*Air Force Life Cycle Management Center*
*Engineering and Technical Management/Services Directorate*

*Providing the Warfighter's Technical Edge*

# Enhancing EWIS Integrity for Continued Airworthiness





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# BLUF

- The Strategic Goal:

REACTIVE ➡ PROACTIVE

- The Requirement:

**Comprehensive Framework**

- The Operational "So What?":

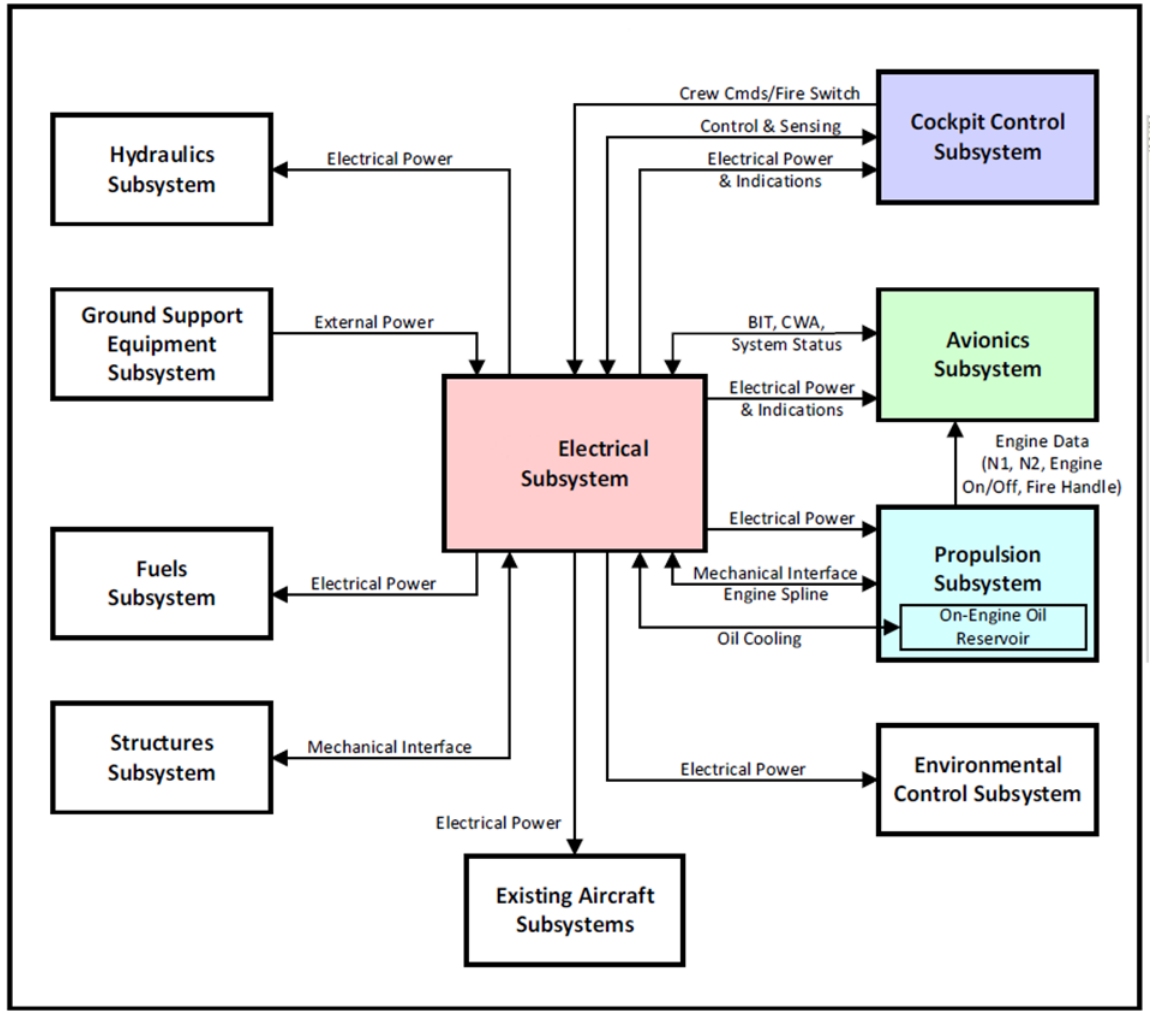
**Continued Airworthiness**

# What is EWIS?

- **Electrical Wiring Interconnect System (EWIS)**
- EWIS is the wiring system and components for a complex electrical system.
  - Wire
  - Cable
  - Fiber optic link
  - Wiring/Cable/Fiber devices
  - Connectors and connector accessories
  - Clamps
  - etc.

# The EWIS Challenge

- A vast critical network
- Historically implicated in a large amount of electrically related Department of War (DOW) mishaps.
- EWIS failures
  - Fires
  - Loss of safety critical systems
  - Loss of mission or aircraft, injury to crew.



# Evolution of DOW EWIS Continued Airworthiness

- 1999, the FAA initiated programs to address commercial aircraft EWIS integrity concerns after electrical systems were implicated in several high-profile aircraft accidents.
  - Address service life of aircraft wiring.
  - Establish the condition of aging wiring in system components.
  - Validate the adequacy of visual inspections.
- FAA's Enhanced Airworthiness Program of Airplane Systems (EAPAS)
  - Maintenance and inspection tasks, intervals, and procedures
    - The Enhanced Zonal Analysis Procedure (EZAP)

# Evolution of DOW EWIS Continued Airworthiness Cont.

- From commercial to the DOW
  - MIL-HDBK-525, Electrical Wiring Interconnect System Integrity Program
    - Leverages and tailors FAA Advisory Circulars for military platforms.
    - Empowers maintenance and engineering communities to make fact-based decisions.
    - Seven Core Process Tasks to condition based assessment, remaining life projection, and continued airworthiness.
  - Implementation of EWISIP promotes the continued operational safety, suitability, and effectiveness (OSS&E) of the EWIS systems throughout all phases of the aircraft's life.

# EWISIP Requirements Vehicles

1. MIL-HDBK-516, Airworthiness Certification Criteria
   - Design requirements
   - Installation requirements
2. MIL-STD-1798, Mechanical Equipment & Subsystems Integrity Program
   - Understanding of the validated capabilities of each mechanical system relative to the design service life, usage and environments
   - Process to achieve and maintain the physical and functional integrity of the mechanical elements of aircraft systems throughout its operational service life.

- A multi-task approach including documentation, analysis, inspection, and risk assessment.

# The Role of the Joint Service Wiring Action Group (JSWAG)

- DOW chartered joint service forum to provide advancement in safety, reliability, maintainability and readiness of all DOW aircraft by improving their EWIS.
- Directly supports the warfighter with timely, specific aircraft wiring systems and components solutions.
- Develops new components, capabilities, specifications, and supports engineering / testing to expedite solutions.
- Supports all type/model/series; sharing lessons learned and EWIS solutions.

***It's not just wiring…….it's "a system"***

# Standardizing EWIS Integrity – The WUC

- Work Unit Code: The WUC consists of five characters and is used to identify the system, subsystem, or component on which maintenance is required or was accomplished.
  - First two characters - Identify the type of system the assembly or component is part of.
  - Third and fourth characters - Identify subsystems or major assemblies as applicable.
  - Fifth character - Identifies reparable items, non-reparable critical parts, and structural members.
- 62AA0
  - Discrepancy: V/UHF transmits very weak, but reception is normal.
  - Corrective Action: Connector plug J1 on V/UHF 1 R/T repaired and reinstalled.

# Standardizing EWIS Integrity – The Problem

- WUC structure for EWIS nonexistent.
- EWIS not identified as a system.
- Existing Codes are Ambiguous Across all Weapons Systems
  - "Generic" wiring WUCs within each aircraft's system/subsystem breakdown indicating the same failure reporting problem exists.
- Difficult to pin-point trouble areas (i.e. multiple connections to multiple systems).
- Failures tracked under the system that was initially logged.
  - 62AA0
    - Discrepancy: V/UHF transmits very weak, but reception is normal.
    - Corrective Action: Connector plug J1 on V/UHF 1 R/T repaired and reinstalled.

# Standardizing EWIS Integrity – The Solution

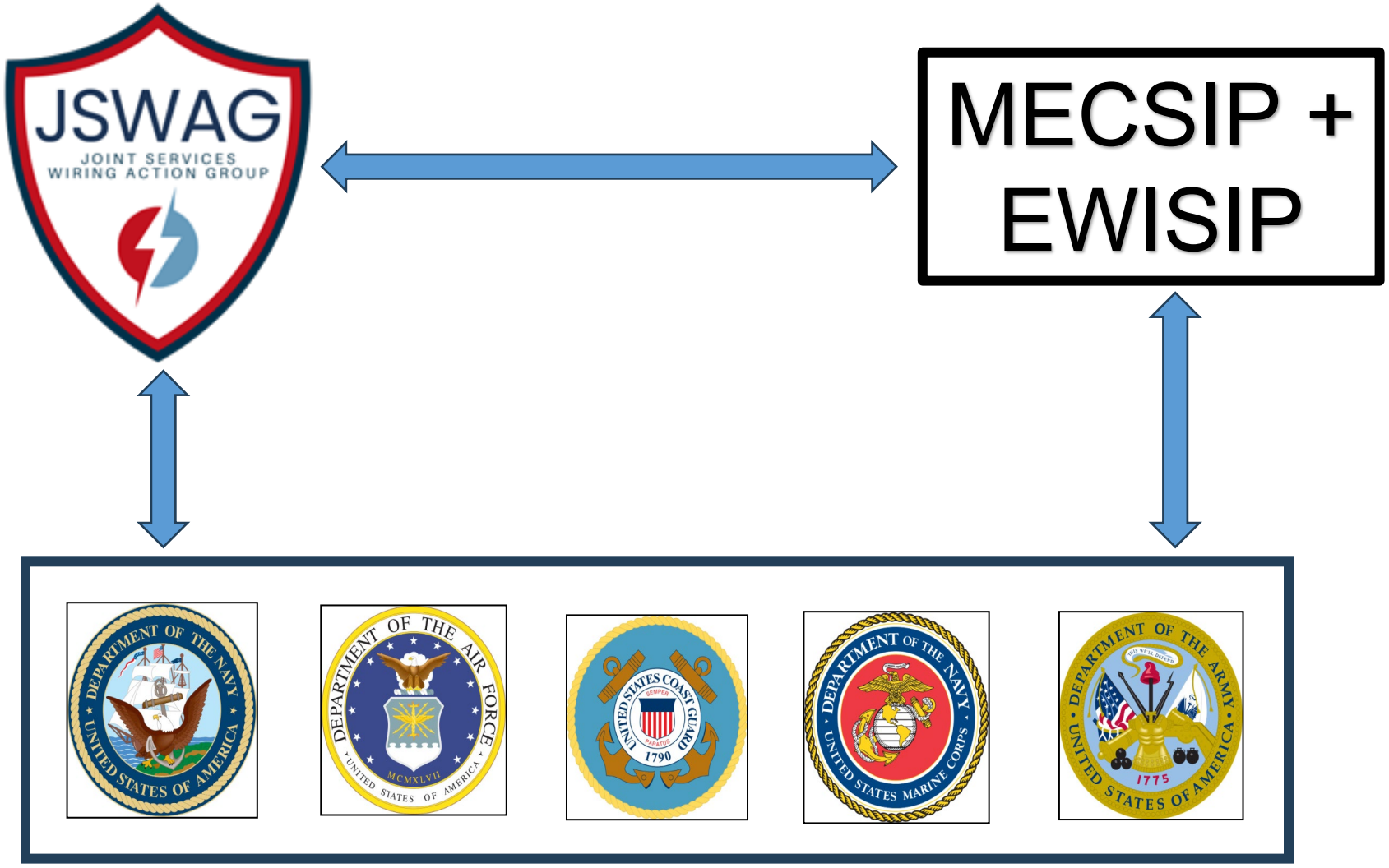
- A standard 5-digit WUC structure for EWIS.
  - Changes made in MIL-DTL-38769, Detailed Specification Manuals, Technical – Work Unit Code (USAF).
- Allows for precise identification of EWIS components across all weapon systems.
- Enables accurate tracking and failure analysis
- Improved data leads to better projections of remaining service life and more effective preventative maintenance schedules.

# Standardizing EWIS Integrity – The Challenges

- Time required to change is a long process.
  - Legacy platform technical data updates.
  - Not all platforms can use the same EWIS system code.
  - Training required.

- Corrections to maintenance data is still required.

# Standardizing EWIS Integrity – The Synergy



# Standardizing EWIS Integrity – The Impact

- The synergy of MECSIP with the guidelines of EWISIP and the collaboration of JSWAG.
  - Assists in a philosophical shift in how the DOW sustains aircraft electrical system.

- Standardizing allows a move from “ad-hoc” repairs to a lifecycle-based health management approach.
  - Proactively addresses the root cause of wiring-related mishaps.
  - Helps to mitigate the risk associated with aging wiring.
  - Ensures continued airworthiness of the certified platform.

# Questions?