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) 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

Non-Group Certification Planning

"Dual STC" Process

- **RVSM Requirements for Configuration**
  - Aircraft systems configuration includes:
    - Two independent air data systems, one automatic altitude control system, one altitude alerting system, and an altitude reporting system
    - Equipment installation must meet FAR Part 25.13XX or 23.13XX, as applicable
    - Normal STC process (or alternate acceptable means) used for certification of equipment modifications/upgrades ("Avionics STC")
- **RVSM Requirements for Performance**
  - Performance of the four RVSM aircraft systems must meet requirements of Memo 91-RVSM
    - 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 AFMS
    - "RVSM STC" generated to cover RVSM compliance
    - RVSM STC requires implementation of the Avionics STC (or approved installation)

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

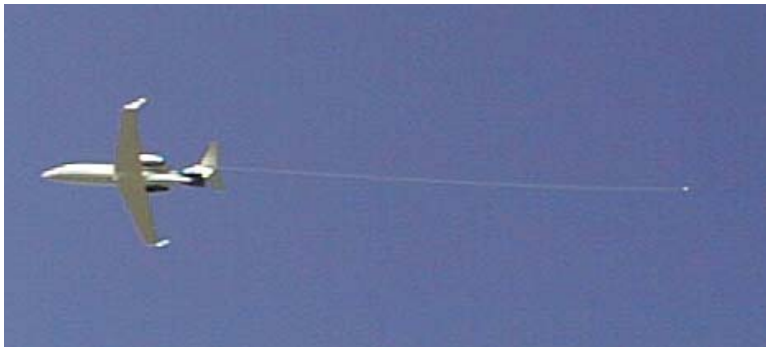
Aircraft Systems

- **RVSM Configuration and Performance Requirements:**
  - Two independent altitude measurement systems (meeting system error 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

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 inspection conducted concurrent with flight test activity**
- **RVSM avionics configuration not always required for flight testing (airframe dependent)**

RVSM ASE Requirements

- Requirement:
  - Group Airplanes:

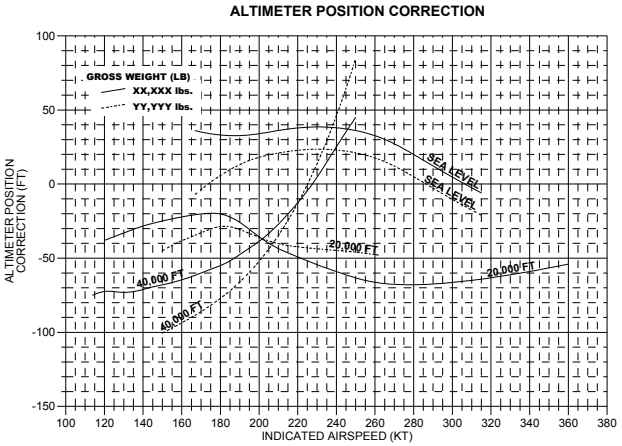
Type Certificate issued before April 9, 1997	Normal Operating Conditions (Basic Flight Envelope)	Full Operating Capability (Full Flight Envelope)
Mean Error	80 feet	120 feet
Mean + Three Standard Deviations	200 feet	245 feet
Type Certificate issued after April 9, 1997		
Mean Error	80 feet	80 feet
Mean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

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

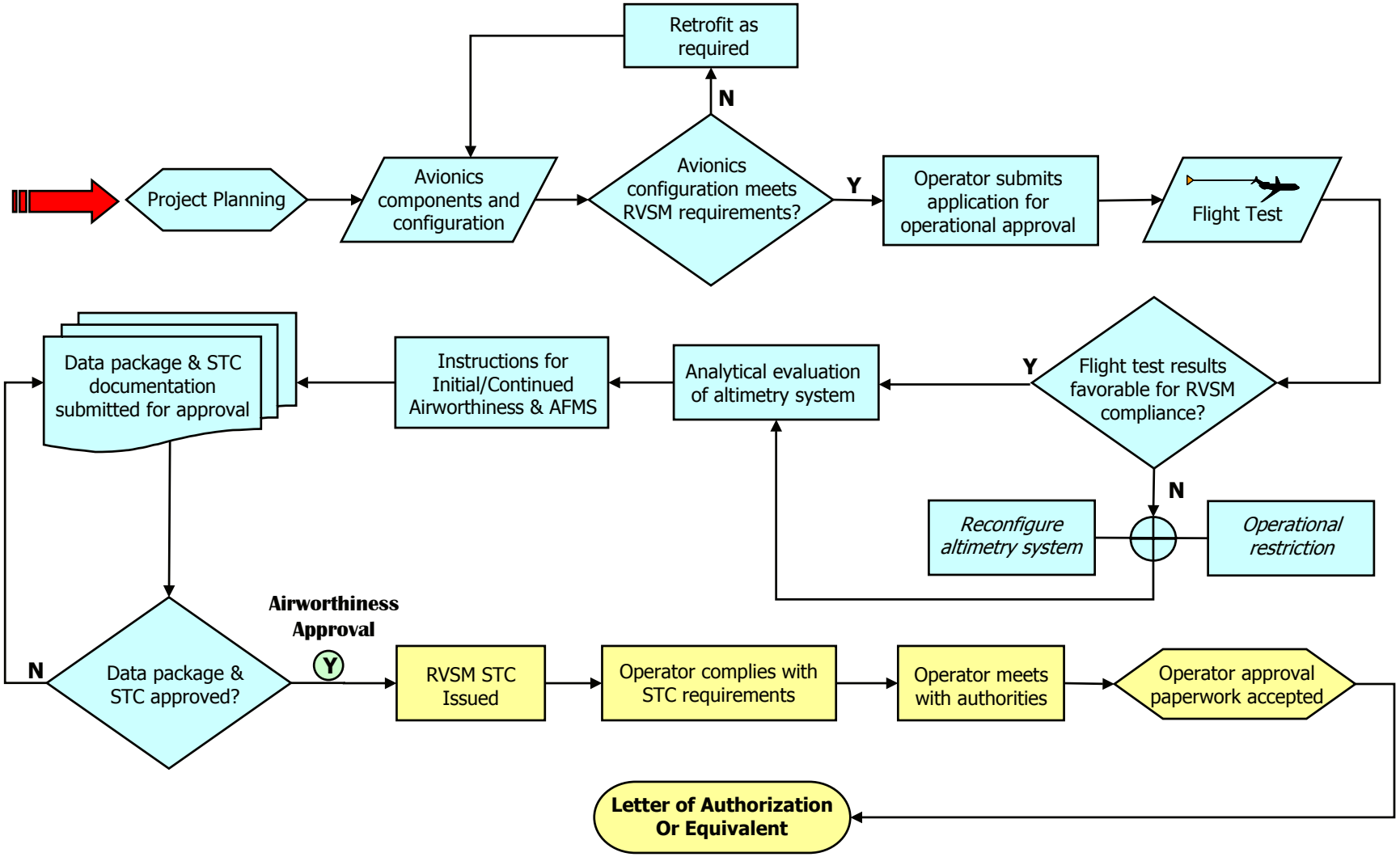


- Instructions for Initial & Continued Airworthiness (IICA) are substantiated through the RVSM analysis process
- Airplane Flight Manual Supplement (AFMS) produced as required
- "Top Level" RVSM Supplemental Type Certificate (STC) provided to the operator with IICA and AFMS documents

RVSM Operator Approval

- Operator should meet with local aviation authorities after flight test is completed
- 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
- RVSM Pilot training
- Coordinate all tasks closely with the local authority to secure Letter of Authorization (LOA) or equivalent

Advantages/Disadvantages in comparison to a Group Certification

- **Advantages:**
  - Different 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
  - Turn-around times beginning to shorten up
- **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