



Joint Services Wiring Action Group 2025



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SLIDES ONLY

NO SCRIPT PROVIDED



C-5M EWIS Physical Audit

**CLEARED
For Open Publication**

Aug 14, 2025

Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

**Name: AMBER DO
Org Base: AFLCMC/WLS
Email: hoang.do@us.af.mil**



EWIS Physical Audit



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- C5 is the largest aircraft in the Air Force inventory
- Many, many EWIS components (connectors, splices, wiring, etc.)
- Physical audit will be labor intensive and take considerable time
- Current plan is to work through section by section





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- The guidelines for Inspection of Aircraft EWIS handbook (MIL-HDBK-522).
- It aligns with the Mechanical Equipment and Subsystem Integrity Program (MECSIP) and MIL-STD-1798
- C-5 established the test procedure and created the test plan for conducting this inspection.





EWIS Physical Inspection Log Sample, Document



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Aircraft Physical Inspection Log

Date _____ Name(s) of assessor(s) _____ Aircraft ID _____
 Location _____ Configuration _____ Page # _____

Line #	Zone	Subzone/ Area/ Access Panel	Harness ID	Wire ID(s)	Discrepancy Description	Notes	Criticality (Class: I - Major, II - Intermediate, III - Minor, IV - Superficial)	Ease of access (1 - Low, 2 - Mid, 3 - High)	Photo #'s
1									
2									
3									
4									
5									
6									
7									
8									
9									



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- Identified Flight Controls as high failure rate using FSIP analyses and EWIS software (WSIRD)
- Priority on Empennage Flight Controls due to safety criticality of area
- Eight Total Subsystems
 - Elevator Control
 - Horizontal Stabilizer Trim Control
 - Pilot Assist Cable Servo Subsystem
 - Pitch Augmentation Subsystem
 - Pitch, Roll and Yaw Autopilot
 - Rudder Control
 - Stall-limiter Subsystem
 - Yaw Augmentation Subsystem
- 44 Total Drawings





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- The first phase of the physical audit:
 - The empennage
 - The controls subsystems that have components located in the empennage.
- Inspection Requirements:
 - Condition – Rating from 1-3 of the condition of the component
 - 1- Good with no defects found
 - 2- Part may have a defect, but functionality is good.
 - 3 – Poor quality or defective part.

Table 1: Empennage Subsystems

System	Subsystem
Control Surface Circuits (C)	Elevator Control
Control Surface Circuits (C)	Horizontal Stabilizer Trim Control
Control Surface Circuits (C)	Pilot Assist Cable Servo
Control Surface Circuits (C)	Pitch Augmentation
Control Surface Circuits (C)	Pitch, Roll, and Yaw Autopilot
Control Surface Circuits (C)	Rudder Control
Control Surface Circuits (C)	Stallimiter
Control Surface Circuits (C)	Yaw Augmentation
Electronic Circuits (R)	Cockpit Voice Recorder
Electronic Circuits (R)	Interphone System
Electronic Circuits (T)	Emergency Locator Transmitter
Embedded Diagnostic System (EDS) Circuits (U)	EDS Superless Instrumentation
Indicator Circuits (D)	Horizontal Stabilizer Trim Position Indicator
Lighting Circuits (L)	Anti-Collision Lights
Lighting Circuits (L)	Empennage Access Lights
Lighting Circuits (L)	Navigation Lights



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- Wires and cable harnesses were inspected: chafing, visible damage, abnormal bend radius, proper security, missing or broken lacing tape, corrosion, excessive splices, and incorrect repairs.
- See MIL-HDBK-525 and the materials listed in Table for reference material on EWIS inspections.

Reference Material Table

MIL-HDBK-525 Rev A, 4-Mar-2020	EWIS Handbook
MIL-HDBK-525 Rev A, 4-Mar-2020, Appendix D	EWIS Task Three – Physical Aircraft Inspection
MIL-HDBK-522 Rev D, 29-Sep-2022	Guidelines for Inspection of Aircraft EWIS
TO 1-1A-14 Change 3, 15 May 2007	Installation and Repair Practices of Aircraft and Electronic Wiring
SAE AS50881 Rev H, 13-Jan-2023	Wiring, Aerospace Vehicles
SAE ARP1870 Rev A, 1-Aug-2012	Aerospace Systems Electrical Bonding and Grounding
TO 1C-5M-6WC-8 Change 2, 1-Oct-2022	Front Matter - Zone Illustrations and Descriptions



Table 3 below lists the spreadsheet's columns and explains how to use each.

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- For all wiring issues identified during inspection, pictures of the defect were taken and numbered, and the Wiring Discrepancy Log was populated.
- Table below lists the spreadsheet's columns and explains how to use each.

Wiring Discrepancy Log Table

Column	Heading	How to use
A	Discrepancy Number	Each discrepancy will be numbered using the next available number
B	Zone	What zone the issue is in based on 1C-5M-6WC-8
C	Subzone/Location	More detailed information about the issue's location. Could be subzone (Avionics Bay 1), FS/BL/WL, etc. Should be detailed enough to find the issue again in the future.
D	Harness/Wire ID	Wire numbers and cable harness numbers if available
E	Discrepancy Description	Description of the issue
F	Ease of Access	Give a rating from 1-3 on how easy the wiring is to access (1 is easy, 3 is difficult)
G	Photo Number	Photos of the discrepancy should be numbered
H	Criticality Rating	Will be hidden during inspection
I	Notes	Add notes when needed



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Inspection Results:

- The first EWIS Inspection was conducted on aircraft tail # 87000044. During inspection, C-5 SPO discovered numerous discrepancies based on the MIL-STD-1798 Rev C and MIL-HDBK-522 Rev D guidelines.
- The following is a list of the empennage, vertical tail, and horizontal tail inspection findings.

MIL-HDKB-522 Discrepancy Photo Documentation.



Figure 4 - J75G Cannon Plug Missing Pin Filler Inserts (Discrepancy #1)



Figure 5 - J61T Cannon Plug Missing Pin Filler Inserts (Discrepancy #2)



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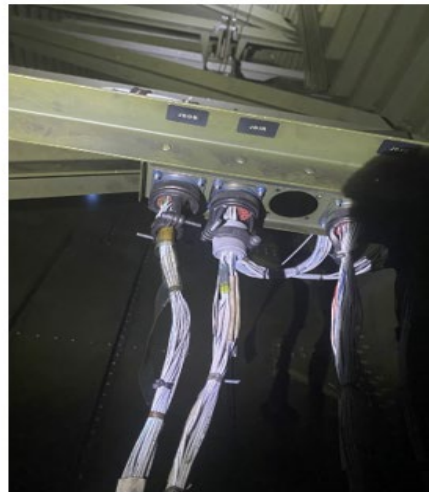


Figure 6- J60S Backshell Lacing Tape Unwinding (Discrepancy #3)



Figure 7 - Intercom Station Cannon Plug Cable Bend Radius (Discrepancy #4)



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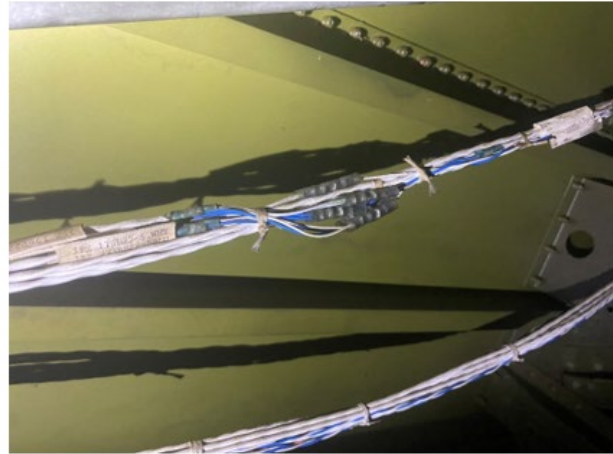


Figure 8 - 1RZ 179L22-5 Cable Harness Splices Not Staggered (Discrepancy #5)



Figure 9 - E 5MU Grounding Terminals Bonding Adhesive Incorrect (Discrepancy #6)



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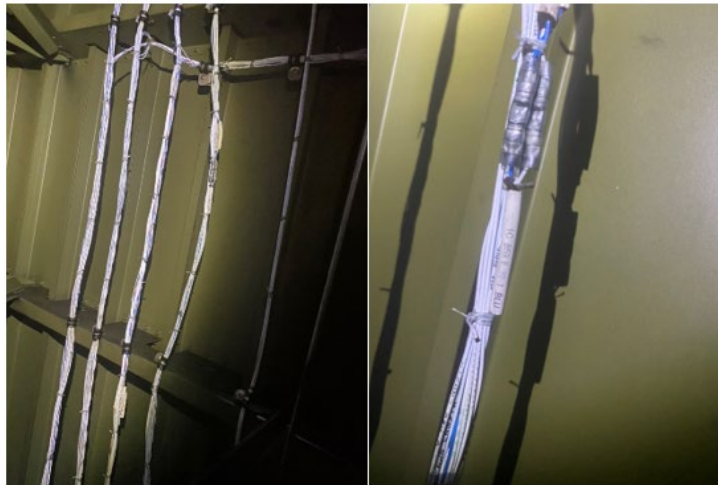


Figure 10 - 1C 859 E 22-1 5_A - Cable Harness Splices Not Staggered (Discrepancy #7)



Figure 11 - Miscellaneous Adel Clamp Filler (Discrepancy #8)



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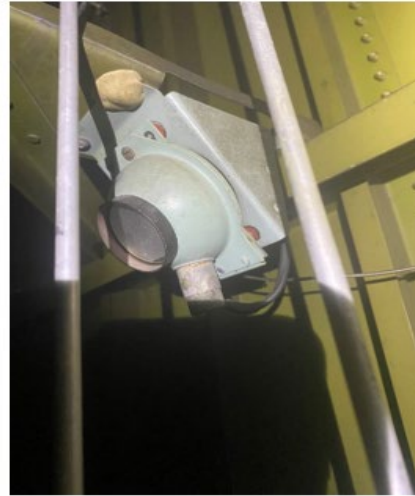


Figure 12 - Light Fastener Bonding Adhesive (Discrepancy #9)



Figure 13 - Grounding Terminals Not Properly Bonded (Discrepancy #10)



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Figure 17 - Top Intercom Station Incorrect Splices and Slack (Discrepancy #14)



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Figure 19 - J310Q Grounding Terminal Corrosion (Discrepancy #16)



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Figure 26 - Rubber Pass Through Grommets Missing (Discrepancy #23)



Figure 44 - Improper Cable Management (Discrepancy #41)



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Figure 46 - Wire Insulation Break Down & Loose Screw (FOD) (Discrepancy #43)



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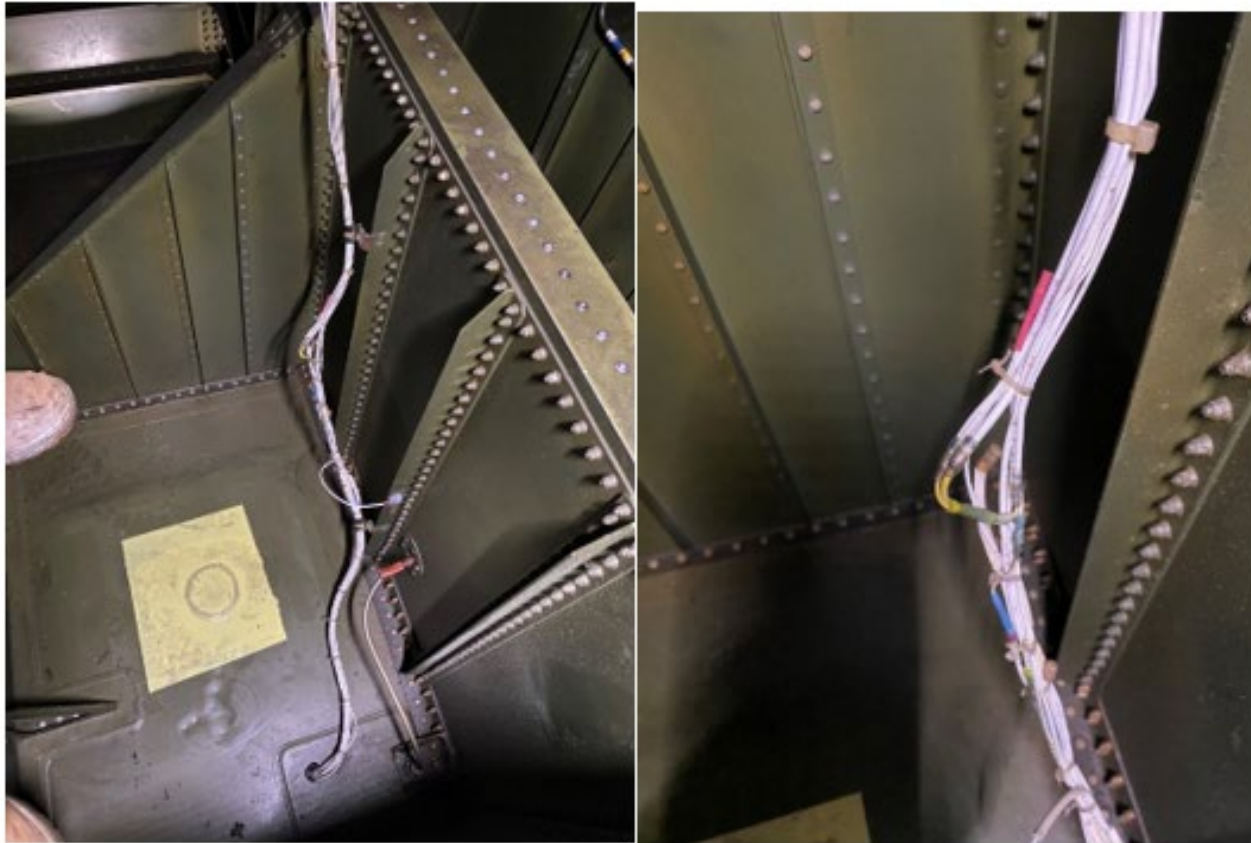


Figure 47 - Incorrect Splices, Severe Bend Radius, Mismanaged Cable Slack (Discrepancy #44)



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- Corrective Actions for the discrepancies:**

Discrepancy #	Discrepancy Description	Corrective Action
14	Top Intercom Station - Incorrect Splices and excessive cable slack	Replace existing splices with correct environmental splices. Reduce excessive cable slack.
16	Grounding Terminal Corrosion	Replace existing ring terminal, remove all corrosion from structure, install new fastener and nut. Apply Corrosion Prevention Compound (CPC).
23	Rubber grommets needed at harness pass-thrus	Install appropriate rubber grommets at pass thru locations of the harness.
41	Bend radius too severe, zip tie use, zip tie on splice, grounding terminal corrosion, bonding putty needed, Adel clamp filler used (potential FOD)	Replace existing splices with correct environmental splices. Reduce excessive cable slack. Replace ring terminal, fastener, and nut, and apply CPC at housing ground terminal. Use appropriate cable tie string instead of zip ties. Replace existing oversized Adel cable clamp with appropriately sized Adel clamp, eliminating rubber filler component as potential FOD.
43	Power wire insulation break down, grounded terminal corroded without bonding putty, lamp mounting screw loose (potential FOD), incorrect splice used on power wire	Replace existing splices with correct environmental splices. Replace power wire which has failing insulation with appropriately sized wire. Replace the existing ring terminal, remove all corrosion from housing, install new fastener and nut, and apply CPC to ground terminal. Tighten light mounting screw, eliminating potential FOD.
44	Several incorrect splices, splices not staggered, wire bend radius too severe	Replace existing splices with correct environmental splices. Correct excessive bend radii adjacent to splice termination points. Eliminate excess slack where possible. Remove zip ties and use appropriate tie string as cable management technique.



EWIS Physical Audit Benefits



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- **Required for Accurate Risk Assessment**
- **Helps move from reactive to proactive maintenance**
- **Proactive replacement and inspections would reduce downtime when possessed**
- **Helps to reduce air and ground aborts**
- **Assesses safety critical components**



C-5 EWIS Physical Audit: Implementation Plan



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- **How C-5 Start the EWIS Physical Audit:**
 - **Mandated by MIL-STD-1798D (Task V, Sustainment).**
 - **Contractor team to conduct comprehensive EWIS Physical Audit.**
 - **Multi-phased audit approach for comprehensive coverage:**
 - **System-by-system inspection.**
 - **Zone-by-zone analysis.**



Contacts



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To offer feedback, suggestions, lessons learned or ask questions regarding EWIS Physical Audits

**AMBER DO
C-5 Avionics/Electrical
Engineering
hoang.do@us.af.mil**





Questions?



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