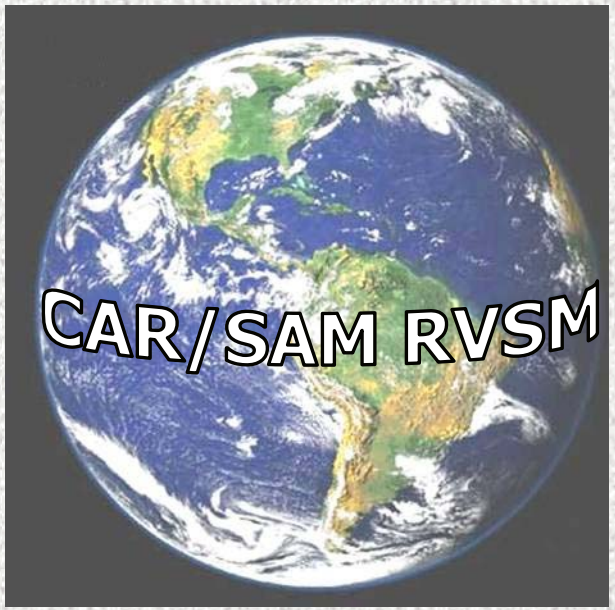
Non-Group RVSM Certification Process



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Non-Group RVSM Certification Presentation Topics

- AeroMech RVSM Experience
- 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

AeroMech RVSM Experience

- Provided RVSM Approval Packages since 1995
- Group and Non-Group Certification capabilities
- Over 5000 airframes
- Approvals worldwide: North America, Europe, Middle East, Africa, Australia, South America
- FAA-delegated approval authority for RVSM Certification data packages
- Certified FAA Repair Station – Specialized services for RVSM initial and continued airworthiness

AeroMech RVSM Experience

Group Approvals

- Preferred Provider of RVSM Certification Services for:
  The Boeing Company, Bombardier Aerospace, Embraer, Israel Aircraft Industries, Lockheed Martin, Raytheon Aircraft Company
- 20 Group Approvals
  - DC-8 (All variants)
  - DC-9 (most variants)
  - 727 w/avionics modification
  - 737 w/avionics modification
  - Lockheed L-1011-1/L-1011-3
  - Lockheed Jetstar II
- Group Programs in Progress:
  - Falcon 10 & 20 series, Cessna Citation, Learjet 20, Sabre 65, Hawker 400/700, Astra series (G100), Jetstar 731
- Provided RVSM support services to over 40 airlines worldwide

AeroMech RVSM Experience

- Over 40 Non-Group (individual airframe) Approvals
  - Including:

    Falcon 10 & 20, Westwind I & II, Cessna Citation 501, Jetstar II & 731, Hawker 700, Sabre 65, Learjet 31, 35, 36 & 55, Astra (G100), Boeing 707, 727, 737, Douglas DC-8 & DC-9
  - Several Non-Group programs currently in progress

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

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 Configuration

- **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
  - Requires coordination with local aviation authority
  - Monitor performance of Air Data System, Autopilot and Altitude Alerter during normal cruise 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
- 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
- Coordinate all tasks closely with the local authority to secure Letter of Authorization (LOA)

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
- **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