

## AIRCRAFT RVSM REQUIREMENTS - AVIONICS AND AIRFRAME

- Two independent, cross coupled altitude measurement systems
- One automatic altitude control system ( $\pm 65'$ )
- One altitude alert system ( $\pm 300'/\pm 50'$ )
- One SSR altitude reporting transponder
- RVSM-compliant avionics configuration

Compliance:

- Flight testing
- Equipment manufacturer's specification data
- Bench testing

Other requirements associated with RVSM modifications generally include checking of:

- Static port/pitot-static probe installation
- Condition of port orifice
- Skin splices, access panels, doors, non-flush rivets, excrescence items

### New aircraft

Newly delivered aircraft may be RVSM compliant by Type Certificate (TC). In this case the Aircraft Flight Manual (AFM) will be amended, as necessary, to declare aircraft RVSM compliance. Also the Manufacturers Minimum Equipment List (MMEL), Maintenance Planning Document (MPD) or Maintenance Schedule or equivalent document, the Structure Repair Manual (SRM) and the Maintenance Manual (MM) will be amended as necessary to enable aircraft RVSM continued compliance. The operator will, typically, have to satisfy their Registration Authority that they are performing the scheduled and unscheduled maintenance requirements, as specified, for continued compliance.

### In-Service aircraft

Usually the airframe manufacturer identifies the work to be done on the aircraft type in a service bulletin (SB). It is recommended, for new and second hand aircraft purchases, for the operator to check the aircraft RVSM compliance status if RVSM operations are envisaged.

*Note:*

*- If the aircraft is in current production and new deliveries are RVSM compliant by Type Certificate and older aircraft are not, then it should be expected that the Original Equipment Manufacturer (OEM) will also have an SB for the older aircraft (check for serial number production cut-in). Application of this SB will usually enable the older aircraft to be made compatible with new aircraft.*

## CONSIDERATIONS for OPERATORS

Operators will inspect and/or modify aircraft in accordance with the appropriate RVSM airworthiness requirements and will institute procedures in respect of continued airworthiness (maintenance and repair) practices and programmes (e.g. as specified in JAA TGL6) in order to prepare their aircraft for monitoring.

Operators will provide the State authority with any documentation that may be required for those aircraft that have been inspected and/or modified in accordance with the RVSM airworthiness documents.

### Applicability

The operator should review their fleet types based on the following rationale:

1/. Does the aircraft have an operational capability of FL290 and above? If not, then it is not applicable for the RVSM process.

2/. Will the aircraft type be operated in EUR RVSM airspace? If not, then it is not applicable for the RVSM process *unless* the operator wishes to obtain aircraft RVSM Approval for reasons of operational flexibility or improved resale value.

3/. Has the aircraft been delivered as RVSM compliant from the Manufacturer?

If not, then the aircraft has to be made RVSM compliant. Compliance may include modifications to the aircraft depending on its avionics equipment and configuration.

4/. Has the aircraft been delivered as RVSM compliant from a previous owner? If so, then the operator will need to confirm that the aircraft has been maintained for continued RVSM compliance. If not, then the operator will need to take steps, such as conducting any scheduled maintenance and checking that the correct standard of components, for RVSM compliance, are fitted.

## Aircraft requiring RVSM Airworthiness Approval

If the operator has determined that the aircraft requires modification for RVSM compliance then the following considerations may apply:-

1/. Is there a Service Bulletin (SB) offered by the OEM for your group of aircraft? If in doubt contact the OEM for the aircraft type who will advise the operator of available SB, mod kit costs and down-time to modify aircraft. Usually this method is preferred so that, under the aircraft monitoring programme for height keeping accuracy, the aircraft will be included in that sample. OEM SB's will already have been approved as an acceptable means of compliance. Your Airworthiness Authority will normally have to confirm acceptance if the SB is produced by another Airworthiness Authority.

2/. If there is no SB available then a specific modification package may be required. Such modification will have to be developed by a design organisation and it will have to be demonstrated to the Airworthiness Authority, as meeting the criteria of a Means of Compliance, eg TGL 6 Rev 1, before it can be approved. Specific modification packages may be developed and approved under a Supplementary Type Certificate (STC).

Operators may wish to check with industry if there is already an approved RVSM solution for their type of aircraft. The EUROCONTROL Users Support Cell can help them in this respect.

*It is imperative that operators notify the Eurocontrol Users Support Cell see contacts and monitoring registration procedure below- as soon as possible after an aircraft has been determined as MASPS compliant (points a and b above). When notifying their MASPS compliance, operators are also requested to provide the Mode S code, if available.*

Full RVSM Approval before 31 March 2001

Operators will need to satisfy the State authority that all three requirements specified in Doc 7030/4 have been met, i.e. the requirements which make the aircraft eligible for monitoring (points a and b) **and** that they have instituted flight crew procedures for operations in the EUR RVSM airspace (point c).

## AIRCRAFT MONITORING PROGRAMME

Height monitoring is not a prerequisite for Aircraft Approval for RVSM Operations.

However, given the critical safety implications and in accordance with the requirements of ICAO Doc 7030, operators intending to operate EUR RVSM airspace are requested to participate in the Eurocontrol monitoring programme.

As stated above, aircraft are eligible for monitoring when they meet the RVSM MASPS, in order to provide:

- Confidence that the safety objectives will be met when RVSM is implemented;
- Guidance on the efficiency of the RVSM MASPS and on the effectiveness of altimetry system modifications;
- Further evidence of the stability of Altimeter System Error (ASE). (ASE stability is a premise around which the monitoring system has been designed)

## MONITORING SYSTEMS

In addition to the ground based Height Monitoring Unit (HMU) implemented for RVSM in the North Atlantic (NAT) region near Strumble (UK), three wide coverage HMU's will be available at the following locations in the EUR region:

- Linz in Austria (*operational 25 May 2000*),
- Nattenheim in Germany (*operational 26 September 2000*), and
- Geneva in Switzerland (*operational 24 October 2000*).

For a successful measurement by an HMU, it is required that the aircraft is in level flight for approximately 5 minutes, between FL290 and FL410 (inclusive) within the coverage (45NM radius) of the HMU.

For aircraft which do not plan to overfly an HMU, portable GPS Monitoring Units (GMUs) are available. In consultation with the operators, a GMU may be installed and operated on the flight deck of aircraft to record the height keeping performance of that airframe. On the basis of the LBA (German Certification Authority) equipment qualification and as supported by JAA, the GMU may be installed on board the aircraft without further technical investigation or approval provided that the instructions and precautions given in Installation Manual AD-GMU-110 are observed.

*The use of the GMU requires operator involvement to accommodate the equipment on the flight deck. Where there is any doubt as to the acceptability of the GMU on a normal scheduled flight, the operator should consider the potential for deviation or special flight to overfly one of the HMUs.*

Monitoring results will be made available on the EUR RVSM web site. If any anomalous height keeping performance is measured, the Eurocontrol Users Support Cell (USC) will contact the aircraft operator to address the issue.

## MONITORING REGISTRATION PROCEDURE

In EUR-RVSM, EUROCONTROL will act as Regional Monitoring Agency (RMA). For aircraft operators, the main contact on RVSM aspects will be the EUROCONTROL User Support Cell (USC).

It is essential that the USC is informed by the Aircraft Operator of:

1-The airframes which are intended for operation in EUR RVSM airspace.

2-The aircraft which are ready for monitoring (i.e. meet the requirements as stated above-points a and b).

It is imperative that operators notify the USC as soon as possible after an aircraft has met the requirements for monitoring and also provide the Mode S code of the aircraft. Additionally, the operator will indicate whether the aircraft are expected to overfly one of the HMUs,

An electronic declaration form is available on the EUR RVSM web site at [www.eur-rvsm.com](http://www.eur-rvsm.com) or on request by fax from the USC.

When the form is sent back to the USC, a copy must also be sent to the State of Registry.

## CONTACT EUROCONTROL USERS SUPPORT CELL :

USC Fax number +32-2-729-4634  
SITA: BRUXX7X

For general information RVSM Office  
E-mail: [rvsm.office@eurocontrol.be](mailto:rvsm.office@eurocontrol.be)  
Tel: +32-2-729-4628  
Fax: +32-2-729-4629

RVSM Technical support:  
Richard Croft on Tel: +32-2-729-3395  
Email: [richard.croft@eurocontrol.be](mailto:richard.croft@eurocontrol.be)

RVSM Regulatory / Airworthiness issues  
Joe Irving on Tel: +32-2-729-4729  
Email: [joe.irving@eurocontrol.be](mailto:joe.irving@eurocontrol.be)

RVSM Business and GA aircraft  
Phil Evans on Tel: +32-2-729-4633  
Email: [phil.evans@eurocontrol.be](mailto:phil.evans@eurocontrol.be)

RVSM Large Aircraft Certification issues  
Len Snelgrove on Tel: +32-2-729-4781  
Email: [len.snelgrove@eurocontrol.be](mailto:len.snelgrove@eurocontrol.be)

EUR RVSM website:

<http://www.eur-rvsm.com>

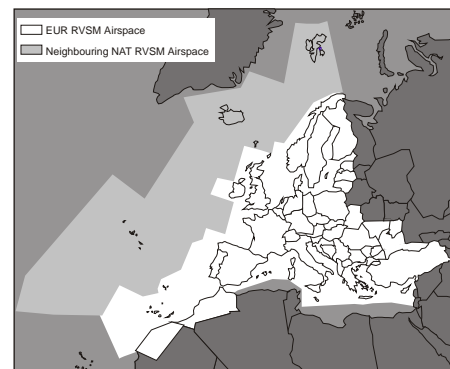
## Notes

## GENERAL

RVSM (Reduced Vertical Separation Minimum) of 1000 ft will be implemented in the European (EUR) RVSM Airspace between FL 290 & FL 410 (inclusive) on 24 January 2002.

Except for State aircraft, only operators and aircraft which have been approved by the responsible authority for RVSM operations will be able to enter in EUR RVSM Airspace; JAA Temporary Guidance Leaflet No.6 Revision 1 (TGL No.6 Rev 1) provides guidance for the approval of specific aircraft type or types, and for operational approval.

## EUR RVSM AREA



## MAIN RVSM REQUIREMENTS and TIMESCALES

OPERATORS WISHING TO USE THE EUR-RVSM AIRSPACE AFTER 24/01/2002 WILL HAVE TO COMPLY WITH ICAO DOC 7030/4 (points a, b and c) AS STATED BELOW.

As stated in the ICAO Regional Supplementary Procedures - Doc 7030/4, EUR, Part 1, Operators intending to conduct flights within EUR RVSM airspace will require an RVSM Approval either from the State in which the Operator is based or from the State in which the aircraft is registered. To obtain an RVSM approval, operators will need to satisfy the said State that:

- a) aircraft for which the RVSM Approval is sought have the vertical navigation performance capability required for RVSM operations through compliance with the criteria of the RVSM Minimum Aircraft Systems Performance Specifications (MASPS)
- b) they have instituted procedures in respect of continued airworthiness (maintenance and repair) practices and programmes
- c) they have instituted flight crew procedures for operations in the EUR RVSM airspace.

Full RVSM approval, i.e. including operational approval (requirement c above) is required by 31 March 2001, to allow the safety and feasibility assessments for an RVSM Go-Delay decision in September 2001.

In addition, the EUROCONTROL monitoring programme, starting 25 May 2000, needs sufficient data for safety analysis before spring 2001.

To achieve this, all aircraft intending to operate in EUR RVSM airspace need to be ready for monitoring (i.e. meet requirements a and b above) by 31 December 2000.

Therefore, for monitoring purposes, all operators are strongly urged to meet RVSM MASPS COMPLIANCE (Points a and b above) : Before END 2000

## AIRCRAFT RVSM REQUIREMENTS

The aircraft manufacturer or the design organisation responsible for the technical preparation of the aircraft for RVSM operations must demonstrate compliance with RVSM requirements, which will allow monitoring to be effected on these aircraft.

## Means of Compliance

A 'Means of Compliance' is documentation providing guidelines against which a modification to an aircraft, or group of aircraft, is authorised so that the aircraft can be declared as meeting the requirements of the MASPS for RVSM operations. (MASPS: Minimum Aircraft Systems Performance Specification).

- One such Means of Compliance is the JAA Temp. Guidance Leaflet No. 6 Rev (JAA TGL No. 6 Rev 1) under the full title of : - *JAA Administrative and Guidance Material, Section One : General, Part Three: Temporary Guidance Leaflets, Leaflet No. 6 - Guidance Material on the Approval of Aircraft and Operators for Flight in Airspace above Flight Level 290 where a 300M (1000 ft) Vertical Separation Minimum is applied.*
- It replaces the JAA Interim Guidance Leaflet No.23 which was only for the North Atlantic Region (NAT) RVSM airspace. Except for Regional Operating practices it is the equivalent of the FAA Interim Guidelines 91 - RVSM.