The depth of water where the bodies and Wreckage were found varied between approximately 520 fathoms and 580 fathoms and the evidence established that at that depth the prospect of further recovery was hopeless.

27. The six bodies recovered were not examined by Professor Fornari, who had examined the bodies recovered at Elba, but four of them were examined at Uxbridge on the 12th April, 1954 by Dr. Teare, one was not subjected to autopsy and the other was examined by the Italian authorities.

These examinations did not disclose anything inconsistent with the view that the accident to Yoke Yoke was attributable to the same cause as the accident to Yoke Peter.

28. As a result of the accident to Yoke Yoke the Royal Aircraft Establishment (hereinafter referred to as R.A.E.) were directed to conduct a full investigation into it and the accident to Yoke Peter. In the absence of any wreckage from Yoke Yoke R.A.E. could only proceed with their investigations in the light of a priori reasoning and experiments and of conclusions to be drawn from the wreckage of Yoke Peter. I have dealt at length with the R.A.E. investigations and Report in my Report on the accident to

Yoke Peter.

PART IX

THE COURT'S CONCLUSION AS TO CAUSE OF ACCIDENT

29. R.A.E's conclusion as regards the cause of the accident to Yoke Peter is expressed in the following paragraph: "Owing to the absence of wreckage, we are unable to form a definite opinion on the cause of the accident near Naples, but we draw attention to the fact that the explanation offered for the accident at Elba appears to be applicable to that at Naples". I agree with this conclusion and have only to add that it is impossible in the case of the Naples accident to be dogmatic that defects of the kind considered in paras. 108-144 of my Report on Yoke Peter were not contributory causes to the Naples accident. I am therefore glad to note that the programme of future action outlined by the de Havilland Aircraft Company Limited and set forth in Appendix VIII to my Report on Yoke Peter includes measures to deal with those defects.

PART X

RESPONSIBILITY

30. I have dealt at length with this question in my Report on the accident to Yoke Peter. There is, however, one matter on which criticism was made which is applicable only to Yoke Peter and that is the decision, after the accident to Yoke Peter, to allow the Comet passenger services to be resumed on the 23rd March, 1954. I have set out in paras. 52 and 53 of my Report on the accident to Yoke Peter the nature of the full investigation carried out by the Committee under the chairmanship of Mr. Abell, the Deputy Operations Director (Engineering) of B.O.A.C. and the modifications made on the recommendation of that Committee.

31. Before deciding to authorise the resumption of the Comet passenger services the Minister of Transport and Civil Aviation consulted A.R.B. and A.S.B. Both of these bodies recommended that consent should be given. When they did so, there had been only one accident to a Comet aircraft for which no explanation had been furnished. According to the evidence it was certainly not the practice either in the United Kingdom or elsewhere to ground all aircraft of a type because of an unexplained accident to one aircraft of that type. The evidence indicated that steps had been taken to deal with what the experts then considered to be all potentially dangerous features. In these circumstances I am of the opinion that no blame can be attached to any one for permitting the resumption of the services.

PART XI

FUTURE

32. I cannot usefully add anything to what I have said on this branch of the Inquiry in my Report on the accident to Yoke Peter.

PART XII

QUESTIONS AND ANSWERS

My answers to the questions submitted on behalf of the Attorney-General are as follows:

Question 1.

What was the cause of the accident?

Answer.

Owing to the impossibility of salvaging any appreciable part of the wreckage of the aircraft no positive answer can be given to this question but the fact that this accident occurred in similar weather conditions, at approximately the same height and after

approximately the same lapse of time after take-off from Rome as that to G-ALYP makes it at least possible that the cause was the same as in that case. The state of the bodies recovered was, as in the case of G-ALYP, consistent with the accident being due to failure of the cabin structure owing to metal fatigue.

Question 2.

If several factors caused the accident what were such factors and to what extent was each contributory?

Answer.

I cannot usefully add anything to my answer to Question 1.

Question 3.

Was the accident due to the act or default or negligence of any party or of any person in the employment of that party?

Answer.

There was no evidence on which I could attribute the accident to the wrongful act or default or negligence of any party or of any person in the employment of any party.

Question 4.

At the time of the accident:

Question 4 (a).

Had the aircraft been properly maintained in accordance with the current approved maintenance schedules? If not did any defect in maintenance affect the safety of the aircraft or contribute to the accident?

Answer.

The aircraft had been properly maintained save that on arrival at

Rome a number of bolts were found lying in the port wing of the aircraft and further inspection revealed that an equal number of bolts were missing from the inspection panel providing access between the rear spar and the wheel well wall and that the remainder of the bolts securing the panel though in position were not properly tightened. The missing bolts were replaced and all were properly tightened and I am satisfied that this defect in maintenance did not affect the safety of the aircraft or contribute to the accident.

Question 4 (b).

Was the aircraft airworthy so far as could reasonably have been then ascertained?

Answer.

Yes.

Question 4 (c).

Was there a valid Certificate of Airworthiness in respect of the aircraft?

Answer.

Semble yes. I do not find it necessary to deal with the legal question whether the default in reassembly referred to in paras. 21 and 22 of this Report had any effect on the validity of the Certificate of Airworthiness since I am satisfied that this default did not contribute to the accident.

Question 4 (d).

Was there a valid Certificate of Maintenance in respect of the aircraft?

Answer.

Semble yes. see my answer to Question 4 (c) on Certificate of Airworthiness.

Question 4 (e).

Was the radio station of the aircraft serviceable and was there a valid Certificate of Serviceability in respect thereof?

Answer.

Yes.

Question 4 (f).

Was the aircraft properly loaded and trimmed within the limits specified in the Flight Manual?

Answer.

Yes.

Question 4 (g).

Were all members of the crew properly licensed and adequately experienced to make the flight? If not did any defect in the licence of any member of the crew affect the safety of the aircraft or contribute to the accident?

Answer.

Yes. The second part of the question does not arise.

Question 5.

Was the Minister of Transport and Civil Aviation properly advised in March, 1954 that Comet services should be resumed?

Answer.

Yes. See paragraph 31 of this Report.

Question 6.

Upon consideration of all facts disclosed by this Inquiry what steps should be taken to increase the safety of civil aircraft?

Answer.

See paragraphs 140-155 of my Report on Yoke Peter.

Report by COHEN., W. S. FARREN., W. J. DUNCAN., A. H. WHEELER.

1st February, 1955.

IMPORTANT NOTE : The information contained in this report remains the property of the Ministry of Transport and Civil Aviation and may not be distributed without their written approval.

Official accident report of Comet I G-ALYZ

B.O.A.C., Comet I, G-ALYZ,
accident at Ciampino Airport, Rome, Italy,
26 October 1952,
Report released by I.C.A.O.

Circumstances

The aircraft was operating a scheduled passenger service from London to Johannesburg. The flight from London Airport to Rome was without incident. During the take-off from Rome on the second stage, the aircraft's normal speed failed to build up and after becoming airborne for a few seconds the Captain's immediate reaction was that there was a lack of engine thrust. He throttled back the engines at the same time as the aircraft came to rest near the airport boundary, and the aircraft sustained considerable damage and two passengers were slightly injured.

Investigation and Evidence

For take-off the aircraft was taxied to Runway 16 and lined up on the centre line; all pre-take-off checks were made and the elevator, aileron and rudder trim were set at the neutral position. The Captain's estimation of runway visibility was 5 miles but with no horizon. The flaps were lowered to 15 deg. and the windscreen wipers were both operating. The engines were opened up to full power and the isolation switches were set to "Isolate" The RPM were checked at 10.250 on all engines; fuel flows, engine temperatures and pressures were reported to be correct. The brakes were released and the aircraft made a normal acceleration. At an IAS of 75-80 knots, the nose wheel was lifted from the runway and a slight tendency to swing to starboard was corrected. At an IAS of 112 knots the Captain lifted the aircraft from the ground by a positive backward movement of the control column and when he considered that the aircraft had reached a safe height he called for "undercarriage up". At about the same instant the port wing dropped rather violently and the aircraft swung to port; the controls gave normal response and lateral level was regained. At this point the Captain realised that the aircraft's speed was not building up, although he made no reference to the ASI. A pronounced buffeting was felt which he associated with the onset of a stall and in spite of two corrective movements of the control column the buffeting continued. Before the First Officer had time to select undercarriage up, the aircraft came down on its main landing wheels and bounced. It was now plainly evident to the Captain that the aircraft's speed was not increasing and he was convinced that there was a considerable loss of engine thrust. He was also aware that the aircraft was rapidly approaching the end of the runway and a decision to abandon the take-off was made. The undercarriage struck a mound of earth as he was closing the throttles and the aircraft slid for some 270 yards over rough ground. The main

undercarriages were wrenched off and considerable damage resulted; a large spillage of fuel occurred but fire did not break out. One passenger suffered slight shock and another sustained a cut finger.

Subsequent interrogation of the crew confirmed that all engines had given their maximum power and that fuel flows, temperatures and pressures had all been normal during the take-off. It was the belief of the First Officer that the nose wheel was lifted from the ground in the usual manner although the control column appeared to be "a fair way back". He also thought that the "unstick" was made by moving the control half way back from the neutral position and that it was held there until the port wing dropped. He also stated that he was unable to determine the attitude of the aircraft after the bounce as no runway lights were visible to him.

Due to darkness and due also to rain, no ground witness had a clear view of the take-off. One, however, who observed it from a point opposite the half-way position of the runway, considered that the aircraft's attitude was critical as it passed him. He continued to observe it as the nose was exceptionally high and he was not aware that the aircraft became airborne.

An inspection carried out at the scene of the accident showed that the aircraft came to rest about 270 yards from the upwind end of runway 16 and 10 yards from the boundary fence; considerable damage had resulted. A large spillage of fuel from the port wing integral tanks had occurred but fire did not break out. Both inertia switches had tripped. The two crash switch operating levers functioned correctly and the methyl fire extinguisher bottles had discharged. The seats and their attachments in the crew and passengers compartments were undamaged. The crew's

forward entrance door and the passenger's entrance door functioned normally as also did the emergency hatches.

The flaps were: in the lowered position of about 15 deg. and this corresponded to that indicated in the cockpit, The elevator, aileron and rudder trim indicators were in the neutral position. Wheel marks on the runway showed that the main landing wheels had been in contact with the runway over the last 30 feet of its length. The next contact was made on two mounds of earth, when this occurred the undercarriages were wrenched off and parts of these units damaged the tailplane. The port main plane hit the runway direction indicator which is mounted on concrete blocks and the wing tip and pitot head were torn off. The starboard inner engine steady strut had become detached at its forward end when the attachment bracket rivets had sheared due to impact forces. This detachment allowed the engine to rotate on its mounting trunnions through the mainplane skin and in a nose-down direction.

The nose wheel was forced upwards into its housing and the tail bumper unit was torn from the rear portion of the fuselage. The bumper attachment bracket was subsequently found in the wreckage trail, An examination of this bracket showed that the shoe was missing and that the bracket was deeply scarred. A search made along the runway revealed evidence of tail bumper marks which varied in length from 3 feet to 40 feet. These marks extended along the last 650 yards of the runway and showed that the aircraft's track was inclined a few degrees to starboard of the runway centre line.

The BOAC Training Manual recommends the following take-off technique:

"At 80 knots the nose should be lifted until the rumble of the nose wheel ceases. Care should be taken not to overdo this and adopt an exaggerated tail-down attitude with a consequent poor acceleration."

The normal fuselage incidence during the take-off ground run is about 2 to 3 deg. after the nose wheel has been raised just clear of the runway. To do this a backward stick movement of about 4 inches is required which is then reduced to 1 to 1.5 inches. The attitude of "unstick" is approximately 6 deg. to 6.5 deg. and to attain this the required stick movement at the time of leaving the ground is of the order of 6 inches back from the neutral position, after which the stick must be returned towards the pre-take-off position.

Take-off by the manufacturers have shown that a constant 6 deg. incidence of fuselage during the ground run gives good results for distance run and for climb-away behaviour. They have also shown that an increase of incidence to 9 deg. results in a partially stalled wing giving high drag which appreciably affects the aircraft's acceleration, and that the symptoms are noticeable to the pilot as low frequency buffet. The aircraft recovers from its semi-stalled position if the nose is pushed well down.

Figure shows a diagrammatic representation of the nose-up attitude of the aircraft in the correct position of unstick, i.e., 6 deg. to 6.5 deg. nose up. The Appendix also shows that for the tail bumper to touch the ground an angle of at least 11 deg. is required.

Probable Cause

The accident was due to an error of judgement by the Captain in not appreciating the excessive nose-up attitude of the aircraft

during the takeoff.

Summary of all D.H. Comet crashes

In this table you will find the most important information related to all De Havilland DH106 Comet crashes. To compile this page, I used different sources. The detailed descriptions of the accidents are listed in separate sections.

Nr	Date	Type	Registration	SN	Operator	Fatalities	Location	Cause
1	26 Oct 52	Comet 1	G-ALYZ	6012	B.O.A.C.	0/8 + 0/35	Rome, Italy	Aircraft
2	03 Mar 53	Comet 1A	CF-CUN	6014	Canadian Pacific	5/5 + 6/6	Karachi, Pakistan	Aircraft
3	02 May 53	Comet 1	G-ALYV	6008	B.O.A.C.	6/6 + 37/37	Calcutta, India	Aircraft
4	25 Jun 53	Comet 1A	F-BGSC	6019	UAT	0/7 + 0/10	Dakar, Senegal	Pilot
5	10 Jan 54	Comet 1	G-ALYP	6003	B.O.A.C.	6/6 + 29/29	Elba, Italy	Aircraft
6	08 Apr 54	Comet 1	G-ALYY	6011	South African Airways	7/7 + 14/14	Stromboli, Italy	Aircraft
7	27 Aug 59	Comet 4	LV-AHP	6411	Aerolineas Argentinas	1/6 + 1/44	Asuncion, Paraguay	Pilot

8 20 Feb 60 Comet 4 LV-AHO 6410 Aerolineas
 Argentinas 0/6 + 0/0 Buenos Aires,
 Argentina Pilot

9 23 Nov 61 Comet 4 LV-AHR 6430 Aerolineas
 Argentinas 12/12 + 40/40 Sao Paulo,
 Brazil Pilot

10 21 Dec 61 Comet 4B G-ARJM 6456 British
 European
 Airways 7/7 + 20/27 Ankara,
 Turkey Aircraft

11 19 Jul 62 Comet 4C SU-AMW 6464 United
 Arab
 Airlines 8/8 + 18/18 Mt Kao Yai,
 Thailand Pilot

12 20 Mar 63 Comet 4C SA-R-7 6461 Saudi Arabian
 Government 9/9 + 9/9 Cuneo,
 Italy Pilot

13 27 Jul 63 Comet 4C SU-ALD 6441 United Arab
 Airlines 8/8 + 55/55 Madh,
 India Pilot

14 22 Mar 64 Comet 4 G-APDH 6409 Malaysian Airlines
 System 0/8 + 0/60 Singapore,
 Singapore Aircraft

15 12 Oct 67 Comet 4 G-ARCO 6449 British European
 Airways 7/7 + 59/59 Nicosia,
 Zypria Bomb

16 14 Jan 70 Comet 4C SU-ANI 6475 United Arab
 Airlines 0/9 + 0/5 Addis Ababa,
 Ethiopia Pilot

17 09 Feb 70 Comet 4C SU-ALE 6444 United Arab
 Airlines 0/9 + 0/14 Munchen-Riem,
 Germany Pilot

18 03 Jul 70 Comet 4 G-APDN 6415 Dan-Air

Services 7/7 + 105/105 Sierra Montensy,
Spain ATC

Aircraft

19 07 Oct 70 Comet 4 G-APDL 6413 Dan-Air

Services 0/4 + 0/5 Newcastle,

GB Pilot

20 02 Jan 71 Comet 4C SU-ALC 6439 United Arab
Airlines 8/8 + 8/8 Tripoli,

Libya Pilot

Nr	Date	Type	Registration	SN	Operator	Fatalities	Location	Cause
A	25 Jul 53	Comet 1	G-ALYR	6004	B.O.A.C.	0/0	Calcutta, India	Pilot
B	13 Sep 57	Comet 2R	XK663	6027	RAF 192 sqn	0/0	Wyton, GB	Fire
C	01 Jan 68	Comet C2	7926M	6028	RAF	0/0	Lyneham, GB	Fire
D	28 Dec 68	Comet 4C	OD-ADR	6445	Middle East Airlines	0/0	Beirut, Lebanon	Bomb
E	28 Dec 68	Comet 4C	OD-ADS	6448	Middle East Airlines	0/0	Beirut, Lebanon	Bomb
F	28 Dec 68	Comet 4C	OD-ADQ	6446	Middle East Airlines	0/0	Beirut, Lebanon	Bomb
G	?? ??? 70	Comet 4C	XM829	06021	Stansted Airport	0/0	Stansted, GB	Fire

Details about all D.H. Comet crashes

1. G-ALYZ / 6012 crash in Rome (Crew 0/8 & Passengers 0/35)

G-ALYZ was the last Comet 1 which was delivered to B.O.A.C. and the first one to be involved in a major incident. The plane with 35 passengers and 8 crew was in the takeoff phase and didn't get altitude. The plane overshoot the runway and stopped finally with broken landing gears. The plane was a hull loss. Initially Captain Foote was made responsible for this incident. It was stated that the plane was pulled up too fast, leading to an interruption of the airflow on the wings.

After the crash of CF-CUN it was found out that a considerable part of the wing lost its lift if the plane was pulled up too fast. A design change of the leading edge of the Comet wings was the solution to this problem. This change proved to be sufficient.

Photo Credit: Aeroplane Monthly [Sep-89]. Thanks to Trevor Friend for contributing this picture. Added [15-Nov-98]

Cause of the accident: design fault

[Official accident report of G-ALYZ]

F-CUN / 6014 crash in Karachi (Crew 5/5 & Passengers 6/6)

CF-CUN was the first Comet 1A for Canadian Pacific. On its delivery flight from England to Sydney the first fatal Comet crash occurred. In the early morning the 'Empress of Hawaii' didn't takeoff in Karachi. The plane collided with a bridge and took fire. None of the 11 people, including Captain Pentland survived this crash.

Initially the Captain was made responsible, but flight tests found

out that a considerable part of the wing lost its lift if the plane was pulled up too fast. A design change of the leading edge of the Comet wings was the solution to this problem. This change proved to be sufficient.

Cause of the accident: design fault
[Accident description of CF-CUN]

3. G-ALYV / 6008 crash in Calcutta (Crew 6/6 & Passengers 37/37)

G-ALYV was on a flight from Singapore to London. The aircraft was in the initial climb phase and at 10Kft it flew in a heavy tropical thunderstorm. The plane disintegrated in this thunderstorm. The remains of the Comet were found in an area of 20 km².

The cause of the crash was an overload of the tail of the aircraft. Other crashes of the Comet make the weak structure of the aircraft a more likely reason.

Cause of the accident: design fault
See also the comments about this crash in the YP accident report.

4. F-BGSC / 6019 crash in Dakar (Crew 0/7 & Passengers 0/10)

The Comet 1A registered, F-BGSC of the French company UAT -- Union Aeromaritime de Transport -- was as scheduled passenger flight in the landing phase to Dakar airport. It overshot the runway and crossed a -- 0.7 m deep and 22 m wide -- sandy culvert. As a result it came to rest 38.4 m later with a sheared landing gear. None of the passengers was injured.

Cause of the accident: pilot error

5. G-ALYP / 6003 crash in Elba (Crew 6/6 & Passengers 29/29)

G-ALYP was as flight BA781 on the way from Singapore to London. A fuel stop was made in Rome. Captain Gibson was in the command when the aircraft crashed at 25Kft. Since the crash occurred in daylight, witnesses could report three explosions. The remains of the aircraft were 150 meters deep in the sea.

Initially an engine explosion or a bomb was assumed to have led to this tragic event. All flights of Comet's were suspended. More than sixty modifications were done on existing Comet aircrafts, all possible causes were eliminated. At least that's what the experts thought at the time. Protections were added in the case of an engine explosion. New fuel pipes, fire and smoke detectors were added. On the 23 Mar 54 the Comet's were again allowed to takeoff.

Only the next Comet crash allowed to find out the real reason of this tragic event. More about it in the next section.

Cause of the accident: design fault
[Official accident report of G-ALYP]

6. G-ALYY / 6011 crash in Stromboli (Crew 7/7 & Passengers 14/14)

G-ALYY was leased from B.O.A.C. to South African Airways. Flight SA201 was on its way from London to Johannesburg. After a fuel stop in Rome the plane took-off, but only 36 minutes later the radio-contact was interrupted in the area of Stromboli.

The next morning remains were found in the sea. Since the sea

was at this place as deep as 1000 meters, no parts of the aircraft could be inspected. Only four days after the crash the Comet flights were again suspended, one of the reasons being the similarities to the YP crash. G-ALYY had only performed 2704 flight hours. A very intensive flight test program was performed in order to find out the reason of the YY and YP crashes, with no special conclusion.

Only after a very long expensive investigations, which included the assembly of the remains of the crashed YP and the underwater stress test of the YU Comet which came from B.O.A.C. Finally the fuselage of YU broke up on a sharp edge of the forward escape-hatch. After that this rupture was repaired the tests were restarted, but only shortly afterwards the fuselage broke up. This time the rupture started at the upper edge of a window and was three meters long.

The YP and YY crashes were due to metal fatigue, which took place because of the crystalline changes in the fuselage skin. They were amplified by the high speed and altitude the Comets were operated. The metal fatigue resulted in ruptures of the fuselage, this had as a consequence a terrible decompression at 33Kft, tearing up the plane with all known consequences.

Cause of the accident: design fault
[Official accident report of G-ALYY]

7. LV-AHP / 6411 crash in Asuncion (Crew 1/6 & Passengers 1/44)

LV-AHP a Comet 4 of Aerolineas Argentinas was on final approach to Asuncion, Paraguay when it hit a hill top. One passenger and one crew member died. Further information is

missing.

Cause of the accident: pilot error

8. LV-AHO / 6410 crash in Buenos Aires (Crew 0/6 & Passengers 0/0)

LV-AHO a Comet 4 of Aerolineas Argentinas was in the landing phase of a training flight. The aircraft was damaged beyond repair, due to a heavy landing, but none of the six crewmembers was killed.

Cause of the accident: pilot error

LV-AHR / 6430 crash in Sao Paulo (Crew 12/12 & Passengers 40/40)

The flight had originated at Buenos Aires, Argentina. At Vira Copos (Campinas) Airport, Brazil, the engines were started at 05:20 hours and the aircraft took off for Trinidad (alternately Barbados) at 05:38 hours. After reaching an altitude of about 100 m, the aircraft lost altitude, collided with a eucalyptus forest and was destroyed. Twelve crew and forty passengers died in the accident, which occurred at approximately 05:40 hours .

It was presumed that the co-pilot was under flight instruction. If such was the case, the instructor, who was pilot-in command, may have failed to brief or supervise the co-pilot properly.

Cause of the accident: pilot error

[Official accident report of LV-AHR]

10. G-ARJM / 6456 crash in Ankara (Crew 7/7 & Passengers 20/27)

The probable cause of the accident was the obstruction of the

pitch pointer in the captain's director horizon which led him to make an excessively steep climb immediately following unstick.

Cause of the accident: instrument failure
[Official accident report of G-ARJM]

11. SU-AMW / 6464 crash in Bangkok (Crew 8/8 & Passengers 18/18)

SU-AMW, a Comet 4C of UAA -- United Arab Airlines -- was supposed to land as scheduled passenger a/c to Bangkok when it made a premature descent and struck Mt Kao Yai. None of the passengers survived this CFIT crash.

Cause of the accident: pilot error

12. SA-R-7 / 6461 crash in Cueno (Crew 9/9 & Passengers 9/9)

SA-R-7 was the private a/c of the Saudi Arabian Royal family. During a flight from Geneva to Nice the plane struck during the descent phase a mountain at 900 m. The crash occurred at Cuneo in Italy. Everybody on board of the a/c -- including members of the royal family -- died.

Cause of the accident: pilot error

13. SU-ALD / 6441 crash in Bombay (Crew 8/8 & Passengers 55/55)

SU-ALD was supposed to land in Bombay, India. The plane crashed at 20h20 in the sea while approaching the Bombay airport. This crash during the initial approach was probably due to a loss of control caused by the heavy rain and severe turbulence which took place at the moment of the crash. None of the passengers survived this crash.

Cause of the accident: pilot error

14. G-APDH / 6409 crash in Singapore (Crew 0/8 & Passengers 0/60)

G-APDH, a Comet 4 of MAS -- Malaysian Airlines Systems -- was as scheduled passenger plane on a flight from Kuala Lumpur to Singapore. Shortly after landing the right gear forging broke because of a fatigue failure. The Comet remained on the runway but fire broke out. None of the passengers was killed.

This crash was caused by a fatigue failure of the right gear forging.

Cause of the accident: fatigue failure

15. G-ARCO / 6449 crash off Nicosia (Crew 7/7 & Passengers 59/59)

G-ARCO, a Comet 4 of British European Airways was flying Athens - Cyprus when it disappeared from the radar screens 10 minutes after it took off from Nicosia. Captain Gordon Blackwood had previously not informed of any technical difficulties. Since there were a lot of similarities to the YP and YY crashes, rumours were saying that this crash was again due to fatigue.

The analysis of the wreckage allowed to detect that the Comet 6449 was indeed teared up, following the detonation of a highly explosive device within the cabin. In addition this theory was reinforced by the fact that initially the General in command of the Cyprus army should have been on board. He cancelled in the last moment his flight. The political problems which existed at the time on the island make a terrorist act highly possible. The

official accident report concluded therefore to a bombing.

Cause of the accident: bomb explosion

16. SU-ANI / 6475 crash in Ethiopia (Crew 0/9 & Passengers 0/5)

SU-ANI was as flight MS755 on a flight from Khartoum to Addis Ababa-Bole in the final approach phase. The aircraft broke through clouds at 150ft, but was 200-300ft to the right of Runway 32. The Comet banked left, made some shallow turns and made a higher than normal landing flare half way down the runway. This caused the aircraft to stall; the left wing and pod fuel tank struck the runway and the Comet crashed.

This crash was caused by the fact that the pilot attempted to land from an unfavourable position, brought about by the fact that he had descended below weather minima before being able to establish visual ground contact.

Cause of the accident: pilot error

17. SU-ALE / 6444 crash in Munchen (Crew 0/9 & Passengers 0/14)

SU-ALE was taking off from Munchen-Riem, but due to buffeting, the take-off had to be rejected at a height of 30ft. The aircraft landed back, overran the runway and struck a fence. The undercarriage was torn off and a small fire started.

This crash was caused by buffeting probably caused by icing on the wings. In addition due to improper operation of the flight controls, the Comet over-rotated.

Cause of the accident: pilot error

18. G-APDN / 6415 crash in Spain (Crew 7/7 & Passengers 105/105)

G-APDN, a Comet 4 of Dan-Air Services was as a charter flight in the descent phase when it hit a mountain. All passengers and crewmembers died.

Cause of the accident: ATC and instrument failure
[Official accident report of G-APDN]

19. G-APDL / 6413 crash in Newcastle (Crew 0/4 & Passengers 0/5)

G-APDL, a Comet 4 of Dan-Air Services was on a training flight when it landed wheels up. The aircraft was damaged beyond repair.

This crash was caused by the fact that the crew omitted to carry out the pre-landing checks while practising a flapless landing.

Cause of the accident: pilot error

20. SU-ALC / 6439 crash in Tripoli (Crew 8/8 & Passengers 8/8)

SU-ALC was as flight MS844 on a flight from Alger-Houari Boumediene to Tripoli and made its initial approach. The Comet struck sand dunes at 395ft while making an ADF approach procedure turn for Runway 18.

This crash was caused by the fact that the captain decided to land while prevailing visibility was below company-minimum for that airport at night.

Cause of the accident: pilot error

Details about all D.H. Comet incidents

In this section I summarized the information of the hull-losses which I collected from different sources. However errors are human, if you think that some information is not correct feel free to post me an . Don't forget to tell me your source.

A. G-ALYR / 6004 hull-loss in Calcutta (Crew 0/0 & Passengers 0/0)

G-ALYR, a Comet 1 operated by B.O.A.C. was damaged beyond repair because the aircraft was being taxied off a curving taxiway. Capt Willerton was faced with a design defect. At night the taxi lights were too dim to use safely, and the crews had to use the landing lights, which were high power, and got hot. So they had to be alternated left and right to avoid a meltdown. The switches to do this were fitted on the left flight deck wall low down, and behind the captain's seat. The taxi light switches were also there, and the layout was poor. It was easy to find the wrong switch. Also the nosewheel steering wheel was self centering, and if the hand was taken off it then the aircraft would turn.

In a left hand turn Capt. Willerton took his left hand off the steering wheel to select another landing light. The steering centered, and then the aircraft right wheel bogies ran off the paved surface. Capt. Willerton made the mistake of trying to get the aircraft back onto the paved surface, and when it did not respond he applied engine power on the two right engines. This caused the bogie struts to be forced up and into the wing structure causing much damage. Willerton was blamed, and lost

seniority. Soon afterwards the switches were relocated to the upper front panel. Note that G-ALYR was returned to the UK for repairs.

Thanks to Capt. Peter Duffey for the details of the report listed above.

Photo Credit: Aeroplane Monthly [Sep-89]. Thanks to Trevor Friend for contributing this picture. Added [15-Nov-98]

B. XK663 / 6027 hull-loss in Wyton (Crew 0/0 & Passengers 0/0)

XK663, a Comet 2R of the 192th RAF sqn was damaged beyond repair during a hangar fire. Unfortunately further details are missing.

C. 7926M / 06028 hull-loss in Lyneham (Crew 0/0 & Passengers 0/0)

7926M, a Comet C2 of the RAF burnt during fire rescue training in 1968. Unfortunately further details are missing.

D. OD-ADR / 6445 hull-loss in Beirut (Crew 0/0 & Passengers 0/0)

The Comet 4C of MEA registered OD-ADR was one of three destroyed by an Israeli commando attack on the 28th December 68.

E. OD-ADS / 6448 hull-loss in Beirut (Crew 0/0 & Passengers 0/0)

The Comet 4C of MEA registered OD-ADS was one of three destroyed by an Israeli commando attack on the 28th December 68.

F. OD-ADQ / 6446 hull-loss in Beirut (Crew 0/0 & Passengers

0/0)

The Comet 4C of MEA registered OD-ADQ was one of three destroyed by an Israeli commando attack on the 28th December 68.

G. XM829 / 06021 hull-loss in Stansted (Crew 0/0 & Passengers 0/0)

Frame 06021, the former Air France Comet 1A, which was converted to 1XB specifications and last served as XM829 was donated to the Stansted airport fire services and destroyed by fire at Stansted in 1970. Sorry I don't have the precise date.

Radical thoughts on the Comet

Now that the Ministry of Transport and Civil Aviation has announced that there is to be a public inquiry into the causes of the accident to the Comet on January 10, it will be both useful and astringent to look back for a moment. By so doing some of the misfortunes suffered by this Comet which means so much to us may be viewed again as rationally as possible and brought into perspective in the light of present information.

There would be no point in minimizing the seriousness of this latest accident, but, at the same time, any tendency to connect it too closely in our minds with previous accidents must, at this difficult time, be prevented. It is true that of the 19 Comet 1s and 1As which have entered, or been about to enter, air-line service, five have been written off. Two of the accidents concerned involved no loss of life, and, more important still, three of the five were the result of known and fully understood causes.

Only two of the five accidents, therefore, need to have any air of mystery about them, but, unfortunately, the causes of two of the three fully understood accidents may tend to remain a little hazy

in the eyes of the public. This should not be, but, at the time when the headlines were at their biggest and the public were most interested, no authoritative explanatory information could be made available about the aircraft's accepted characteristics. To ordinary people, a couple of Comets simply failed, for some reason or other, to become airborne.

Even though an official report about the first of these two accidents had already been issued when the second one occurred, the wording of this report was not such as to lead any reader straight to an understanding of both accidents.

U.A.T. Comet 1A F-BGSC

The third of these "understood" accidents received little attention in this country and concerned one of Union Aériomarine de Transport's Comets. It was a mishap on the landing run at an African aerodrome and need only be mentioned here because the aircraft was considered, from the insurance point of view, to be damaged beyond repair.

So, before considering the two more recent tragedies, let us try to remove any remaining mystery from the sequence of these take-off accidents.

The Take-off Accidents

B.O.A.C. Comet 1 G-ALYZ

The first was suffered by a B.O.A.C. Comet, G-ALYZ, at Ciampino Airport, Rome, on October 26, 1952. It was dark and it was raining. The Comet failed to accelerate adequately, or even to become properly airborne, and the captain, considering that there must be a lack of thrust, abandoned the take-off.

No one was seriously hurt, but the aircraft was irrevocably damaged in the resultant crash landing. The report showed that

the attitude of the Comet had, unknown to the crew, become very nose-high during the takeoff run, so much so that the wing was stalled or semi-stalled.

In the Corporation's Training Manual, as quoted in the report at that time, it was noted that "an increase of incidence to 9 deg. results in a partially stalled wing giving a high drag which appreciably affects the aircraft's acceleration " In fact, the tail-bumper of G-ALYZ had been scoring the runway, so the Comet's attitude was of the order of 11 deg., or more, noseup. At the take-off weight of 100,370 lb. it would never have flown at all in that attitude.

Following this accident a new take-off technique was apparently recommended for B.O.A.C. pilots and more attention was paid to this particular problem during the training of Comet pilots. The modified system involved lifting the nosewheel at the appropriate speed and afterwards letting it touch again, so that it could be felt on the runway until take-off safety speed had been reached. The Comet's controls are power-operated, and "feel" is provided by spring-loading from a neutral trimming datum.

Canadian Pacific Air Lines Comet 1A CF-CUN

The second of the two take-off accidents followed the same form, but the conditions were much more difficult this time and the accident disastrous. It occurred at Karachi on March 3, 1953, during the delivery flight of the first of the Canadian Pacific Air Lines' Comet 1As to its service base at Sydney.

No official report was published after the accident, but a summary was issued. This made it clear that the aircraft was at its limit of weight for the conditions existing. It was being taken off at 114,816 lb., which was very nearly the permissible maximum for the 1A Series, and the hours of darkness had been

chosen so that the air temperature should be as low as possible. Even so, this was about 8 degC. above International Standard Atmosphere and water-methanol injection was being used to regain the power from the Ghosts for the take-off. There was no wind--and the Comet's take-off distance is sensitive to wind conditions.

In the words of the report summary, "the aircraft continued along nearly the whole length of the runway in a very nose-high attitude and never left the ground." The summary concluded with the words: "at this high weight strict compliance with the take-off technique would be necessary for a successful take-off." It is tragic that good and experienced pilots should have been defeated, as they were at Rome and Karachi, by a new type of aircraft, but the Comets characteristics and power-operated controls were known and its technique of take-off understood. Later history has shown the Comet to be a "different" aircraft, but far from being a difficult one.

Calcutta and Elba

Long afterwards it was learnt that de Havillands had started experimenting with a new wing section before even the accident at Rome in 1952. No doubt this re-design was primarily intended as a development to permit the use of higher weights for a later Comet Series, but its advantages in the take-off case must have been much in the designers' and test pilots' minds. Meantime they had, supported by B.O.A.C. Comet pilots, adamantly resisted any suggestion that the control system should be altered. Its simplicity and other advantages apparently outweighed, in their view, any risks of over-control it might involve.

The two take-off accidents and the one almost unrecorded landing accident can now be put on one side in the knowledge

that their reasons are well understood.

But the Elba accident--and, to a lesser degree, the Calcutta accident--are still in the present. They must be understood and explained as thoroughly as possible so that we can go on to the next stage of progress with clear minds and a full understanding of the means by which such accidents can be prevented in future. There will always be aeroplane accidents, but even the most timid traveller will accept this prospect-- just as he or she accepts the possibility of a train accident or of a sinking ship--so long as the reasons are known and action known to have been taken.

B.O.A.C. Comet 1 G-ALYV

The sequence of events leading up to, and following, the Calcutta accident on May 2, 1953, will be remembered by the majority of people and only certain features need to be mentioned here.

The report of the Indian Court of Inquiry which had investigated the accident --and which included one experienced British assessor amongst the three who were appointed-- gave the "probable" cause of the Comets disintegration as: "severe gusts encountered in the thundersquall: or over-controlling or loss of control by the pilot when flying through the thunderstorm." An appendix, written by one of the assessors and giving a suggested sequence of events leading to the disaster, was described by the Court as being "plausible" but unproven.

Concurrently with the issue of this report B.O.A.C. and de Havillands, in a combined statement, made it clear that they did not agree that over-control or loss of control was a likely cause, and stressed the theoretical nature of any findings before a more detailed examination of the wreckage had been made.

The Indian report had, in fact, recommended that such an

examination should be made.

No further information has yet been made publicly available about the results of this continued examination. So, following this very' natural resistance to the findings of the Court. This leaves the Calcutta accident still in the "unsolved" category. Since they each occurred on the climb it may be natural for many people interested in the Comet to tend to connect the Calcutta accident with that near Elba twelve days ago.

B.O.A.C. Comet 1 G-ALYP

Some considerable attention was paid in the Press last weekend to Sir Miles Thomas' statement that the possibility of sabotage in the case of the Elba accident "cannot be overlooked." This statement was natural enough in the circumstances, since such a cause is always a possibility in any such disaster, and efforts must obviously be made to follow up likely clues.

But the weight of the investigation will, no doubt, continue to be directed towards hat I believe to more practical possible causes. Among these could be the explosion of a kerosene-air mixture, or of hydraulic fluid vapour, and the medical evidence may go a long way towards confirming the likelihood of one or other similar possibility.

The very difficult feature of the Elba accident--that the aircraft fell into water--has also provided medical evidence which might not have been available if the wreckage had fallen on land. Unfortunately, latest reports say that the wreckage of G-ALYP is lying at a depth of the order of 600 ft. and salvage may not be practicable.

The fact that the Comets had been taken out of service by

B.O.A.C. was a voluntary move so there was no reason why these aircraft should not be returned to service when they had been thoroughly examined.

Nevertheless, no one imagined it probable that signs of incipient structural failure would actually be found in the Comets under examination. B.O.A.C.'s maintenance and inspection is among the most thorough in the World, and if such signs were to be seen in any of the Comets in service it is likely that they would have been found during previous maintenance checks completed during the past few months.

But a full and careful inspection of all the Corporation's Comets was vital, both as a means of assuring the public and as an essential link in the series of checks which must be made towards a narrowing-down of the possible cause of the accident.

Air France and Union Aéromaritime de Transport had also removed their Comets temporarily from service last week and the former was making a thorough examination of at least one aircraft. The Royal Canadian Air Force, as military operators, were taking no action for the time being.

Last week-end Mr. A. T. Lennox-Boyd, Minister of Transport and Civil Aviation, flew out to Rome to observe the progress of the investigation there. He was due to return on Tuesday for the opening of Parliament.

Finally, let us remember, that the Comet is far from being the first or only civil aircraft to have suffered serious trouble, the cause of which could not be immediately diagnosed, in the earlier stages of its service life.

There was the case, for instance, of the DC-6. After one of these aircraft had been lost, with all its passengers and crew, following a fire in the air (October 24, 1947) another, flown by a different U.S. operator, was successfully force-landed after suffering similar trouble (November 11, 1947).

All DC-6s were then grounded while investigations were made. It was discovered that if, after transferring fuel between certain tanks, the immersion pumps were accidentally left "on," the resultant pressure build-up caused fuel to vent. This could be carried by the airflow straight into the air-intake of a combustion heater, causing a continuous fire which could not be controlled.

There have been other similar cases of trouble with civil transports which have afterwards continued, during their long lives, to be popular and successful aircraft.---H.n.w.

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: From Ken Smart

Dear Bill, 7 June 02

Well, rebuffed by opinion but never facts, as usual, again. He refuses to address the vertical skin tears above the door or the peeled back skin from the aft midspan latch that match United Airlines Flight 811.

Are the photos of Air India Flight 182 cargo door area forthcoming?

The officials say use evidence for conclusions and then when you ask for the evidence they refuse it.

If only Ken Smart had not misspelled his title, 'Inspector', in the last line; that lack of attention to detail really rankles me although it appears trivial.

very extensive technical evidence presented at the trial by specialists from around the world.

From the Trial Judgment:

[2] It is not disputed, and was amply proved, that the cause of the disaster was indeed the explosion of a device within the aircraft.

It was never disputed it was a bomb by the defence so to say they was extensive technical evidence which proved it is not true.

Well, Bill, will you wait until the photos are delivered to you for Air India Flight 182 and the CVR for China Airlines Flight 611 is recovered? If the CVR for China Airlines Flight 611 has that sudden loud sound and the abrupt power cut to the recorders, just like Air India Flight 182 and the rest, will you stay on to find out what is going on with Boeing 747s that suffer inflight breakups?

Cheers,
Barry

X-From_: ksmart@aaib.gov.uk Fri Jun 7 02:33:31 2002
Date: Fri, 7 Jun 2002 10:33:14 +0100

To: John Barry Smith <barry@corazon.com>
From: Ken Smart <ksmart@aaib.gov.uk>
Subject: Re: Conscience/Comet/Wiring/Doors
Dear Mr Smith

Your recent e-mail trails presents me with the difficulty of responding to your hypothesising in what I hope is a reasonable way.

I can only reiterate that accident investigation, along with all other forms of investigation, is an evidence based process. I cannot afford the luxury of taking a stance that is in effect one that says " don't confuse me with the facts".

I can see that there is nothing that I can do to convince you that Panam 103 was bought down by an improvised explosive device. I can only refer you to the AAIB report and the very extensive technical evidence presented at the trial by specialists from around the world.

Ken Smart

Chief Inspector of Air Accidents

IN THE HIGH COURT OF JUSTICIARY AT CAMP ZEIST

Lord Sutherland

Lord Coulsfield

Lord MacLean

Case No: 1475/99

OPINION OF THE COURT

delivered by LORD SUTHERLAND

in causa

HER MAJESTY'S ADVOCATE

v

ABDELBASET ALI MOHMED AL
MEGRAHI and AL AMIN KHALIFA

FHIMAH, Prisoners in the Prison of Zeist,
Camp Zeist (Kamp van Zeist), The
Netherlands
Accused

**Act: The Lord Advocate, AP Campbell QC, Advocate
Depute; Turnbull QC,
Advocate Depute; Lake and Armstrong; the Crown Agent.
Alt: Taylor QC; Burns QC; Beckett, McCourts, Solicitors,
Edinburgh for the
first accused.
Keen QC; Davidson QC, Macleod, McGrigor Donald,
Solicitors,
Edinburgh for the second accused.**

[1] At 1903 hours on 21 December 1988 PanAm flight 103 fell
out of the sky.

The 259 passengers and crew members who were on board and
11 residents of

Lockerbie where the debris fell were killed. The Crown case is
that the cause of the

disaster was that an explosive device had been introduced into
the hold of the aircraft

by the two accused whether acting alone or in concert with each
other and others.

This device exploded when the aircraft was in Scottish air space
thus causing the

aircraft to disintegrate. In these circumstances it was originally
contended that the

accused were guilty of conspiracy to murder, alternatively
murder, alternatively a

2

contravention of section 2(1) and (5) of the Aviation Security Act
1982. At the

conclusion of the Crown's submissions, however, the libel was

restricted to the charge
of murder.

[2] It is not disputed, and was amply proved, that the cause of the disaster was indeed the explosion of a device within the aircraft. Nor is it disputed that the person or persons who were responsible for the deliberate introduction of the explosive device would be guilty of the crime of murder. The matter at issue in this trial therefore is whether or not the Crown have proved beyond reasonable doubt that one or other or both of the accused was responsible, actor or art and part, for the deliberate introduction of the device.

Thursday, June 6, 2002

Ottawa ripped on info access

By LOUISE ELLIOTT -- The Canadian Press

OTTAWA -- Horror stories involving interference and deceit by top civil servants and troubling new government rules marked the further erosion of Canadians' right to know last year, says the country's information commissioner.

Top bureaucrats were found to have deliberately misled and threatened people seeking information under Canada's access law in at least two instances, John Reid said in his annual report on Thursday.

"The fragility of the right of access was also illustrated in this reporting year by the disdain showed towards some access requesters by certain senior officials in the government of Canada," he wrote in the 149-page report.

In one case, a former deputy minister of Fisheries and Oceans sent an intimidating letter to a person who was requesting information after he learned the person's identity from an unidentified source, Reid said.

Bill Rowat subsequently refused to give the name of his source to Reid, who cited him for contempt. Rowat then stated he had forgotten the identity of his source.

Another well-known case involving top officials of former finance minister Paul Martin led to a reprimand from Reid earlier this year.

Reid concluded Martin's staff committed "errors of judgment" and some gave "intentionally misleading" answers in 1999 when they withheld documents pertaining to a tainted blood scandal. The staff cited by Reid included then-deputy minister Scott Clark; there was no evidence to suggest Martin was aware that documents were withheld.

These "horror stories" reveal a government-wide resistance to access rights at the top levels, Reid said in an interview.

"I think the motivation is that they're trying to maintain control over an awful lot of information, and the motivation comes from senior levels of the civil service as well as some ministers."

A political storm over recent revelations about advertising contracts granted by the Department of Public Works has prompted calls for an inquiry for the same reasons outlined in Reid's report, said Alliance Leader John Reynolds.

"An independent justice looking into all these issues could start asking some serious questions of bureaucrats who'd have to answer under oath," he said, adding Canadians need to know whether political interference is also a matter of course.

"No government, be it Liberal, Conservative or Alliance, should be pressuring bureaucrats to lie to the public or to lie to the media."

Some of the revelations about Montreal ad firm Groupaction,

which led Auditor General Sheila Fraser to call for an RCMP investigation, resulted from requests under the Access to Information Act.

The act is used by journalists, businesses, researchers and private citizens to unearth details of government activities.

Liberal MP John Bryden said Reid's report points to corruption at the highest levels of government.

"The reason one has to be very uneasy about that is that senior levels of government lead," he said.

"And if you haven't persuaded senior levels of government -- both in the bureaucracy and the cabinet -- to be transparent, to underwrite transparency, then it's going to be a very slow process to bring more freedom of information to Canadians."

Reid's report also says new rules to obscure ministerial spending, new security laws post-Sept. 11 and new government bodies not subject to access laws have all jeopardized public accountability. Most Canadians are unaware that the sweeping power granted under Bill C-36 allows the government to exempt large amounts of information from access laws, he said.

He said the bill was the result of a "panic attack" on the part of government after terrorist attacks in the United States.

Also, an access request for Prime Minister Jean Chretien's daily agenda book, still before the courts, led to new Treasury Board rules regarding ministerial spending, Reid argued.

"The government quietly and firmly shut the door on 19 years of public access to the records showing how ministers and staff spend their money," he said.

He added that the creation of more and more arms-length bodies that are exempt from access laws is allowing the government to hide information. On the positive side, Reid said the operations of departments in fulfilling access requests have led to shorter wait times.

The number of complaints has gone down while the number of

access requests has gone up, he said. Complaints about delays have dropped to 28.2 per cent from 43.1 per cent.

Also Thursday, a new study found the federal information commissioner should have more powers, possibly including the power to order the release of disputed files.

Reid currently cannot make binding orders and may only recommend solutions to disagreements between requesters and federal agencies.

Ottawa lawyer Barbara MacIsaac, who prepared the report for a federal task force on information access, wrote that relations between the commissioner's office and government are strained.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: Ken Smart <ksmart@aaib.gov.uk>

Subject: Line of communication open Pan Am Flight 103

Dear Mr Smith

Your recent e-mail trails presents me with the difficulty of responding to your hypothesising in what I hope is a reasonable way.

I can only reiterate that accident investigation, along with all other forms of investigation, is an evidence based process. I cannot afford the luxury of taking a stance that is in effect one that says " don't confuse me with the facts".

I can see that there is nothing that I can do to convince you that Panam 103 was bought down by an improvised explosive device. I can only refer you to the AAIB report and the very extensive technical evidence presented at the trial by specialists from around the world.

Ken Smart

Chief Inspector of Air Accidents

Ken Smart

Chief Inspector of Accidents,
Air Accident Investigations Branch

AAIB

DRA Farnborough

Hants GU14 6TD

United Kingdom

Dear Mr. Smart, 9 June 02

Thank you for replying to my latest email, I realize you do not have to reply to any of my warnings about a current hazard in early model Boeing 747 that may suffer an inflight breakup. You do have a conscience after all. And you sound perplexed and a little vexed. I can understand why.

Let me first reply to your comments above:

Your recent e-mail trails presents me with the difficulty of responding to your hypothesising in what I hope is a reasonable way.

Well, yes, air, I think we have been reasonable. The issue of Pan Am Flight 103 is fraught with emotion, bias and conspiracy theories. It's hard to be factual. I contend I have been factual and reasonable and may, in fact, have overloaded you with facts, data, and evidence to support my reasoning. If you are perplexed it is because on one hand you have the official version of an explosive device and on the other hand my version of mechanical/electrical. They appear to be a paradox but are fully explainable and mutually correct if taken literally.

I can only reiterate that accident investigation, along with all other forms of investigation, is an evidence based process.

Would that were so. I was naive in 1990 to believe facts count but not now after twelve years of research and interacting with officials, media, and business. I am fully aware of the pressures put upon official investigators by all parties involved to come to a quick, satisfactory, and resolvable answer. I used to think that aviation safety was above all that politicking but I was wrong.

Of course it's political. Any event that involves relationships among nations and billions of dollars has to be political. Trans World Airlines Flight 800 was a bomb from the day after when President Clinton said that 'terrorist' act would not go unpunished. It took 17 months of intense FBI efforts to make it a bomb, but eventually the evidence was not there and bomb/missile ruled out for the same reasons Pan Am Flight 103 is not a bomb: Not enough corroborative evidence and any minute evidence can be explained as benign. Air India Flight 182 was a bomb from the few days after the event when the Indian government removed a real aircraft accident investigator and installed a judge with no aviation experience to conduct the 'investigation' which concluded it was a bomb. Pan Am Flight 103 was a bomb when the NTSB 'go' team left New York on the way to London hours after the event and it was a bomb five days after the event according to the AAIB. United Airlines Flight 811 was a bomb moments after the event according to the flight crew. China Airlines Flight 611 was speculated already to be a bomb and still may be pending corroborative evidence. All those accidents were all rushed to political judgment by blaming others because it cleared so many of responsibility for the horror.

Everyone wants the quick easy satisfactory answer and will

accept pleasant lies. Everyone rejects unpleasant truths. I thought, as an aviation accident survivor, that aviation safety was above politics. I was wrong.

Aviation accident investigation is a politically based process, sad to say, when it comes to the big crashes.

I cannot afford the luxury of taking a stance that is in effect one that says " don't confuse me with the facts".

I'm confused by that statement, Mr. Smart: Does it mean if you could afford the luxury you would not want to be confused by facts but since you can't afford the luxury, you are confused by the facts? The only facts that confuse you, Mr. Smart, are the solid ones proved by the AAIB itself that refute the official conclusions such as the small 'bomb' hole and the huge cargo door hole at concurrent initial event time.

I hate that cliché anyway. It reveals a closed and lazy mind and I'm glad you did not use it. I welcome facts, make sure they are accurate, and then sort them out; that is the requirement of my stance. I want more facts for Pan Am Flight 103; for instance, may I see the engine breakdown report from Pratt and Whitney on their JTD-9s, in particular for engine number three to check for missing blades, sooted blades, and soft body impacts? I understand your vexation at the evidence I present which conflicts with the official conclusions. I'm not making up the small 'bomb' hole or the sudden loud sound or the peeled back skin at the aft midspan latch or the wreckage distribution charts. The explanation that makes more sense and fits the facts better is the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation, not the bomb explanation with shadowy confusing conspiracy plots.

I can see that there is nothing that I can do to convince you that Panam 103 was brought down by an improvised explosive device.

Strange statement. The implication is that I can not be convinced because I am an idiot, stubborn, and unreasonable. My Smith AAR, my website, and my emails to you have shown me to be otherwise. (Bought down? Freudian slip?)

<http://www.corazon.com/crashcontentspagelinks.html> and <http://www.corazon.com/PDF182and103SmithAAR.html%20> give details on the entire shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. It is factual and devoid of the conspiracy nonsense which permeates all these Boeing 747 inflight breakups.

You have not tried to convince me it was a bomb other than to refer me to other's opinions such as a trial judge and AAIB conclusions from long ago. And I agree it was brought down by an improvised explosive device, the forward cargo door rupturing open in flight. The UAL 811 crew reported in quotes, a "tremendous explosion" when the cargo door blew open in flight. Even at this late date, you are reluctant to call the IED a bomb even though I know, the media knows, and you know, you mean a bomb, a bomb planted by terrorists in a conspiracy. Sabotage is such a rare event in airplane accidents and pilot error/mechanical problems so prevalent that a mechanical or crew error must be the assumed probable cause unless proven otherwise but in this topsy turvy world, it's a bomb unless proven it wasn't, and even then there are lingering suspicions of conspiracy, such as a missile for Trans World Airlines Flight 800.

I can only refer you to the AAIB report

I can refer you to that report and the CASB report, the Kirpal Report, the three NTSB reports and the eventual China Airlines Flight 611 report, all for early model Boeing 747s that suffered sudden inflight breakups.

Regarding the AAIB Report: Fourteen observations of fact are attached to this email as well as a pdf file regarding the contradictory findings in that report. I know that AAIB report by heart. I well remember the moment in 1995 after receiving it when I read the aft cargo door and bulk cargo door latch status was reported as latched but nary a whisper about the forward cargo door. It's as if it never existed and yet was very close to the 'bomb' detonation.

You, Mr. Smart, as representing AAIB, said that vertical tear lines above the door mean it opened in flight. They are there. You said, by the wreckage distribution drawings in the AAIB report, the open cargo door happened at initial event time and the drawings also show that the door hole was many times larger than the concurrent small bomb hole on the port side. You said that stiffeners and belts are there to stop small holes from getting bigger and they did. You said the small hole and the minor damage to the baggage container appeared as if a rather large shotgun was discharged at close range. You said the blast was relatively mild, directed, and not heard on the CVR. You said there was a sudden loud sound followed by an abrupt power cut. You showed, by the photographs you provided, there was peeled back skin from the aft midspan latch of the forward cargo door.

And the facts go on and on. They support the mechanical explanation, not the conspiracy one. The red herring, which you (AAIB staff and predecessors) have chosen to follow, is that of a

relatively mild directed blast discharged from a rather large shotgun causing a 20 inch hole which has been turned into a powerful spherical noisy plastic bomb making a huge hole in the port side which tore the nose off. That red herring is a pleasant lie but refuted by facts presented in the AAIB report which give the unpleasant truth the forward cargo door ruptured open in flight at the initial event time. A subsequent similar event, UAL 811, proved to be an electrical cause after the red herring of improper latching was ruled out years later after further investigation. NTSB did not give up on United Airlines Flight 811, even after an AAR was written, 90/01. They got it right the second time and wrote another AAR, 92/02. United Airlines Flight 811 set so many precedents.

The probable cause of bomb is a pleasant lie because it absolves so many of culpability. The probable cause of electrical problem causing the ruptured open forward cargo door is an unpleasant truth because it implicates so many as negligent. It's human nature to go for the easy out. I had assumed professional investigators do not go for the easy out but for the difficult comprehensive answer.

I partly understand human nature and the primal urge to look good and not look bad. I have been in a life and death situation in a sudden night fiery fatal jet airplane crash and I will tell you, Mr. Smart, and all the other accident investigators in this world, there is no pride, no embarrassment, and no shame when faced with imminent death. Exact and timely truth is everything, regardless of reputation or stature. If the engine has inadvertently reduced thrust and drag stays the same, lift is reduced and the plane descends to crash. Period. Time to eject. It does not matter who is on board, good guys or bad guys, the plane descends. There is no negotiation with the natural laws of

physics. The outward opening nonplug cargo door had to rupture open when the cams turned to the unlock position with the almost 100000 pounds of internal pressure exerted on those lone midspan latches with no locking sectors.

And it's all happened before with United Airlines Flight 811, the one accident of an unpleasant truth about an early model Boeing 747 that no one wants to refer to, never mind discuss. It's like a guilty ghost accident hanging around in the background while Pan Am Flight 103 is the exciting myth in the foreground.

Investigators who want to know what happened ask questions. Prosecutors who 'know' what happened and are trying to make it official just refer to documents and opinions of those 'experts' who agree with them. Investigators are curious whilst prosecutors reject or ignore any information which hurts their case.

You have never asked me any question about Pan Am Flight 103, Mr. Smart. You have never asked me any telling questions which would reveal the errors of my reasoning, if present. You are not curious about any door hinge overtravel, or paint smears, or guns in baggage manifests, or missing manual locking handles and midspan latches which should be there and aren't. You have all the wreckage and reports available to you but are unwilling to check them out for a match to United Airlines Flight 811. There is no funding to seek or permission to gain for you to review the background documents or the wreckage in Farnborough. You could determine for yourself very easily and quickly when that forward cargo door opened in flight for Pan Am Flight 103. You might even find the precise location and the shorted/arcng/burnt cargo door motor wiring or switch S2 that was implicated in United Airlines Flight 811.

You have acted like a prosecutor trying to keep his case together while fending off unwanted criticism from an amateur citizen. You have not acted like a curious investigator who never gives up until completely satisfied. And you are not completely satisfied that the initial cause was not mechanical, are you. United Airlines Flight 811 always comes back to haunt. It's that sudden loud sound on Pan Am Flight 103 and United Airlines Flight 811 CVRs. And those similar sounds are not a bomb sounds but they are the sound of the consequences of an explosive device, air rushing out that huge hole on the starboard side where the cargo door and the skin above it used to be. It's the sound of explosive decompression. If the Comets had had CVRs in them, they would have picked up the same sound at their inflight breakups. The DC-10 did. United Airlines Flight 811 did. Air India Flight 182 had the sound and it was matched to the DC-10 event. The best evidence which exists is the CVR because it was there at the initial event time and that unimpeachable witness says no bomb explosion but explosive decompression. If that sudden loud sound were able to be matched to the extensive FBI library of bomb sounds, it certainly would have been proclaimed as proof positive of a bomb. But it was not matched to a bomb sound because there was no bomb sound because there was no bomb...or planted device.

KS>and the very extensive technical evidence presented at the trial by specialists from around the world.

High Court>[2] It is not disputed, and was amply proved, that the cause of the disaster was indeed the explosion of a device within the aircraft. The matter at issue in this trial

therefore is whether or not the Crown have proved beyond reasonable doubt that one or other or both of the accused was responsible, actor or art and part, for the deliberate introduction of the device.

The defence never disputed it was a bomb. They just said their clients did not plant it. There was no extensive technical evidence presented at the trial that it was a bomb because it was agreed by both sides it was a bomb. Only the location of the bomb was disputed, inside or outside the baggage container. The issue at trial was who put the bomb there, not whether it existed or not. To imply trial evidence by specialists confirmed it was a bomb is misleading. The CIA and FBI and Scotland Yard may have said it was a bomb because to a person with a hammer, everything is a nail. The evidence which was needed, but absent, to rule in a bomb for Trans World Airlines Flight 800 is the same evidence found lacking for the presence of a bomb for Pan Am Flight 103.

And that faulty defence strategy was to be expected from attorneys who know about conspiracy crimes like bank robberies but not about airplane crashes and did not want to learn or research previous similar accidents.

Pan Am Flight 103 was an airplane crash with a mechanical cause. The accident had two causes for precedent, Air India Flight 182 long before and United Airlines Flight 811 shortly thereafter.

And it has apparently happened again with China Airlines Flight 611 just a two weeks ago.

And of course, it can happen again as I type but probably within two years. 1985, 1987, 1988, 1989, 1991, 1996, 2000, and now 2002 are all Boeing 747 cargo door uncommanded openings on the ground or in the air, according to my research as documented on www.corazon.com.

1985 for Air India Flight 182, inflight, 329 dead.

1987 for Pan Am Flight 125, inflight, 0 dead.

1988 for Pan Am Flight 103, inflight, 270 dead.

1989 for United Airlines Flight 811, inflight, 9 dead.

1991 for United Airlines Flight preflight, on the ground, 0 dead.

1996 for Trans World Airlines Flight 800, inflight, 230 dead.

2000 for United Airlines Flight postflight, on the ground, 0 dead.

2002 for China Airlines Flight 611, inflight, 225 dead.

I do not pick the flight numbers, Mr. Smart, the evidence does. China Airlines Flight 611 fits the pattern so far but needs more corroborative evidence to confirm it is a wiring/cargo door event which may be forthcoming.

So, where does that leave the Pan Am Flight 103 situation? Libya wants to payoff the relatives and get back into the real world. The secret agent sits in jail for life. The UK gets even for having a policewoman shot in the stomach outside an embassy. The insurance has paid off. Pan Am went bankrupt and ceases to exist. Almost everybody is happy. Life goes on.

And the known faulty Poly X wiring occasionally continues to crack and short and turn on the door unlatch motor in early model Boeing 747s of which over 500 are in service around the world flying thousands of passengers every day and killing a few hundred every few years.

And the safety officials who have sworn to investigate leads, who are trained to evaluate facts, who are paid to turn over every stone, who have budgets for databases to compare similar accidents for matches, who have staffs to ask questions of informed citizens with important information and warnings, those safety officials instead remain silent about the contradictory evidence, refuse to consider correcting serious errors, narrowly look at their one tree in the forest of seven, and continue to give their seniors comfortable conclusions they want to hear which are essentially it's not their fault.

Chief Inspector of Air Accidents

Mr. Smart, the above typo would be funny but it's not. This appears to be a trivial error but it's not. It reveals a lack of attention to detail, a rush to get off the email with no proofreading or using the high tech tool of a spell checker. It is an insult to me. I'm not a dummy. I've been a charter pilot and accepted the responsibility of flying passengers for money. I've been in aerial combat in wartime. I've owned my own plane. I've flown thousands of hours in props, propjets, and jets. Heck, I've been supersonic twice. And I've worked twelve years on early model Boeing 747s that suffer inflight breakups, one of which is Pan Am Flight 103. I am not to be dismissed with a quickly typed note with grammatical and spelling errors, even lacking the grace of exit line such as 'Sincerely.'

But, I've learned in life and death situations, as this is, there is no pride. I am not important, only my message. I care little about the insult and the attempted curt dismissal of me and my mechanical explanation for Pan Am Flight 103. I keep on trying, polite, factual, and hopefully persuasive.

Mr. Smart, will you please do this: Keep an open mind and wait for the CVR and FDR of China Airlines Flight 611 to be retrieved and if they reveal a sudden loud sound followed by an abrupt power cut, will you reconsider the probable cause for Pan Am Flight 103 to be that for China Airlines Flight 611? Will you let the facts and evidence of China Airlines Flight 611 be matched to Pan Am Flight 103? Maybe China Airlines Flight 611 is a bomb which would strengthen your IED cause for Pan Am Flight 103.

Will you be willing to look to the recent accident of China Airlines Flight 611 and the past accident of United Airlines Flight 811 for similar evidence to Pan Am Flight 103 for a match which would reveal a common cause for both? If the common cause is revealed by the evidence, would you consider reopening the investigation into Pan Am Flight 103 with a point of view of a mechanical cause?

Would you keep this email line of communication open between us in the narrow subject of Boeing 747s that suffer inflight breakups?

But in case you don't and boot me out and close the door to your virtual office, let me take this opportunity to talk about aviation safety in general.

Everyone talks about facts, even me. I'm awash in facts and have inundated you, Mr. Smart. So why has not the wiring/cargo door explanation become accepted by aviation safety authorities?

Why was not United Airlines Flight 811 compared to Pan Am Flight 103 since the events happened two months apart? Did not someone say on February 23, 1989, 'Hey look, here's another

early model Boeing 747 that suffered an inflight breakup leaving a sudden loud sound on the CVR, an abrupt power cut to the recorders, and yet the crew thought it was a bomb but it wasn't? Why was and is to this day, United Airlines Flight 811 ignored as a match for Pan Am Flight 103 and others?

The facts have always been on the wiring/cargo door side for Pan Am Flight 103, and yet, the investigators went back three and a half years for a match, Air India Flight 182, while ignoring the one that happened just two months later.

Let's follow the logic trail for a bomb for Pan Am Flight 103 from 1988 to 2002:

In 1985 Air India Flight 182 suffered an inflight breakup leaving a sudden loud sound followed by an abrupt power cut. The Canadian aviation accident authorities, the CASB, investigated and determined there was an explosion on the right side of the forward cargo compartment but declined to state the cause. The AAIB representative to the investigation, Mr. Davis, stated it was not a bomb but of a cause yet to be determined.

But....politics....three weeks after the event the Indian aviation accident authority, Mr. Khola, was replaced and a political judge was assigned to 'investigate into the circumstances of the accident.' After much twisting and turning, according to the Kirpal Report which is sometimes embarrassing to read, Judge Kirpal said that the finding for Air India Flight 182 was an inflight breakup from an explosion on the right side of the forward cargo compartment caused by a bomb. There was even less evidence for a bomb in Air India Flight 182 than Pan Am Flight 103 which is less than Trans World Airlines Flight 800. However, bomb it was for Air India Flight 182 and three Sikhs

go on trial for their life's freedom in March 2003 for planting it.

The precedent was set by a judge for blaming political opposition forces as being terrorists and planting bombs in airplanes, curiously always early model Boeing 747s in which the 'bomb' always seems to get randomly placed in the forward cargo compartment, not the aft or bulk or passenger cabins.

So, three and a half years later, in 1988, another early model Boeing 747 suffers an inflight breakup with a sudden loud sound and much other matching evidence. What is the call? Bomb of course planted by the Iranians....then the Syrians...then the Libyans. The conspiracy machine cranks up and plots appear all over the place.

Two months later, 1989, another early model Boeing 747 suffers an inflight breakup leaving a sudden loud sound on the CVR and an abrupt power cut to the recorders, a very rare twin event, and the passengers and pilots thought it was Pan Am Flight 103 all over again but the nose stayed on. The crew at first says a cargo door opened and then reports a bomb went off. Against all odds the aircraft landed and was able to provide evidence of what really happened.

After landing it was apparent the forward cargo door did rupture open in flight. It was, after all, a mechanical event, a boring event that had happened before in 1987 to a sister ship on the assembly line to Pan Am Flight 103, Pan Am Flight 125, as stated in NTSB AAR 92/02 for United Airlines Flight 811: '1.17.1 Previous Cargo Door Incident: On March 10, 1987, a Pan American Airways B-747-122, N740PA, operating as flight 125 from London to New York, experienced an incident involving the forward cargo door. According to Pan Am and Boeing officials

who investigated this incident, the flightcrew experienced pressurization problems as the airplane was climbing through about 20,000 feet. The crew began a descent and the pressurization problem ceased about 15,000 feet. The crew began to climb again, but about 20,000 feet, the cabin altitude began to rise rapidly again. The flight returned to London. When the airplane was examined on the ground, the forward cargo door was found open about 1 1/2 inches along the bottom with the latch cams unlatched and the master latch lock handle closed. The cockpit cargo door warning light was off.

So, the investigators for Pan Am Flight 103 in 1989 and 1990 had two early model Boeing 747s to compare and all three had the sudden loud sound followed by an abrupt power cut plus many other similarities.

Both United Airlines Flight 811 and Pan Am Flight 103 were:
Aged.

High flight time.

Early model-100.

Poly x wired.

Boeing 747.

Experienced hull rupture forward of the wing on right side in cargo door area.

Shape of hull rupture forward of the wing on the right side is rectangle with specific rectangular shape.

Fodded number three engine.

On fire number three engine.

Sudden sound on CVR

Loud sound on the CVR.

Short duration sound on the CVR.

Abrupt power cut to FDR.

Outwardly peeled and down skin in cargo door area from aft

midspan latch.

Longitudinal break at midline of the forward cargo door at midspan latch.

More severe inflight damage on starboard side.

At least nine never recovered bodies.

Vertical fuselage tear lines forward of the wing and aft of cargo door.

Torn off and missing skin in forward cargo door area on starboard side.

Outward peeled skin on upper forward fuselage.

Destruction initially thought to be have been caused by a bomb.

Pan Am Flight 103 and Air India Flight 182 were both:

early model,

poly x wired,

Boeing 747,

suffered hull rupture in forward cargo hold,

engine three falls apart from other engines,

sudden sound on CVR,

loud sound on the CVR,

short duration sound on the CVR,

abrupt power cut to FDR,

sound does not match bomb sound,

outward peeled skin in cargo door area,

midspan latch status not determined,

more severe inflight damage on starboard side,

at least nine never recovered bodies,

vertical fuselage tear lines forward of the wing and aft of cargo door,

inadvertent opening of the forward cargo door in flight offered as explanation during official inquiry,

bomb in forward cargo hold initially suspected.

Which one to pick? Which one to refer to in the AAIB report for Pan Am Flight 103?

All three had explosions in the forward cargo compartment. Forward cargo doors were known to open in flight. A suddenly opened cargo door in flight was known to be catastrophic in wide body airliners. What did the forward cargo door areas of the three early model Boeing look like after the fatal events?

By text and pictures they all looked basically the same, door split longitudinally, frayed from an outward force, vertical tear lines above door edges, and missing essential pieces of the door.

Which accident to match was the one with the irrefutable, indisputable, and plain to see probable cause? Yes, United Airlines Flight 811 as a mechanical cause, not a conspiracy sabotage terrorist act.

And yet, which accident is compared to Pan Am Flight 103 and referred to at length in the AAIB 2/90 report? Yes, Air India Flight 182 as a terrorist bombing.

The trail of bomb conclusion led from Air India Flight 182 to Pan Am Flight 103 while ignoring United Airlines Flight 811, still ignored for Trans World Airlines Flight 800, and now, incredibly, still ignored for China Airlines Flight 611.

So, you see, Mr. Smart, facts and truth have little to do with a probable cause for Pan Am Flight 103 according to the authorities. Narrow perspective, selfish attitudes, and small minds believing in myth and superstition ruled in 1990. And the aviation safety authorities went along for the ride.

Judge Kirpal decided he knew what caused a plane to crash and it was a bomb although the Canadian aviation accident officials declined to state the cause of the explosion. Three years later the UK and USA faced the same mystery and agreed it was a bomb too. Then seven years after that the USA faced another similar mystery and tried to make it a bomb for a year and a half but reason prevailed and it was not a bomb. And now, six years after that, another mystery Boeing 747 suffers an inflight breakup and now the Chinese get a chance to solve their mystery.

And all along United Airlines Flight 811 is ignored as if it never happened; as if it is not relevant, as if it were a ghost.

I believed, Mr. Smart, that by your producing the photographs of the starboard side of Pan Am Flight 103 that you had an open mind, you had a wider view, and that you were not selfish in pursuit of favor with your bosses. I believed you actually were willing to consider all probable causes for Pan Am Flight 103 as long as they made sense, were backed up by facts and evidence, and exposed a current hazard to flying passengers.

You stated to me the obvious: the forward cargo door of Pan Am Flight 103 opened in flight but added it happened after the 'bomb' went off. Well, fine, let us discuss when that door opened in flight. I offered as evidence the wreckage distribution drawings that showed it happened at initial event time. Why do you think it happened later? Why do you think a relatively mild directed blast that gives minor damage to a baggage container and makes a 20 inch hole in the fuselage skin can be construed to be a powerful spherical plastic bomb sufficient to cause the nose of a 747 to tear off? What do you think caused the peeled back skin from the aft midspan latch of the forward cargo door? Why do you never mention United Airlines Flight 811 when discussing Pan Am

Flight 103? Why is there no mention of the forward cargo door in the AAIB report? I ask these questions not in a belligerent manner but to really find out why. Those questions have been on my mind to ask aviation authorities for 12 years.

We are on the same side for aviation safety. Do you have other priorities? What can be more important than preventing death from a plane crash? All other reasons are secondary to me such as promotion, fame, adulation from strangers, loyalty towards friends, and respect from media. But then, I can afford the luxury of being objective since my job or financial status or popularity is not on the line here and I have the motivation to pursue this forever because of my near death experience in a sudden night fiery fatal jet airplane crash.

I'll understand but will be disappointed if you stop corresponding, Mr. Smart. I'll understand if Pan Am Flight 103 just lies there forever a bomb although the facts and hindsight say otherwise. Judge Kirpal was partially wrong with Air India Flight 182 and it led to Pan Am Flight 103. The AAIB was partially wrong with Pan Am Flight 103 and it led to Trans World Airlines Flight 800. NTSB was partially wrong about Trans World Airlines Flight 800 and it may have led to China Airlines Flight 611. We shall see.

I ask again to keep that open mind with a larger view, Mr. Smart. If China Airlines Flight 611 proves to be a forward cargo door event, will you please reconsider Pan Am Flight 103 in light of the newer advantage of hindsight?

History is important to be accurate and never more so than aviation safety which is built upon the discovered errors which can be corrected.

We are on the same side for aviation safety.

Sincerely,
Barry Smith

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IN THE HIGH COURT OF JUSTICIARY AT CAMP ZEIST

Lord Sutherland

Lord Coulsfield

Lord MacLean

Case No: 1475/99

OPINION OF THE COURT

delivered by LORD SUTHERLAND

in causa

HER MAJESTY'S ADVOCATE

v

ABDELBASET ALI MOHMED AL

MEGRAHI and AL AMIN KHALIFA

FHIMAH, Prisoners in the Prison of Zeist,

Camp Zeist (Kamp van Zeist), The

Netherlands

Accused

Act: The Lord Advocate, AP Campbell QC, Advocate Depute;

Turnbull QC,

Advocate Depute; Lake and Armstrong; the Crown Agent.

Alt: Taylor QC; Burns QC; Beckett, McCourts, Solicitors,
Edinburgh for the
first accused.

Keen QC; Davidson QC, Macleod, McGrigor Donald, Solicitors,
Edinburgh for the second accused.

[1] At 1903 hours on 21 December 1988 PanAm flight 103 fell
out of the sky.

The 259 passengers and crew members who were on board and
11 residents of

Lockerbie where the debris fell were killed. The Crown case is
that the cause of the

disaster was that an explosive device had been introduced into
the hold of the aircraft

by the two accused whether acting alone or in concert with each
other and others.

This device exploded when the aircraft was in Scottish air space
thus causing the

aircraft to disintegrate. In these circumstances it was originally
contended that the

accused were guilty of conspiracy to murder, alternatively
murder, alternatively a

contravention of section 2(1) and (5) of the Aviation Security Act
1982. At the

conclusion of the Crown's submissions, however, the libel was
restricted to the charge
of murder.

[2] It is not disputed, and was amply proved, that the cause of the
disaster was

indeed the explosion of a device within the aircraft. Nor is it
disputed that the person

or persons who were responsible for the deliberate introduction
of the explosive

device would be guilty of the crime of murder. The matter at

issue in this trial
therefore is whether or not the Crown have proved beyond
reasonable doubt that one
or other or both of the accused was responsible for the deliberate
introduction of the device.

From Smith AAR for Pan Am Flight 103:

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AIRCRAFT
ACCIDENT
REPORT
Pan Am Flight 103
Part IV
Comparison between AAIB 2/90 and Smith AAR for PA 103

Report on the accident to
Boeing 747-121, N739PA
at Lockerbie, Dumfriesshire, Scotland
on 21 December 1988
by John Barry Smith,
Independent Aircraft Accident Investigator
Part IV: Comparison between AAIB 2/90 and Smith AAR for PA
103

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6. Observation:

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7. Observations:

In the AAIB report there is a grammatical error in verb tense and irrelevant inclusions of phrases and conclusions for bomb explosion which are unsupported by evidence.

8. Observations:

There are two photographs in the AAIB report of the port "bomb" side hole

9. Observation:

The latch status of the forward cargo door is omitted whilst the latch status of the identical aft cargo door (frames 1800-1920)

and the CRAF door is given and stated as "latched."

10. Observation:

There is much more airframe damage on the starboard side of the airframe away from the "bomb" explosion in areas such as the leading edge of the right wing and the right horizontal stabilizer.

11. Observation:

There was a single primary return received by both Great Dun Fell and Claxby radars approximately 16 seconds before SSR returns were lost.

12. Observation:

The aircraft, Flight PA103 from London Heathrow to New York, had been in level cruising flight at flight level 310 (31,000 feet)

13. Observation:

Pan Am Flight 103 was proceeding normally until a sudden, loud, audible sound was immediately followed by an abrupt power cut to the data recorders.

14. Observation:

The evidence of Pan Am Flight 103 was matched to Air India Flight 182 in AAIB 2/90 but not to United Airlines Flight 811.

1. Observations:

Engine number three was the only engine to fall apart from the others; it was the only one to catch fire; and it contained ingested debris from within the aircraft.

There are confusing statements in the AAIB report regarding which engines had foreign object damage:

"...it is reasonable to deduce that a manoeuvre of the aircraft occurred before most of the energy of the No 2 engine fan was lost due to the effect of ingestion (seen only in this engine.)"

"...No 3 engine, identified on site as containing ingested debris from within the aircraft,..."

A. Bomb explanation:

No explanation given for engine number three falling 1100 meters apart from the others. When the bomb explosion caused the 20 inch hole on the port side, the ejected debris went out and into engine number two but not serious enough to cause a fire, then went under the fuselage and into far away engine number three causing the foreign object damage and fire. The distance from bomb explosion hole to engine number two is about 27 feet aft and 30 feet outboard and the distance to engine number three is 27 feet aft and 50 feet outboard.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The major amount of ejected material from within the cabin or baggage hold, which had opened up in the starboard side in the explosive decompression, entered the nearby engine number three causing it to catch fire. A minor amount of ejected material from the small shotgun firing hole on port side went into engine number two. The large hole where the cargo door and skin used to be caused the forward fuselage section to bend to the starboard and impact engine number three causing it to break loose and fall apart from the other three engines. No explanation given for contradiction in AAIB report on which engines ingested foreign objects and when it occurred.

C. Conclusions:

It makes little sense that foreign objects ejected from a small hole on the port side would go around the fuselage and into engine number three serious enough to cause a fire.

It makes greater sense that foreign objects from the cabin or baggage hold ejected from the very large hole on the starboard side would go into nearby engine number three; and when the larger amount of ejected material went into engine number three

a normal consequence of fire ensued. When the nose bent to the starboard because of the large hole where the door and skin used to be, the forward fuselage section hit engine number three and broke it loose to land apart from the other three engines still attached to the wing.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

“By similar reasoning, the absence of such shingling damage on blades of No 3 engine was a reliable indication that it suffered no ingestion until well into the accident sequence.”

(ii) No 3 engine, identified on site as containing ingested debris from within the aircraft, nonetheless had no evidence of the type of shingling seen on the blades of No 2 engine. Such evidence is usually unmistakable and its absence is a clear indication that No 3 engine did not suffer a major intake airflow disturbance whilst delivering significant power.

(iii) All 3 engines had evidence of blade tip rubs on the fan cases having a combination of circumference and depth greater than hitherto seen on any investigation witnessed on Boeing 747 aircraft by the Pratt and Whitney specialists. Subsequent examination of No 4 engine confirmed that it had a similar deep, large circumference tip rub. These tip-rubs on the four engines were centred at slightly different clock positions around their respective fan cases.

2.5 Engine evidence The shingling damage noted on the fan blades of No 2 engine can only be attributed to airflow disturbance caused by ingestion related fan blade damage occurring when substantial power was being delivered. This is readily explained by the fact that No 2 engine intake is positioned some 27 feet aft and 30 feet outboard of the site of the explosion and that the interior of the intake exhibited a number of prominent paint smears and general foreign object damage. By similar reasoning, the absence of such shingling damage on

blades of No 3 engine was a reliable indication that it suffered no ingestion until well into the accident sequence.Õ

ÔThe combination of the position of the explosive device and the forward speed of the aircraft was such that significant sized debris resulting from the explosion would have been available to be ingested by No 2 engine within milliseconds of the explosion. ...The onset of this time period would have been the time at which debris from the explosion first inflicted damage to fan blades in No 3 engine and, since the fan is only approximately 40 feet from the location of the explosive device, this would have been an insignificant time interval after the explosion.Õ

ÔExamination of engines: The No 3 engine had fallen 1,100 metres north of the other three engines, striking the ground on its rear face, penetrating a road surface and coming to rest without any further change of orientation i.e. with the front face remaining uppermost. The intake area contained a number of loose items originating from within the cabin or baggage hold. It was not possible initially to determine whether any of the general damage to any of the engine fans or the ingestion noted in No 3 engine intake occurred whilst the relevant engines were delivering power or at a later stage.Õ

2. Observation:

Forward fuselage section was bent to starboard and then entirely detached.

A. Bomb explanation:

No explanation given why a 20 inch bomb shatter hole on the port side caused the forward fuselage section to bend to starboard and separate.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

A twenty foot by thirty foot hole appeared suddenly on the starboard side where the forward cargo door and skin around it used to. The large hole was too large for the fuselage to maintain structural integrity as the forward fuselage section forward of the forward cargo door bent to the starboard, hit number three engine, and the forward fuselage section separated.

C. Conclusions:

It makes little sense for a forward fuselage section to bend to the starboard and detach when the bomb exploded on the port side giving a small 20 inch hole which the aircraft is designed to withstand.

It makes greater sense that the forward fuselage section would bend into a huge hole on starboard side, lose structural integrity, and then separate.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) Quotes:

Ô1.12.3.3 General damage features not directly associated with explosive forces.

A number of features appeared to be a part of the general structural break-up which followed on from the explosive damage, rather than being a part of the explosive damage process itself. This general break-up was complex and, to a certain extent, random. However, analysis of the fractures, surface scores, paint smears and other features enabled a number of discreet elements of the break-up process to be identified. These elements are summarised below.

(v) A large, clear, imprint of semi-elliptical form was apparent on the lower right side at station 360 which had evidently been

caused by the separating forward fuselage section striking the No 3 engine as it swung rearwards and to the right (confirmed by No 3 engine fan cowl damage).

(iv) The forward fuselage deflected to the right, pivoting about the starboard window belt, and then peeled away from the structure at station 800. During this process the lower nose section struck the No 3 engine intake causing the engine to detach from its pylon. This fuselage separation was apparently complete within 3 seconds of the explosion.

(xiii) The No 3 engine detached when it was hit by the separating forward fuselage.

3. Observations:

There are only two small fragments of plastic which are the only hard evidence of a bomb. One is a fragment of circuit board (with serial number!) alleged to be part of a timer of for the bomb. This fragment was discovered at an unknown time by an unknown person on a baggage container behind the container manufacturer's data plate which contained a burnt piece of material which itself contained a fragment of circuit board. The other fragment was discovered in a buckled section of the metal container by an AAIB Inspector to contain, trapped within its folds, an item which was subsequently identified by forensic scientists at the Royal Armaments Research and Development Establishment (RARDE) as belonging to a specific type of radio-cassette player and that this had been fitted with an improvised explosive device (IED).

A. Bomb explanation:

Bomb exploded in a metal baggage container and blew the timer to pieces which lodged in baggage container. The data plate is on the outside of the container, not the inside and no explanation

given for its discovery on the outside of the container. A piece of plastic from a boom box radio-cassette player was found in the folds of the container and determined to be the bomb container holding the timer and plastic explosive. No explanation given for that determination.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The "timer" fragment did not get into a burnt piece of material and placed behind a data plate on the outside of the container by action of explosion or wind; it was placed there by a person and that person should be asked where and when he found the fragment and why he put it behind the manufacturer's data plate on the outside of that particular container. No explanation given for matching of fragment and container which blew up at 31000 feet.

The boom box fragment may have been a piece from a boom-box loaded into the baggage compartment by a passenger who listened to music. There is no supporting evidence that a piece of plastic from a boom box was part of a bomb or that the "timer" fragment was inside the plastic boom box.

C. Conclusions:

It makes little sense that a bomb containing a timer (which is neither timing or altitude actuated) explodes six miles high, scatters thousands of pieces of debris to the winds, and yet a fragment of the "timer" is found in the wreckage of the baggage container, identified as such, and placed on the outside in the correct container out of many. It makes little sense that a bomb with a timer exploded inside a suitcase inside a baggage container which then sends a fragment of the timer to lodge on the outside, not the inside, of the baggage container, which is

mostly intact. It makes little sense that a piece of a boom box which can reasonably be expected to be in a baggage compartment can be determined to be a makeshift bomb with no supporting evidence.

It makes greater sense that an unknown person put the plastic fragment behind the data plate for some unknown reason and that there was a boom box in a suitcase of a passenger who listened to music.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

Appendix F-5, item 5 which states, "Container manufacturer's data plate which contained a burnt piece of material which itself contained a fragment of circuit board."
"Container Reconstruction Those parts which could be positively identified as being from containers AVE 4041 PA and AVN 7511 PA were assembled onto one of three wooden frameworks; one each for the floor and superstructure of container 4041, and one for the superstructure of container 7511. Approximately 85% of container 4041 was identified, the main missing sections being the aft half of the sloping face skin and all of the curtain."

"While this work was in progress a buckled section of skin from container 4041 was found by an AAIB Inspector to contain, trapped within its folds, an item which was subsequently identified by forensic scientists at the Royal Armaments Research and Development Establishment (RARDE) as belonging to a specific type of radio-cassette player and that this had been fitted with an improvised explosive device."

"Examination of all other component parts of the remaining containers from the front and rear cargo holds did not reveal any evidence of blast damage similar to that found on containers

4041 and 7511.Ö

4. Observation:

The overall evidence of damage from an explosion of a powerful plastic bomb in the port side of the forward cargo hold is very limited.

A. Bomb explanation:

The powerful bomb exploded and caused a series of events which are difficult to explain but did cause the forward fuselage section to come off.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The firing of a rather large shotgun on the port side of the forward cargo compartment which may have given evidence which led investigators to conclude a powerful bomb had been detonated causing the destruction of Pan Am Flight 103. The limited damage to the fuselage skin and the baggage containers may have been caused by a rather large shotgun which fired after the nearby huge explosive decompression when the cargo door ruptured open. The evidence shows a relatively mild directed blast existed a corner of a baggage container, traveled 25 inches and caused a 20 inch hole in the fuselage skin. The sound of the mild directed blast was not heard on the cockpit voice recorder.

Bombs are loud, spherical, and powerful. Shotgun blasts are relatively mild and directed. The damage in the baggage container and adjacent area is from a mild directed blast as if a rather large shotgun had gone off at close range. The AAIB official opined the cause of the damage he/she personally viewed to be as if a rather large shotgun had been fired at the fuselage at close range. It may not have been exactly a shotgun but some

other type of directed firearm.

This AAIB opinion may have been correct in its assessment of the cause of the mild blast, pitting, sooting, distortions, ragged, and shattered skin as if a very large shotgun had been fired at the inner surface of the fuselage at close range. It may be that pitting, sooting, distortions, ragged, and shattered skin could also have been interpreted as evidence of a bomb explosion.

Loaded guns have been inserted into baggage holds of airliners before and have been accidentally discharged, (April 26, 2000 Gun goes off in bag being loaded into jet. Associated Press - Portland ÒA high-powered handgun went off in the baggage compartment of an Alaska Airlines jetliner on the tarmac at Portland International Airport, sending a bullet into the passenger compartment within inches of passengers' feet. Nobody was injured.Ó)

Shotgun cartridges give sooty residue when fired. A shotgun fires in a directed manner and would give a relatively mild blast compared to a high explosive bomb. The sound of the weapon firing is not heard on the cockpit voice recorder because the power had been abruptly cut after the tremendous explosive decompression when the huge hole appeared on the starboard side of the hold or the gunshot was over shouted by the tremendous noise from the huge hole and the explosive decompression.

The evidence corroborates the firing of a device called a rather large shotgun in a baggage container which caused a relatively mild directed blast which resulted in a 20 inch hole in the fuselage skin on the port side. This damage was not sufficient to cause the forward fuselage section to come off Pan Am Flight

103 because the structure was designed to withstand a hole that size in the pressurized hull by the presences of stiffeners, ribs, and belts. In fact, a Boeing 747 can withstand a hole of nine feet by twenty feet in the nose just forward of the wing as shown by United Airlines Flight 811.

The firing of the shotgun was after the explosive decompression because the sound of the gunshot is not on the cockpit voice recorder which had had an abrupt power cut.

The location in the forward cargo compartment in the baggage container which had its lower quadrant blown way may have held a rather large shotgun which was stored in baggage, was loaded, and was safe unless a tremendous explosion happened nearby. A tremendous explosion did happen nearby when the opposite fuselage blew out when a huge twenty foot by forty foot hold appeared suddenly where the forward cargo door and skin above it used to be. The rather large shotgun fired, the relatively mild directed explosion left soot on a rib, burst through the corner of the baggage container, went 25 inches and made a 20 inch hole in the port side of the fuselage. A sooty rib was soon found on the ground and incorrectly declared proof a bomb had gone off instead of a shotgun cartridge.

C. Conclusions:

It makes little sense that a 20 inch hole in the fuselage was caused by a powerful plastic bomb and that small hole would cause the forward fuselage section of a Boeing 747 to bend to the starboard and detach.

It makes greater sense that a rather large shotgun inadvertently fired in a suitcase and caused the 20 inch hole in the skin and other sooty evidence and misled investigators to believe it was the result of a powerful plastic bomb explosion.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

Fuselage: "Where these panels formed the boundary of the shatter zone, the metal in the immediate locality was ragged, heavily distorted, and the inner surfaces were pitted and sooted - rather as if a very large shotgun had been fired at the inner surface of the fuselage at close range."

Analysis: "With the two container reconstructions placed together it became apparent that a relatively mild blast had exited container 4041 through the rear lower face to the left of the curtain and impinged at an angle on the forward face of container 7511."

"Throughout the general examination of the aircraft wreckage, direct evidence of blast damage was exhibited on the airframe only in the area bounded, approximately, by stations 700 and 720 and stringers 38L and 40L. Blast damage was found only on pieces of containers 4042 and 7511, the relative location and character of which left no doubt that it was directly associated with airframe damage."

"Blast damage to the forward face of container 7511 was as a direct result of hot gases/fragments escaping from the aft face of container 4041. No evidence was seen to suggest that more than one IED had detonated on Flight PA103."

5. Observation:

The sudden loud sound on the cockpit voice recorder can be linked to the explosive decompression sound of a cargo door opening in flight on an airliner. The sudden loud sound has not been matched to any bomb explosion sound because of missing lower frequencies and a too slow rise time. The sudden loud sound is stated to be the initial event and is the best evidence

because it is direct proof of the explosion.

A. Bomb explanation:

No explanation given why a bomb explosion sound is absent from the CVR when it must be present if it were the initial event.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The initial event of sudden loud sound is the explosive decompression sound when the rupture/structural failure occurred and the air molecules rushed out making the sudden loud sound on the CVR. Pan Am Flight 103 has been matched to Air India Flight 182 in the AAIB report. This initial event sudden sound on the CVR for Air India Flight 182 has been matched to a DC-10 explosive decompression sound when its cargo door opened in flight. All four Boeing 747 sudden loud sound events, Air India Flight 182, Pan Am Flight 103, and United Airlines Flight 811 have been matched by NTSB in Chart 12 (Cover sheet of Part II of Smith AAR) of the public docket for Trans World Airlines Flight 800. The sound of the shotgun firing was not heard because the explosive decompression noise was louder or was because there was an abrupt power cut to the recorders after the sudden loud sound of explosive decompression.

C. Conclusions:

It makes little sense to disregard the most direct evidence of the initial event which is the sudden loud sound on the cockpit voice recorder which is not matched to a bomb explosion.

It makes greater sense to determine the sudden loud sound is the sound of the explosive decompression when the hull ruptures at the forward cargo door giving a sudden loud sound have been linked to an explosive decompression in a DC-10 cargo door

event.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

“Cockpit voice recorder The CVR tape was listened to for its full duration and there was no indication of anything abnormal with the aircraft, or unusual crew behaviour. The tape record ended, at 19:02:50 hrs +/- second, with a sudden loud sound on the CAM channel followed almost immediately by the cessation of recording whilst the crew were copying their transatlantic clearance from Shanwick ATC.” UK AAIB Report 2/90 Page 15 It is not clear if the sound at the end of the recording is the result of the explosion or is from the break-up of the aircraft structure. The short period between the beginning of the event and the loss of electrical power suggests that the latter is more likely to be the case. UK AAIB Report 2/90 Page 38

From the Canadian Aviation Occurrence Report: 2.10.2 Analysis by Accidents Investigation Branch (AIB), United Kingdom An analysis of the CVR audio found no significant very low frequency content which would be expected from the sound created by the detonation of a high explosive device. Considering the different acoustic characteristics between a DC-10 and a B747, the AIB analysis indicates that there were distinct similarities between the sound of the explosive decompression on the DC-10 and the sound recorded on the AI 182 CVR.

6. Observation:

Inflight damage to the airframe of Pan Am Flight 103 does not match airframe damage from a staged bomb explosion event in a Boeing 747 at Bruntingthorpe.

A. Bomb explanation:

No explanation given why staged Boeing 747 bombing evidence does not match the evidence of a terrorist planned bombing of another Boeing 747, Pan Am Flight 103.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

A real bombing gives an obvious and unique signature of specific evidence. That signature was present at the Bruntingthorpe staged bombing but absent from Pan Am Flight 103 because there was no bomb explosion.

C. Conclusions:

It makes little sense to disregard a mismatch between a real bombing event and a presumed bombing event and continue to call the presumed event a bomb explosion.

It makes greater sense to determine Pan Am Flight 103 was not a bombing event because a bomb signature, such as that found at Bruntingthorpe staged bombing, was absent.

D. Quote from official at Bruntingthorpe:

"Very small amounts of explosives left very distinctive marks, unlike anything we've seen on the plane," said one investigative source, speaking of the recent tests. "Even the small amounts [of explosives] left distinctive signatures on the structures, so if a small bomb had gone off, it clearly would leave a signature."

7. Observations:

In the AAIB report there is a grammatical error in verb tense and irrelevant inclusions of phrases and conclusions for bomb explosion which are unsupported by evidence.

AAIB 2/90:

ÔThe datum line, discussed at paragraph 1.12.1.6, was derived from a detailed analysis of the distribution of specific items of wreckage, including those exhibiting positive evidence of a detonating high performance plastic explosive.Õ

ÔThe items used to define the datum line, included those exhibiting positive evidence of a detonating high performance plastic explosive, would have been the first pieces to have been released from the aircraft.Õ

A. Bomb explanation:

Any time an opportunity arises to declare a bomb exploded in Pan Am Flight 103 is a good time.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The AAIB report is generally well written, precise, grammatically correct, and punctuation is perfect; however, the only two exceptions deal with statements about the Ôplastic explosiveÕ.

The text reads clearer: ÔThe datum line, discussed at paragraph 1.12.1.6, was derived from a detailed analysis of the distribution of specific items of wreckage.Õ The inclusion of the phrase, Ô...including those exhibiting positive evidence of a detonating high performance plastic explosive,Ó is irrelevant and incongruous in context of datum lines.

And:

ÔThe items used to define the datum line would have been the first pieces to have been released from the aircraft.Õ The inclusion of the almost identical strange phrase, Ô...included those exhibiting positive evidence of a detonating high

performance plastic explosive, is appended, grammatically incorrect as written, and incongruous in context of datum lines.

C. Conclusions:

It makes little sense that AAIB investigators who have written an important document which is precise and grammatically correct in most respects would make grammar errors in two sentences concerning a detonating high performance plastic explosive.

It makes greater sense that the the phrases were inserted as changes at the last minute by a non-AAIB official to bolster a weak case and the insertions were not caught by AAIB officials.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

“The datum line, discussed at paragraph 1.12.1.6, was derived from a detailed analysis of the distribution of specific items of wreckage, including those exhibiting positive evidence of a detonating high performance plastic explosive. The scatter of these items about the datum line may have been due partly to velocities imparted by the force of the detonating explosive and partly by the difficulty experienced in pinpointing the location of the wreckage accurately in relatively featureless terrain and poor visibility. However, the random nature of the scatter created by these two effects would have tended to counteract one another, and a major error in any one of the eleven grid references would have had little overall effect on the whole line. There is, therefore, good reason to have confidence in the validity of the datum line.

“The items used to define the datum line, included those exhibiting positive evidence of a detonating high performance plastic explosive, would have been the first pieces to have been

released from the aircraft.

8. Observations:

There are two photographs in the AAIB report of the port side hole just forward of the wing in the wreckage reconstruction, B-16 and B-17, and two identical artist impressions of the port side bomb explosion on B-19 and B-24. There are no pictures of the shattered starboard, cargo door, side just forward of the wing in the wreckage reconstruction. The forward cargo door is sketched in as undamaged in B-20 and B-21 in three drawings of explosive damage which contradicts the wreckage reconstruction evidence in the photographs of the shattered forward cargo door.

A. Bomb explanation:

The only important side to look at is the bomb explosion side which is the port side with its 20 inch hole in the fuselage skin and worthy of two photographs, two identical sketches and another of an artist impression of the explosion. The twenty foot by thirty foot hole in the starboard side, the cargo door side, is not relevant and thus can be omitted.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

No explanation given for omission of photographs of the wreckage reconstruction of the other side of the cargo hold said to contain a powerful bomb. No explanation given for sketches of an undamaged forward cargo door when the photographic evidence shows it shattered. Recent photographs of the forward cargo door area are very revealing and show much outward shattered skin and missing parts. The port side damage was exaggerated in sketches and the starboard side damage omitted or played down.

C. Conclusions:

It makes little sense to go to the expense of a total fuselage reconstruction and only show one side, a relatively smooth port side while omitting a shattered starboard side.

It makes greater sense that the investigators were making a case for a bomb explosion on the port side and deemed any other information which contradicted that conclusion as irrelevant and distracting and thus omitted.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

“To facilitate this additional work, wreckage forming a 65 foot section of the fuselage (approximately 30 feet each side of the explosion) was transported to AAIB Farnborough, where it was attached to a specially designed framework to form a fully three-dimensional reconstruction [Appendix B, Figures B-16 and B-17] of the complete fuselage between stations 360 & 1000 (from the separated nose section back to the wing cut out). The support framework was designed to provide full and free access to all parts of the structure, both internally and externally.”

9. Observation:

The latch status of the forward cargo door is omitted whilst the latch status of the identical aft cargo door (frames 1800-1920) and the CRAF door is given and stated as “latched.”

A. Bomb explanation:

The latch status of the forward cargo door is unimportant as it was not involved in any way with the bomb explosion and thus omitted.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The assumption must be made that the latch status of the forward cargo door was "unlatched" or "unknown," since, if it were latched, it would have been reported as same.

No explanation given for the omission in the report of the latch status of a cargo door which is known to have failed before, is a complex device prone to airworthiness directives, and was very near the site of the "bomb" explosion.

C. Conclusions:

It makes little sense to omit such vital information about a complex device that has failed before which could cause a hull rupture inflight if it had failed again.

It makes greater sense that the information was omitted because it conflicted with the official conclusions of a bomb explosion and thus deemed unimportant.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes: "The CRAF door itself (latched) apart from the top area containing the hinge;"

"Other items found in the wreckage included both body landing gears, the right wing landing gear, the left and right landing gear support beams and the cargo door (frames 1800-1920) which was latched."

10. Observation:

There is much more airframe damage on the starboard side of the airframe away from the "bomb" explosion in areas such as the leading edge of the right wing and the right horizontal stabilizer.

A. Bomb explanation:

The ejected material and skin from the post side bomb explosion went out, aft, and over the fuselage then impacted the

starboard side wing and tailplane. The bomb energy spread out and through the aircraft gaining power and blew out the faraway sections of skin although it was not possible to find a specific mechanism for the damage.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The more severe starboard side fuselage, tail, and wing damage was caused by the tremendous explosive decompression on the starboard side of the fuselage just forward of the wing in the forward cargo door area. The evidence of localised skin separation and peel-back is from the explosive decompression forces, not the relatively mild blast from the bomb explosion.

C. Conclusions:

It makes little sense that a small 20 inch hole on the port side could cause the severe damage on the starboard side of the airframe or that material from the port side of the aircraft travels out, over, and aft of the fuselage and impacts on the starboard side of the tailplane.

It makes greater sense that the more severe airframe localised skin separation and peel-back inflight damage on the starboard side is because of the massive ejected material and torn away skin from the forward cargo door area on the starboard side of the airframe from the explosive decompression that ejected material out and directly aft into the right wing leading edge, engine number three and right horizontal stabilizer.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

Whilst it has not been possible to find a specific mechanism to explain the regions of localised skin separation and peel-back (i.e. the 'pressure blow' regions referred to in para 2.12.2), they were almost certainly the result of high intensity shock

overpressures produced locally in those regions as a result of the additive recombination of shock waves transmitted through the lower hull cavities. It is considered that the relatively close proximity of the left side region of damage just below floor level at station 500, [Appendix B, Figure B-19, region D] to the forward end of the cargo hold may be significant insofar as the reflections back from the forward end of the hold would have produced a local enhancement of the shock overpressure. Similarly, 'end blockage effects' produced by the cargo door frame might have been responsible for local enhancements in the area of the belly skin separation and curl-back at station 560.

(iv) The fuselage left side lower lobe from station 740 back to the wing box cut-out, and from the window level down to the cargo deck floor (the fracture line along stringer 38L), had peeled outwards, upwards and rearwards - separating from the rest of the fuselage at the window belt. The whole of this separated section had then continued to slide upwards and rearwards, over the fuselage, before being carried back in the slipstream and colliding with the outer leading edge of the right horizontal stabiliser, completely disrupting the outer half.

The right tailplane exhibited massive leading edge impact damage on the outboard portion which also appeared to have progressed to disruption of the aft torsion box. A fragment of right tailplane spar cap was found embedded in the fuselage structure adjacent to the two vent valves, just below, and forward of, the L2 door and it is clear that this area of forward left fuselage had travelled over the top of the aircraft and contributed to the destruction of the outboard right tailplane.

11. Observation:

There was a single primary return received by both Great Dun

Fell and Claxby radars approximately 16 seconds before SSR returns were lost. The return was only present for one paint and no explanation can be offered for its presence. It is displayed as a green diamond in Figures C-15 through C-23 in the AAIB Report 2/90.

A. Bomb explanation:

No explanation given for radar returns shown as green diamond. Information was disregarded.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

One primary target on one radar may be an artifact. Two targets on two radars may be a coincidence. Two targets on two radars at the same time and at the same place is a real target which means a large piece of metal reflected radar energy to two radars.

The explanation offered for its presence is of the lower half of the forward cargo door rupturing outward and spinning away in the night. The angles of the spinning metal skin were such to only return energy to two radars on only one sweep. A precedent was set of surveillance radars picking up pieces of cargo door spinning away in flight has been set by United Airlines Flight 811.

C. Conclusions:

It makes little sense for a genuine primary radar target to appear just before the destruction of a large airliner and for that target information to be disregarded.

It makes greater sense that when the lower half of the forward cargo door ruptured open in flight and ejected the door pieces and fuselage skin into the air that two radars picked up the reflections from the spinning metal skin and the target appeared on the radar scopes at the same time at the same location.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

ÔRecorded radar information: Recorded radar information on the aircraft was available from from 4 radar sites. Initial analysis consisted of viewing the recorded information as it was shown to the controller on the radar screen, from this it was clear that the flight had progressed in a normal manner until Secondary Surveillance Radar (SSR) was lost. There was a single primary return received by both Great Dun Fell and Claxby radars approximately 16 seconds before SSR returns were lost. The Lowther Hill and St. Annes radars did not see this return. The Great Dun Fell radar recording was watched for 1 hour both before and after this single return for any signs of other spurious returns, but none was seen. The return was only present for one point and no explanation can be offered for its presence.Õ

12. Observation:

The aircraft, Flight PA103 from London Heathrow to New York, had been in level cruising flight at flight level 310 (31,000 feet) for approximately seven minutes when the last secondary radar return was received just before 19.03 hrs. The radar then showed multiple primary returns fanning out downwind.

A. Bomb explanation:

A bomb was placed in a Boeing 727 which took off from Malta and flew to Frankfurt Germany without the bomb going off. The plane then flew to London without the bomb going off. The bomb was transferred to a Boeing 747 which took off and then the bomb went off. The timer was thus not an altitude timer nor a timing timer but a timer of unknown type.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The explosion occurred soon after the highest pressure differential was reached, 8.9 PSI at 31000 feet MSL, when the midspan latches ruptured open the forward cargo door. There was no bomb and there was no timer and there was no bomb explosion but there was something that looked, smelled, and sounded like a bomb explosion, but wasn't. It was a tremendous explosion of an explosive decompression from a hull rupture at a door. There was something that looked like a rather large shotgun had gone off in a baggage container and it probably was and it probably did which led investigators to assume a bomb explosion had occurred.

C. Conclusions:

It makes little sense for a bomb to be placed aboard an aircraft which flies and flies without detonating and then the bomb is transferred to another plane which explodes later by some unknown type of timer.

It makes greater sense that an explosive decompression occurred, which mimics a bomb explosion, at the highest pressure differential in the hull soon after takeoff and cruise established.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

None regarding the several flights of the bomb in two aircraft in three airports in three countries before it detonated.

13.Observation:

Pan Am Flight 103 was proceeding normally until a sudden, loud, audible sound was immediately followed by an abrupt power cut to the data recorders.

A. Bomb explanation:

The bomb explosion cut the power to the recorders.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The tremendous explosive decompression explosion cut the power to the recorders in the adjacent main equipment compartment abruptly after the sudden loud sound of the air rushing out of the forward cargo compartment was picked up on the cockpit voice recorders.

C. Conclusions:

It makes little sense that a relatively mild explosion which caused a 20 inch hole in the fuselage skin would cause an abrupt power cut to the recorders when the aircraft is designed to easily withstand such an event.

It makes greater sense that a tremendous explosive decompression would cause an abrupt power cut to the recorders in the adjacent compartment.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

ÔDigital flight data recordings The analysis of the recording from the DFDR fitted to N739PA, showed that the recorded data simply stopped. Following careful examination and correlation of the various sources of recorded information, it was concluded that this occurred because the electrical power supply to the recorder had been interrupted at 19:02:50 +- second. UK AAIB Report 2/90 Page 37 The analysis of the cockpit voice recording, which is detailed in Appendix C, concluded that there were valid signals available to the DVR when it stopped at 19:02.50 +- second because the power supply to the recorder was interrupted. It is not clear if the sound at the end of the recording is the result of the explosion or is from the break-up of the aircraft structure. The short period between the beginning of the event and the loss of electrical power suggests that the latter is more likely to be the case. UK AAIB Report 2/90 Page 38

14. Observation:

The evidence of Pan Am Flight 103 was matched to Air India Flight 182 in AAIB 2/90 but not to United Airlines Flight 811.

A. Bomb explanation:

Air India Flight 182 was deemed a bomb explosion by the Indian judicial authorities. Since Pan Am Flight 103 was determined early on to be a bomb explosion, only that flight information was relevant and thus compared and included in AAIB 2/90.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

No explanation given why the evidence of United Airlines Flight 811 with much similar evidence to Pan Am Flight 103 was not matched to Pan Am Flight 103 as well as Air India Flight 182 in AAIB 2/90.

Both United Airlines Flight 811 and Pan Am Flight 103 were:
Aged.

High flight time.

Early model-100.

Poly x wired.

Boeing 747.

Experienced hull rupture forward of the wing on right side in cargo door area.

Shape of hull rupture forward of the wing on the right side is rectangle with specific rectangular shape.

Fodded number three engine.

On fire number three engine.

Sudden sound on CVR

Loud sound on the CVR.

Short duration sound on the CVR.

Abrupt power cut to FDR.

Outwardly peeled and down skin in cargo door area from aft midspan latch.

Longitudinal break at midline of the forward cargo door at midspan latch.

More severe inflight damage on starboard side.

At least nine never recovered bodies.

Vertical fuselage tear lines forward of the wing and aft of cargo door.

Torn off and missing skin in forward cargo door area on starboard side.

Outward peeled skin on upper forward fuselage.

Destruction initially thought to be have been caused by a bomb.

C. Conclusions:

It makes little sense to ignore closely matching evidence of Pan Am Flight 103 to another similar event of United Airlines Flight 811 while including an accident with inconclusive findings, Air India Flight 182.

It makes greater sense to compare Pan Am Flight 103 to United Airlines Flight 811 as well as Air India Flight 182. (Trans World Airlines Flight 800 had not yet occurred.)

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

ÔDetection of explosive occurrences: In the aftermath of the Air India Boeing 747 accident (AI 182) in the North Atlantic on 23 June 1985, RARDE were asked informally by AAIB to examine means of differentiating, by recording violent cabin pressure pulses, between the detonation of an explosive device within the cabin (positive pulse) and a catastrophic structural failure (negative pulse).Õ

15. Conclusions:

Pan Am Flight 103 occurred before United Airlines Flight 811 and Trans World Airlines Flight 800 and after Air India Flight 182.

The AAIB Aircraft Accident Report No 2/90 (EW/C1094) report reflects the sentiment of the times in the late 1980s that terrorists were everywhere and were blowing up airplanes at will. The determination was made within days of the inflight breakup that the cause was probably a bomb explosion and efforts were directed toward catching the culprits. A precedent has been set by the Indian government who declared that the similar accident, Air India Flight 182, was caused by a bomb explosion in the forward cargo hold, although the Canadians refused to state the cause of that explosion. A mechanical explanation for Pan Am Flight 103, such as that of United Airlines Flight 811, was given very little consideration.

The AAIB investigators did not have the luxury of hindsight to learn the lessons of Trans World Airlines Flight 800 nor did they take advantage of the lessons of United Airlines Flight 811 which occurred a short two months later after Pan Am Flight 103.

The writers of the AAIB report struggled to explain how a relatively mild directed blast on the port side of the forward cargo compartment caused outward ruptures faraway from the shatter zone, caused foreign object damage in an engine far away, caused inflight damage to an opposite side horizontal stabilizer, and caused much more damage throughout the starboard side of the airframe. They stretched with explanations such as the ejected material did strange things by going over, around, and under the fuselage to get to the affected areas. They brought in a theory of Mach Stem which presents the novel idea

that a mild blast which disseminates through ducts and baggage containers actually manages to gain enough energy to do more damage faraway even as the energy is being absorbed by suitcases, baggage containers, and floor panels.

The writers ignored the logical questions of how a mild blast on the port side could have caused such a large hole opposite on the starboard side at initial event time; why the forward section buckled to the starboard instead of the port side; why was the sound of a powerful bomb not heard on the cockpit voice recorder; how a mild blast abruptly shut off the entire power supply to the aircraft, and how a piece of timer of a bomb which exploded high up shows up inexplicably tucked in behind a plate on the outside of a baggage container.

Only photographs of the port side are revealed, no text explanations are given to the starboard side opposite, sketches of the cargo door are inaccurate while the port side sketches are exaggerated. The writers generally ignored the starboard side of the wreckage reconstruction although it showed more damage than the port and all of the inflight damage to engine number three, right wing, and right horizontal stabilizer would be easily explained if the explosion had occurred on the starboard side.

The AAIB report reads more like a prosecution case for a crime of a terrorist bombing than an objective investigative aircraft accident report. In fact, one could say the report doth protest too much that it was a bomb explosion. (As one might say the Smith AAR doth protest too much it was a wiring/cargo door event.)

The precision of the English language was put to good use by the conclusions reached of an "Improvised Explosive Device" instead of a "Bomb" since the evidence did show an improvised

explosive device and not a bomb explosion, although the intent was for the reader to believe it was a bomb explosion. To this day, officials continue to call the object which started the destruction a "device" and not a "bomb".

Mechanical alternatives were not given due consideration after the first few days when a sooty and pitted rib was found in the wreckage. There is very little information in the AAIB report about possible alternatives such as a center fuel tank explosion, hull rupture by structural failure, or explosive decompression by a mechanical source such as inadvertently opened cargo door or cargo shift.

Since major aircraft accidents now have international repercussions, politics which reflects the popular will of the moment takes precedence over objective investigations conducted in a calm and thoughtful manner. Extreme pressure was put on all investigative authorities from law enforcement to aviation accident investigators for a quick answer to the cause of Pan Am Flight 103. A popular answer was that the cause was not the fault of the manufacturer, the airline, or the government oversight agencies but was the fault of evil terrorists who had managed to slip by inadequate security. The direction of the investigation was set; a crime of a bombing and find the perpetrators.

The result is AAIB Aircraft Accident Report No 2/90, written fifteen months after Pan Am Flight 103 suffered the inflight breakup which appeared to be caused by a bomb, was assumed to be a bomb explosion, and almost all of the report describes what happened after the bomb went off on the port side of the forward cargo compartment. To this day, it is assumed a bomb exploded in Pan Am Flight 103 and the only disagreements are who put it

there, when, and why.

The conclusion reached by this investigator in this AAR is that there was no bomb in Pan Am Flight 103. There was no bomb explosion. There was something that looked like a bomb explosion but wasn't. The evidence revealed by subsequent similar accidents indicates that there was a tremendous explosion of an explosive decompression when the forward cargo door ruptured open in flight, probably at the midspan latches and probably caused by faulty wiring or switch.

Respectfully submitted;

John Barry Smith
Independent Aircraft Accident Investigator
1 May 2002,
Carmel Valley, California

Below is from NTSB AAR 92/02 for United Airlines Flight 811:

'1.17.1 Previous Cargo Door Incident

On March 10, 1987, a Pan American Airways B-747-122, N740PA, operating as flight 125 from London to New York, experienced an incident involving the forward cargo door. According to Pan Am and Boeing officials who investigated this incident, the flightcrew experienced pressurization problems as the airplane was climbing through about 20,000 feet. The crew began a descent and the pressurization problem ceased about 15,000 feet. The crew began to climb again, but about 20,000 feet, the cabin altitude began to rise rapidly again. The flight returned to London.

When the airplane was examined on the ground, the forward cargo door was found open about 1 1/2 inches along the bottom with the latch cams unlatched and the master latch lock handle

closed. The cockpit cargo door warning light was off. According to the persons who examined the airplane, the cargo door had been closed manually and the manual master latch lock handle was stowed, in turn closing the pressure relief doors and extinguishing the cockpit cargo door warning light. Subsequent investigation on N740PA revealed that the latch lock sectors had been damaged and would not restrain the latch cams from being driven open electrically or manually. It was concluded by Boeing and Pan Am that the ground service person who closed the cargo door apparently had back-driven (opened) the latches manually after the door had been closed and locked. The damage to the sectors, and the absence of other mechanical or electrical failures supported this conclusion.

Further testing of the door components from N740PA and attempts to recreate the events that led to the door opening in flight revealed that the lock sectors, even in their damaged condition, prevented the master latch lock handle from being stowed, until the latch cams had been rotated to within 20 turns (using the manual 1/2 inch socket drive) of being fully closed. A full cycle, from closed to open, is about 95 turns with the manual drive system.'

From the Kirpal Report for Air India Flight 182:

ACTION TAKEN BY THE COURT

1.4.1 Despite the fact that Mr. H.S. Khola had been appointed as the Inspector of Accidents under Rule 71 of the Aircraft Rules, the Government thought it proper to appoint Mr. Justice B.N. Kirpal as the Court to investigate into the circumstances of the accident.

NOTICE AIR INDIA KANISHKA ACCIDENT INVESTIGATION

The Government of India, vide Notification dated 13th July, 1985, appointed Hon'ble Mr. Justice B.N. Kirpal as a Court to

investigate into the accident to Air India's Boeing 747 aircraft VT-EFO (KANISHKA) near the Irish Coast on 23rd June, 1985, when the aircraft was engaged on a scheduled passenger flight from Montreal to Bombay via London and New Delhi.

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>
Subject: To Ken Smart: Line of communication open Pan Am Flight 103

Dear Bill, below sent to Mr. Smart for his consideration.

Cheers,
Barry

Date: Sun, 9 Jun 2002 22:00:39 -0700
To: Ken Smart <ksmart@aaib.gov.uk>
From: John Barry Smith <barry@corazon.com>
Subject: Line of communication open Pan Am Flight 103
Cc:
Bcc:
X-Attachments: :AuxMaster:
58933:SmithAAR103fourobserve.pdf:
Dear Mr Smith

Your recent e-mail trails presents me with the difficulty of responding to your hypothesising in what I hope is a reasonable way.

I can only reiterate that accident investigation, along with all

other forms of investigation, is an evidence based process. I cannot afford the luxury of taking a stance that is in effect one that says " don't confuse me with the facts".

I can see that there is nothing that I can do to convince you that Panam 103 was bought down by an improvised explosive device. I can only refer you to the AAIB report and the very extensive technical evidence presented at the trial by specialists from around the world.

Ken Smart

Chief Inspector of Air Accidents

Ken Smart

Chief Inspector of Accidents,

Air Accident Investigations Branch

AAIB

DRA Farnborough

Hants GU14 6TD

United Kingdom

Dear Mr. Smart, 9 June 02

Thank you for replying to my latest email, I realize you do not have to reply to any of my warnings about a current hazard in early model Boeing 747 that may suffer an inflight breakup. You do have a conscience after all. And you sound perplexed and a little vexed. I can understand why.

Let me first reply to your comments above:

Your recent e-mail trails presents me with the difficulty of responding to your hypothesising in what I hope is a reasonable way.

Well, yes, air, I think we have been reasonable. The issue of Pan Am Flight 103 is fraught with emotion, bias and conspiracy theories. It's hard to be factual. I contend I have been factual and reasonable and may, in fact, have overloaded you with facts, data, and evidence to support my reasoning. If you are perplexed it is because on one hand you have the official version of an explosive device and on the other hand my version of mechanical/electrical. They appear to be a paradox but are fully explainable and mutually correct if taken literally.

I can only reiterate that accident investigation, along with all other forms of investigation, is an evidence based process.

Would that were so. I was naive in 1990 to believe facts count but not now after twelve years of research and interacting with officials, media, and business. I am fully aware of the pressures put upon official investigators by all parties involved to come to a quick, satisfactory, and resolvable answer. I used to think that aviation safety was above all that politicking but I was wrong.

Of course it's political. Any event that involves relationships among nations and billions of dollars has to be political. Trans World Airlines Flight 800 was a bomb from the day after when President Clinton said that 'terrorist' act would not go unpunished. It took 17 months of intense FBI efforts to make it a bomb, but eventually the evidence was not there and bomb/missile ruled out for the same reasons Pan Am Flight 103 is not a bomb: Not enough corroborative evidence and any minute evidence can be explained as benign. Air India Flight 182 was a bomb from the few days after the event when the Indian government removed a real aircraft accident investigator and installed a judge with no aviation experience to conduct the 'investigation' which concluded it was a bomb. Pan Am Flight

103 was a bomb when the NTSB 'go' team left New York on the way to London hours after the event and it was a bomb five days after the event according to the AAIB. United Airlines Flight 811 was a bomb moments after the event according to the flight crew. China Airlines Flight 611 was speculated already to be a bomb and still may be pending corroborative evidence. All those accidents were all rushed to political judgment by blaming others because it cleared so many of responsibility for the horror.

Everyone wants the quick easy satisfactory answer and will accept pleasant lies. Everyone rejects unpleasant truths. I thought, as an aviation accident survivor, that aviation safety was above politics. I was wrong.

Aviation accident investigation is a politically based process, sad to say, when it comes to the big crashes.

I cannot afford the luxury of taking a stance that is in effect one that says " don't confuse me with the facts".

I'm confused by that statement, Mr. Smart: Does it mean if you could afford the luxury you would not want to be confused by facts but since you can't afford the luxury, you are confused by the facts? The only facts that confuse you, Mr. Smart, are the solid ones proved by the AAIB itself that refute the official conclusions such as the small 'bomb' hole and the huge cargo door hole at concurrent initial event time.

I hate that cliché anyway. It reveals a closed and lazy mind and I'm glad you did not use it. I welcome facts, make sure they are accurate, and then sort them out; that is the requirement of my stance. I want more facts for Pan Am Flight 103; for instance, may I see the engine breakdown report from Pratt and Whitney

on their JTD-9s, in particular for engine number three to check for missing blades, sooted blades, and soft body impacts? I understand your vexation at the evidence I present which conflicts with the official conclusions. I'm not making up the small 'bomb' hole or the sudden loud sound or the peeled back skin at the aft midspan latch or the wreckage distribution charts. The explanation that makes more sense and fits the facts better is the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation, not the bomb explanation with shadowy confusing conspiracy plots.

I can see that there is nothing that I can do to convince you that Panam 103 was brought down by an improvised explosive device.

Strange statement. The implication is that I can not be convinced because I am an idiot, stubborn, and unreasonable. My Smith AAR, my website, and my emails to you have shown me to be otherwise. (Bought down? Freudian slip?)

<http://www.corazon.com/crashcontentspagelinks.html> and <http://www.corazon.com/PDF182and103SmithAAR.html%20> give details on the entire shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. It is factual and devoid of the conspiracy nonsense which permeates all these Boeing 747 inflight breakups.

You have not tried to convince me it was a bomb other than to refer me to other's opinions such as a trial judge and AAIB conclusions from long ago. And I agree it was brought down by an improvised explosive device, the forward cargo door rupturing open in flight. The UAL 811 crew reported in quotes, a "tremendous explosion" when the cargo door blew open in flight. Even at this late date, you are reluctant to call the IED a bomb

even though I know, the media knows, and you know, you mean a bomb, a bomb planted by terrorists in a conspiracy. Sabotage is such a rare event in airplane accidents and pilot error/mechanical problems so prevalent that a mechanical or crew error must be the assumed probable cause unless proven otherwise but in this topsy turvy world, it's a bomb unless proven it wasn't, and even then there are lingering suspicions of conspiracy, such as a missile for Trans World Airlines Flight 800.

I can only refer you to the AAIB report

I can refer you to that report and the CASB report, the Kirpal Report, the three NTSB reports and the eventual China Airlines Flight 611 report, all for early model Boeing 747s that suffered sudden inflight breakups.

Regarding the AAIB Report: Fourteen observations of fact are attached to this email as well as a pdf file regarding the contradictory findings in that report. I know that AAIB report by heart. I well remember the moment in 1995 after receiving it when I read the aft cargo door and bulk cargo door latch status was reported as latched but nary a whisper about the forward cargo door. It's as if it never existed and yet was very close to the 'bomb' detonation.

You, Mr. Smart, as representing AAIB, said that vertical tear lines above the door mean it opened in flight. They are there. You said, by the wreckage distribution drawings in the AAIB report, the open cargo door happened at initial event time and the drawings also show that the door hole was many times larger than the concurrent small bomb hole on the port side. You said that stiffeners and belts are there to stop small holes from getting bigger and they did. You said the small hole and the minor

damage to the baggage container appeared as if a rather large shotgun was discharged at close range. You said the blast was relatively mild, directed, and not heard on the CVR. You said there was a sudden loud sound followed by an abrupt power cut. You showed, by the photographs you provided, there was peeled back skin from the aft midspan latch of the forward cargo door.

And the facts go on and on. They support the mechanical explanation, not the conspiracy one. The red herring, which you (AAIB staff and predecessors) have chosen to follow, is that of a relatively mild directed blast discharged from a rather large shotgun causing a 20 inch hole which has been turned into a powerful spherical noisy plastic bomb making a huge hole in the port side which tore the nose off. That red herring is a pleasant lie but refuted by facts presented in the AAIB report which give the unpleasant truth the forward cargo door ruptured open in flight at the initial event time. A subsequent similar event, UAL 811, proved to be an electrical cause after the red herring of improper latching was ruled out years later after further investigation. NTSB did not give up on United Airlines Flight 811, even after an AAR was written, 90/01. They got it right the second time and wrote another AAR, 92/02. United Airlines Flight 811 set so many precedents.

The probable cause of bomb is a pleasant lie because it absolves so many of culpability. The probable cause of electrical problem causing the ruptured open forward cargo door is an unpleasant truth because it implicates so many as negligent. It's human nature to go for the easy out. I had assumed professional investigators do not go for the easy out but for the difficult comprehensive answer.

I partly understand human nature and the primal urge to look

good and not look bad. I have been in a life and death situation in a sudden night fiery fatal jet airplane crash and I will tell you, Mr. Smart, and all the other accident investigators in this world, there is no pride, no embarrassment, and no shame when faced with imminent death. Exact and timely truth is everything, regardless of reputation or stature. If the engine has inadvertently reduced thrust and drag stays the same, lift is reduced and the plane descends to crash. Period. Time to eject. It does not matter who is on board, good guys or bad guys, the plane descends. There is no negotiation with the natural laws of physics. The outward opening nonplug cargo door had to rupture open when the cams turned to the unlock position with the almost 100000 pounds of internal pressure exerted on those lone midspan latches with no locking sectors.

And it's all happened before with United Airlines Flight 811, the one accident of an unpleasant truth about an early model Boeing 747 that no one wants to refer to, never mind discuss. It's like a guilty ghost accident hanging around in the background while Pan Am Flight 103 is the exciting myth in the foreground.

Investigators who want to know what happened ask questions. Prosecutors who 'know' what happened and are trying to make it official just refer to documents and opinions of those 'experts' who agree with them. Investigators are curious whilst prosecutors reject or ignore any information which hurts their case.

You have never asked me any question about Pan Am Flight 103, Mr. Smart. You have never asked me any telling questions which would reveal the errors of my reasoning, if present. You are not curious about any door hinge overtravel, or paint smears, or guns in baggage manifests, or missing manual locking handles and

midspan latches which should be there and aren't. You have all the wreckage and reports available to you but are unwilling to check them out for a match to United Airlines Flight 811. There is no funding to seek or permission to gain for you to review the background documents or the wreckage in Farnborough. You could determine for yourself very easily and quickly when that forward cargo door opened in flight for Pan Am Flight 103. You might even find the precise location and the shorted/arcng/burnt cargo door motor wiring or switch S2 that was implicated in United Airlines Flight 811.

You have acted like a prosecutor trying to keep his case together while fending off unwanted criticism from an amateur citizen. You have not acted like a curious investigator who never gives up until completely satisfied. And you are not completely satisfied that the initial cause was not mechanical, are you. United Airlines Flight 811 always comes back to haunt. It's that sudden loud sound on Pan Am Flight 103 and United Airlines Flight 811 CVRs. And those similar sounds are not a bomb sounds but they are the sound of the consequences of an explosive device, air rushing out that huge hole on the starboard side where the cargo door and the skin above it used to be. It's the sound of explosive decompression. If the Comets had had CVRs in them, they would have picked up the same sound at their inflight breakups. The DC-10 did. United Airlines Flight 811 did. Air India Flight 182 had the sound and it was matched to the DC-10 event. The best evidence which exists is the CVR because it was there at the initial event time and that unimpeachable witness says no bomb explosion but explosive decompression. If that sudden loud sound were able to be matched to the extensive FBI library of bomb sounds, it certainly would have been proclaimed as proof positive of a bomb. But it was not matched to a bomb sound because there was no bomb

sound because there was no bomb...or planted device.

KS>and the very extensive technical evidence presented at the trial by specialists from around the world.

High Court>[2] It is not disputed, and was amply proved, that the cause of the disaster was indeed the explosion of a device within the aircraft. The matter at issue in this trial therefore is whether or not the Crown have proved beyond reasonable doubt that one or other or both of the accused was responsible, actor or art and part, for the deliberate introduction of the device.

The defence never disputed it was a bomb. They just said their clients did not plant it. There was no extensive technical evidence presented at the trial that it was a bomb because it was agreed by both sides it was a bomb. Only the location of the bomb was disputed, inside or outside the baggage container. The issue at trial was who put the bomb there, not whether it existed or not. To imply trial evidence by specialists confirmed it was a bomb is misleading. The CIA and FBI and Scotland Yard may have said it was a bomb because to a person with a hammer, everything is a nail. The evidence which was needed, but absent, to rule in a bomb for Trans World Airlines Flight 800 is the same evidence found lacking for the presence of a bomb for Pan Am Flight 103.

And that faulty defence strategy was to be expected from attorneys who know about conspiracy crimes like bank robberies but not about airplane crashes and did not want to learn or

research previous similar accidents.

Pan Am Flight 103 was an airplane crash with a mechanical cause. The accident had two causes for precedent, Air India Flight 182 long before and United Airlines Flight 811 shortly thereafter.

And it has apparently happened again with China Airlines Flight 611 just a two weeks ago.

And of course, it can happen again as I type but probably within two years. 1985, 1987, 1988, 1989, 1991, 1996, 2000, and now 2002 are all Boeing 747 cargo door uncommanded openings on the ground or in the air, according to my research as documented on www.corazon.com.

1985 for Air India Flight 182, in flight, 329 dead.

1987 for Pan Am Flight 125, in flight, 0 dead.

1988 for Pan Am Flight 103, in flight, 270 dead.

1989 for United Airlines Flight 811, in flight, 9 dead.

1991 for United Airlines Flight preflight, on the ground, 0 dead.

1996 for Trans World Airlines Flight 800, in flight, 230 dead.

2000 for United Airlines Flight postflight, on the ground, 0 dead.

2002 for China Airlines Flight 611, in flight, 225 dead.

I do not pick the flight numbers, Mr. Smart, the evidence does. China Airlines Flight 611 fits the pattern so far but needs more corroborative evidence to confirm it is a wiring/cargo door event which may be forthcoming.

So, where does that leave the Pan Am Flight 103 situation? Libya wants to payoff the relatives and get back into the real world. The secret agent sits in jail for life. The UK gets even for having

a policewoman shot in the stomach outside an embassy. The insurance has paid off. Pan Am went bankrupt and ceases to exist. Almost everybody is happy. Life goes on.

And the known faulty Poly X wiring occasionally continues to crack and short and turn on the door unlatch motor in early model Boeing 747s of which over 500 are in service around the world flying thousands of passengers every day and killing a few hundred every few years.

And the safety officials who have sworn to investigate leads, who are trained to evaluate facts, who are paid to turn over every stone, who have budgets for databases to compare similar accidents for matches, who have staffs to ask questions of informed citizens with important information and warnings, those safety officials instead remain silent about the contradictory evidence, refuse to consider correcting serious errors, narrowly look at their one tree in the forest of seven, and continue to give their seniors comfortable conclusions they want to hear which are essentially it's not their fault.

Chief Inspector of Air Accidents

Mr. Smart, the above typo would be funny but it's not. This appears to be a trivial error but it's not. It reveals a lack of attention to detail, a rush to get off the email with no proofreading or using the high tech tool of a spell checker. It is an insult to me. I'm not a dummy. I've been a charter pilot and accepted the responsibility of flying passengers for money. I've been in aerial combat in wartime. I've owned my own plane. I've flown thousands of hours in props, propjets, and jets. Heck, I've been supersonic twice. And I've worked twelve years on early model Boeing 747s that suffer inflight breakups, one of which is

Pan Am Flight 103. I am not to be dismissed with a quickly typed note with grammatical and spelling errors, even lacking the grace of exit line such as 'Sincerely.'

But, I've learned in life and death situations, as this is, there is no pride. I am not important, only my message. I care little about the insult and the attempted curt dismissal of me and my mechanical explanation for Pan Am Flight 103. I keep on trying, polite, factual, and hopefully persuasive.

Mr. Smart, will you please do this: Keep an open mind and wait for the CVR and FDR of China Airlines Flight 611 to be retrieved and if they reveal a sudden loud sound followed by an abrupt power cut, will you reconsider the probable cause for Pan Am Flight 103 to be that for China Airlines Flight 611? Will you let the facts and evidence of China Airlines Flight 611 be matched to Pan Am Flight 103? Maybe China Airlines Flight 611 is a bomb which would strengthen your IED cause for Pan Am Flight 103.

Will you be willing to look to the recent accident of China Airlines Flight 611 and the past accident of United Airlines Flight 811 for similar evidence to Pan Am Flight 103 for a match which would reveal a common cause for both? If the common cause is revealed by the evidence, would you consider reopening the investigation into Pan Am Flight 103 with a point of view of a mechanical cause?

Would you keep this email line of communication open between us in the narrow subject of Boeing 747s that suffer inflight breakups?

But in case you don't and boot me out and close the door to your

virtual office, let me take this opportunity to talk about aviation safety in general.

Everyone talks about facts, even me. I'm awash in facts and have inundated you, Mr. Smart. So why has not the wiring/cargo door explanation become accepted by aviation safety authorities?

Why was not United Airlines Flight 811 compared to Pan Am Flight 103 since the events happened two months apart? Did not someone say on February 23, 1989, 'Hey look, here's another early model Boeing 747 that suffered an inflight breakup leaving a sudden loud sound on the CVR, an abrupt power cut to the recorders, and yet the crew thought it was a bomb but it wasn't?' Why was and is to this day, United Airlines Flight 811 ignored as a match for Pan Am Flight 103 and others?

The facts have always been on the wiring/cargo door side for Pan Am Flight 103, and yet, the investigators went back three and a half years for a match, Air India Flight 182, while ignoring the one that happened just two months later.

Let's follow the logic trail for a bomb for Pan Am Flight 103 from 1988 to 2002:

In 1985 Air India Flight 182 suffered an inflight breakup leaving a sudden loud sound followed by an abrupt power cut. The Canadian aviation accident authorities, the CASB, investigated and determined there was an explosion on the right side of the forward cargo compartment but declined to state the cause. The AAIB representative to the investigation, Mr. Davis, stated it was not a bomb but of a cause yet to be determined.

But....politics....three weeks after the event the Indian aviation

accident authority, Mr. Khola, was replaced and a political judge was assigned to 'investigate into the circumstances of the accident.' After much twisting and turning, according to the Kirpal Report which is sometimes embarrassing to read, Judge Kirpal said that the finding for Air India Flight 182 was an inflight breakup from an explosion on the right side of the forward cargo compartment caused by a bomb. There was even less evidence for a bomb in Air India Flight 182 than Pan Am Flight 103 which is less than Trans World Airlines Flight 800. However, bomb it was for Air India Flight 182 and three Sikhs go on trial for their life's freedom in March 2003 for planting it.

The precedent was set by a judge for blaming political opposition forces as being terrorists and planting bombs in airplanes, curiously always early model Boeing 747s in which the 'bomb' always seems to get randomly placed in the forward cargo compartment, not the aft or bulk or passenger cabins.

So, three and a half years later, in 1988, another early model Boeing 747 suffers an inflight breakup with a sudden loud sound and much other matching evidence. What is the call? Bomb of course planted by the Iranians....then the Syrians...then the Libyans. The conspiracy machine cranks up and plots appear all over the place.

Two months later, 1989, another early model Boeing 747 suffers an inflight breakup leaving a sudden loud sound on the CVR and an abrupt power cut to the recorders, a very rare twin event, and the passengers and pilots thought it was Pan Am Flight 103 all over again but the nose stayed on. The crew at first says a cargo door opened and then reports a bomb went off. Against all odds the aircraft landed and was able to provide evidence of what really happened.

After landing it was apparent the forward cargo door did rupture open in flight. It was, after all, a mechanical event, a boring event that had happened before in 1987 to a sister ship on the assembly line to Pan Am Flight 103, Pan Am Flight 125, as stated in NTSB AAR 92/02 for United Airlines Flight 811: '1.17.1 Previous Cargo Door Incident: On March 10, 1987, a Pan American Airways B-747-122, N740PA, operating as flight 125 from London to New York, experienced an incident involving the forward cargo door. According to Pan Am and Boeing officials who investigated this incident, the flightcrew experienced pressurization problems as the airplane was climbing through about 20,000 feet. The crew began a descent and the pressurization problem ceased about 15,000 feet. The crew began to climb again, but about 20,000 feet, the cabin altitude began to rise rapidly again. The flight returned to London. When the airplane was examined on the ground, the forward cargo door was found open about 1 1/2 inches along the bottom with the latch cams unlatched and the master latch lock handle closed. The cockpit cargo door warning light was off.

So, the investigators for Pan Am Flight 103 in 1989 and 1990 had two early model Boeing 747s to compare and all three had the sudden loud sound followed by an abrupt power cut plus many other similarities.

Both United Airlines Flight 811 and Pan Am Flight 103 were:
Aged.

High flight time.

Early model-100.

Poly x wired.

Boeing 747.

Experienced hull rupture forward of the wing on right side in

cargo door area.

Shape of hull rupture forward of the wing on the right side is rectangle with specific rectangular shape.

Fodded number three engine.

On fire number three engine.

Sudden sound on CVR

Loud sound on the CVR.

Short duration sound on the CVR.

Abrupt power cut to FDR.

Outwardly peeled and down skin in cargo door area from aft midspan latch.

Longitudinal break at midline of the forward cargo door at midspan latch.

More severe inflight damage on starboard side.

At least nine never recovered bodies.

Vertical fuselage tear lines forward of the wing and aft of cargo door.

Torn off and missing skin in forward cargo door area on starboard side.

Outward peeled skin on upper forward fuselage.

Destruction initially thought to be have been caused by a bomb.

Pan Am Flight 103 and Air India Flight 182 were both:

early model,

poly x wired,

Boeing 747,

suffered hull rupture in forward cargo hold,

engine three falls apart from other engines,

sudden sound on CVR,

loud sound on the CVR,

short duration sound on the CVR,

abrupt power cut to FDR,

sound does not match bomb sound,

outward peeled skin in cargo door area,
midspan latch status not determined,
more severe inflight damage on starboard side,
at least nine never recovered bodies,
vertical fuselage tear lines forward of the wing and aft of cargo
door,
inadvertent opening of the forward cargo door in flight offered as
explanation during official inquiry,
bomb in forward cargo hold initially suspected.

Which one to pick? Which one to refer to in the AAIB report for
Pan Am Flight 103?

All three had explosions in the forward cargo compartment.
Forward cargo doors were known to open in flight. A suddenly
opened cargo door in flight was known to be catastrophic in wide
body airliners. What did the forward cargo door areas of the three
early model Boeing look like after the fatal events?

By text and pictures they all looked basically the same, door split
longitudinally, frayed from an outward force, vertical tear lines
above door edges, and missing essential pieces of the door.

Which accident to match was the one with the irrefutable,
indisputable, and plain to see probable cause? Yes, United
Airlines Flight 811 as a mechanical cause, not a conspiracy
sabotage terrorist act.

And yet, which accident is compared to Pan Am Flight 103 and
referred to at length in the AAIB 2/90 report? Yes, Air India
Flight 182 as a terrorist bombing.

The trail of bomb conclusion led from Air India Flight 182 to

Pan Am Flight 103 while ignoring United Airlines Flight 811, still ignored for Trans World Airlines Flight 800, and now, incredibly, still ignored for China Airlines Flight 611.

So, you see, Mr. Smart, facts and truth have little to do with a probable cause for Pan Am Flight 103 according to the authorities. Narrow perspective, selfish attitudes, and small minds believing in myth and superstition ruled in 1990. And the aviation safety authorities went along for the ride.

Judge Kirpal decided he knew what caused a plane to crash and it was a bomb although the Canadian aviation accident officials declined to state the cause of the explosion. Three years later the UK and USA faced the same mystery and agreed it was a bomb too. Then seven years after that the USA faced another similar mystery and tried to make it a bomb for a year and a half but reason prevailed and it was not a bomb. And now, six years after that, another mystery Boeing 747 suffers an inflight breakup and now the Chinese get a chance to solve their mystery.

And all along United Airlines Flight 811 is ignored as if it never happened; as if it is not relevant, as if it were a ghost.

I believed, Mr. Smart, that by your producing the photographs of the starboard side of Pan Am Flight 103 that you had an open mind, you had a wider view, and that you were not selfish in pursuit of favor with your bosses. I believed you actually were willing to consider all probable causes for Pan Am Flight 103 as long as they made sense, were backed up by facts and evidence, and exposed a current hazard to flying passengers.

You stated to me the obvious: the forward cargo door of Pan Am Flight 103 opened in flight but added it happened after the 'bomb'

went off. Well, fine, let us discuss when that door opened in flight. I offered as evidence the wreckage distribution drawings that showed it happened at initial event time. Why do you think it happened later? Why do you think a relatively mild directed blast that gives minor damage to a baggage container and makes a 20 inch hole in the fuselage skin can be construed to be a powerful spherical plastic bomb sufficient to cause the nose of a 747 to tear off? What do you think caused the peeled back skin from the aft midspan latch of the forward cargo door? Why do you never mention United Airlines Flight 811 when discussing Pan Am Flight 103? Why is there no mention of the forward cargo door in the AAIB report? I ask these questions not in a belligerent manner but to really find out why. Those questions have been on my mind to ask aviation authorities for 12 years.

We are on the same side for aviation safety. Do you have other priorities? What can be more important than preventing death from a plane crash? All other reasons are secondary to me such as promotion, fame, adulation from strangers, loyalty towards friends, and respect from media. But then, I can afford the luxury of being objective since my job or financial status or popularity is not on the line here and I have the motivation to pursue this forever because of my near death experience in a sudden night fiery fatal jet airplane crash.

I'll understand but will be disappointed if you stop corresponding, Mr. Smart. I'll understand if Pan Am Flight 103 just lies there forever a bomb although the facts and hindsight say otherwise. Judge Kirpal was partially wrong with Air India Flight 182 and it led to Pan Am Flight 103. The AAIB was partially wrong with Pan Am Flight 103 and it led to Trans World Airlines Flight 800. NTSB was partially wrong about Trans World Airlines Flight 800 and it may have led to China Airlines

Flight 611. We shall see.

I ask again to keep that open mind with a larger view, Mr. Smart. If China Airlines Flight 611 proves to be a forward cargo door event, will you please reconsider Pan Am Flight 103 in light of the newer advantage of hindsight?

History is important to be accurate and never more so than aviation safety which is built upon the discovered errors which can be corrected.

We are on the same side for aviation safety.

Sincerely,
Barry Smith

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IN THE HIGH COURT OF JUSTICIARY AT CAMP ZEIST

Lord Sutherland

Lord Coulsfield

Lord MacLean

Case No: 1475/99

OPINION OF THE COURT

delivered by LORD SUTHERLAND

in causa

HER MAJESTY'S ADVOCATE

v

ABDELBASET ALI MOHMED AL
MEGRAHI and AL AMIN KHALIFA
FHIMAH, Prisoners in the Prison of Zeist,
Camp Zeist (Kamp van Zeist), The
Netherlands
Accused

Act: The Lord Advocate, AP Campbell QC, Advocate Depute;
Turnbull QC,

Advocate Depute; Lake and Armstrong; the Crown Agent.

Alt: Taylor QC; Burns QC; Beckett, McCourts, Solicitors,
Edinburgh for the
first accused.

Keen QC; Davidson QC, Macleod, McGrigor Donald, Solicitors,
Edinburgh for the second accused.

[1] At 1903 hours on 21 December 1988 PanAm flight 103 fell
out of the sky.

The 259 passengers and crew members who were on board and
11 residents of

Lockerbie where the debris fell were killed. The Crown case is
that the cause of the

disaster was that an explosive device had been introduced into
the hold of the aircraft

by the two accused whether acting alone or in concert with each
other and others.

This device exploded when the aircraft was in Scottish air space
thus causing the

aircraft to disintegrate. In these circumstances it was originally
contended that the

accused were guilty of conspiracy to murder, alternatively
murder, alternatively a

contravention of section 2(1) and (5) of the Aviation Security Act
1982. At the

conclusion of the Crown's submissions, however, the libel was restricted to the charge of murder.

[2] It is not disputed, and was amply proved, that the cause of the disaster was indeed the explosion of a device within the aircraft. Nor is it disputed that the person or persons who were responsible for the deliberate introduction of the explosive device would be guilty of the crime of murder. The matter at issue in this trial therefore is whether or not the Crown have proved beyond reasonable doubt that one or other or both of the accused was responsible for the deliberate introduction of the device.

From Smith AAR for Pan Am Flight 103:

John Barry Smith
www.corazon.com
barry@corazon.com
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AIRCRAFT
ACCIDENT
REPORT

Pan Am Flight 103
Part IV

Comparison between AAIB 2/90 and Smith AAR for PA 103

Report on the accident to

Boeing 747-121, N739PA
at Lockerbie, Dumfriesshire, Scotland
on 21 December 1988
by John Barry Smith,
Independent Aircraft Accident Investigator
Part IV: Comparison between AAIB 2/90 and Smith AAR for PA
103

Table of Contents:

1. Observations:

Engine number three was the only engine to fall apart from the others; it was the only one to catch fire; and it contained ingested debris from within the aircraft.

2. Observation:

Forward fuselage section was bent to starboard and then entirely detached.

3. Observations:

There are only two small fragments of plastic which are the only "hard" evidence of a bomb (there is much evidence of an explosive decompression).

4. Observation:

The overall evidence of damage from an explosion of a powerful plastic bomb in the port side of the forward cargo hold is very limited.

5. Observation:

The sudden loud sound on the cockpit voice recorder can be linked to the explosive decompression sound of a cargo door opening in flight on an airliner.

6. Observation:

Inflight damage to the airframe of Pan Am Flight 103 does not match airframe damage from a staged bomb explosion event in a Boeing 747 at Bruntingthorpe.

7. Observations:

In the AAIB report there is a grammatical error in verb tense and irrelevant inclusions of phrases and conclusions for bomb explosion which are unsupported by evidence.

8. Observations:

There are two photographs in the AAIB report of the port bomb side hole

9. Observation:

The latch status of the forward cargo door is omitted whilst the latch status of the identical aft cargo door (frames 1800-1920) and the CRAF door is given and stated as 'latched.'

10. Observation:

There is much more airframe damage on the starboard side of the airframe away from the bomb explosion in areas such as the leading edge of the right wing and the right horizontal stabilizer.

11. Observation:

There was a single primary return received by both Great Dun Fell and Claxby radars approximately 16 seconds before SSR returns were lost.

12. Observation:

The aircraft, Flight PA103 from London Heathrow to New York, had been in level cruising flight at flight level 310 (31,000 feet)

13. Observation:

Pan Am Flight 103 was proceeding normally until a sudden, loud, audible sound was immediately followed by an abrupt power cut to the data recorders.

14. Observation:

The evidence of Pan Am Flight 103 was matched to Air India Flight 182 in AAIB 2/90 but not to United Airlines Flight 811.

1. Observations:

Engine number three was the only engine to fall apart from the others; it was the only one to catch fire; and it contained ingested

debris from within the aircraft.

There are confusing statements in the AAIB report regarding which engines had foreign object damage:

Ò...it is reasonable to deduce that a manoeuvre of the aircraft occurred before most of the energy of the No 2 engine fan was lost due to the effect of ingestion (seen only in this engine.Ó
Ò...No 3 engine, identified on site as containing ingested debris from within the aircraft,...Ó

A. Bomb explanation:

No explanation given for engine number three falling 1100 meters apart from the others. When the bomb explosion caused the 20 inch hole on the port side, the ejected debris went out and into engine number two but not serious enough to cause a fire, then went under the fuselage and into far away engine number three causing the foreign object damage and fire. The distance from bomb explosion hole to engine number two is about 27 feet aft and 30 feet outboard and the distance to engine number three is 27 feet aft and 50 feet outboard.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The major amount of ejected material from within the cabin or baggage hold, which had opened up in the starboard side in the explosive decompression, entered the nearby engine number three causing it to catch fire. A minor amount of ejected material from the small shotgun firing hole on port side went into engine number two. The large hole where the cargo door and skin used to be caused the forward fuselage section to bend to the starboard and impact engine number three causing it to break loose and fall apart from the other three engines. No explanation given for contradiction in AAIB report on which engines ingested foreign

objects and when it occurred.

C. Conclusions:

It makes little sense that foreign objects ejected from a small hole on the port side would go around the fuselage and into engine number three serious enough to cause a fire.

It makes greater sense that foreign objects from the cabin or baggage hold ejected from the very large hole on the starboard side would go into nearby engine number three; and when the larger amount of ejected material went into engine number three a normal consequence of fire ensued. When the nose bent to the starboard because of the large hole where the door and skin used to be, the forward fuselage section hit engine number three and broke it loose to land apart from the other three engines still attached to the wing.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

“By similar reasoning, the absence of such shingling damage on blades of No 3 engine was a reliable indication that it suffered no ingestion until well into the accident sequence.”

(ii) No 3 engine, identified on site as containing ingested debris from within the aircraft, nonetheless had no evidence of the type of shingling seen on the blades of No 2 engine. Such evidence is usually unmistakable and its absence is a clear indication that No 3 engine did not suffer a major intake airflow disturbance whilst delivering significant power.

(iii) All 3 engines had evidence of blade tip rubs on the fan cases having a combination of circumference and depth greater than hitherto seen on any investigation witnessed on Boeing 747 aircraft by the Pratt and Whitney specialists. Subsequent examination of No 4 engine confirmed that it had a similar deep, large circumference tip rub. These tip-rubs on the four engines were centred at slightly different clock positions around their

respective fan cases. Ô

Ô2.5 Engine evidence The shingling damage noted on the fan blades of No 2 engine can only be attributed to airflow disturbance caused by ingestion related fan blade damage occurring when substantial power was being delivered. This is readily explained by the fact that No 2 engine intake is positioned some 27 feet aft and 30 feet outboard of the site of the explosion and that the interior of the intake exhibited a number of prominent paint smears and general foreign object damage. By similar reasoning, the absence of such shingling damage on blades of No 3 engine was a reliable indication that it suffered no ingestion until well into the accident sequence.Õ

ÔThe combination of the position of the explosive device and the forward speed of the aircraft was such that significant sized debris resulting from the explosion would have been available to be ingested by No 2 engine within milliseconds of the explosion. ...The onset of this time period would have been the time at which debris from the explosion first inflicted damage to fan blades in No 3 engine and, since the fan is only approximately 40 feet from the location of the explosive device, this would have been an insignificant time interval after the explosion.Õ

ÔExamination of engines: The No 3 engine had fallen 1,100 metres north of the other three engines, striking the ground on its rear face, penetrating a road surface and coming to rest without any further change of orientation i.e. with the front face remaining uppermost. The intake area contained a number of loose items originating from within the cabin or baggage hold. It was not possible initially to determine whether any of the general damage to any of the engine fans or the ingestion noted in No 3 engine intake occurred whilst the relevant engines were

delivering power or at a later stage.

2. Observation:

Forward fuselage section was bent to starboard and then entirely detached.

A. Bomb explanation:

No explanation given why a 20 inch bomb shatter hole on the port side caused the forward fuselage section to bend to starboard and separate.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

A twenty foot by thirty foot hole appeared suddenly on the starboard side where the forward cargo door and skin around it used to. The large hole was too large for the fuselage to maintain structural integrity as the forward fuselage section forward of the forward cargo door bent to the starboard, hit number three engine, and the forward fuselage section separated.

C. Conclusions:

It makes little sense for a forward fuselage section to bend to the starboard and detach when the bomb exploded on the port side giving a small 20 inch hole which the aircraft is designed to withstand.

It makes greater sense that the forward fuselage section would bend into a huge hole on starboard side, lose structural integrity, and then separate.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) Quotes:

1.12.3.3 General damage features not directly associated with explosive forces.

A number of features appeared to be a part of the general

structural break-up which followed on from the explosive damage, rather than being a part of the explosive damage process itself. This general break-up was complex and, to a certain extent, random. However, analysis of the fractures, surface scores, paint smears and other features enabled a number of discreet elements of the break-up process to be identified. These elements are summarised below.

(v) A large, clear, imprint of semi-elliptical form was apparent on the lower right side at station 360 which had evidently been caused by the separating forward fuselage section striking the No 3 engine as it swung rearwards and to the right (confirmed by No 3 engine fan cowl damage).

(iv) The forward fuselage deflected to the right, pivoting about the starboard window belt, and then peeled away from the structure at station 800. During this process the lower nose section struck the No 3 engine intake causing the engine to detach from its pylon. This fuselage separation was apparently complete within 3 seconds of the explosion.

(xiii) The No 3 engine detached when it was hit by the separating forward fuselage.

3. Observations:

There are only two small fragments of plastic which are the only hard evidence of a bomb. One is a fragment of circuit board (with serial number!) alleged to be part of a timer of for the bomb. This fragment was discovered at an unknown time by an unknown person on a baggage container behind the container manufacturer's data plate which contained a burnt piece of material which itself contained a fragment of circuit board. The other fragment was discovered in a buckled section of the metal container by an AAIB Inspector to contain, trapped

within its folds, an item which was subsequently identified by forensic scientists at the Royal Armaments Research and Development Establishment (RARDE) as belonging to a specific type of radio-cassette player and that this had been fitted with an improvised explosive device (IED).

A. Bomb explanation:

Bomb exploded in a metal baggage container and blew the timer to pieces which lodged in baggage container. The data plate is on the outside of the container, not the inside and no explanation given for its discovery on the outside of the container. A piece of plastic from a boom box radio-cassette player was found in the folds of the container and determined to be the bomb container holding the timer and plastic explosive. No explanation given for that determination.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The "timer" fragment did not get into a burnt piece of material and placed behind a data plate on the outside of the container by action of explosion or wind; it was placed there by a person and that person should be asked where and when he found the fragment and why he put it behind the manufacturer's data plate on the outside of that particular container. No explanation given for matching of fragment and container which blew up at 31000 feet.

The boom box fragment may have been a piece from a boom-box loaded into the baggage compartment by a passenger who listened to music. There is no supporting evidence that a piece of plastic from a boom box was part of a bomb or that the "timer" fragment was inside the plastic boom box.

C. Conclusions:

It makes little sense that a bomb containing a timer (which is neither timing or altitude actuated) explodes six miles high, scatters thousands of pieces of debris to the winds, and yet a fragment of the "timer" is found in the wreckage of the baggage container, identified as such, and placed on the outside in the correct container out of many. It makes little sense that a bomb with a timer exploded inside a suitcase inside a baggage container which then sends a fragment of the timer to lodge on the outside, not the inside, of the baggage container, which is mostly intact. It makes little sense that a piece of a boom box which can reasonably be expected to be in a baggage compartment can be determined to be a makeshift bomb with no supporting evidence.

It makes greater sense that an unknown person put the plastic fragment behind the data plate for some unknown reason and that there was a boom box in a suitcase of a passenger who listened to music.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

Appendix F-5, item "c" which states, "Container manufacturer's data plate which contained a burnt piece of material which itself contained a fragment of circuit board."
"Container Reconstruction Those parts which could be positively identified as being from containers AVE 4041 PA and AVN 7511 PA were assembled onto one of three wooden frameworks; one each for the floor and superstructure of container 4041, and one for the superstructure of container 7511. Approximately 85% of container 4041 was identified, the main missing sections being the aft half of the sloping face skin and all of the curtain."

"While this work was in progress a buckled section of skin from

container 4041 was found by an AAIB Inspector to contain, trapped within its folds, an item which was subsequently identified by forensic scientists at the Royal Armaments Research and Development Establishment (RARDE) as belonging to a specific type of radio-cassette player and that this had been fitted with an improvised explosive device.Õ

ÔExamination of all other component parts of the remaining containers from the front and rear cargo holds did not reveal any evidence of blast damage similar to that found on containers 4041 and 7511.Õ

4. Observation:

The overall evidence of damage from an explosion of a powerful plastic bomb in the port side of the forward cargo hold is very limited.

A. Bomb explanation:

The powerful bomb exploded and caused a series of events which are difficult to explain but did cause the forward fuselage section to come off.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The firing of a rather large shotgun on the port side of the forward cargo compartment which may have given evidence which led investigators to conclude a powerful bomb had been detonated causing the destruction of Pan Am Flight 103. The limited damage to the fuselage skin and the baggage containers may have been caused by a rather large shotgun which fired after the nearby huge explosive decompression when the cargo door ruptured open. The evidence shows a relatively mild directed blast existed a corner of a baggage container, traveled 25 inches

and caused a 20 inch hole in the fuselage skin. The sound of the mild directed blast was not heard on the cockpit voice recorder.

Bombs are loud, spherical, and powerful. Shotgun blasts are relatively mild and directed. The damage in the baggage container and adjacent area is from a mild directed blast as if a rather large shotgun had gone off at close range. The AAIB official opined the cause of the damage he/she personally viewed to be as if a rather large shotgun had been fired at the fuselage at close range. It may not have been exactly a shotgun but some other type of directed firearm.

This AAIB opinion may have been correct in its assessment of the cause of the mild blast, pitting, sooting, distortions, ragged, and shattered skin as if a very large shotgun had been fired at the inner surface of the fuselage at close range. It may be that pitting, sooting, distortions, ragged, and shattered skin could also have been interpreted as evidence of a bomb explosion.

Loaded guns have been inserted into baggage holds of airliners before and have been accidentally discharged, (April 26, 2000 Gun goes off in bag being loaded into jet. Associated Press - Portland ÒA high-powered handgun went off in the baggage compartment of an Alaska Airlines jetliner on the tarmac at Portland International Airport, sending a bullet into the passenger compartment within inches of passengers' feet. Nobody was injured.Ó)

Shotgun cartridges give sooty residue when fired. A shotgun fires in a directed manner and would give a relatively mild blast compared to a high explosive bomb. The sound of the weapon firing is not heard on the cockpit voice recorder because the power had been abruptly cut after the tremendous explosive

decompression when the huge hole appeared on the starboard side of the hold or the gunshot was over shouted by the tremendous noise from the huge hole and the explosive decompression.

The evidence corroborates the firing of a device called a rather large shotgun in a baggage container which caused a relatively mild directed blast which resulted in a 20 inch hole in the fuselage skin on the port side. This damage was not sufficient to cause the forward fuselage section to come off Pan Am Flight 103 because the structure was designed to withstand a hole that size in the pressurized hull by the presences of stiffeners, ribs, and belts. In fact, a Boeing 747 can withstand a hole of nine feet by twenty feet in the nose just forward of the wing as shown by United Airlines Flight 811.

The firing of the shotgun was after the explosive decompression because the sound of the gunshot is not on the cockpit voice recorder which had had an abrupt power cut.

The location in the forward cargo compartment in the baggage container which had its lower quadrant blown way may have held a rather large shotgun which was stored in baggage, was loaded, and was safe unless a tremendous explosion happened nearby. A tremendous explosion did happen nearby when the opposite fuselage blew out when a huge twenty foot by forty foot hold appeared suddenly where the forward cargo door and skin above it used to be. The rather large shotgun fired, the relatively mild directed explosion left soot on a rib, burst through the corner of the baggage container, went 25 inches and made a 20 inch hole in the port side of the fuselage. A sooty rib was soon found on the ground and incorrectly declared proof a bomb had gone off instead of a shotgun cartridge.

C. Conclusions:

It makes little sense that a 20 inch hole in the fuselage was caused by a powerful plastic bomb and that small hole would cause the forward fuselage section of a Boeing 747 to bend to the starboard and detach.

It makes greater sense that a rather large shotgun inadvertently fired in a suitcase and caused the 20 inch hole in the skin and other sooty evidence and misled investigators to believe it was the result of a powerful plastic bomb explosion.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

Fuselage: "Where these panels formed the boundary of the shatter zone, the metal in the immediate locality was ragged, heavily distorted, and the inner surfaces were pitted and sooted - rather as if a very large shotgun had been fired at the inner surface of the fuselage at close range."

Analysis: "With the two container reconstructions placed together it became apparent that a relatively mild blast had exited container 4041 through the rear lower face to the left of the curtain and impinged at an angle on the forward face of container 7511."

"Throughout the general examination of the aircraft wreckage, direct evidence of blast damage was exhibited on the airframe only in the area bounded, approximately, by stations 700 and 720 and stringers 38L and 40L. Blast damage was found only on pieces of containers 4042 and 7511, the relative location and character of which left no doubt that it was directly associated with airframe damage."

"Blast damage to the forward face of container 7511 was as a direct result of hot gases/fragments escaping from the aft face of

container 4041. No evidence was seen to suggest that more than one IED had detonated on Flight PA103. Ô

5. Observation:

The sudden loud sound on the cockpit voice recorder can be linked to the explosive decompression sound of a cargo door opening in flight on an airliner. The sudden loud sound has not been matched to any bomb explosion sound because of missing lower frequencies and a too slow rise time. The sudden loud sound is stated to be the initial event and is the best evidence because it is direct proof of the explosion.

A. Bomb explanation:

No explanation given why a bomb explosion sound is absent from the CVR when it must be present if it were the initial event.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The initial event of sudden loud sound is the explosive decompression sound when the rupture/structural failure occurred and the air molecules rushed out making the sudden loud sound on the CVR. Pan Am Flight 103 has been matched to Air India Flight 182 in the AAIB report. This initial event sudden sound on the CVR for Air India Flight 182 has been matched to a DC-10 explosive decompression sound when its cargo door opened in flight. All four Boeing 747 sudden loud sound events, Air India Flight 182, Pan Am Flight 103, and United Airlines Flight 811 have been matched by NTSB in Chart 12 (Cover sheet of Part II of Smith AAR) of the public docket for Trans World Airlines Flight 800. The sound of the shotgun firing was not heard because the explosive decompression noise was louder or was because there was an abrupt power cut to the recorders after

the sudden loud sound of explosive decompression.

C. Conclusions:

It makes little sense to disregard the most direct evidence of the initial event which is the sudden loud sound on the cockpit voice recorder which is not matched to a bomb explosion.

It makes greater sense to determine the sudden loud sound is the sound of the explosive decompression when the hull ruptures at the forward cargo door giving a sudden loud sound have been linked to an explosive decompression in a DC-10 cargo door event.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

“Cockpit voice recorder The CVR tape was listened to for its full duration and there was no indication of anything abnormal with the aircraft, or unusual crew behaviour. The tape record ended, at 19:02:50 hrs +/- second, with a sudden loud sound on the CAM channel followed almost immediately by the cessation of recording whilst the crew were copying their transatlantic clearance from Shanwick ATC.” UK AAIB Report 2/90 Page 15 It is not clear if the sound at the end of the recording is the result of the explosion or is from the break-up of the aircraft structure. The short period between the beginning of the event and the loss of electrical power suggests that the latter is more likely to be the case. UK AAIB Report 2/90 Page 38

From the Canadian Aviation Occurrence Report: 2.10.2
Analysis by Accidents Investigation Branch (AIB), United Kingdom An analysis of the CVR audio found no significant very low frequency content which would be expected from the sound created by the detonation of a high explosive device. Considering the different acoustic characteristics between a DC-10 and a B747, the AIB analysis indicates that there were

distinct similarities between the sound of the explosive decompression on the DC-10 and the sound recorded on the AI 182 CVR.Ö

6. Observation:

Inflight damage to the airframe of Pan Am Flight 103 does not match airframe damage from a staged bomb explosion event in a Boeing 747 at Bruntingthorpe.

A. Bomb explanation:

No explanation given why staged Boeing 747 bombing evidence does not match the evidence of a terrorist planned bombing of another Boeing 747, Pan Am Flight 103.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

A real bombing gives an obvious and unique signature of specific evidence. That signature was present at the Bruntingthorpe staged bombing but absent from Pan Am Flight 103 because there was no bomb explosion.

C. Conclusions:

It makes little sense to disregard a mismatch between a real bombing event and a presumed bombing event and continue to call the presumed event a bomb explosion.

It makes greater sense to determine Pan Am Flight 103 was not a bombing event because a bomb signature, such as that found at Bruntingthorpe staged bombing, was absent.

D. Quote from official at Bruntingthorpe:

"Very small amounts of explosives left very distinctive marks, unlike anything we've seen on the plane," said one investigative source, speaking of the recent tests. "Even the small

amounts [of explosives] left distinctive signatures on the structures, so if a small bomb had gone off, it clearly would leave a signature."

7. Observations:

In the AAIB report there is a grammatical error in verb tense and irrelevant inclusions of phrases and conclusions for bomb explosion which are unsupported by evidence.

AAIB 2/90:

ÔThe datum line, discussed at paragraph 1.12.1.6, was derived from a detailed analysis of the distribution of specific items of wreckage, including those exhibiting positive evidence of a detonating high performance plastic explosive.Õ

ÔThe items used to define the datum line, included those exhibiting positive evidence of a detonating high performance plastic explosive, would have been the first pieces to have been released from the aircraft.Õ

A. Bomb explanation:

Any time an opportunity arises to declare a bomb exploded in Pan Am Flight 103 is a good time.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The AAIB report is generally well written, precise, grammatically correct, and punctuation is perfect; however, the only two exceptions deal with statements about the Ôplastic explosiveÕ.

The text reads clearer: ÔThe datum line, discussed at paragraph 1.12.1.6, was derived from a detailed analysis of the distribution of specific items of wreckage.Õ The inclusion of the

phrase, "including those exhibiting positive evidence of a detonating high performance plastic explosive," is irrelevant and incongruous in context of datum lines.

And:

The items used to define the datum line would have been the first pieces to have been released from the aircraft. The inclusion of the almost identical strange phrase, "including those exhibiting positive evidence of a detonating high performance plastic explosive," is appended, grammatically incorrect as written, and incongruous in context of datum lines.

C. Conclusions:

It makes little sense that AAIB investigators who have written an important document which is precise and grammatically correct in most respects would make grammar errors in two sentences concerning a detonating high performance plastic explosive.

It makes greater sense that the the phrases were inserted as changes at the last minute by a non-AAIB official to bolster a weak case and the insertions were not caught by AAIB officials.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

The datum line, discussed at paragraph 1.12.1.6, was derived from a detailed analysis of the distribution of specific items of wreckage, including those exhibiting positive evidence of a detonating high performance plastic explosive. The scatter of these items about the datum line may have been due partly to velocities imparted by the force of the detonating explosive and partly by the difficulty experienced in pinpointing the location of the wreckage accurately in relatively featureless terrain and poor

visibility. However, the random nature of the scatter created by these two effects would have tended to counteract one another, and a major error in any one of the eleven grid references would have had little overall effect on the whole line. There is, therefore, good reason to have confidence in the validity of the datum line.

ÔThe items used to define the datum line, included those exhibiting positive evidence of a detonating high performance plastic explosive, would have been the first pieces to have been released from the aircraft.Õ

8. Observations:

There are two photographs in the AAIB report of the port ÔbombÕ side hole just forward of the wing in the wreckage reconstruction, B-16 and B-17, and two identical artistÕs impression of the port side bomb explosion on B-19 and B-24. There are no pictures of the shattered starboard, cargo door, side just forward of the wing in the wreckage reconstruction. The forward cargo door is sketched in as undamaged in B-20 and B-21 in three drawings of explosive damage which contradicts the wreckage reconstruction evidence in the photographs of the shattered forward cargo door.

A. Bomb explanation:

The only important side to look at is the bomb explosion side which is the port side with its 20 inch hole in the fuselage skin and worthy of two photographs, two identical sketches and another of an artistÕs impression of the explosion. The twenty foot by thirty foot hole in the starboard side, the cargo door side, is not relevant and thus can be omitted.

B. Shorted wiring/forward cargo door rupture/explosive

decompression/inflight breakup explanation:

No explanation given for omission of photographs of the wreckage reconstruction of the other side of the cargo hold said to contain a powerful bomb. No explanation given for sketches of an undamaged forward cargo door when the photographic evidence shows it shattered. Recent photographs of the forward cargo door area are very revealing and show much outward shattered skin and missing parts. The port side damage was exaggerated in sketches and the starboard side damage omitted or played down.

C. Conclusions:

It makes little sense to go to the expense of a total fuselage reconstruction and only show one side, a relatively smooth port side while omitting a shattered starboard side.

It makes greater sense that the investigators were making a case for a bomb explosion on the port side and deemed any other information which contradicted that conclusion as irrelevant and distracting and thus omitted.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

ÔTo facilitate this additional work, wreckage forming a 65 foot section of the fuselage (approximately 30 feet each side of the explosion) was transported to AAIB Farnborough, where it was attached to a specially designed framework to form a fully three-dimensional reconstruction [Appendix B, Figures B-16 and B-17] of the complete fuselage between stations 360 & 1000 (from the separated nose section back to the wing cut out). The support framework was designed to provide full and free access to all parts of the structure, both internally and externally.Õ

9. Observation:

The latch status of the forward cargo door is omitted whilst the

latch status of the identical aft cargo door (frames 1800-1920) and the CRAF door is given and stated as "latched."

A. Bomb explanation:

The latch status of the forward cargo door is unimportant as it was not involved in any way with the bomb explosion and thus omitted.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The assumption must be made that the latch status of the forward cargo door was "unlatched" or "unknown," since, if it were latched, it would have been reported as same.

No explanation given for the omission in the report of the latch status of a cargo door which is known to have failed before, is a complex device prone to airworthiness directives, and was very near the site of the "bomb" explosion.

C. Conclusions:

It makes little sense to omit such vital information about a complex device that has failed before which could cause a hull rupture inflight if it had failed again.

It makes greater sense that the information was omitted because it conflicted with the official conclusions of a bomb explosion and thus deemed unimportant.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes: "The CRAF door itself (latched) apart from the top area containing the hinge;"

"Other items found in the wreckage included both body landing gears, the right wing landing gear, the left and right landing gear support beams and the cargo door (frames 1800-1920) which was

latched.

10. Observation:

There is much more airframe damage on the starboard side of the airframe away from the bomb explosion in areas such as the leading edge of the right wing and the right horizontal stabilizer.

A. Bomb explanation:

The ejected material and skin from the post side bomb explosion went out, aft, and over the fuselage then impacted the starboard side wing and tailplane. The bomb energy spread out and through the aircraft gaining power and blew out the faraway sections of skin although it was not possible to find a specific mechanism for the damage.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The more severe starboard side fuselage, tail, and wing damage was caused by the tremendous explosive decompression on the starboard side of the fuselage just forward of the wing in the forward cargo door area. The evidence of localised skin separation and peel-back is from the explosive decompression forces, not the relatively mild blast from the bomb explosion.

C. Conclusions:

It makes little sense that a small 20 inch hole on the port side could cause the severe damage on the starboard side of the airframe or that material from the port side of the aircraft travels out, over, and aft of the fuselage and impacts on the starboard side of the tailplane.

It makes greater sense that the more severe airframe localised skin separation and peel-back inflight damage on the starboard side is because of the massive ejected material and torn away

skin from the forward cargo door area on the starboard side of the airframe from the explosive decompression that ejected material out and directly aft into the right wing leading edge, engine number three and right horizontal stabilizer.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

“Whilst it has not been possible to find a specific mechanism to explain the regions of localised skin separation and peel-back (i.e. the 'pressure blow' regions referred to in para 2.12.2), they were almost certainly the result of high intensity shock overpressures produced locally in those regions as a result of the additive recombination of shock waves transmitted through the lower hull cavities. It is considered that the relatively close proximity of the left side region of damage just below floor level at station 500, [Appendix B, Figure B-19, region D] to the forward end of the cargo hold may be significant insofar as the reflections back from the forward end of the hold would have produced a local enhancement of the shock overpressure. Similarly, 'end blockage effects' produced by the cargo door frame might have been responsible for local enhancements in the area of the belly skin separation and curl-back at station 560.”

(iv) The fuselage left side lower lobe from station 740 back to the wing box cut-out, and from the window level down to the cargo deck floor (the fracture line along stringer 38L), had peeled outwards, upwards and rearwards - separating from the rest of the fuselage at the window belt. The whole of this separated section had then continued to slide upwards and rearwards, over the fuselage, before being carried back in the slipstream and colliding with the outer leading edge of the right horizontal stabiliser, completely disrupting the outer half.”

“The right tailplane exhibited massive leading edge impact

damage on the outboard portion which also appeared to have progressed to disruption of the aft torsion box. A fragment of right tailplane spar cap was found embedded in the fuselage structure adjacent to the two vent valves, just below, and forward of, the L2 door and it is clear that this area of forward left fuselage had travelled over the top of the aircraft and contributed to the destruction of the outboard right tailplane.Ö

11. Observation:

There was a single primary return received by both Great Dun Fell and Claxby radars approximately 16 seconds before SSR returns were lost. The return was only present for one paint and no explanation can be offered for its presence. It is displayed as a green diamond in Figures C-15 through C-23 in the AAIB Report 2/90.

A. Bomb explanation:

No explanation given for radar returns shown as green diamond. Information was disregarded.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

One primary target on one radar may be an artifact. Two targets on two radars may be a coincidence. Two targets on two radars at the same time and at the same place is a real target which means a large piece of metal reflected radar energy to two radars.

The explanation offered for its presence is of the lower half of the forward cargo door rupturing outward and spinning away in the night. The angles of the spinning metal skin were such to only return energy to two radars on only one sweep. A precedent was set of surveillance radars picking up pieces of cargo door spinning away in flight has been set by United Airlines Flight 811.

C. Conclusions:

It makes little sense for a genuine primary radar target to appear just before the destruction of a large airliner and for that target information to be disregarded.

It makes greater sense that when the lower half of the forward cargo door ruptured open in flight and ejected the door pieces and fuselage skin into the air that two radars picked up the reflections from the spinning metal skin and the target appeared on the radar scopes at the same time at the same location.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

“Recorded radar information: Recorded radar information on the aircraft was available from from 4 radar sites. Initial analysis consisted of viewing the recorded information as it was shown to the controller on the radar screen, from this it was clear that the flight had progressed in a normal manner until Secondary Surveillance Radar (SSR) was lost. There was a single primary return received by both Great Dun Fell and Claxby radars approximately 16 seconds before SSR returns were lost. The Lowther Hill and St. Annes radars did not see this return. The Great Dun Fell radar recording was watched for 1 hour both before and after this single return for any signs of other spurious returns, but none was seen. The return was only present for one point and no explanation can be offered for its presence.”

12. Observation:

The aircraft, Flight PA103 from London Heathrow to New York, had been in level cruising flight at flight level 310 (31,000 feet) for approximately seven minutes when the last secondary radar return was received just before 19.03 hrs. The radar then showed multiple primary returns fanning out downwind.

A. Bomb explanation:

A bomb was placed in a Boeing 727 which took off from Malta and flew to Frankfurt Germany without the bomb going off. The plane then flew to London without the bomb going off. The bomb was transferred to a Boeing 747 which took off and then the bomb went off. The timer was thus not an altitude timer nor a timing timer but a timer of unknown type.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The explosion occurred soon after the highest pressure differential was reached, 8.9 PSI at 31000 feet MSL, when the midspan latches ruptured open the forward cargo door. There was no bomb and there was no timer and there was no bomb explosion but there was something that looked, smelled, and sounded like a bomb explosion, but wasn't. It was a tremendous explosion of an explosive decompression from a hull rupture at a door. There was something that looked like a rather large shotgun had gone off in a baggage container and it probably was and it probably did which led investigators to assume a bomb explosion had occurred.

C. Conclusions:

It makes little sense for a bomb to be placed aboard an aircraft which flies and flies without detonating and then the bomb is transferred to another plane which explodes later by some unknown type of timer.

It makes greater sense that an explosive decompression occurred, which mimics a bomb explosion, at the highest pressure differential in the hull soon after takeoff and cruise established.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

None regarding the several flights of the bomb in two aircraft in

three airports in three countries before it detonated.

13.Observation:

Pan Am Flight 103 was proceeding normally until a sudden, loud, audible sound was immediately followed by an abrupt power cut to the data recorders.

A. Bomb explanation:

The bomb explosion cut the power to the recorders.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

The tremendous explosive decompression explosion cut the power to the recorders in the adjacent main equipment compartment abruptly after the sudden loud sound of the air rushing out of the forward cargo compartment was picked up on the cockpit voice recorders.

C. Conclusions:

It makes little sense that a relatively mild explosion which caused a 20 inch hole in the fuselage skin would cause an abrupt power cut to the recorders when the aircraft is designed to easily withstand such an event.

It makes greater sense that a tremendous explosive decompression would cause an abrupt power cut to the recorders in the adjacent compartment.

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

“Digital flight data recordings The analysis of the recording from the DFDR fitted to N739PA, showed that the recorded data simply stopped. Following careful examination and correlation of the various sources of recorded information, it was concluded that this occurred because the electrical power supply to the

recorder had been interrupted at 19:02:50 +/- second. UK AAIB Report 2/90 Page 37 The analysis of the cockpit voice recording, which is detailed in Appendix C, concluded that there were valid signals available to the DVR when it stopped at 19:02.50 +/- second because the power supply to the recorder was interrupted. It is not clear if the sound at the end of the recording is the result of the explosion or is from the break-up of the aircraft structure. The short period between the beginning of the event and the loss of electrical power suggests that the latter is more likely to be the case. UK AAIB Report 2/90 Page 38

14. Observation:

The evidence of Pan Am Flight 103 was matched to Air India Flight 182 in AAIB 2/90 but not to United Airlines Flight 811.

A. Bomb explanation:

Air India Flight 182 was deemed a bomb explosion by the Indian judicial authorities. Since Pan Am Flight 103 was determined early on to be a bomb explosion, only that flight information was relevant and thus compared and included in AAIB 2/90.

B. Shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation:

No explanation given why the evidence of United Airlines Flight 811 with much similar evidence to Pan Am Flight 103 was not matched to Pan Am Flight 103 as well as Air India Flight 182 in AAIB 2/90.

Both United Airlines Flight 811 and Pan Am Flight 103 were:

Aged.

High flight time.

Early model-100.

Poly x wired.

Boeing 747.

Experienced hull rupture forward of the wing on right side in cargo door area.

Shape of hull rupture forward of the wing on the right side is rectangle with specific rectangular shape.

Fodded number three engine.

On fire number three engine.

Sudden sound on CVR

Loud sound on the CVR.

Short duration sound on the CVR.

Abrupt power cut to FDR.

Outwardly peeled and down skin in cargo door area from aft midspan latch.

Longitudinal break at midline of the forward cargo door at midspan latch.

More severe inflight damage on starboard side.

At least nine never recovered bodies.

Vertical fuselage tear lines forward of the wing and aft of cargo door.

Torn off and missing skin in forward cargo door area on starboard side.

Outward peeled skin on upper forward fuselage.

Destruction initially thought to be have been caused by a bomb.

C. Conclusions:

It makes little sense to ignore closely matching evidence of Pan Am Flight 103 to another similar event of United Airlines Flight 811 while including an accident with inconclusive findings, Air India Flight 182.

It makes greater sense to compare Pan Am Flight 103 to United Airlines Flight 811 as well as Air India Flight 182. (Trans World Airlines Flight 800 had not yet occurred.)

D. AAIB Aircraft Accident Report No 2/90 (EW/C1094) quotes:

ÔDetection of explosive occurrences: In the aftermath of the Air India Boeing 747 accident (AI 182) in the North Atlantic on 23 June 1985, RARDE were asked informally by AAIB to examine means of differentiating, by recording violent cabin pressure pulses, between the detonation of an explosive device within the cabin (positive pulse) and a catastrophic structural failure (negative pulse).Õ

15. Conclusions:

Pan Am Flight 103 occurred before United Airlines Flight 811 and Trans World Airlines Flight 800 and after Air India Flight 182.

The AAIB Aircraft Accident Report No 2/90 (EW/C1094) report reflects the sentiment of the times in the late 1980s that terrorists were everywhere and were blowing up airplanes at will. The determination was made within days of the inflight breakup that the cause was probably a bomb explosion and efforts were directed toward catching the culprits. A precedent has been set by the Indian government who declared that the similar accident, Air India Flight 182, was caused by a bomb explosion in the forward cargo hold, although the Canadians refused to state the cause of that explosion. A mechanical explanation for Pan Am Flight 103, such as that of United Airlines Flight 811, was given very little consideration.

The AAIB investigators did not have the luxury of hindsight to learn the lessons of Trans World Airlines Flight 800 nor did they take advantage of the lessons of United Airlines Flight 811 which occurred a short two months later after Pan Am Flight 103.

The writers of the AAIB report struggled to explain how a relatively mild directed blast on the port side of the forward cargo compartment caused outward ruptures faraway from the shatter zone, caused foreign object damage in an engine far away, caused inflight damage to an opposite side horizontal stabilizer, and caused much more damage throughout the starboard side of the airframe. They stretched with explanations such as the ejected material did strange things by going over, around, and under the fuselage to get to the affected areas. They brought in a theory of Mach Stem which presents the novel idea that a mild blast which disseminates through ducts and baggage containers actually manages to gain enough energy to do more damage faraway even as the energy is being absorbed by suitcases, baggage containers, and floor panels.

The writers ignored the logical questions of how a mild blast on the port side could have caused such a large hole opposite on the starboard side at initial event time; why the forward section buckled to the starboard instead of the port side; why was the sound of a powerful bomb not heard on the cockpit voice recorder; how a mild blast abruptly shut off the entire power supply to the aircraft, and how a piece of timer of a bomb which exploded high up shows up inexplicably tucked in behind a plate on the outside of a baggage container.

Only photographs of the port side are revealed, no text explanations are given to the starboard side opposite, sketches of the cargo door are inaccurate while the port side sketches are exaggerated. The writers generally ignored the starboard side of the wreckage reconstruction although it showed more damage than the port and all of the inflight damage to engine number three, right wing, and right horizontal stabilizer would be easily explained if the explosion had occurred on the starboard side.

The AAIB report reads more like a prosecution case for a crime of a terrorist bombing than an objective investigative aircraft accident report. In fact, one could say the report doth protest too much that it was a bomb explosion. (As one might say the Smith AAR doth protest too much it was a wiring/cargo door event.)

The precision of the English language was put to good use by the conclusions reached of an "Improvised Explosive Device" instead of a "Bomb" since the evidence did show an improvised explosive device and not a bomb explosion, although the intent was for the reader to believe it was a bomb explosion. To this day, officials continue to call the object which started the destruction a "device" and not a "bomb".

Mechanical alternatives were not given due consideration after the first few days when a sooty and pitted rib was found in the wreckage. There is very little information in the AAIB report about possible alternatives such as a center fuel tank explosion, hull rupture by structural failure, or explosive decompression by a mechanical source such as inadvertently opened cargo door or cargo shift.

Since major aircraft accidents now have international repercussions, politics which reflects the popular will of the moment takes precedence over objective investigations conducted in a calm and thoughtful manner. Extreme pressure was put on all investigative authorities from law enforcement to aviation accident investigators for a quick answer to the cause of Pan Am Flight 103. A popular answer was that the cause was not the fault of the manufacturer, the airline, or the government oversight agencies but was the fault of evil terrorists who had managed to slip by inadequate security. The direction of the

investigation was set; a crime of a bombing and find the perpetrators.

The result is AAIB Aircraft Accident Report No 2/90, written fifteen months after Pan Am Flight 103 suffered the inflight breakup which appeared to be caused by a bomb, was assumed to be a bomb explosion, and almost all of the report describes what happened after the bomb went off on the port side of the forward cargo compartment. To this day, it is assumed a bomb exploded in Pan Am Flight 103 and the only disagreements are who put it there, when, and why.

The conclusion reached by this investigator in this AAR is that there was no bomb in Pan Am Flight 103. There was no bomb explosion. There was something that looked like a bomb explosion but wasn't. The evidence revealed by subsequent similar accidents indicates that there was a tremendous explosion of an explosive decompression when the forward cargo door ruptured open inflight, probably at the midspan latches and probably caused by faulty wiring or switch.

Respectfully submitted;

John Barry Smith
Independent Aircraft Accident Investigator
1 May 2002,
Carmel Valley, California

Below is from NTSB AAR 92/02 for United Airlines Flight 811:
'1.17.1 Previous Cargo Door Incident
On March 10, 1987, a Pan American Airways B-747-122, N740PA, operating as flight 125 from London to New York, experienced an incident involving the forward cargo door.

According to Pan Am and Boeing officials who investigated this incident, the flightcrew experienced pressurization problems as the airplane was climbing through about 20,000 feet. The crew began a descent and the pressurization problem ceased about 15,000 feet. The crew began to climb again, but about 20,000 feet, the cabin altitude began to rise rapidly again. The flight returned to London.

When the airplane was examined on the ground, the forward cargo door was found open about 1 1/2 inches along the bottom with the latch cams unlatched and the master latch lock handle closed. The cockpit cargo door warning light was off.

According to the persons who examined the airplane, the cargo door had been closed manually and the manual master latch lock handle was stowed, in turn closing the pressure relief doors and extinguishing the cockpit cargo door warning light. Subsequent investigation on N740PA revealed that the latch lock sectors had been damaged and would not restrain the latch cams from being driven open electrically or manually. It was concluded by Boeing and Pan Am that the ground service person who closed the cargo door apparently had back-driven (opened) the latches manually after the door had been closed and locked. The damage to the sectors, and the absence of other mechanical or electrical failures supported this conclusion.

Further testing of the door components from N740PA and attempts to recreate the events that led to the door opening in flight revealed that the lock sectors, even in their damaged condition, prevented the master latch lock handle from being stowed, until the latch cams had been rotated to within 20 turns (using the manual 1/2 inch socket drive) of being fully closed. A full cycle, from closed to open, is about 95 turns with the manual drive system.'

From the Kirpal Report for Air India Flight 182:

ACTION TAKEN BY THE COURT

1.4.1 Despite the fact that Mr. H.S. Khola had been appointed as the Inspector of Accidents under Rule 71 of the Aircraft Rules, the Government thought it proper to appoint Mr. Justice B.N. Kirpal as the Court to investigate into the circumstances of the accident.

NOTICE AIR INDIA KANISHKA ACCIDENT INVESTIGATION

The Government of India, vide Notification dated 13th July, 1985, appointed Hon'ble Mr. Justice B.N. Kirpal as a Court to investigate into the accident to Air India's Boeing 747 aircraft VT-EFO (KANISHKA) near the Irish Coast on 23rd June, 1985, when the aircraft was engaged on a scheduled passenger flight from Montreal to Bombay via London and New Delhi.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: Bill.Tucker@tsb.gc.ca, ksmart@aaib.gov.uk

Subject: Please notify Chinese Authorities about the wiring/cargo door explanation

W.T. (Bill) Tucker
Director General,
Investigation Operations
Transportation Safety Board
Canada

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough

Hants GU14 6TD

United Kingdom

Dear Mr. Bill Tucker and Mr. Ken Smart, 22 June 2002

The last noise was a sharp "thud" before the power went off, he said.

Please Mr. Smart and Mr. Tucker, I suggest/ask/beg you to notify the Chinese aviation safety authorities, your counterparts, in Taipei about the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation. Inform them there there is a similar event of United Airlines Flight 811 from which to match China Airlines Flight 611 evidence.

The officials in Taiwan are mystified by the sudden loud sound/thud and the abrupt power cut. I am not and I believe you are not surprised either.

Please get them on the right track before another Boeing 747 suffers an inflight breakup.

Respectfully,
Barry Smith

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China Airlines Crash Remains Mystery

Sun Jun 23,10:32 AM ET

By ANNIE HUANG, Associated Press Writer

TAIPEI, Taiwan (AP) - Initial analysis of a black box from a China Airlines jet has yielded no clues in the crash last month that killed 225 people but has shown several unusual sounds, the chief investigator said Sunday.

Minutes before the Boeing 747-200 went down, the cockpit voice recorder picked up a noise that sounded like a human heart beat. But investigators have yet to identify the source of the noise, said Kay Yong, the chief investigator at Taiwan's Aviation Safety Council. Shortly before the crash, the black box also recorded a noise that sounded like "ka ta, ka ta, ka ta," Yong said. The last noise was a sharp "thud" before the power went off, he said.

Several Boeing 747 pilots who listened to the tape said the sounds were not normal in the cockpit, Yong said.

Each sound lasts a fraction of a second. Investigators could not say if they were related to the crash, "but at this moment, we'd rather be more suspicious," Yong said.

A closer and more sophisticated analysis was needed to identify the noises, he said.

The second black box, the flight data recorder, was still being analyzed, and Yong would not comment on its contents.

Yong repeated on Sunday that the pilots' conversations did not indicate any problems.

He refused to speculate about why the plane crashed on May 25 about 20 minutes after taking off from Taiwan enroute for Hong Kong. But divers searching for the wreckage deep under the sea did not "find anything that did not belong to the airplane."

Search crews are still trying to recover large parts of the plane, which split into four pieces before plunging into the Taiwan Strait near the Penghu island chain off Taiwan's western coast. The wreckage might offer the best clues about why the plane crashed.

Some aviation experts have suggested that metal fatigue might have caused the 22-year-old plane to break up. Others have suggested that an explosion perhaps in the fuel tank was to blame. Security officials have said there were no signs of terrorism or a missile attack.

Rescue teams have so far recovered 160 bodies. Eight corpses including that of co-pilot Hsieh Ya-hsiung were found Saturday in wreckage about 200 feet under the sea.

The United Daily News quoted prosecutors as saying Hsieh's body was attached to the seat when it was found, indicating there had been no problem requiring him to get up immediately before the crash.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: RE: Please notify Chinese Authorities about the wiring/cargo door explanation

Dear Barry,

I have forwarded your message to them. However, I must emphasize that I will not immerse myself in the ASC's investigation. I did say that I found you to be sincere and well motivated, and I suggested that they may find it worthwhile to look through what you have sent them and to use whatever they find to be useful.

Dear Bill, thanks, that will be very useful to them.

I have a long half-finished e-mail reply to you which I will complete before I "depart this fix" on Wednesday.

Looking forward to the email, Bill but not to your retirement. Who is your replacement? Will you brief him on the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for Air India Flight 182? May I email him?

As I had indicated, though I wanted to reply anyway, I felt I had to reply "for the record" when I read your comments about "something fishy going on".

My frustration may have led to that premise. My frustration is that weirdos can say they overheard an Arab speaking on a cell phone about something and he is interviewed and taken seriously while I have credentials, experience, and documents which support an important explanation with current relevance and yet am mostly ignored. You are one of the few that at least checked out the story.

Photos of the Air India Flight 182 explosion area are very valuable as none have been seen before in public.

The CVR of the four affected aircraft can be matched to the China Airlines Flight 611 CVR.

Well, we shall see what the evidence turns up. The Chinese seem very competent and open so far.

Looking forward to your 'fishy' email and any photos you can obtain.

It's been a pleasure communicating and meeting with you, Bill; I just wish all the other aviation officials were as open, fair, and polite as you have been.

Cheers,
Barry

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: "Tucker, Bill" <Bill.Tucker@tsb.gc.ca>

Subject: Summary of exit briefing...

Dear Bill, 24 June, 2002

1) - I am not being "rebuffed with excuses and delay".

Well, rebuffed since no pictures for somewhat curious reasons. If cargo door not involved in Air India Flight 182 crash and thus not involved in criminal action, then why can't release pictures. Bottom line, Bill, no pictures.

2) - There is nothing fishy going on.

Fishy...Things don't add up. Things like Garstang saying bomb in aft cargo compartment when CASB and Kirpal all say explosion in forward cargo compartment. Things like sudden loud sound is not bomb according to AAIB representative. And yet, conclusion? Bomb in aft compartment.

3) - Ron Schleede contacts me because he is a colleague and a friend. He worked for me here as Director of Investigations-Air for six months on an international exchange (and he did a great job).

Then you could follow up on his strange email where he reports the forward cargo door was locked and latched when it had not been retrieved and when only later retrieved one door sill and that was the aft door sill.

Bill, I keep on bringing up contradictory facts, I know. It's because the official version does not make sense while the wiring/cargo door version does.

4) - Ken Smart said nothing to influence my retirement, and I am shocked that you would suspect a connection. The fact is that my decision was made and relayed to my boss in late March, at least a month before Ken's visit.

Just a coincidence. I think you are the honest and fair official I have been seeking for six years. I believe you want to retire because you also know things do not add up and do not want to get involved with the earth shaking consequences of the wiring/cargo door explanation. Things do not make sense in official versions. There are too many contradictions and omissions. When an omission is filled in, such as starboard side photo of Pan Am Flight 103, and it supports the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation, the obvious implications are ignored. Really, Bill, the forward cargo door area of Air India Flight 182 and Pan Am Flight 103 are shattered, frayed, and ruptured; it's plain to see in the photo and read in the text. The official version of bomb in aft compartment or bomb on port side is 'fishy', only because it contradicts the plain to see evidence. I'm not blind and I can read. So can you.

5) - I do not believe the "more likely explanation for Air India Flight 182 is mechanical rather than conspiracy". Based on my direct

knowledge from the AI 182 investigation, I saw mechanical failure as one plausible explanation. Adding my indirect knowledge at the time (back in the late 1980s), from others who were more directly involved, I considered a bomb to be the more likely explanation and mechanical failure to be plausible, but unlikely. Adding in the additional knowledge I have acquired since then (which is almost all indirect in a pure accident investigation sense) I have become more convinced that a bomb brought down AI 182.

Because of the conspiracy circumstantial evidence of Narita bombing and the bad person Sikhs, but not because of the hard evidence in the wreckage because bomb evidence is not there. The same reasons for ruling out bomb for Air India Flight 182 are the same reasons it was ruled out in Trans World Airlines Flight 800, absence of corroborative evidence.

6) - The only reason that my recent e-mail referred to AI 182, PanAm 103, and TWA 800, but not to UA 811, was that I had less familiarity with the UA 811 investigation than the other three. However, I have absolutely no reason to doubt the eventual conclusion that the cargo door failed in UA 811.

United Airlines Flight 811 is the model for all and is the model for China Airlines Flight 611. The evidence is being matched as we speak.

7) - As I advised you last summer, this agency has no mandate to re-conduct an investigation of AI 182. Moreover, my personal opinion is that it would not be an appropriate use of our resources to do so. Nevertheless, I did believe that the TSB should make John Garstang available to that investigation through periodic secondment to the RCMP, and I still feel that our doing so was an appropriate decision. I have high confidence in the integrity and the thoroughness of the RCMP investigation; and I sincerely hope that justice will be served by the pending trial - whatever its outcome.

Your faith in a fellow government official and agency is laudable. I did but do not now share that faith. May 2002 was a turning point for me: 1. Your retirement. 2. China Airlines Flight 611. 3. This email of no photos for Air India Flight 182.

Now to the matter of your request for photos of the forward right side of the AI 182 B747.

Yes, a request for photos of the area at which the explosion occurred according to the CASB and Kirpal Report which

brought down Air India Flight 182. Sort of like the autopsy photo of a famous assassinated person. Very important and relevant photos that any investigator charged with considering a door open in flight would have before him. If Garstang was supposed to give an objective opinion about this wiring/cargo door explanation, he would have had the photos, grainy or clear, available to you in ten minutes.

I spoke with John Garstang about your request. He advised that there are both photos and videos from the AI 182 investigation. However, with respect to the forward right side and the cargo door in particular, he is only certain about the video. They have pictures showing where the cargo door was in the debris field, and they also have a picture of the door at the ocean surface when it broke free during the recovery attempt; he is just not sure how much was video, or still frame from video, versus photographs..

Cagey, stonewalling, stalling, this area is the most important part of the entire wreckage, it is the location of the wound, it is not the left wing tip. And the drawings show two parts to the door (which match United Airlines Flight 811 perfectly) and the text describes much worse. There is no picture of 'a' door, there are pictures or video of door pieces.

Let's see the picture at the surface.

To complicate matters, the video was deteriorating as time went by.

How convenient for someone who does not want anyone to see that important area. The Kirpal report states much about the multitude of high quality 35 MM color film and video from special cameras taken underwater. 1985 was not 1885.

Some years ago (estimate: around 1995), the RCMP took the magnetic tape video

(which would be of even poorer quality by now) and made a digitized version.

The former is ours, the latter is theirs; however they need both for trial purposes (continuity of evidence, I assume).

A copy is easy to make to show the Director General of TSB.

Moreover, they have advised that the matter is before the courts, that a publication ban is in effect, and that they do not want anything to be released that could be prejudicial to the court process.

Publication ban is on court matters. A photo of wreckage from 17 years ago is not under ban, unless someone is looking for an excuse not to show the photos.

So far: Photo may or may not exist; if it does, it's deteriorating; and if it exists and has not deteriorated, it can't be shown under court order.

Bill, fishy is the least of the words that come to mind to describe this debacle. Cover up, concealment, hiding, is closer to it. You are not a nosy reporter from a tabloid asking for the pictures of a plane crash from long ago.

Cover up is not by you but to you.

Both the TSB's General Counsel and I have been notified that the RCMP Legal Services group believes that release of Air India wreckage photographs could be injurious to the RCMP's work and that, as such, release is exempted under Sec. 16(1) of Canada's Access to Information Act.

Yeah, yeah, yeah, Blachford refers me to you and you refer me to RCMP and RCMP refers to the Court and the result? No photos of an important area of a plane crash, (not a crime according to CASB) of 17 years ago.

The 'C' in CASB stands for Canadian. The CASB says not a crime since no bomb stated. If TSB wanted to look at those photos, it could, would, and should.

Injurious to the RCMP work? How is that? Bill, it's pieces of metal, not testimony from informers. What a crock of bull. The RCMP are investigators not prosecutors. TSB are investigators not RCMP assistants.

This is reminiscent of the FBI taking over the Trans World Airlines Flight 800 investigation from NTSB for 17 months. The guys with the guns rule, even in plane crash investigations.

There may (far from certain) be some form of photo/video info that is still in the TSB's possession and that may (also far from certain) be releasable to you. To determine that will take considerable effort and, to be at all manageable, it will require the personal involvement of John Garstang. With his heavy workload, as we try to complete the report on the SWR111 investigation, we just can't give him any more tasks for the next few months.

The brushoff. Garstang will have nothing to do with me and I know why. I have refuted his assertions about aft compartment bomb.

However, I have obtained a personal commitment from both the Director of Engineering and the Director of Air Investigations that they will follow-up on this at the end of the summer and see if there is anything that can be made available to you.

A shard of hope. Thank you for this. It's something. May I

communicate with them?

To that end, I shall send both of them a copy of this message so that they can create a "bring forward" reminder to follow up.

Bill, thank you and I mean that sincerely.
At the very worst, the TSB's photos/videos can certainly be made available after the trial.

I doubt that but I could be wrong. One would think that the prosecution would say here is the bomb, here is the bomb damage in photos, and here are the accused. A crime has to be established for criminals to exist. But, in the Pan Am Flight 103 trial, the defense never disputed the bomb and thus a crime and criminals and it may happen to Air India Flight 182 also.

Meanwhile, I can assure you that the cargo door failure possibility was looked at in a rigorous and unbiased manner.

I keep hearing that but I don't see the proof. There was no detailed examination of the cams, latches, pressure doors, manual locking handle, etc, as was done in United Airlines Flight 811 report. The CASB and Kirpal reports never considered the door opening inflight. One paragraph on the door is all there is. Where is the documentation that the cargo door failure possibility was looked at in a rigorous and unbiased manner?

In fact, I understand that part of that process was to specifically review the information

and suggestions that you had provided. John G. told me that when he was asked by the RCMP to do work in that area, there was not the slightest hint of a desired outcome - only that all the information be reviewed thoroughly and objectively to find the truth.

And where is the rebuttal to my conclusions? He never talked to me, he never asked questions, he never followed up.

As Sgt Blachford has indicated to both of us, the aircraft-related elements are only part of a huge investigation. The trial (which is expected to be the largest in Canada's history) will also bring out much evidence that was obtained through the RCMP's criminal investigation.

It's all conspiracy nonsense. I've been through that jungle with the missile guys for Trans World Airlines Flight 800. Conspiracy guys are really nuts; it is impossible to reason with them. Every gap in logic is filled with mystery men. The premise for bomb for Air India Flight 182 is even funny with a plane taking off with bomb..that does not go off, lands, new baggage and passengers and plane takes off and bomb does not go off, lands, and new plane, new crew, new baggage, new passengers and plane takes off, flies for five hours and explodes and lo, bomb. Ha!

I never believed in cover up until I met you, Bill, you are the one honest guy, and your bailing out when the situation is getting hot

with China Airlines Flight 611 is very disappointing.

I don't think there is a conspiracy to hold back evidence such as photos since I think everyone is acting in their own perceived best interest. That best interest is maintaining reputation of self and agency.

If Garstang wanted to know about shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation he would email me with questions which would reveal the errors of logic. There is none. It is correct. Bomb in aft compartment, his pet answer totally unsupported by evidence and contradicted by direct examination of the area underwater, is incorrect. He never responded to my rebuttal to his explanation.

This head in the sand attitude has resulted in another 225 dead. Judge Kirpal did great damage by his jump to bomb for Air India Flight 182. Because of that, 747s were not checked for door problems and Pan Am Flight 103 was thought a bomb too. Then United Airlines Flight 811 happened and the door was 'fixed' but the midspan latches had no locking sectors to strengthen. So...Trans World Airlines Flight 800 which was a bomb for 17 months...and now China Airlines Flight 611 for which bomb is mentioned already.

You will no doubt be following the trial, as I will. Let us hope that the trial will not be delayed much longer and that it will culminate in a just outcome (whatever that may be)..

It's not a bank robbery, it's a plane crash. The verdict will be political which is to say one guy goes to jail and the others walk

away.

In closing, I can honestly say that I have enjoyed communicating with you - at least most of the time.

Likewise.

(I must admit that there have been times when you added to my stress level because I couldn't keep up with your correspondence; it is against my nature to ignore a sincere message or to respond to it without adequate consideration.)

My passion comes from having my life saved in a sudden night fiery fatal jet plane crash. Near death experiences do change people's lives. You should read the emails from United Airlines Flight 811 survivors.

If I may offer some gratuitous advice, please don't let the cargo door issue consume you, and don't become like the conspiracy theorists.

It does not consume me, my daughter's welfare and upbringing consumes me. I have learned from the conspiracy guys; zealots always defeat their cause. I must resist lies, exaggerations, misleading statements, profanity, and unsubstantiated allegations.

When I now read that the Director General of TSB can not get quick access to photos of the direct area of the explosion in the

most important crash in Canada history, I have to wonder, what is going on?

You have already raised awareness of the cargo door issue; but if you are seen as pushing it as the only credible explanation for so many accidents,

Only four until May 25, and now five. Only five have the evidence out of about 40 hull losses of 747s of 32 years. I do not pick the flight numbers, the evidence does. Know any more early model 747 that suffer inflight breakup with sudden sound on CVR followed by abrupt power cut...and about a dozen hard evidence matches? I've only discovered four and soon probably five.

people will not listen to what you have to say.

They rarely do now. Once the mythic Pan Am Flight 103 comes into play, off they go....It shows the power of myth and superstition, especially when the story absolves so many of responsibility and gives good reason to smite enemies.

I was, and still am, impressed with you. You have a good brain, a pleasant personality, good health, and a wonderful family and home; Don't miss out on enjoying all that in your retirement years.

Bill, thanks for the thoughts and you too. You were most helpful in obtaining the Pan Am Flight 103 cargo door photos, for notifying ASC for China Airlines Flight 611, and for the future involving DE and DAI of TSB.

It's not over yet. The Chinese have been open and objective so far which is to say non political. They will eventually come to the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup explanation for China Airlines Flight 611. (I've just read that bomb, missile meteor, CWT explosion, crew error have all been ruled out and metal fatigue or structural failure still a possibility.)

And of course there's always the next one.

Cheers,
Barry

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From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Pattern emerging**

Dear Mr. Smart, 25 June 2002

Yong said the disaster apparently wasn't caused by a fuel tank explosion, bomb, missile or meteor.

Investigators are considering the possibility that metal fatigue,

structural failure or engine problems brought down the Taipei-Hong Kong flight,

Mr Smith

You can rest assured that the Aviation Safety Council in Taiwan, who are leading the investigation, will examine all possible causes for this tragic accident.

Well, it appears they are getting closer and closer to the shorted wiring/forward cargo door rupture/explosive decompression/inflight breakup (Structural failure) explanation.

I understand that the cockpit voice recording contains some very interesting sounds in the seconds before the cessation of the record. These may give an important clue to the circumstances surrounding the loss of the aircraft, its passengers and crew.

Right, sudden 'thud' sound and then abrupt power cut. Only happened five times before on early model Boeing 747 just before inflight breakups. I wonder if the sudden loud sound on Pan Am Flight 103 was a 'thud'?

The Chinese are very impressive by being fast, open, and forthright in their reporting of this investigation. It also appears they are going to get all the wreckage. The forward cargo door area will show a striking resemblance to Pan Am Flight 103 cargo door area as per your photographs, and when it does, will you reconsider the cause of Pan Am Flight 103 if China Airlines Flight 611 is shown not to be an 'explosive device'?

Both Trans World Airlines Flight 800 and China Airlines Flight 611 both showed abnormal climb at event time, as one would imagine when the nose comes off a Boeing 747. Did Pan Am Flight 103 show a marked climb at event time? Was there altitude radar on it?

At least you now can understand the mystery 'green diamond' in the AAIB report which was the mystery primary radar return from two radars on the same target at same time; it was probably parts of the airframe coming apart and reflecting to radars on ground.

All of the suspect aircraft had that mystery radar return except Air India Flight 182 which was out of primary radar range. China Airlines Flight 611 had it with ejected material coupled with the other three main pieces of airframe.

Ah, the similar evidence matches keep on coming...did you notice the similarity between the cockpit wreckage of China Airlines Flight 611 and Pan Am Flight 103?

When one looks at the forest of five Boeing 747 inflight breakups the pattern is clear; when one looks closely at the one tree, the pattern is hard to see.

Cheers,
Barry Smith

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Investigators find no signs of pilot error, explosion in debris of
China Airlines crash
Tue Jun 25, 5:31 AM ET

By WILLIAM IDE, Associated Press Writer

TAIPEI, Taiwan - The initial probe of a China Airlines crash is ruling out an explosion and pilot error as causing the Boeing 747-200 to break up over the Taiwan Strait shortly after takeoff last month, the chief investigator said Tuesday.

Investigators are considering the possibility that metal fatigue, structural failure or engine problems brought down the Taipei-Hong Kong flight, killing 225 passengers and crew, said Kay Yong, the chief investigator at Taiwan's Aviation Safety Council.

Flight CI611 suddenly split into four pieces about 20 minutes after takeoff on May 25. The pilots indicated no problems before the plane disappeared from radar screens and crashed near the Penghu island chain, off Taiwan's west coast.

Yong said the disaster apparently wasn't caused by a fuel tank explosion, bomb, missile or meteor.

"From the bodies and wreckage that have been recovered so far, we haven't seen any signs of burning or an explosion," Yong told reporters.

After analyzing the plane's so-called black boxes, or cockpit voice and flight data recorders, Yong said that the devices showed no evidence of flight operation errors, such as pilot mistakes or communication problems. "Seventy percent of air accidents are caused by flight operation," he added.

The chief investigator said the flight data recorder indicated that one engine seemed to be running slightly abnormally. But it was unknown if this was related to the crash, he said.

In the flight's final seconds, the plane climbed at three times its previous rate Ñ from 3,960 meters (1,200 feet) per minute to 11,220 meters (3,400 feet) per minute, he said. This supposedly equated to about 27 secs. Most likely explained by the crew converting speed to height in order to slow down. (i.e. doubt that it was a stab failure / trim runaway). More likely that they heard the sounds of breakup begin and slowed as quickly as possible - by simply raising the nose.

"The ascent should have been more gradual," Yong said, but he added that such a steep ascent shouldn't have caused problems for the plane.

The investigator also said that a security review of the passengers showed no evidence that any of them were carrying hazardous materials. There was also no evidence that any passenger purchased large amounts of insurance as part of a suicide plan that would enrich relatives, he said.

Earlier this week, Yong said the plane's cockpit voice recorder picked up several unusual sounds, but investigators have yet to identify them.

Minutes before the crash, the cockpit voice recorder detected noises, some resembling a human heartbeat. The last recorded noise was a thud, Yong said. Several Boeing 747 pilots who listened to the tape said these were not sounds usually heard in the cockpit, Yong said.

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: ksmart@aaib.gov.uk, Bill.Tucker@tsb.gc.ca, kfchou@asc.gov.tw, Lyle.Streeter@faa.dot.gov, WILDEYJ@ntsb.gov
Subject: **Maybe not open cargo door....**

From: John Barry Smith <barry@corazon.com>
Subject: How about midspan latches?
Cc:
Bcc:
X-Attachments:

Still no real ideas, fwd cargo door intact and locks in place so there goes that theory.

John, I've heard that before. How many locks? the bottom eight will be attached and locked to sill because of the AD strengthening the lock sectors. The midspan ones may be ruptured.

But, the debris field rules against nose coming off
And last noise was not loud...

Hull rupture but where and why?

FCD is not in FS 800 to 1200...it's 560 to 670...

How close is first to second debris field?

Barry

Fuse section 800-1200 and another engine was delivered to the dock last night, the eng core was relatively intact and showed no signs of failure other than smacking into the sea at terminal velocity. Still no real ideas, fwd cargo door intact and locks in place so there goes that theory. Got all the charts ref wreckage spread etc but as I am sure you can understand I can't publish any here but I'll see what I can do ref exact position of main groups of wreckage. In a nutshell the debris closest to the last radar return was the tail (+CVR and FDR) first then main wreckage (sect 41) then the cockpit and then 2 of the engines, that was expected as the engines are classed as ballistic items and therefore will travel max dist. Keep in mind that this model of engine is capable of still running for 3-4 seconds after detaching from the pylon. There are still areas that haven't been mapped due to various reasons, presently there is a large vessel called Fisheries Research 1 mapping the area and also Navy minesweepers are going to assist soon. The area is so huge and resources are stretched. The team examined the new wreckage last night including the second engine and are still stumped as to what happened. The center fuel tank is clean and shows no signs

of burning at all. The CVR was perfectly normal and the sounds that were on it are routine other than the "funny" sounds that make no sense, a sim run will be made today to try to duplicate the sounds and the Capt doing it is a top guy and knows his stuff.

From: John Barry Smith <barry@corazon.com>

Date: September 5, 2009 11:47:12 PM PDT

To: Terry.Burtch@tsb.gc.ca

Cc: Paulette.Delorme@tsb.gc.ca

Subject: **Air India Flight 182 update**

At 9:09 AM -0400 7/3/03, Delorme, Paulette wrote:

Thank you for your recent inquiry regarding the last correspondence you had with Mr. Bill Tucker on the Air India file. Mr. Tucker's replacement is Mr. Terry Burtch, who joined us last October. Mr. Burtch is presently following up with other staff in those respective organizations, and will communicate directly with you at the earliest opportunity.

Terry Burtch
Director General,
Investigation Operations
Transportation Safety Board Canada

Dear Mr. Burtch, Monday, July 14, 2003 12:23 PM

John Barry Smith here following up on Ms. Delorme's email of a few weeks ago.

Essentially my premise is that Air India Flight 182 and others were brought down by a mechanical cause with precedent. There

are no conspiracies, just a machine obeying the physical laws of nature.

My proof is in official documents, photographs, and the wonderful luxury of hindsight of 18 years.

The issue is important because the mechanical problems exist to this day and the danger exists of a reoccurrence of the shorted wiring/ruptured open cargo door/explosive decompression/inflight breakup explanation.

There also exists the trial of two men accused of causing the inflight breakup. Would it not be prudent for TSB to conduct an update of the AAR of so many years ago? The CASB report and the Kirpal report were conducted without the benefit of subsequent similar accidents to similar type aircraft and model under similar circumstances.

An update would be most beneficial since the latest Canadian opinion as to the probable cause of Air India Flight 182 was an explosion of undetermined origin in the forward cargo compartment, an opinion I concur with as time has revealed the cause of the explosion.

It's not a bomb. Nobody 'blew' it up. It was an explosion all right, an explosive decompression.

John Garstang has been seconded to the RCMP and his opinion does not reflect that of the TSB, does it? If so, then there are many inconsistencies and contradictions in his opinion that a bomb in the aft cargo compartment caused the breakup.

The Crown is in the position of arguing against itself in the

pursuit of justice for the 329 deaths in Air India Flight 182. For instance, CASB and the Kirpal Report both conclusively agree the explosion was in the forward cargo compartment. The reports offer ample evidence to support that conclusion. Yet the Crown now postulates the explosion occurred in the aft cargo compartment, a premise easily refuted with the Crown's own evidence.

If the explosion occurred in the forward cargo compartment, the accused are innocent as all the baggage from the Vancouver passengers were loaded in the aft cargo compartment. The Montreal passengers' baggage was loaded into the forward cargo compartment.

If the explosion occurred in the aft cargo compartment, the CASB and the Kirpal Report are incorrect in a basic finding. If so, that error must be explained by data, facts, and evidence. That has not been done.

Just exactly where did the explosion occur? The lives of the accused and flying passenger's today are dependent on that conclusion.

Once determined where, then the question is why. I believe I have found the answer and it is the shorted wiring/ruptured open cargo door/explosive decompression/inflight breakup explanation for Air India Flight 182 and others.

This is quite controversial and refutes conventional wisdom/wishful thinking of many years. However the facts are there. I can present them to you at your convenience, Mr. Burtch.

Many facts can be deduced from the actual photographs of the

actual wreckage of Air India Flight 182. Apparently the RCMP has those photographs and will not release them to TSB, according to Mr. Bill Tucker.

That's not right. That's wrong when an aviation safety board can not look at accident photographs. Could you look at the photographs and high quality video to see if the forward cargo door area of Air India Flight 182 matches the photographs of United Airlines Flight 811? Could you update the AAR for Air India Flight 182 to include the knowledge gained by hindsight and similar accidents in early model Boeing 747s?

Could you assign a staff person to listen to me as I present my research and analysis that concludes the probable cause of the inflight breakup of Air India Flight 182 was the shorted wiring/ruptured open cargo door/explosive decompression/inflight breakup explanation?

Cheers,
Barry Smith

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Commercial pilot, instrument rated, former FAA Part 135 certificate holder.

US Navy reconnaissance navigator, RA-5C 650 hours.

US Navy patrol crewman, P2V-5FS 2000 hours.

Air Intelligence Officer, US Navy

Retired US Army Major MSC
Owner Mooney M-20C, 1000 hours.
Survivor of sudden night fiery fatal jet plane crash in RA-5C

From: John Barry Smith <barry@corazon.com>
Date: September 5, 2009 11:47:12 PM PDT
To: Ken Smart <ksmart@aaib.gov.uk>
Subject: **Investigators ask questions....**

Ken Smart
Chief Inspector of Accidents,
Air Accident Investigations Branch
AAIB
DRA Farnborough
Hants GU14 6TD
United Kingdom

Dear Mr. Smart; Saturday, August 16, 2003 11:23 PM

Ask the Libyans to prove to you they did it. They can't do it because they did not do it. They said they would cooperate, ask for evidence that persuades you they put a bomb on board on their evidence alone. They can't do it.

pledges to cooperate in good faith with any further requests for information in connection with the Pan Am 103 investigation. Such cooperation would be extended in good faith through the usual channels;

accepts responsibility for the actions of its officials;

Oh, rogue secret agent working against orders from the government? Hung out to dry in prison?

Pan American World Airways Flight 103 was a mechanical event with precedent. No conspiracies. No bombs. Just bad wiring and non plug cargo doors.

And I know you know about that shattered forward cargo door on the starboard side and that small shotgun shot sized hole on the port side which occurred at the same time as that sudden loud sound that was not matched to a bomb sound.

A politician lets the judgment slide and the money exchange hands. An investigator asks questions whenever facts contradict the conventional wisdom.

Which are you?

Cheers
Barry Smith

John Barry Smith

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H.E. Dr Mikhail Wehbe
*President of the Security Council
Excellency*

1. I am pleased to inform you that the remaining issues relating to fulfilment of all Security Council resolutions resulting from the Lockerbie incident have been resolved. I am also pleased to inform you that my country is confident that Representatives of the United Kingdom and of the United States of America will be confirming this development to you and to members of the Council as well.

2. The Libyan Arab Jamahiriya has sought to cooperate in good faith throughout the past years to bring about a solution to this matter.

3. In this context, and out of respect for international law and pursuant to the Security Council resolutions, Libya as a sovereign state:

has facilitated the bringing to justice of the two suspects charged with the bombing of Pan Am 103, and accepts responsibility for the actions of its officials;

has cooperated with the Scottish investigating authorities before and during the trial and pledges to cooperate in good faith with any further requests for information in connection with the Pan Am 103 investigation. Such cooperation would be extended in good faith through the usual channels;

has arranged for the payment of appropriate compensation. To this end, a special fund has been established and instructions

have already been issued to transmit the necessary sums to an agreed escrow account within a matter of days

4. The Libyan Arab Jamahiriya, which during the last two decades did, on numerous occasions, condemn all acts of terrorism in its correspondence to the General Assembly and to the Security Council, reaffirms its commitment to this policy.

The following are examples of this policy:

The Libyan Arab Jamahiriya confirms its support for UN Security Council resolution 1373 of 2001 which stipulates, according to Chapter VII of the (UN) Charter, that all states are to "refrain from providing any form of support, active or passive, to entities or persons involved in terrorist acts"; that they are to "take the necessary steps to prevent the commission of terrorist acts, including taking action and sharing information to provide early warning to other states"; that they are to "deny safe haven to any person who finances, plans, supports, or commits terrorist acts"; that they are to "ensure that any person who participates in the financing, planning, preparation or perpetration of terrorist acts or in supporting terrorist acts is brought to justice"; and that they are to "afford one another the greatest measure of assistance in connection with criminal investigations or proceedings relating to the financing or support of terrorist acts, including assistance in obtaining evidence in their possession, deemed necessary for legal proceedings."

5. In this connection, the Libyan Arab Jamahiriya is committed to be cooperative in the international fight against terrorism. It is also committed to cooperate with efforts to bring those who are suspects to justice.

6. In addition, the Libyan Arab Jamahiriya renews its support for the U.N. General Assembly's Declaration against International Terrorism as well as its support for General Assembly resolutions such as resolution 55/158 which "strongly condemns all acts, methods and practices of terrorism as criminal and unjustifiable,

wherever and by whom so ever committed."

7. The Libyan Jamahiriya continues to endorse the "Declaration on Measures to Eliminate Terrorism," annexed to General Assembly Resolution 49/60. That resolution stipulates that "all states shall refrain from organizing, instigating, assisting or participating in terrorist acts in territories of other states, or from acquiescing in or encouraging terrorist activities within their territories directed towards the commission of such acts." It also stipulates that "those responsible for acts of international terrorism must be brought to justice."