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 R 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

Requirements Verification Matrix

Verification Flight Test

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

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

Warfighter Achieves Airspace Access

End Product: LoC

Platform Testing

Laws, Mandates, Regulations

Performance Requirements

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

CNS/ATM Office

influence

interpret

Data Chain Audit – HBAG

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

Integrity - Service - Excellence

DISTRIBUTION STATEMENT A. Approved for public release.
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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)