



Non-Group RVSM Certification Process



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Non-Group RVSM Certification Presentation Topics

- Definition of the Non-Group Airframe
- Aircraft Systems Configuration
- Flight Testing
- RVSM ASE Requirements
- Data Package Development
- Operator Approval
- Advantages/Disadvantages of the Non-Group approval, compared to a Group Approval
- RVSM Non-Group Approval Flowchart





Definition of a RVSM Non-Group Airframe

“If an airframe (meets) the (following) conditions, or is presented as an individual airframe for approval, then it must be considered as a non-group aircraft for the purposes of RVSM approval”.

- Aircraft has been modified such that the basic (certified; nominal) aerodynamic design has been altered
- The static system of the aircraft differs from the original production or “Group” standard
- The avionics units installed varies significantly from the production or “Group” standard
- Airframes for which a Group certification does not exist



Airframe Specification for Non-Group Certification

→ Configuration design alterations that may constitute Non-Group status include:

- Fuselage configuration modifications (fairings, belly tanks, etc.)
- Wing modifications
- Engine modifications



→ Avionics components:

- Unique air data, autopilot or altitude alert configurations

→ Static pressure system:

- Static source location different from nominal design





Dual STCs May Be Required for Non-group Aircraft



- *One STC for the avionics upgrade/installation*
- *One STC for RVSM certification of the retrofitted airframe*

- STC for system installation/configuration
 - Two independent altimetry systems, one automatic altitude control system, one altitude alert system and altitude reporting transponder (required by 91.215)
 - System installation must meet FAR Part 25.13XX or part 23.13XX, as applicable
 - Normal STC process used for certification of equipment modifications and upgrades



Dual STCs for Non-group Aircraft (continued)



→ STC for RVSM Certification

- RVSM STC establishes that the upgraded avionics systems meet Part 91 Appendix G, Section 2 performance tolerances
- RVSM STC establishes airframe configuration requirements for initial and continued airworthiness
- RVSM STC substantiation includes flight testing, data analysis (in accordance with Memo 91-RVSM), development of maintenance instructions (FAR Part 25 Appendix H) and development of RVSM Airplane Flight Manual Supplement
- RVSM STC requires accomplishment of the installation STC



Aircraft Systems

- **RVSM Configuration and Performance Requirements:**
 - Two independent altitude measurement systems (meeting RVSM altimetry system error [ASE] requirements)
 - One automatic altitude control system (± 65 ft)
 - One altitude alert system (± 300 ft / ± 50 ft)
 - One SSR altitude reporting transponder
 - RVSM-compliant avionics configuration

- **Compliance:**
 - Flight testing
 - Equipment manufacturer's specification data
 - Bench testing



RVSM ASE Requirements

→ Requirement:

→ Group Airplanes:

<i>Type Certificate issued before April 9, 1997</i>	Normal Operating Conditions (Basic Flight Envelope)	Full Operating Capability (Full Flight Envelope)
Mean Error	80 feet	120 feet
Mean + Three Standard Deviations	200 feet	245 feet
<i>Type Certificate issued after April 9, 1997</i>		
Mean Error	80 feet	80 feet
Mean + Three Standard Deviations	200 feet	200 feet

→ Non-Group Airplanes:

	Normal Operating Conditions (Basic Flight Envelope)	Full Operating Capability (Full Flight Envelope)
Absolute Error	160 feet	200 feet



Flight Testing

→ **Trailing cone/calibrated chase plane**

- Downtime 3 - 5 days, weather dependent
- Simple data acquisition system
- Monitor performance of Air Data, Autopilot and Altitude Alert systems during normal operation

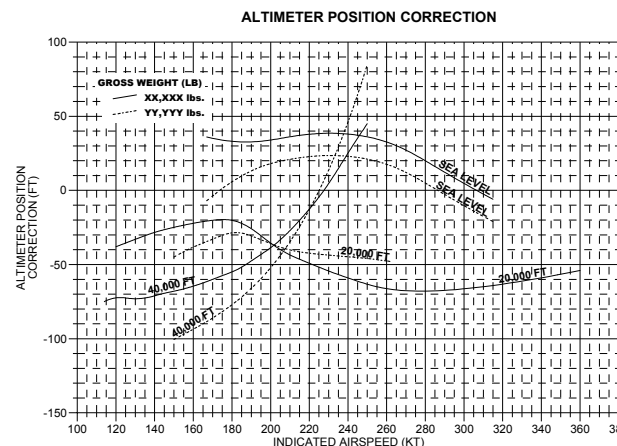


- **Airframe/static system inspections conducted concurrent with flight test activity**
- **RVSM avionics configuration not always required for flight testing (airframe dependent)**



RVSM Data Package

➔ **Substantiating data for RVSM STC compiled into a certification data package, including all analysis and substantiation for the configuration and performance of the RVSM-specific aircraft systems**



- ➔ **Instructions for Initial & Continued Airworthiness (ICA) are developed and substantiated through the RVSM analysis process**
- ➔ **Airplane Flight Manual Supplement (AFMS) produced as required**
- ➔ **“Top Level” RVSM Supplemental Type Certificate (STC) provided to the operator with ICA and AFMS documents**



RVSM Operator Approval

- Operator should meet with local aviation authorities after flight test is completed (60 days typically required)**
- After receipt of the RVSM STC, operator should develop a plan to show compliance with STC instructions**
- Perform Initial airworthiness maintenance instructions, and develop a plan for continued airworthiness compliance**
- RVSM Pilot training**
- Coordinate all tasks closely with the local authority to secure Letter of Authorization (LOA)**



Advantages/Disadvantages in comparison to a Group Certification

→ Advantages:

- Non-Group RVSM ASE requirements often favorable for individual airframes
- Flight test results may be used to satisfy monitoring requirements
- Fewer avionics updates and/or static system changes may be necessary for RVSM compliance
 - Operator has more options for aircraft systems modifications
- Airframe-specific, customized maintenance requirements

→ Disadvantages:

- All Non-Group aircraft must be flight tested
 - An airworthiness certification program must be completed for each airframe
- **Operator is free to choose the approval path for a specific airframe (Group or Non-Group)**



Non-Group Certification Flowchart

