



V22 AWTs DATA COLLECTION

JSWAG 2024

CLEARED
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OFFICE OF PREPUBLICATION AND SECURITY REVIEW

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Distribution: A

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V22 EWIS Projects

- **Overview of Use of AWTs on V-22**
 - **AWTS Phase Inspection**
 - **Equipment (Systems, Cables & Software)**
 - **Supplemental Instruction Guide (SIG)**
 - **Technical Publications**
- **Contract Overview and Purpose**
- **MAF Data**
- **AWTS Data Collection**
- **Findings**



AWTS Phase Inspection

- **Provide a Periodic Wiring Health Assessment for FADEC and targeted Flight Control Wiring in the Nacelle and Conversion Area**
 - **Utilizes the 500V AWTS + 1 Switching Module**
- **O Level Tasks released Nov 2020 for V22 B and D Phase Intervals**
- **Testing will occur approx. every 560 flight hours**
 - **Additional tasks for troubleshooting**
- **Tests Targeted FADEC and Flight Control Wiring and WIAs**
- **Options to run TAC Loopback & Hookup Instructions**
- **Each Test utilizes:**
 - **Unused Pin, Continuity, Backshell Continuity, Certification Test Protocol* (CTP), Isolation and Insulation**
- ***4 Wire Test & Method for testing the health of the conductor and contacts using multiple stimulus to determine stability and linearity**



AWTS Phase Inspection

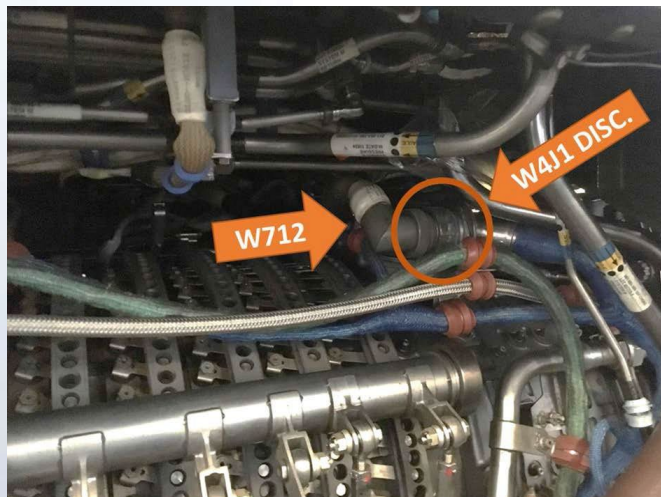
A1-V22AB-TIS-000-S2
TO 1V-22(C)B-2-DB-1

- Supplemental Instruction Guide
 - A1-V22AB-TIS-000-S2
 - Explanation of Programs
 - Hookup Instructions
 - Testing Checklist
 - Graphics with Arrows
 - On NATEC

SUPPLEMENTAL
DATA FOR

V-22 AWTS PHASE TEST PROGRAM SETS

For UUT Part Numbers 901-005-813-105, 901-005-814-103, 901-075-637-101, 901-075-638-101, 901-076-519-107, 901-076-539-105, 901-076-709-103, 901-076-710-103, 901-076-711-107, 901-076-711-109, 901-076-712-111, 901-076-712-113, 901-076-715-105, 901-076-716-107, 901-076-717-105, 901-076-717-107, 901-076-719-109, 901-076-719-111, 901-076-720-107, 901-076-720-109, 901-076-722-107, 901-076-723-103, 901-376-825-121, 901-376-826-121, 901-376-826-123, 901-376-827-121, 901-376-828-121, 901-376-831-121, 901-376-832-121, 901-376-845-101, and 901-376-845-103.



Authorized to Department of Defense and U.S. DoD (2017). Other U.S. requests shall be referred to Special Mission Programs, PEO (A), V-22 Joint Bldg, 47123 Buse Road, Building 2272, Room 146,

ed documents, destroy by any method that will prevent document.

COMMANDER, NAVAL AIR SYSTEMS COMMAND

29 JUNE 2020



AWTS Phase Inspection

Eclipse ELITE

Main Menu

Test Information	Test Status
Aircraft No. <input type="text" value="MV 168330"/>	TAC Loopback <input type="text" value="UNTESTED"/>
Test Purpose <input type="text" value="Pre-Phase"/>	Unused Pin <input type="text" value="UNTESTED"/>
Operator <input type="text" value="FRG"/>	Continuity <input type="text" value="UNTESTED"/>
JCN <input type="text" value="364374"/>	Continuity Back <input type="text" value="UNTESTED"/>
Nacelle <input type="text" value="Left"/>	Continuity CTP <input type="text" value="UNTESTED"/>
Inlet Panel <input type="text" value="Installed"/>	Isolation <input type="text" value="UNTESTED"/>
	Insulation <input type="text" value="UNTESTED"/>

Step 1 Optional

Step 2 Optional

Step 3 Select Test Options

☒ Show Only Failures ☐ Show All Test Results ☐ Hold On Fail ☒ Continuity CTP

Step 4 Select Test

NAV  AIR



AWTS Phase Inspection

Eclipse ELITE

Main Menu

Test Information

Aircraft No.

Test Purpose

Operator

JCN

Nacelle

Inlet Panel

Test Status

TAC Loopback

Unused Pin

Continuity

Continuity Back

Continuity CTP

Isolation

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Step 4 Select Test



AWTS Phase Inspection

- **Training**
 - Initial training required for O Level maintainers
 - Interpretation of Test Results
 - Follow On Training Available
- **Equipment:**
 - E Coded assets delivered to sites
 - Managed by I level
 - Cable Drawings on NDDS
 - Additional sets purchased
- **Software**
 - Developed by Eclipse
 - Managed by Lakehurst
 - Available on NDDS





Contract Overview and Purpose

- PMA-275 in support of the V-22 platform and at the engineering request of the FST set in place a two year contract with quarterly delivery requirements of a report of AWTs use in the fleet.
 - Report relates MAF Data to AWTs test results from Phase.
 - It has been noted that even though the maintainers find faults while using the AWTs machine at Phases, they are not repairing the faults found. Since the aircraft has not yet reported these as failure, the maintainers are not considering them faults. However, the data of every test ever ran is recorded and saved to the machine.



Contract Overview and Purpose

- Intention is to correlate discrepancies found during Phase to troubleshooting efforts or mission aborts on the flightline.
- This data will also give us trend analysis of failure modes within the wiring system to determine future modifications to the wiring system.
- Analysis from Eclipse will be provided quarterly for two years to the FST. The FST will compile and work with NAVAIR Wiring to correlate the two data collection efforts together. These reports once complete will be provided to FST Leadership, PMA-275 Air Vehicle IPT, and the MAG Cos.



MAF Data

- AWTs Phase Inspections began in in late 2019. FST decided to pull MAF data from 2020 forward to baseline the reports going forward.
- Provided 4 years of MAF data to Eclipse for analysis.
- Following the baseline, MAF Data will be pulled quarterly to provide to Eclipse for analysis.
- Requires several discussions to understand the data and what various codes mean within the data.

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AWTS Data Collection

- Collection CDs sent out to each site to pull the data off the AWTS control computers.
 - There are multiple computers at each site depending on the quantity requirement to fill the phase requirements.
 - The data was dropped into the return envelope and went directly back to Eclipse for analysis.
 - Received 44 Data pulls for individual computers.
- A great deal of data was lost due to password requirements on the computers.
 - The AWTS units are E-Coded to I-Level or backshops.
 - The password requirement was to be changed every 60 days. Caused confusion if the password change requirement occurred while system was checked out.



Early Findings

There are 6121 test events each logged as an erx file with filename that starts with "V22-".

2143 test events with purpose = Troubleshoot						
1262 test events with purpose = Phase B						
1713 test events with purpose = Phase D						

There are 3529 test events with complete continuity testing.

2948 (83.5%) test events passed continuity.						
581 (16.5%) test events failed continuity.						

There are 3432 test events with complete low voltage insulation testing.

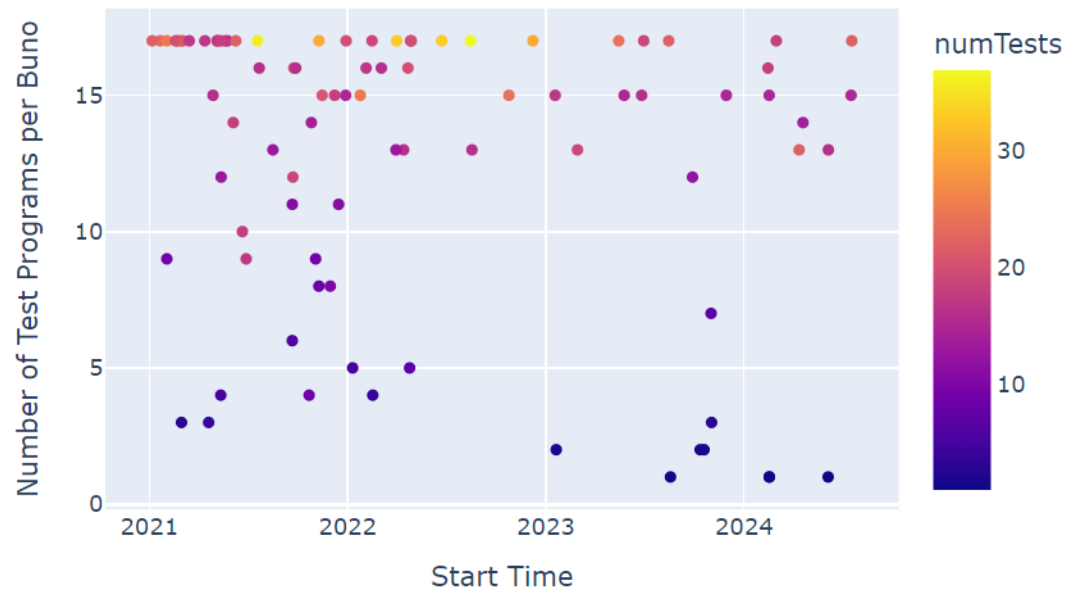
3249 (94.7%) test events passed low voltage insulation.						
183 (5.3%) test events failed low voltage insulation.						



Early Findings

- Able to determine what computer is running correct software
- Able to determine what sites are completing all 17 tests
- Initial phase of creating baseline to go forward and quantify trend data

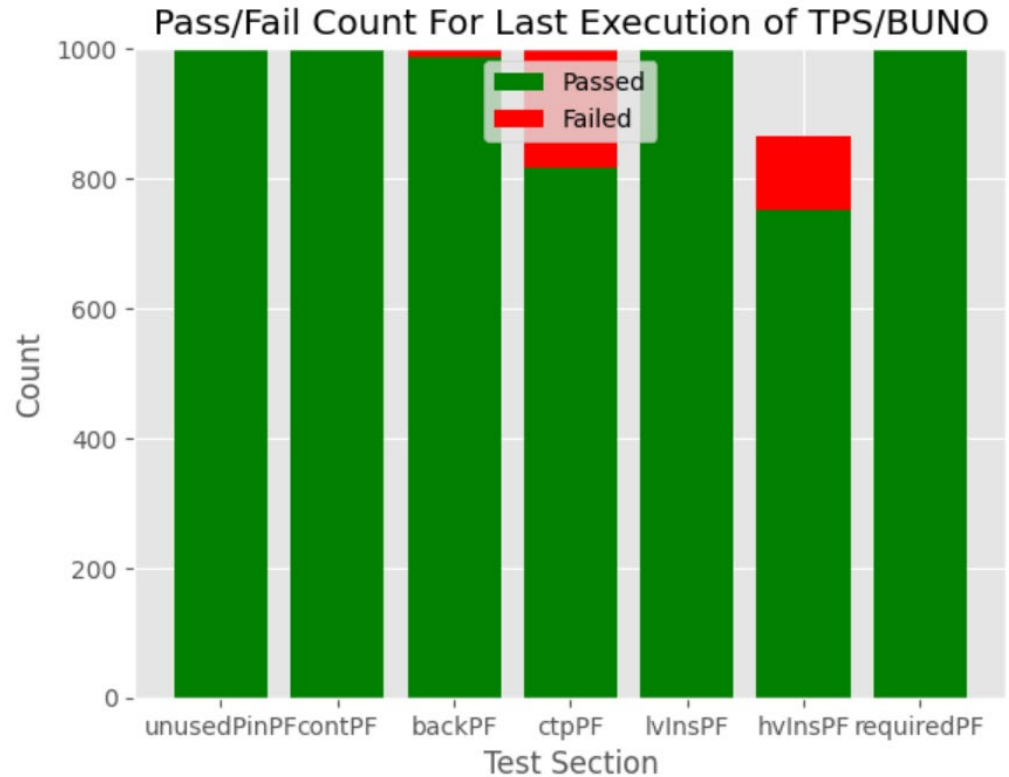
Buno Phase B and Phase D Testing Data





Early Findings

- Can determine Pass/Fail Count by type of test.
- Some examples and data support signal conditioning occurring.





Questions

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