



PMA209 RVSM Update

Sept 13-15, 2016

ASE Workshop

FAA Tech Center, Atlantic City

PMA209 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 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



- **When the aircraft has been determined to need RVSM certification the steps are:**
 - RVSM Qualification Analysis and Report (typically Original Equipment Manufacturer (OEM))
 - Requires flight test for Altimetry System Error (ASE) data (AIR 5.1.6 and OEM)
 - Verification Flight Test with a calibrated truth source (AIR 5.1.6)
 - Development of the aircraft RVSM configuration inspection to validate Type Model Series (TMS) configuration by BuNo (Aircraft PMA)
 - Initial Monitoring Plan (PMA209 Navigation IPT joint with Aircraft PMA)
 - Collection of initial monitoring data (Aircraft PMA designated)
 - Analysis of initial monitoring data (PMA209, 5.1.6.2, and FAA)
 - Development of Operator and Maintenance Procedures including training materials (OEM and Aircraft PMA)
 - Completion of RVM (PMA209 Navigation IPT)
 - Assembly of Certification Data Package (CDP) (PMA209 Test & Cert)
 - Review of CDP by PMA209
 - Execution of certification letter (PMA209)
 - Fleet release of capability to aviators (Aircraft PMA)



Initial Monitoring Flights



- **Demonstrated satisfactory 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 SCS 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 AoA vanes



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



Post-Certification



- **Required to perform Periodic Monitoring in two year cycles**
 - COMNAVAIRPAC/COMNAVAIRLANT INST 13200.1B
 - PMA209 RVSM Periodic Monitoring Policy – 14 Jul 15
 - Number of aircraft from a group that require to be monitored is determined by PMA209 RVSM SMEs
 - PMA209 can provide Periodic Monitoring Special Instructions (SPINS) for operators
- **Monitoring Methods Used**
 - AGHME
 - On-board GPS Recording
 - TCTS Pod



Periodic Monitoring Tracking



- **An Access database is maintained by the PMA209 Navigation team (currently Adrienne Cooper)**
 - Database contains:
 - A table of monthly DoD AGHME reports from the FAA Tech Center
 - A table for each aircraft group with their Mode S and BuNos
 - Queries for each aircraft group on their current monitoring period results and monitoring results since their initial certification
 - Will eventually contain initial monitoring data
 - Matlab code has been developed to calculate aircraft ASE statistics to include in 6 month report
 - A monitoring update report is generated every 6 months and provided to each aircraft group to notify them of their status and when their 2 year monitoring is due



NAVAIR RVSM Certifications



- **7 Certified Groups**
- **5 Groups in certification process for initial certification.**



Questions?





Backup

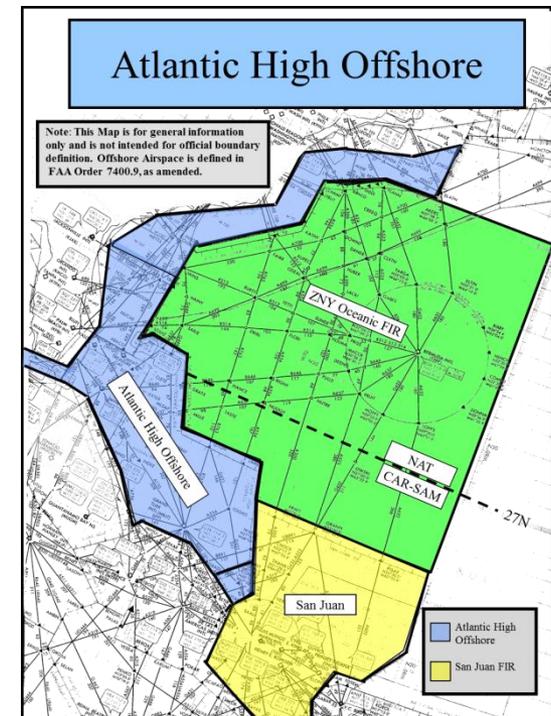




Domestic US RVSM



- On 20 Jan 05, the FAA implemented Reduced Vertical Separation Minimum (RVSM) between flight level (FL) 290-410 (inclusive) in the following airspace: the airspace of the lower 48 states of the United States, Alaska, Atlantic and Gulf of Mexico High Offshore Airspace and the San Juan Flight Information Region (FIR)
 - Includes – Houston and Miami Oceanic FIRs
 - Coincided with RVSM implementation in Southern Canada, Mexico, Caribbean States and South America





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)