



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



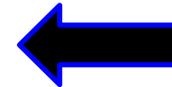
OEM Static
Source Error
Correction (SSEC)
Development



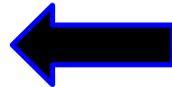
RVSM
Qualification
Analysis and
Report



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



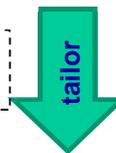
Laws, Mandates, Regulations



Performance Requirements

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

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



Data Chain Audit – HBAG



Warfighter Achieves Airspace Access



End Product:
LoC



Platform Testing

Integrity - Service - Excellence

DISTRIBUTION STATEMENT A. Approved for public release.

PA- 66ABG-2016-0105



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)