

GENERAL

A "State Operational Approval" is needed for Airspace where Operations require Approval in accordance with an ICAO Regional Navigation Agreement, and which may or may not include RVSM.

The full Approval should be obtained before 31 March 2001, to allow RVSM implementation date in European Airspace on 24 January 2002.

Below are some points to be considered during the preparation of "THE RVSM OPERATIONAL APPROVAL" application. (See ref. JAA TGL-6)

RVSM Operational Approval Content:

Notes:

The following material should be made available to the responsible authority, in sufficient time to permit evaluation, before the intended start of RVSM operations.

The JAA Temporary Guidance Leaflet No.6 (TGL-6) is downloadable from the EUR-RVSM web site:
<http://www.eur-rvsm.com/library.htm> (161 KB).

1. DESCRIPTION OF AIRCRAFT EQUIPMENT

[Ref: TGL-6, para. 8].
Describe the aircraft equipment appropriate to operations in an RVSM environment.

2. AIRWORTHINESS DOCUMENTS

[Ref: TGL-6, para. 9].
Show that the aircraft has an RVSM airworthiness approval.

3. TRAINING PROGRAMMES, OPERATING PRACTICES AND PROCEDURES

[Ref: TGL-6, Appendix: 4].
Submit training syllabi for initial, and where appropriate, recurrent training programmes, and make flight crews aware of the criteria for operating in RVSM airspace and train them accordingly. The training material will need to show that the operating practices, procedures and training items, related to RVSM operations in airspace that requires State Operational Approval, are incorporated.

Notes:
Certain items may already be adequately standardised in existing procedures.

Non-AOC (Air Operator's Certificate) operators will need to comply with local procedures to satisfy the responsible authority that their knowledge of RVSM operating practices and procedures is equivalent to that set for AOC Holders, and sufficient to permit them to conduct RVSM operations.

4. OPERATIONS MANUALS AND CHECKLISTS

Appropriate manuals and checklists should be revised to include information/guidance on standard operating procedures then submitted to the responsible authority for review.

5. PAST PERFORMANCE

Include relevant operating history, where available, in the application.

6. MINIMUM EQUIPMENT LIST

Include items pertinent to operating in RVSM airspace in the minimum equipment list (MEL), adapted from the master minimum equipment list (MMEL) and relevant operational regulations.

7. MAINTENANCE

[Ref: TGL-6, para. 10].
Establish a maintenance programme acceptable to the responsible authority.

8. PLAN FOR PARTICIPATION IN EUROCONTROL VERIFICATION/MONITORING PROGRAMMES: (*)

[Ref: TGL-6, Appendix: 3].
Establish a plan for participation in Eurocontrol verification/monitoring programme. This plan will need to include, as a minimum, a check on a sample of the operator's fleet by means of, either Height Monitoring Unit (HMU) or GPS-based Monitoring Unit (GMU), monitoring systems.

Note:

For the final step of the approval process, the responsible authority may appoint an inspector for a demonstration flight to ensure satisfactory performance and to verify that all relevant procedures are applied effectively.

(*) Is not a prerequisite for granting RVSM approval, but a plan for this requirement should be included in the application.

"Responsible Authority" is the state of registration or the state of operation of the airframe.

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1. DESCRIPTION OF AIRCRAFT EQUIPMENT

The two independent altitude measurement systems comprised of the following elements:

- Cross coupled static source system provided with ice protection if located in areas subject to ice accretion.
- Equipment for measuring static pressure sensed by the static source, converting it to pressure altitude displayed to the flightcrew.
- Equipment for providing a digitally coded signal corresponding to the displayed pressure altitude, for automatic altitude reporting purposes.
- Static source error correction (SSEC), if required to meet RVSM altimetry system error requirements.
- Equipment to provide reference signals for automatic altitude control and alerting systems.

The secondary surveillance radar transponder with an altitude reporting system.

The altitude alerting system.

The automatic altitude control system.

2. AIRWORTHINESS DOCUMENTS

Evidence confirming that the aircraft has been inspected and modified in accordance with the applicable Service Bulletin, and is of a type and build standard that meet the RVSM airworthiness criteria.

Confirmation that the continued airworthiness instructions are available in the application and that the approved Flight Manual amendment or supplement has been incorporated.

Performance & Analytical Data supporting RVSM airworthiness approval of the defined build standard.

Aircraft Flight Manual statement, Type Certificate Data Sheet, Maintenance and Repair Manuals with continued Airworthiness instructions associated. (For newly built aircraft).

Service Bulletin, or its equivalent, Aircraft Service Change, Supplemental Type Certificate, that identifies the work to be done to achieve the build standard, continued airworthiness instructions, and an amendment to the Aircraft Flight Manual stating related conditions and limitations. (For in-service aircraft).

RVSM statement of compliance in the Aircraft Flight Manual, including reference to the applicable build standard, related conditions and limitations.

Data showing compliance with the RVSM performance and Aircraft systems criteria.

Aircraft statement, group or non-group.

- Group aircraft means aircraft that are of nominally identical design and build with respect to all details that could influence the accuracy of height,
- Keeping performance,
- Individual applications are required for non-group aircraft.

Definition of the applicable flight envelope(s).

The procedures to be used, and the details of any special procedures that are not covered, to ensure that all aircraft submitted for airworthiness approval comply and have continuous compliance with RVSM criteria. (These procedures will include the references of airworthiness approval and the applicable approved Aircraft Flight Manual amendment or supplement).

The maintenance instructions that ensure continued airworthiness for RVSM operational approval.

3. TRAINING PROGRAMMES, OPERATING PRACTICES AND PROCEDURES

Flight Crews Awareness and Training:

- Knowledge and understanding of standard ATC phraseology contingencies used in each area of operations, special & in-flight procedures/contingencies;
- Cross checking to ensure that ATC clearances, Notams, AIPs are promptly and correctly complied with;
- Use and limitations, in terms of accuracy, of standby altimeters in contingencies (where applicable, the pilot should review the application of static source error correction/position error correction through the use of correction cards; such correction data will need to be readily available on the flight deck);
- Awareness of visual perception of other aircraft at 300 m (1,000 ft) planned separation during darkness, when encountering local phenomena such as northern lights, for opposite and same direction traffic, and during turns;
- Awareness of the characteristics of the aircraft altitude capture systems which may lead to overshoots;
- Awareness of the relationship between the aircraft's altimetry; automatic altitude control and transponder systems in normal and abnormal conditions;
- Awareness of problems due to wake vortex encounters and TCAS Operations in RVSM airspace;
- Awareness regarding any airframe operating restrictions, if required for the specific aircraft group, related to RVSM airworthiness approval;
- Awareness about Transitions problems and Safety issues.

Initial and recurrent training to relevant personnel regarding:

Aircraft geometric inspection techniques.
 Test equipment calibration and use of that equipment.
 Flight Planning filing and relevant CFMU messages/error messages.
 Route, Weather, Flight Levels, Notams and AIPs for dispatch considerations.
 Fuel account for the above requirements and considerations; turbulence or loss of equipment requiring a non-RVSM FL.
 New sectorisations (boundaries, entry & exit points), New Route Structure, FL allocation schemes.
 Use of the MEL in addition to Aircraft, Flight, and Maintenance Manuals regarding RVSM operations.
 Any special instructions or procedures introduced for RVSM approval.
 Rostering account for scheduled training programs: classroom, simulator training, on-board familiarisation.

4. OPERATIONS MANUALS, DOCUMENTATION AND CHECKLISTS

Maintenance Schedule has to be revised with an effective quality control program.

Review and update the Standard Practices Manuals, Aircraft Flight Manual and the Basic Operations Manual. Illustrated Parts Catalogues have to be updated.

Structural Repair Manuals should be reviewed with special attention to the areas around each static source, angle of attack sensors, and doors if their rigging can affect airflow around the previously mentioned sensors.

State in manuals the airspeeds, altitudes and weights considered in RVSM aircraft approval, including identification of any operating limitations or conditions established for that aircraft group.

All checklists and relevant documentation should be updated to reflect RVSM requirements.

The Navigation Database on the FMGS should be consistent with RVSM requirements.

RVSM Safety measures and requirements have to be incorporated in Operations and safety manuals, Practices and applicable procedures.

Quality assurance programs have to be homogenous with RVSM requirements.

Aircraft performance and fuel consumption tables should be updated.

5. PAST PERFORMANCE

Show that changes needed in training, operating or maintenance practices to improve poor height keeping performance have been made.

Show previous RVSM experience in other areas, some aircraft types previously approved and/or previous pilot experience.

6. MINIMUM EQUIPMENT LIST

Review the Master Minimum Equipment List (MMEL).

7. MAINTENANCE

Enable test equipment to have the capability and to demonstrate continuing compliance with all the parameters established.

Make test equipment calibrated at periodic intervals as agreed by the responsible authority using reference standards.

Define the required test equipment accuracy.
 Make regular calibrations of test equipment traceable to a master standard.

Determine the calibration interval to be as a function of the stability of the test equipment.

Establish calibration interval using historical data so that degradation is small in relation to the required accuracy.

Ensure regular audits of calibration facilities both in-house and outside.

Adhere to approved maintenance practices.

Review procedures for controlling operator errors and unusual environmental conditions which may affect calibration accuracy.

Maintain all RVSM equipment in accordance with the component manufacturers' maintenance instructions and the performance criteria of the RVSM approval data package.

Report any modification or design change, which affects in any way the initial RVSM approval, to the responsible authority for a design review.

Report any repairs, not covered by approved maintenance documents that may affect the integrity of the continuing RVSM approval, to the responsible authority for a design review. E.g. those affecting the alignment of pitot/static probes, repairs to dents or deformation around static plates.

Ensure that Built-in Test Equipment (BITE) testing should not be used for system calibration unless it is shown to be acceptable by the aircraft constructor or an approved design organisation, and with the agreement of the responsible authority.

Apply appropriate system leak check (or visual inspection where permitted) following reconnection of a quick-disconnect static ligne.

Maintain airframe and static systems in accordance with the aircraft constructor's inspection standards and procedures. Make surface measurements or skin waviness checks, as specified by the aircraft constructor, to ensure the proper maintenance of airframe geometry for proper surface contours and the mitigation of altimetry system error, and to adhere to RVSM tolerances. These checks should be performed following repairs, or alterations having an effect on airframe surface and airflow.

The maintenance and inspection programme for the autopilot will need to ensure continued accuracy and integrity of the automatic altitude control system to meet the height keeping standards for RVSM operations. This requirement will typically be satisfied with equipment inspections and serviceability checks.

Verify that the associated maintenance practices are consistent with continued RVSM approval as far as the performance of installed equipment has demonstrated to be satisfactory for RVSM approval. Examples of equipment to be considered are: Altimetry alerting, Automatic Altitude Control System, Secondary surveillance radar altitude reporting equipment and Altimetry systems.

Include in the approved maintenance programme, for each aircraft type, the maintenance practices stated in the applicable aircraft and component manufacturers' maintenance manuals.

Review maintenance procedures and address all aspects of relevant continued airworthiness.

Ensure that altimetry systems continue to meet RVSM approval criteria and to be verified by scheduled tests and inspections in conjunction with an approved maintenance programme and inspection practices acceptable and as required by the responsible authority.

Take action for Non-compliant Aircraft.

For aircraft exhibiting height keeping performance errors that require investigation, confirm and isolate malfunction, and take corrective action as necessary to support RVSM approval.

8. PLAN FOR PARTICIPATION IN VERIFICATION/MONITORING PROGRAMMES

Contact EUROCONTROL "User Support Cell" to participate in the Height Monitoring Program:
 Tel: +32 2 729 4780
 Fax: +32 2 729 4634
 E-mail: rvsm.office@eurocontrol.be
http://www.eur-rvsm.com/support2.htm#contact_table for any help.

Read more about the Height Monitoring Program on the EUR RVSM site at:
http://www.eur-rvsm.com/height_monitoring.htm.

Download and fill in the required documentation.

Schedule your fleet and amend the fleet roster to allow the required monitoring.

Re-route your destinations, if necessary, to overfly one of the designated Height Monitoring Units (HMUs) or contact the "User Support Cell" for GMU monitoring.

Contact Eurocontrol User Support Cell if can't re-route and need to carry GPS-based Monitoring Units (GMUs) on board (no cost involved).

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