

Jul 27, 2026

Department of War
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

AFLCMC... Providing the Warfighter's Edge



AUTOMATIC WIRE TEST SET (AWTS)

2026 JSWAG TIM

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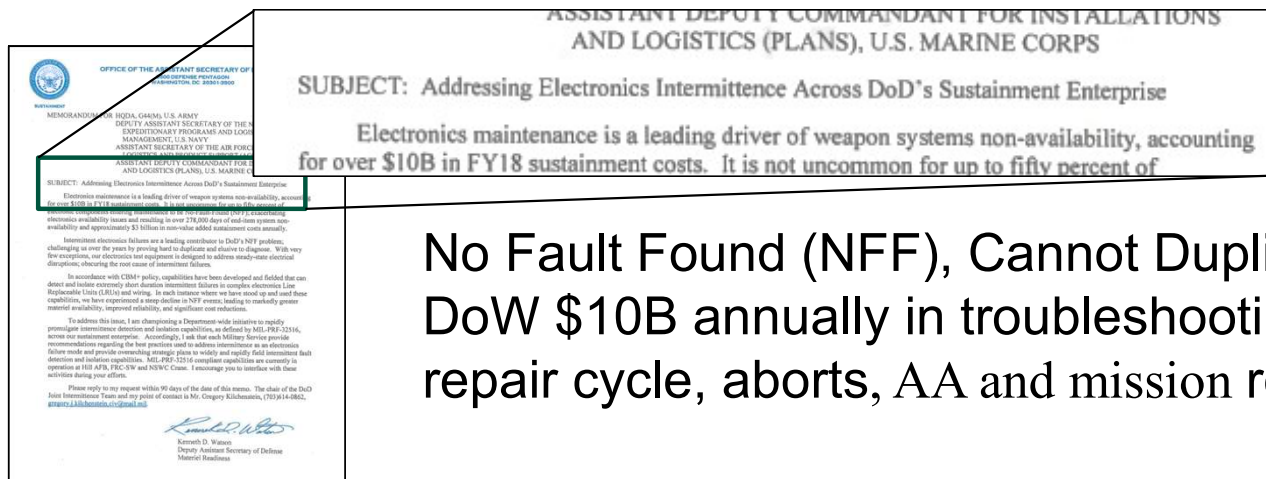


Intermittence and Wiring Faults



Problem

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No Fault Found (NFF), Cannot Duplicate (CND) and A700 cost the DoW \$10B annually in troubleshooting, repeat maintenance, LRU repair cycle, aborts, AA and mission readiness degradation.

Many intermittent/recurring system failures are caused by a wiring fault that is easily isolated and located with modern test equipment.

Few SPOs have an Electrical Wiring Interconnect System (EWIS) Preventive Maintenance program.



Solution

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- A wire...is a wire...is a wire
- A cable...is a cable...is a cable
- While an indispensable tool, the Digital Multimeter is no longer the standard source of truth on wire integrity/health





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Can your Digital Multimeter do that?

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Faults Detectable by AWTs – Intermittence Common Root causes

- **Broken wires making intermittent contact**
- **Degradation**
 - Contact Resistance
 - Corrosion in connectors
 - Salt residue on pins and connectors
 - Loose connections
 - Terminal loose nut
 - Loose connectors
 - Recessed pin
 - Loose crimp
 - Dirty Relay Contacts
 - Insulation Leakage
 - Cracked Insulation
 - Oxide Buildup on Connectors
- **Poor maintenance**
 - Bad Crimps on pins
 - Bad solder joints
 - Bad wire splices
 - Loose connector
 - Damaged or recessed pin
 - Mis-wire
 - Incorrect wire routing
- **Other Physical Non-Uniformities**



AWTS Background

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- AWTS is a wiring analyzer that performs automated electrical testing of wiring systems and discrete electrical components.
 - 1152 test points
 - Expandable to 15k test points
 - Wire harnesses
 - Control Panels
 - Relay Panels
 - Etc.
- Since 2008, DAF and DoW common wiring tester, designed to meet DoW deployable common test equipment requirements for the USAF, USN and USMC.
- Offers Field and Depot technicians capabilities previously only found in OEM, factories and depots.



AWTS System

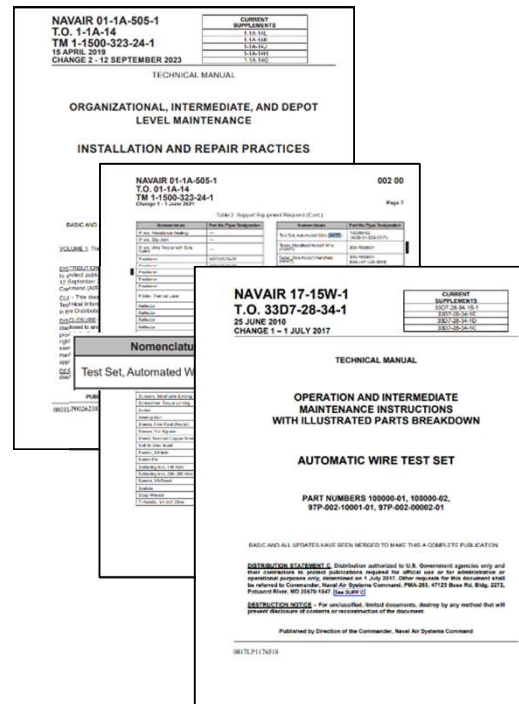
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- P/N: 100000-002
- NSN: 4920-01-528-5517
- Technical Data
- 1-1A-14
- 33D7-28-34-1

AF MDS

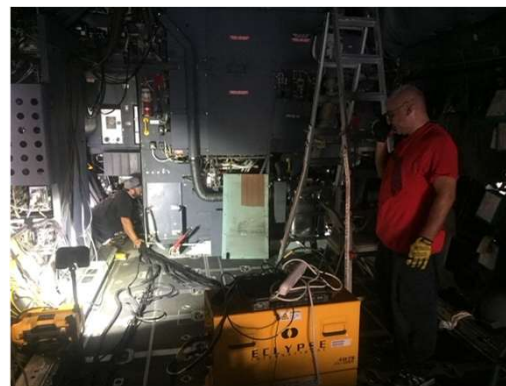
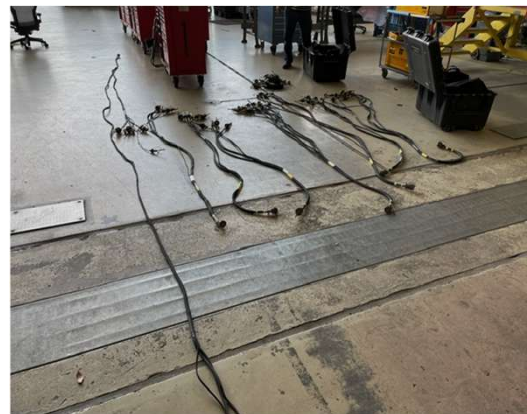
- A-10
- B-1
- C-5
- C-130
- AC/EC-130
- KC-135
- F-15
- F-16
- F-35
- HH-60
- CV-22



AWTS Capabilities

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- AWTS performs
 - Continuity/Insulation
 - Resistance
 - Capacitance
 - AC/DC Voltage
 - Expandable from 1152 to 15K test points with expansion units and modules
 - Certification Test Protocol (CTP)





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```

* 34.02.12 * * * * * FAILED * * * * *
* Circuit: 10K-F049 B1-B2 CLOSED Test: ENERGIZED CONTINUITY
* Stimulus: 0.100A Expected: <5.000ohm
* Energization: Stimulus Applied Location
*                24VDC 52J-F058B 43
*                24VDC RTN 52J-F058B 89
* Result From To Measured
* FAILED - HIGH 52J-F058B 67 ---> 52J-F058B 40 =1.001kohm
* CONTINUITY TEST FAILED HIGH
* - Resistance between 52J-F058B 67 and 52J-F058B 40 measured out of limits.
* - 10K-F049 and 5K-F12 are energized.
* - Repair wiring or replace 10K-F049 as required.

```

*Default Pass Reports do not show Ohm values, show passed tests in green



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Certification Test Protocol (CTP)



AWTS Certification Test Protocol (CTP)

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- CTP, Precision Testing method developed by Eclipse and the 160th SOAR
- Identifies physical non-uniformities and degradation in the EWIS.
 - Faulty pins, crimps, switches, pots, splices, insulation and ground
 - Shorts
 - Broken wires
 - Corrosion/thin film oxides
 - Incorrect wire routing
 - Loose connections
 - Etc.



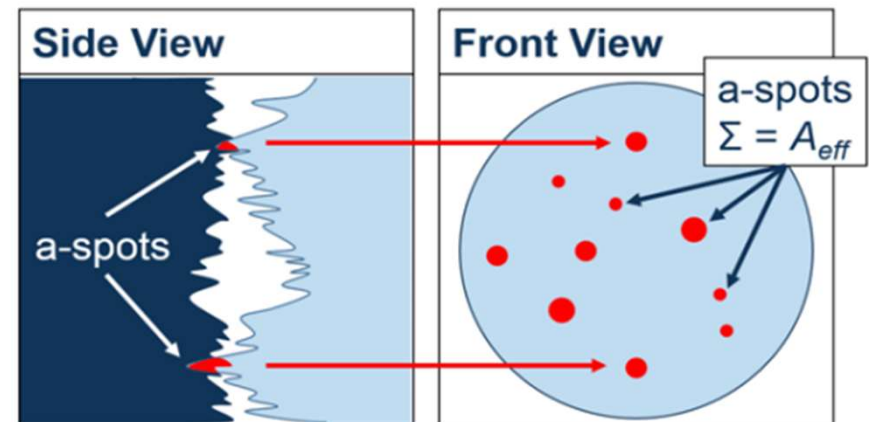


Wire Conditioning

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- Material surfaces on wire connections have imperfections at the micro and nano scales, creating “A-spots”
- Current is conducted through A-spots
- CTP stimuli recondition mating/contact surfaces
 - Eliminate A-spots
 - Thin Film Oxides
 - Improves wire health





CTP Benefits: Before and After

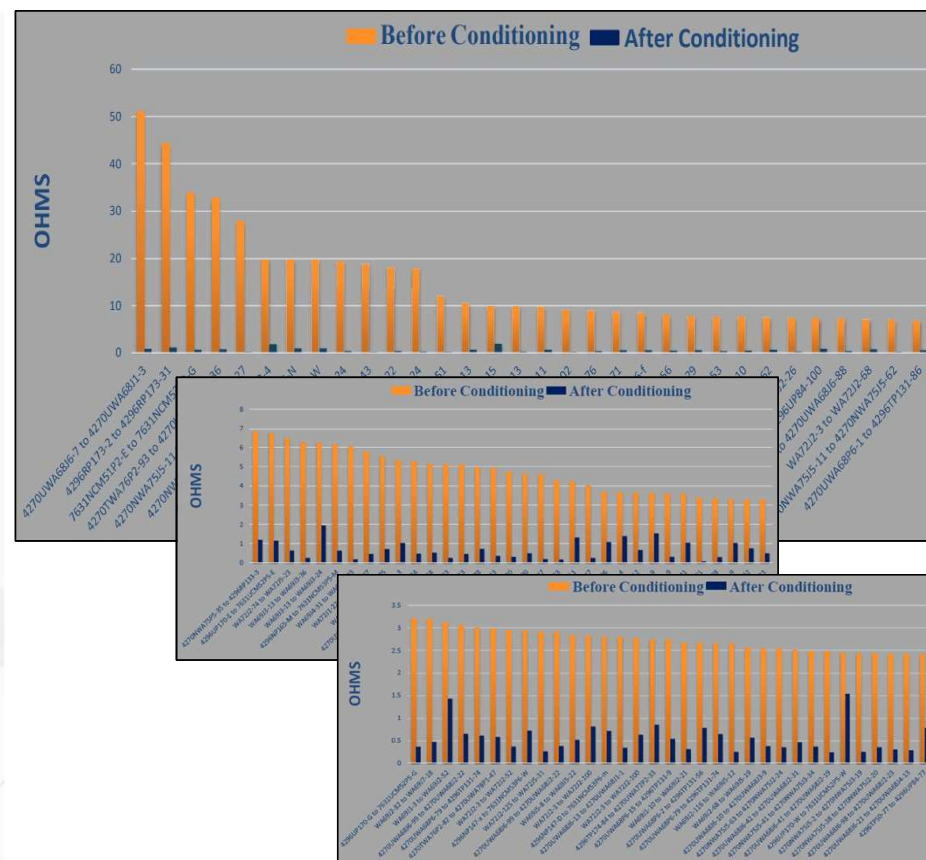
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V-22 Conditioning Stats

- ▶ 97 Total Aircraft Tested
- ▶ 139,404 Total Tests Ran
- ▶ Resistance improved by > 1 ohm: 171 measurements
- ▶ Resistance improved by > 0.1 ohm: 646 measurements
- ▶ 49 Aircraft Improved by > 1 ohm
- ▶ 78 Aircraft Improved by > .1 ohm

Distribution Statement A. Approved for public release; distribution is unlimited.





CTP Test Reports

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* Continuity CTP * * * * * FAILED * * * * *				
* Circuit: 52P-P143 A to 9P-S003C B			Test: CONTINUITY Certification	
* From: 52P-P143 A			To: 9P-S003C B	
* Test Number	Note	Result	Expected	Measured
* 4.01.0001	a) 0.01A Stim	PASSED	<5.00ohm	=250.0mohm
* 4.01.0001.CTP1	b) 0.10A Stim	DEGRADED-HIGH	<400mohm	=500.0mohm
* 4.01.0001.CTP2	c) 1.00A Stim	DEGRADED-HIGH	<400mohm	=500.0mohm
* 4.01.0001.CTP3	d) 0.01A Stim	PASSED	<400mohm	=250.0mohm
* 4.01.0001.CTP4	e) b - c	PASSED	>-50.0mohm, <50.0mohm	=0.000ohm
* 4.01.0001.CTP5	f) d - a	PASSED	>-50.0mohm, <50.0mohm	=0.000ohm
* CONTINUITY TEST FAILED HIGH				
* - Resistance between 52P-P143 A and 9P-S003C B measured high.				
* - Repair wiring as required.				
* CTP FAILURES INDICATE DEGRADED CONTINUITY				
* ***THOROUGHLY INSPECT AIRCRAFT CONNECTORS FOR THE FOLLOWING***				
* - MOISTURE/OIL/CONTAMINATION				
* - CORROSION				
* - RECESSED/LOOSE CONTACTS				
* - LOOSE TERMINAL LUGS (IF APPLICABLE)				
* - IMPROPER CRIMPS/REPAIRS				
* - DAMAGED COMPONENTS				



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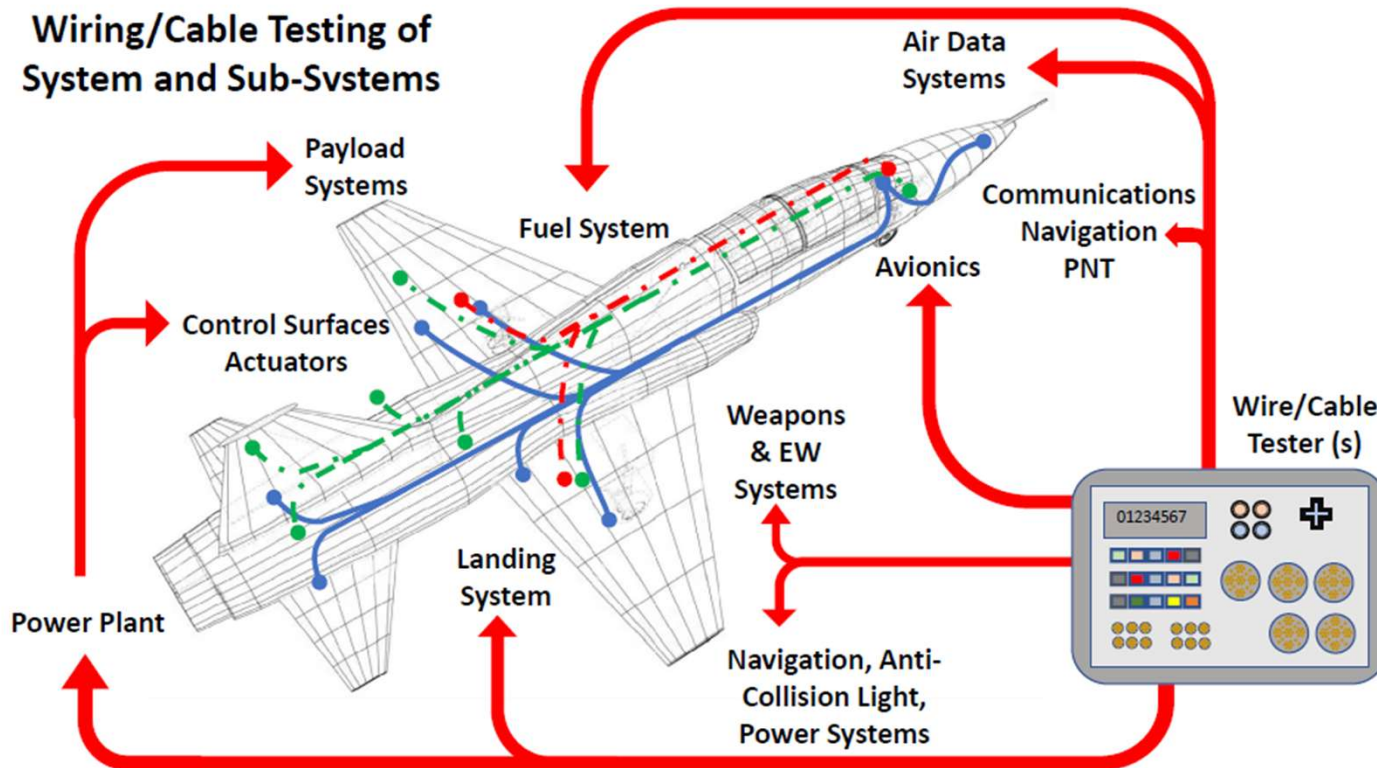
Test Program Set (TPS)

Development and Management



TPS Overview

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TPS Overview

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ATS
Managed

AWTS



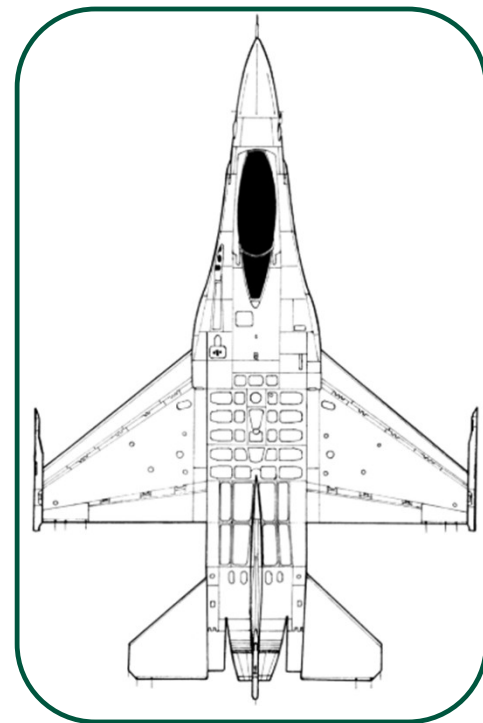
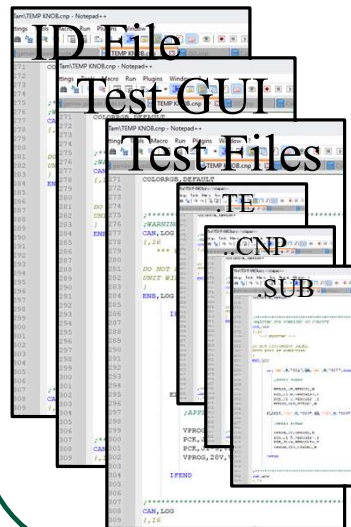
SPO Managed

TPS

Software

ITA/TAC

Cables





ETIMS - CPIN

SPO-developed TPS





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EWIS Checks Benefits

Bending back the curve on Intermittence



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Problem:

- **Few SPOs have EWIS Preventive Maintenance program or Engineering Requirements**
 - Requires SPO and AFSC support / buy-in

Solution:

- **Recommend aircraft SPOs establish EWIS and Data Bus preventive maintenance inspections (ERR) during depot/heavy maintenance**
 - Proven record of mitigating unscheduled intermittent failures at home station
- **Since Aircraft is down for scheduled MX, time is afforded for technicians to inspect and repair faulty EWIS.**
 - SPO would develop TPS's to accompany EWIS Engineering Requirements



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EWIS Checks Inspection Requirements

Development and Management

Requirements: High-Driver Intermittence

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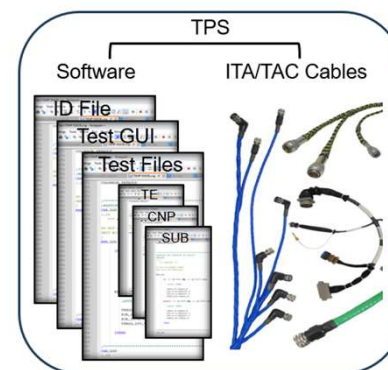
Identify High-Drivers



Develop EWIS Inspections (ERR)

ERR #	WS Para / J-6WC-14 Card	Task Title
2	2.1.1	2.1.1 - AA - Upon receipt of aircraft at maintenance facility,
3	3.2.13.1	3.2.13.1 - Propeller maintenance shall be limited to Pre-flight
5	3.2.2.10.4.1	3.2.2.10.4.1 - CA - Visually inspect the forward and aft pylor
8	3.2.2.10.4.2	3.2.2.10.4.2 - CA - Inspect bolts and barrel nuts IAW TO 1C
9	3.2.2.11.2.1	3.2.2.11.2.1 - CD - Visually inspect the forward and aft pylor
11	3.2.2.11.2.4	3.2.2.11.2.4 - CD - Inspect the bolts IAW TO 1C-130A-36,
12	3.2.2.11.2.2	3.2.2.11.2.2 - CD - Inspect the attach holes IAW TO 1C-130A
15	3.2.2.11.1.1	3.2.2.11.1.1 - CD - Visually inspect forward and aft aerial
16	3.2.2.9.2.1	3.2.2.9.2.1 - CE - Visually inspect aft nacelle and heat shield
18	3.2.2.9.3.1	3.2.2.9.3.1 - CF - Visually inspect exposed wing structure fo

Develop TPS





Requirements: High-Driver Intermittence

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Incorporate into
TD and Work

TO 1C-130A-6WC-10

**TECHNICAL MANUAL
WORK CARDS
PREFLIGHT/THRUFLIGHT/COMBINED PRE/POSTFLIGHT INSPECTION
USAF SERIES
ALL C-130 AIRCRAFT
EXCEPT C-130A AIRCRAFT**

1 MARCH 2010

CARD NO. 1-087	WORK AREA/ZONES 6	INSPECTION TYPE	TYPE MECH RGR WEA DEL	MECH NO. 1	CARD TIME 00 28	PUBLICATION NUMBER TO 1C-130A-6WC-10	CHANGE NO.
MAN MIN	AREA/ ZONE	WUC	INS P R	T H		FUSELAGE - EXTERNAL AND INTERNAL	ELECTRICAL POWER ON/OFF
020	6D	75PA0	X	X		LH MIDDLE FUSELAGE (FS 617 TO FS 245) - EXTERNAL - CONTINUED AC-130W - CONTINUED 9. PERFORM FUNCTIONAL CHECK OF 30MM GUN TO ENSURE WEAPON OPERATES PROPERLY IAW TO 1C-130(A)W-2-94JG-50-1, 94-50-01.	CARD NO. 1-087
002	6D	114RF		X		10. INSPECT 105MM GUN PORT PRESSURE SEAL FOR DAMAGE (780) AND CONDITION (020) IAW TO 1C-130(A)W-2-94JG-00-1, 94-00-19.2.	
002	6D	114RF		X		11. INSPECT 30MM GUN BOOT MAIN SEAL PANELS AND SEAMS FOR CONDITION (020), CONTAMINATION (230), AND SERVICEABILITY (780) IAW TO 1C-130(A)W- 2-94JG-00-1, 94-00-17.	
002	6D	114RF		X		12. INSPECT 30MM GUN PORT SEAL AND AIRFRAME FLANGE FOR SECURITY (730) AND CONDITION (020) IAW TO 1C-130(A)W-2-94JG-00-1, 94-00-12.	
002	6L	74C00, 74ECJ 74EDE, 74J00 748B0	X	X		UPPER FORWARD FUSELAGE (FLIGHT DECK) - INTERNAL AC-130UW 1. VISUALLY INSPECT GUN CONTROL PANELS, DISPLAYS, TRIGGER SWITCH, AND ATTACHING WIRES FOR DAMAGE (780), AND SECURITY (730) OF PANELS, SWITCHES, INDICATOR LAMPS (080), CONNECTORS (170), AND CABLES (070).	
CARD NO. 1-087	WORK AREA/ZONES 6	INSPECTION TYPE	TYPE MECH RGR WEA DEL	MECH NO. 1	CARD TIME 00 28	PUBLICATION NUMBER TO 1C-130A-6WC-10	CHANGE NO.



Organizatio



Implement
Intermediate



Depot





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TPS Management

TPS Current State: Managed

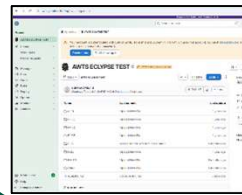
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Point of
Use



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ETIMS/CPIN



AFLCMC/Wxx

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Organic



Contract Vendor

ECLYPSE



- Field Units and Users develop and self-manage some TPS
- SPO manages others
- Decentralized management leads to duplicative effort

TPS Current State: Non-Managed

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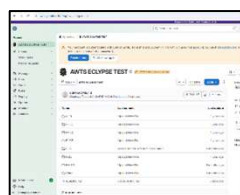
Point of



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ETIMS/CPIN

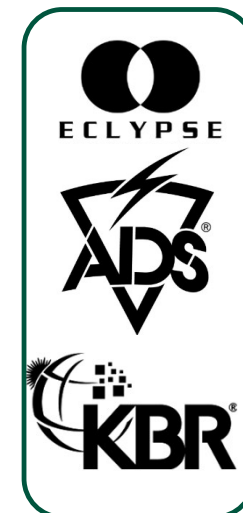


- No SPO sponsorship/support
- Field Units and Users develop and self-manage

Organic

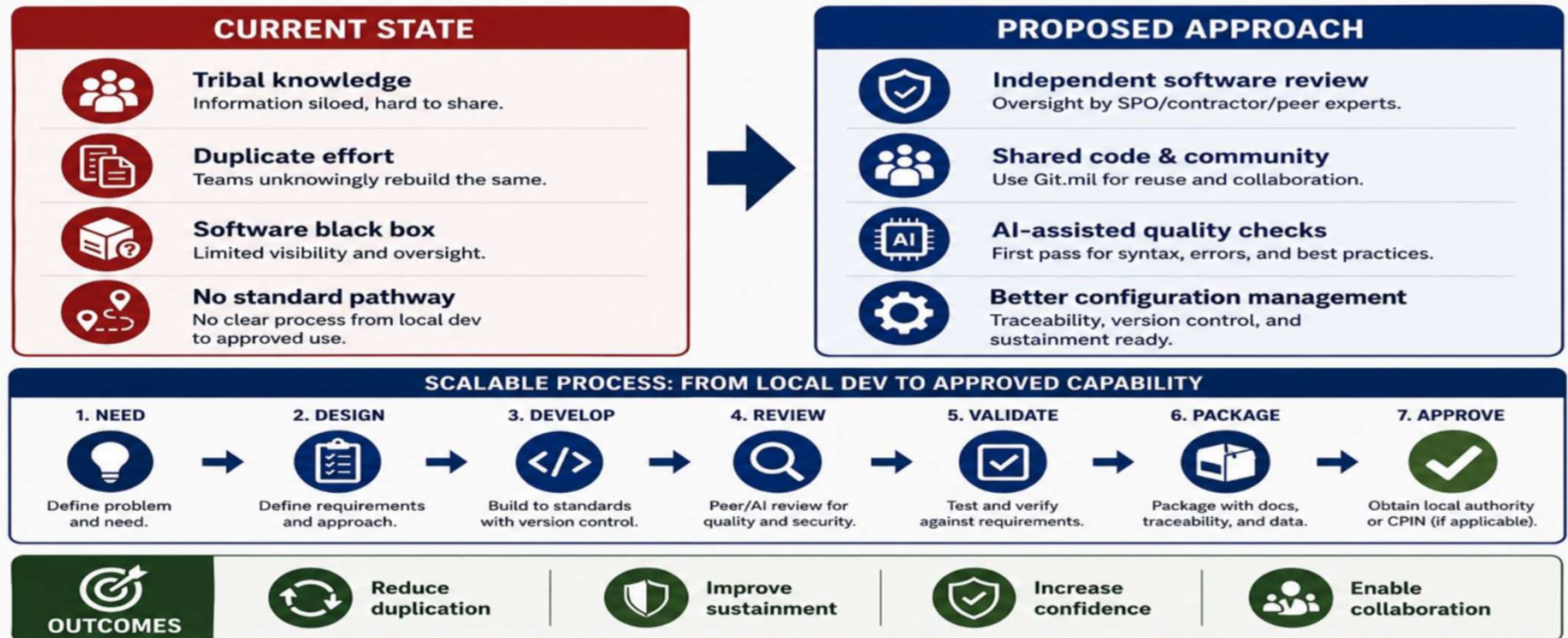


Contract Vendor



TREAT SOFTWARE AS ITS OWN ENTITY

From local TPS development to scalable Air Force sustainment.





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TPS: Organic Management Solution

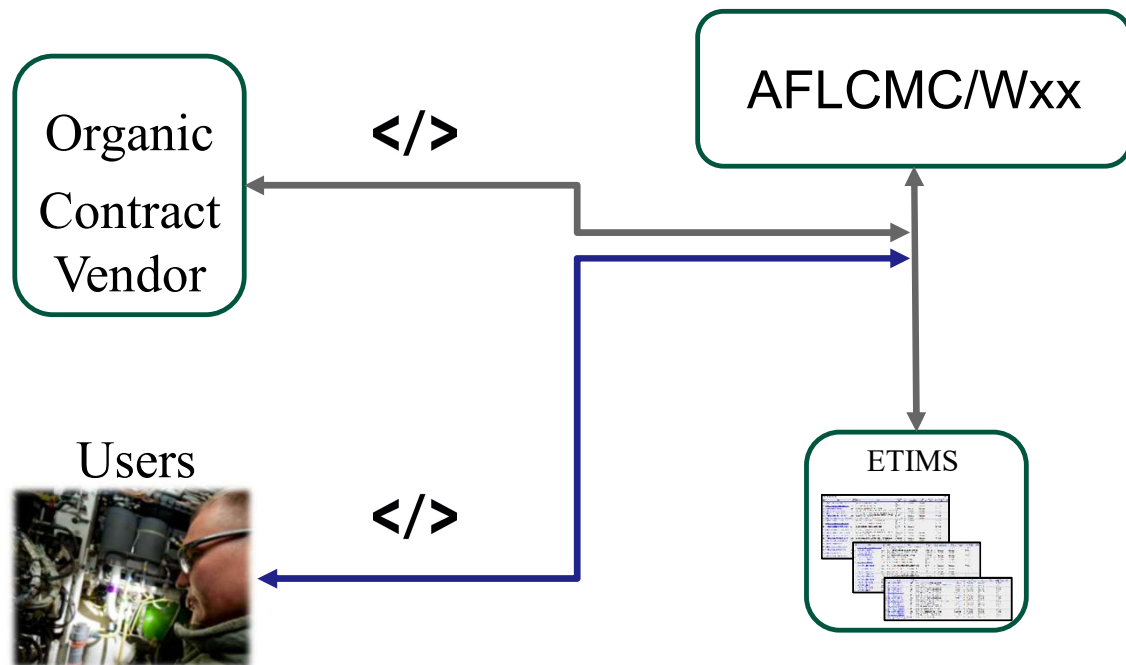
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The image displays four overlapping screenshots of the TPS (Test Program System) web application interface, which is designed for the organic management of test programs. The main screenshot on the left is titled "TPS LOCAL DEVELOPMENT PROCESS" and describes it as a structured, risk-based path for rapid development, independent review, and SPO authorization of Test Programs. It features a sidebar with navigation links for "Process Overview", "Development Scenarios", "Development Stages", and "Process". The main content area shows a "Process Overview" section with a description of the process and a list of "SCOPE" items: Cable testing (isolated or aircraft installed), Bench check of C/UAs / F-16 Level backshop operations, AWTG / ELITE based F-16 maintenance SPO work, and Single-unit troubleshooting aids through fleet-wide CPN events. Overlaid on the right are three other screenshots: "SPO CHECKLIST" showing a list of tasks and status; "TPS PROCESS PATH ASSESSMENT" showing a guided assessment tool for determining the appropriate development path; and "TPS Review Tool" showing a welcome screen with options for "New Review" and "Load Review".

TPS Proposed Model A

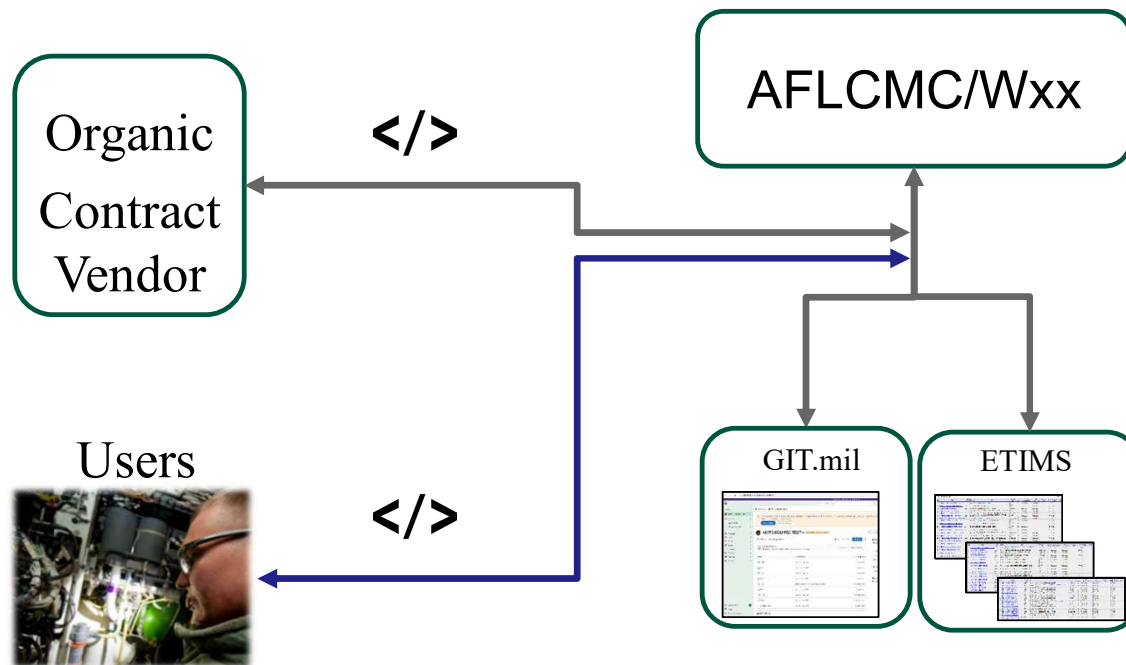
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- SPO-managed
- Single Source
- Establishes vetting and an approval process
- Eliminates duplication
- Leverages user's expertise
- Enables Field and Depot to develop and contribute

TPS Proposed Model B

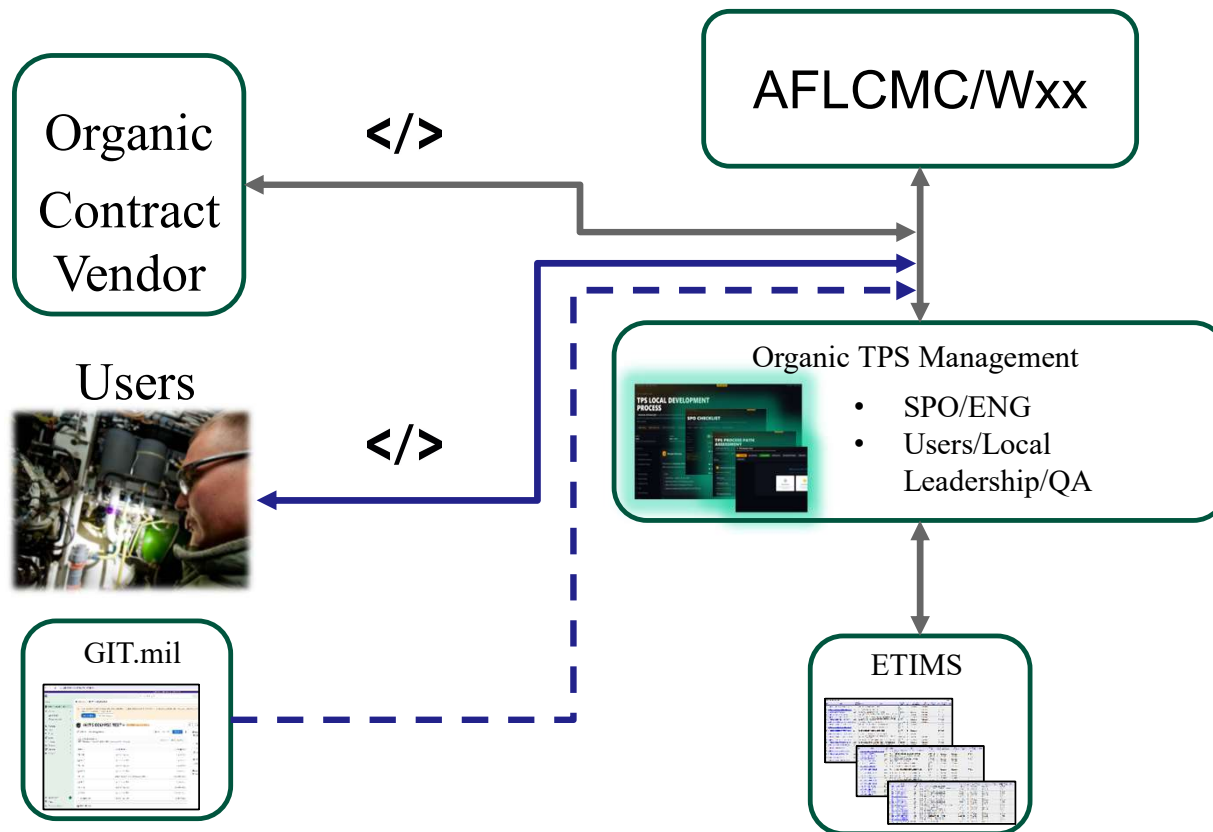
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- SPO-managed
- Dual Source
- Establishes vetting and an approval process
- Eliminates duplication
- Leverages user's expertise
- Enables Field and Depot to develop and contribute

TPS Proposed Model C

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- SPO/Field joint management
- Smaller administrative burden for approval
- Single Source
- Establishes vetting and approval process
- Eliminates duplication
- Leverages user's expertise
- Enables Field and Depot to develop and contribute



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[illegible][illegible][illegible]

No matter the process, method or model you choose,
ATS and our mission partners are here to help.



Current Initiatives

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- ATO in-work for new controller configuration Win-11 and Elite v2.11
- Get technicians the modern tools they need
 - Propagate the use of AWTs across the DAF Enterprise
 - Working with SPO which are currently in some state of execution
 - Connecting AWTs newcomers with veterans for knowledge-sharing and best practices
 - Reaching out to other SPO to encourage the development of Inspection Requirements to incorporate preventative maintenance EWIS inspections (ERR)
 - TPS Development and Management
- Aligning AWTs and IFD programs to increase DAF awareness and provide training across the Sustainment and Maintenance Communities



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Questions?

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