Navy RVSM Certifications

17-19 October, 2017

2017 ASE Workshop

FAA Tech Center, Atlantic City

PMA 209 develops, integrates, and delivers avionics solutions that meet customer requirements, enable interoperability, and maximize affordability.

PMA209 CNS/ATM

- **PMA209 is certification authority for Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) functionalities for Navy and Marine Aircraft**
  - Mode Select (Mode S)
  - Automatic Dependent Surveillance-Broadcast Out (ADS-B Out)
  - Required Navigation Performance/Area Navigation (RNP/RNAV)
  - 8.33 kHz Channel Separation
  - Reduced Vertical Separation Minimum (RVSM)

NAVAIR RVSM Requirements

- **Aircraft are evaluated and tested IAW NAVAIR Functional Requirements Document (FRD) for RVSM Rev A**
  - The FRD is based on FAA AC 91-85 of 21 Aug 2009
- **NAVAIR Requirements Verification Matrix (RVM) developed from the FRD**
  - Validates compliance with the FRD for RVSM
  - Baseline document for Certification Data Package (CDP)

Single Altimetry Certification

- **Memorandum of Understanding signed between FAA and DoD 25 July 2001**
- **Agreement governs the use of Domestic RVSM (DRVSM) Airspace by DoD aircraft Policy:**
  - The FAA recognizes the DoD need to approve Single Altimetry Tactical aircraft for RVSM
  - These aircraft may be approved providing the altimetry systems meet the performance requirements of AC 91-85
  - DoD agrees to follow periodic height-keeping performance monitoring required by FAA

RVSM Initial Certification

SSEC Development Flight Test

OEM Static Source Error Correction (SSEC) Development

RVSM Qualification Analysis and Report

Verification Flight Test

-Inspection Plan
-Monitoring Plan
-Maintenance Procedures
-NATOPS updates

Requirements Verification Matrix

Certification Data Package

PMA209 Review Process

Certification Letter

Initial Monitoring Flights

- **Demonstrated satisfactory Altimetry System Error (ASE) performance prior to issuing RVSM certification**
- **RVSM Configuration Inspection**
  - Verifies compliance with airframe RVSM equipage requirements
  - Executed on all aircraft selected for initial monitoring
- **10% of existing or projected fleet subjected to Initial Monitoring to verify predicted ASE performance (USN minimum sample size)**
- **Onboard instrumentation, Mode S Aircraft Geometric Height Measurement Element (AGHME) site or GPS Monitoring Unit (GMU) used to measure RVSM height keeping performance (ASE performance)**
  - Data reduction and analysis conducted by the FAA Tech Center, Atlantic City
- **Initial Monitoring Flight results reviewed by PMA209 RVSM SMEs**

Continuation of Certification and Re-Certification

- **RVSM Model Group Certification requires a Continuation of Certification (CoC) or Re-certification (R-Cert) for:**
  - Hardware changes (from Equipment Configuration List)
  - Software changes (from Equipment Configuration List)
    - FCC/MC software changes
  - Airframe modifications
    - Vicinity of air data sensors
    - Moldline changes
  - External stores changes
- **Changes are assessed by PMA209 RVSM SMEs to determine if CoC or R-Cert is required based on the changes to the RVSM certified configuration**

Continuation of Certification and Re-Certification

- **Continuation of Certification (CoC)**
  - Change to the RVSM certified configuration that does not affect compliance with RVSM FRD requirements
  - Examples include most software configuration changes
  - May require supporting artifacts
- **Re-Certification (R-Cert)**
  - Change to the RVSM certified configuration that affects compliance with RVSM FRD requirements
  - Examples include new SSEC, new sensor such as Angle of Attack (AoA) transmitters

Re-certification Requirements

- **Re-certification requirements are developed on a case by case basis depending on the nature of the change to the RVSM certified configuration**
- **Scope of Re-certification varies**
- **Re-certification may require:**
  - Flight Tests as needed to support analysis
  - Updated RVSM Analysis
  - Verification Flight Tests
  - Initial Monitoring

Compliance Process Sequence

Delivering what we promised when we promised — *War-winning Capabilities…On Time, On Cost*

CNS/ATM Office

influence

Laws, Mandates, Regulations

interpret

Performance Requirements

GPM – HBAG
TPM – HBAG & Program Office
DQR – Program Office

tailor

Artifacts – Program Office & Integrator
PAR – Program Office often with HBAG support

Data Chain Audit – HBAG

Platform Testing

assess

End Product: LoC

Warfighter Achieves Airspace Access

Questions?

Contact: rvsm@navy.mil

Backup

OEM RVSM Analysis

- **Airframe OEM performs an RVSM Analysis IAW FRD requirements**
  - Group/Non-Group classification
  - RVSM Configuration
  - Equipage Definition
  - Flight Envelope Definition (Basic and Full)
  - ASE Error Model
  - ASE Compliance Analysis
  - Altimeter/Air Data System – Integrity and Reliability
  - Altitude Control, Altitude Alerting, ATC Transponder
  - Inspection and Maintenance Procedures
  - Operational Material (NATOPS Flight Manual Inputs)