AFILON

STRATEGY | INNOVATION
SYSTEMS ENGINEERING | PROGRAM SUPPORT

AFILON
Weapons Systems
Test Program Set (TPS)
IV&V Experience

AFILON has implemented a rigorous repeatable process to IV&V Test Program Sets (TPS) for the avionics, other electronic devices and hydraulic units, of major Weapons systems: E-3, RC135 and A10

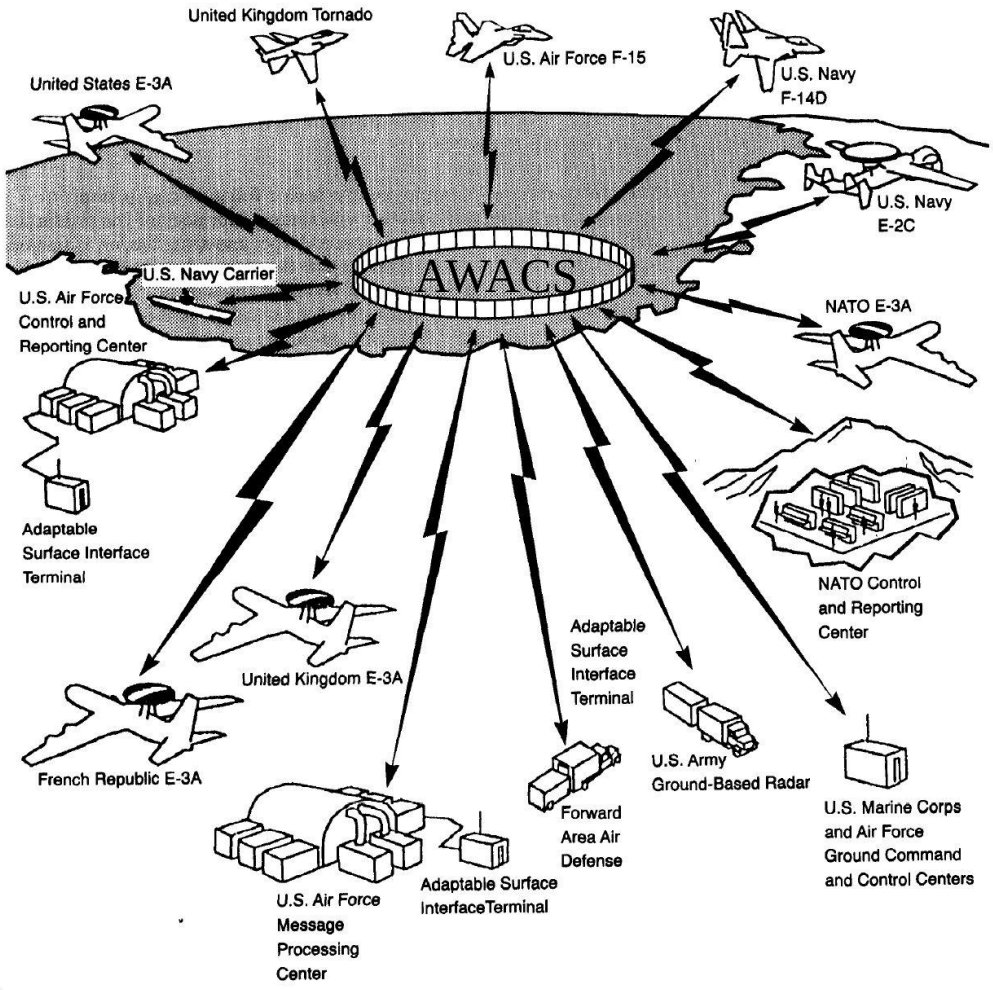
- Avionics of Major Weapons Systems
  - E-3 (AWACS)
  - RC-135
  - A-10
- 132 Units Under Test (UUTs) IV&V
  - E-3 – 112 units
  - RC-135 – 17 units
  - A-10 – 3 units
- 7 Calibration and Adjustment/Alignment of the BRAT (TPS Test System)

E-3 Airborne Warning and Control System

RC-135 Reconnaissance Aircraft Theater and National Level Intelligence

A-10
Close Air Support (CAS) for Ground Forces

E-3 Joint Tactical Information Distribution System: JTIDS



IV&V Results

- Identified 3,977 (922 major) errors and omissions in the design, implementation, test and documentation of 139 TPSs
- The most important outcome of this support is that not one TPS that was IV&V by AFILON has been returned from the field. All potential problems were found before deployment and the great majority before the TPS sell-off (acceptance test) session
- This is a great deviation from normal practice. In some weapons systems up to 50% of TPSs have been returned from the field
- Returns delay test plans, may incorrectly ground critical assets, or may erroneously test pass a faulty unit with potential grave results
- There was not a single TPS on which the AFILON team performed IV&V that has been returned from the field

Example of Systems IV&V

- E-3 VHF Communications System
- E-3 UHF Communications System
- E-3 Surveillance System, APY-1/2
- E-3 Radio Navigation
- E-3 Pressurization Air Condition
- E-3 Joint Tactical Information Distribution System: JTIDS
- E-3 Instruments
- E-3 High Frequency Communications
- E-3 Fuel System
- E-3 Autopilot System
- E-3 Miscellaneous Utilities Fire Protection
- E-3 Flight Control System
- E-3 Radio Navigation, GINS
- E-3 Engines
- E-3 Electric Power Supply
- E-3 Electronic Counter Measures
- E-3 Auxiliary Power Plant
- E-3 Autopilot System
- RC-135 UHF Communications System
- RC-135 FD-109 System
- A-10 Malfunction Analysis and Recording Equipment
- A-10 Miscellaneous Systems (HUD)

Deficiency by Weapons Systems

- E-3:
  - 821 Major deficiencies and 2032 Minor deficiencies
- RC-135:
  - 83 Major deficiencies and 665 Minor deficiencies
- A-10
  - 1 Major deficiency and 57 Minor deficiencies
- BRAT Calibration and Adjustment/Alignment
  - 17 Major deficiencies and 301 Minor deficiencies

AFILON Proven Repeatable IV&V Process and Capabilities

AFILON's Repeatable IV&V Process

- AFILON rigorous IV&V process includes:
  - Perform a thorough study of the avionic Unit Under Test (UUT), including its sub-units, functionality, interfaces, performance and functional requirements, design and design specifications.
  - Review manufacturer's tests and test specifications.
  - Establish test strategies and test cases.
  - Evaluate preliminary Test Strategy Report, including test plan, test cases and test procedures.
  - Determine translation of requirements to a valid design which will ensure optimum performance capabilities while minimizing technical/cost/schedule risks and life cycle costs.

AFILON's Repeatable IV&V Process

- Review and evaluate the Developer's software/firmware and hardware design for compliance to the appropriate Statement of Work (SOW), CDRL, performance specifications, testing requirements, and military and/or industry standards for clarity of definition, testability, adequacy, and completeness.
- Review and evaluate the Developer's engineering drawings, integration, and test efforts to ensure compatibility and integrity.

AFILON's Repeatable IV&V Process

- Monitor formal acceptance testing
  - Verify that the TPS, as built, executes according to and conforms to the technical documentation that defines the TPS
  - Ensure all detectable faults are properly isolated
  - Verify the TPS has met all aspects of the acceptance criteria
  - Ensure all changes to the documentation and software has been documented and that the revision history is accurate
  - Verify all User interactions are correct and the TPS (hardware and software) works as specified
- Evaluate technical manual changes
  - Technical orders
  - Commercial manuals
  - Changes to existing manuals, and
  - Development of new manuals. The manuals are evaluated for technical accuracy and adherence to the appropriate specification/standard for style and format.

TPS Web-Based Information System

- AFILON hosts TPS Management System (TMS) a web-based information system that provides:
  - TPS development calendar
  - Depository of TPS development documentation
  - Document discrepancies to be addressed
  - Real time discrepancy tracking resolution
  - Integrated process team collaboration
  - Action item tracking and notification
  - Configuration management
  - Automated e-mail notifications
  - Secure multi-level internet access
  - Audit trail and traceability
  - Report generation

Benefits of AFILON's Experienced TPS IV&V Team

- Validation of TPSs reduces errors and omissions
- Problems are identified early and reduces costly future recalls
- Ensure that all TPSs are being developed to the same standards
- Management has a clear view of development status
- Technical expertise is available to evaluate developer performance
- Data is managed on one site (TMS)
- Independent review of TPS development guarantees objectivity