



EUROCONTROL Guidelines for the Certification and Operation of State Aircraft in European RVSM Airspace

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Abstract			
<p>This document has been produced to provide guidance to operators of State aircraft intending to operate in European RVSM airspace.</p> <p>The guidance material contains general information relating to the RVSM certification and approval of aircraft types and flight plan procedures.</p> <p>This EUROCONTROL Guideline document supersedes the EUROCONTROL published "Guidance material for the certification and operation of State aircraft in European RVSM airspace - Edition 3.0".</p>			
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EXECUTIVE SUMMARY

Reduced Vertical Separation Minimum (RVSM) operations in the International Civil Aviation (ICAO) European (EUR) region provide six additional flight levels between FL 290 and FL 410, inclusive, since 24 January 2002 with a view to increasing airspace capacity and reducing delays and fuel costs.

The European Regional Monitoring Agency (EUR RMA) operated by EUROCONTROL on behalf of the ICAO European Region Aviation System Planning Group (EASPG) is responsible for monitoring and supporting aircraft operations within the EUR RVSM airspace, namely verifying operator compliance with RVSM approval requirements, monitoring aircraft height keeping performance, and conducting airspace safety assessments as required by the ICAO Regional Planning Group.

The monitoring of the performance of the airborne altimetry is also part of the Network Functions covered by Regulation (EU) 2019/123 of 24 January 2019.

The issues associated to the operation of State aircraft within the RVSM airspace are in particular the validation of height-keeping performance requirements for derivative aircraft types and the necessity for an RVSM approval to be issued by the appropriate State airworthiness authority.

This document is intended to provide guidelines for the operation of State aircraft flying within European RVSM airspace. State aircraft operators need to take account of the following:

- There is no exemption for State aircraft operating as GAT within RVSM airspace. In that airspace, aircraft need an RVSM approval to operate in accordance with a 1000 ft vertical separation minimum. The absence of such approval does not mean that State aircraft cannot access RVSM-designated airspace, but it does require specific flight planning in order to operate with a 2000 ft separation as specified in ICAO Doc 7030 [RD 6] and the EUROCONTROL NM IFPS Users Manual [RD 7]¹.
- Any previously approved aircraft that is modified for specific functions (e.g. fuselage modifications or add-ons) is considered as a derivative aircraft and must undergo RVSM altimetry system performance validation.
- Formation flights are not permitted within RVSM airspace with a 1000 ft vertical separation minimum.
- Ensure their crews are trained on RVSM flight planning and procedures.

State aircraft competent authorities need to take account:

- The need to forward RVSM approval information to the European RMA.
- The need to participate to the European RMA technical height keeping performance monitoring programme.

This EUROCONTROL Guidelines document supersedes the EUROCONTROL published "Guidance material for the certification and operation of State aircraft in European RVSM airspace" published in 2021 (edition 3.0).

¹ FPL procedures evolve with introduction of advanced processes (FF-ICE) which will trigger updates to this guideline in due time.

1 Introduction

1.1 Background

Reduced Vertical Separation Minimum (RVSM) was introduced in the European Civil Aviation Conference (ECAC) region in January 2002. It introduced an additional six flight levels between flight level (FL 290 and FL 410 by reducing the vertical separation between those flight levels from 2000 ft to 1000 ft.

As the risk of collision is inherently greater in an RVSM environment, stringent aircraft height-keeping performance requirements were introduced to maintain the level of risk within acceptable limits. The aircraft height-keeping performance requirements were embodied in standards known as Minimum Aircraft System Performance Specifications (MASPS)².

Since 2011 the entire airspace between FL 290 and FL 410 of the International Civil Aviation (ICAO) European Air Navigation Region is RVSM. This means that all operators wishing to file an ICAO flight plan between these flight levels must make use of aircraft that have an RVSM approval.

The European Regional Monitoring Agency (EUR RMA), operated by EUROCONTROL on behalf of the ICAO European Region Aviation System Planning Group, is tasked with the safety oversight of operations within the European portion of RVSM airspace within the ICAO European Air Navigation Region. This is referred to as EUR RVSM airspace. The RMA conducts an annual safety assessment, monitors aircraft height-keeping performance and also verifies the RVSM approval status of aircraft operating in RVSM airspace. The monitoring of the performance of the airborne altimetry is also part of the network function tasks covered by Regulation (EU) 2019/123 of 24 January 2019.

One of the greatest risks to safety within RVSM airspace is the operation of an aircraft declared as RVSM-approved when in reality the aircraft does not meet the technical performance criteria as defined in the MASPS. State aircraft operating as RVSM-approved without a known technical compliance method, often airframe derivatives (e.g. fuselage modifications, or add-ons, or varying external payloads), whose height-keeping performance characteristics are not proven to be similar to the original design, raise significant safety concerns.

1.2 Purpose of the document

This document is intended to provide guidance to national military authorities on the certification/operational approvals of new aircraft types and variants, the reporting of RVSM approvals, RVSM flight planning and operations, and the remedial actions in the event of a poor altimetry system error (ASE) report submitted by the RMA.

This EUROCONTROL Guidelines document supersedes the EUROCONTROL published “Guidance material for the certification and operation of State aircraft in European RVSM airspace” published in 2021 (edition 3.0).

² The requirements for the certification and operation of RVSM aircraft are contained in a number of ICAO Annexes and other guidance material. The standards addressed in this document are referenced in section 1.7.

1.3 EUROCONTROL Guidelines

EUROCONTROL guidelines, as defined in EUROCONTROL Regulatory and Advisory Framework

(ERAF), are advisory materials and contain:

“Any information or provisions for physical characteristic, configuration, material, performance, personnel or procedure, the use of which is recognised as contributing to the establishment and operation of safe and efficient systems and services related to ATM in the EUROCONTROL Member States.”

Therefore, the application of EUROCONTROL guidelines document is not mandatory.

In addition, EUROCONTROL Regulatory and Advisory Framework specifies that:

“EUROCONTROL Guidelines may be used, inter alia, to support implementation and operation of ATM systems and services, and to:

- *complement EUROCONTROL Rules and Specifications;*
- *complement ICAO Recommended Practices and Procedures;*
- *complement EC legislation;*
- *indicate harmonisation targets for ATM Procedures;*
- *encourage the application of best practice;*
- *provide detailed procedural information.”*

1.4 Scope of the document

This document compiles applicable requirements and best practices for the operation of aircraft in RVSM airspace in the International Civil Aviation (ICAO) European (EUR) region. In particular, it includes the specific flight planning and operational requirements applicable to state aircraft.

The material in this document is applicable to state aircraft operating with a 1000 ft vertical separation in RVSM airspace and also describes the flight plan procedures for non-RVSM approved State aircraft operating within RVSM airspace with a 2000 ft vertical separation.

1.5 Applicability

These guidelines are intended to be used by:

- State aircraft operators
- National competent authorities responsible and overseeing the approval of state aircraft
- Air navigation service providers
- European RMA

1.6 Conventions

The following conventions are used in this EUROCONTROL Guidelines:

- 1) Guidelines using the operative verb **shall** indicate that they must be implemented to achieve the minimum objectives of this guidance material.
- 2) Guidelines using the operative verb **should** indicate that they are recommended to achieve the best possible implementation of this guidance material.
- 3) Guidelines using the operative verb **may** indicate options.

Keywords are highlighted in the requirement text using **bold** as shown above.

The specific guidance developed for the purpose of this document is identifiable by the prefix **SA-RVSM-GM_x**, where **x** is a numerical value.

Referenced documents are listed in section 1.11 and are identifiable by [RD x], where x is a numerical value.

1.7 North Atlantic Tracks

The North Atlantic Tracks (FL285 - FL420) are outside of the scope of this document, but it is also an area of interest, with many aircraft flying between Europe and North America.

RVSM operations are also applicable in NAT, and for the non-approved RVSM aircraft, special arrangements are defined in NAT Doc. 007:

To Climb/Descend Through RVSM Levels

NAT HLA approved aircraft that are not approved for RVSM operation will be permitted, subject to traffic, to climb/descend through RVSM levels in order to attain cruising levels above or below RVSM airspace. Flights should climb/descend continuously through the RVSM levels without stopping at any intermediate level and should “Report leaving” current level and “Report reaching” cleared level.

Such aircraft are also permitted to flight plan and operate at FL 430 either Eastbound or Westbound above the NAT HLA.

To Operate at RVSM Levels

ATC may provide special approval for a NAT HLA approved aircraft that is not approved for RVSM operation to fly in the NAT HLA provided that the aircraft:

- a) is on a delivery flight; or
- b) was RVSM approved but has suffered an equipment failure and is being returned to its base for repair and/or re-approval; or
- c) is on a mercy or humanitarian flight.

For further details about how to fill the flight plan and the required times to ask for a permission to fly in RVSM airspace, see NAT Doc. 007 [RD 8].

1.8 RVSM in North Atlantic Central Monitoring Agency (NAT CMA) - Norway, Iceland, Ireland, Portugal and Bermuda

The North Atlantic Central Monitoring Agency (NAT CMA) supports the preparation and introduction of RVSM in the North Atlantic Region, and thereafter to provide data-based assurance of continuing system safety and integrity.

The CMA is one of thirteen Regional Monitoring Agencies (RMAs) around the world which serve their ICAO Planning and Implementation Regional Groups, their associated States, ANSPs and aircraft operators. Currently the CMA maintains State Registration and Operational Approval records for aircraft registered in five designated States (Norway, Iceland, Ireland, Portugal and Bermuda), Operational Approvals granted by other States for aircraft registered in these five States, and assists those States in overseeing operator compliance with height monitoring targets in accordance with ICAO Annex 6 (Operation of Aircraft) requirements. It supports the RMA community by maintaining a combined database of aircraft registration, operators and RVSM Approvals incorporating regular revisions of data from other RMAs into a common system.

NATCMA has established and maintains an RVSM Approvals database for the following State Authorities for which it is the designated RMA:

- Bermuda
- Iceland
- Ireland
- Norway
- Portugal

These State authorities are required to notify the NATCMA when they issue an approval, or an amendment to an approval, or the withdrawal of approval of an operator/aircraft for operations within RVSM Airspace. This can be done in one of two ways:

1. If State Authorities have their own database of approvals information they can provide the NATCMA with an Excel or csv file containing RVSM Approval information for all aircraft on their register. This file should contain all the fields listed on the RVSM Approval form and should be emailed to the NATCMA on a monthly basis.
2. Alternatively the information can be submitted through the website (<https://nadcma.com/rvsm-approvals/>) on an F2 or F3 form.

RVSM Approvals verification

The NATCMA is responsible for verifying the approval status of all aircraft operating within the NAT, not just for the 5 states that are designated to the NATCMA. To achieve this, the NATCMA combines its RVSM approvals database with the RVSM Approvals databases of the other RMA's across the world to have a single combined RVSM Approvals database.

This combined database is then used to verify that all aircraft operating within NAT MNPS airspace at an RVSM level are authorised to do so. If any aircraft are found to be operating in the NAT and not with the relevant approval then the relevant RMA or State authority will be notified and asked to take the necessary follow-up action with the operator.

1.9 Abbreviations and acronyms

Abbreviation	Description
ADEXP	ATS Data Exchange Presentation
AMC	Acceptable Means of Compliance
ASE	Altimetry System Error
B2B	Business-to-Business
CS	Certification Specification
DoD	Department of Defence
EANPG	European Air Navigation Planning Group
EASA	European Aviation Safety Agency
EC	European Commission
ECAC	European Civil Aviation Conference
EUR	European
FAA	Federal Aviation Authority
FMS	Flight Management System
GAT	General Air Traffic
GMU	GPS Monitoring Unit
GPS	Global Positioning System
HMU	Height Monitoring Unit
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
MAA	Military Aviation Authority
MASPS	Minimum Aircraft System Performance Specification
MEL	Minimum Equipment List
MMEL	Master Minimum Equipment List
NAS	National Airspace System
OAT	Operational Air Traffic
OEM	Original Equipment Manufacturer
PBCS	Performance-Based Communication and Surveillance
RCO	RVSM Coordination Officer
RCP	Required Communication Performance
RMA	Regional Monitoring Agency
RSP	Required Surveillance Performance

RVSM	Reduced Vertical Separation Minimum
SARPS	Standards and Recommended Practices
SB	Service Bulletin
SES	Single European Sky
SSE	Static Source Error
SSEC	Static Source Error Correction
STC	Supplementary Type Certificate
TC	Type Certificate

1.10 Definitions

As indicated the below definitions are extracted from various sources and added for convenience.

Term	Definition	Source
Aberrant Aircraft	Aircraft which exhibit measured height-keeping performance that is significantly different from the core height-keeping performance measured for the whole population of aircraft operating in RVSM airspace.	ICAO Doc 9937
Altimetry System Error (ASE)	The difference between the altitude indicated by the altimeter display, assuming a correct altimeter barometric setting, and the pressure altitude corresponding to the undisturbed ambient pressure.	ICAO Annex 6
General Air Traffic (GAT)	Flights conducted in accordance with the rules and provisions of ICAO.	ICAO EUR Doc 009
Height-Keeping Performance	The observed performance of an aircraft with respect to adherence to a flight level.	ICAO EUR Doc 009
Non-Compliant Aircraft	An aircraft configured to comply with the requirements of the RVSM MASPS which, through height monitoring, is found to have a total vertical error (TVE) or an assigned altitude deviation (AAD) of 90 m (300 ft) or greater, or an altimetry system error (ASE) of 75 m (245 ft) or more.	ICAO Doc 9937
Non-Group Aircraft	An aircraft for which the operator applies for approval on the characteristics of the unique airframe rather than on a group basis.	EASA Notice of Proposed Amendment 2013-06
Operational Air Traffic (OAT)	Flights which do not comply with the provisions for GAT and which rules and procedures have been specified by appropriate authorities.	ICAO EUR Doc 034

RVSM Approval	<p>The approval to operate within RVSM-designated airspace with a 1000 ft vertical separation minimum, issued by the appropriate authority of the State in which the operator is based or of the State in which the aircraft is registered. To obtain such RVSM approval, operators must demonstrate to the said State that:</p> <ol style="list-style-type: none"> 1. aircraft for which 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 Specification (MASPS); 2. they have instituted procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; 3. they have instituted flight crew procedures for operations in the EUR RVSM airspace. 	ICAO Annex 6 Part II
State Aircraft ³	Aircraft used in military, customs, and police services shall be deemed to be state aircraft (Reference - ICAO Convention on International Civil Aviation, Article 3 (b)).	ICAO EUR Doc 034

1.11 Reference material

- [RD 1]** Commission Regulation (EU) No 965/2012 'laying down technical requirements and administrative procedures related to air operations' (October 2012 as amended). Available on eur-lex.europa.eu.
- [RD 2]** EASA. Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Annex V Specific approvals [Part-SPA] of Commission Regulation (EU) 965/2012 on air operations. March 1999. Available on www.easa.europa.eu.
- [RD 3]** EASA. Certification Specifications and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance (CS-ACNS). Issue 5 - May 2024. Available on www.easa.europa.eu.
- [RD 4]** ICAO. Annex 6⁴ Operation of Aircraft - Part I — International Commercial Air Transport — Aeroplanes. Twelfth Edition. July 2022.⁵
- [RD 5]** ICAO. Doc 9574 Manual on a 300 m (1000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive. Third Edition. 2012.
- [RD 6]** ICAO. Doc 7030 Regional Supplementary Procedures. Fifth Edition. 2008.
- [RD 7]** EUROCONTROL. IFPS Users Manual – Network Manager. Edition 27.0. 28/04/2023.
FAA Advisory Circular AC 91-85B. 29/01/2019
- [RD 8]** NAT Doc. 007 - North Atlantic operations and airspace manual – V.2024, Amd 4 (applicable from March 2024).

³ Unmanned aircraft systems (UAS) used in military, customs, and police services should be subject to the current guidelines when operating within RVSM airspace and same flight rules.

⁴ Although the ICAO Annexes are not obligatory requirements for State aircraft, it is recommended that operators satisfy these requirements to ensure the continued safe operation of RVSM

⁵ Same requirements are present in Annex 6 Operation of Aircraft - Part II — International General Aviation — Aeroplanes. Eleventh Edition. July 2022.

1.12 Document structure

This document is organised as follows:

Section 1 introduces this guidance material for the certification and operation of State aircraft in European RVSM airspace.

Section 2 describes the functioning of the European Regional Monitoring Agency.

Section 3 describes the European framework for aircraft RVSM certification.

Section 4 details specific guidance and operations of State aircraft in the European RVSM airspace.

Annex A presents general requirements for RVSM operations.

Annex B shows the template of the EUR RMA F1 (contact details for matters relating to RVSM approvals).

Annex C presents the template of the EUR RMA F2 (record of approval to operate in RVSM airspace or airspace performance).

Annex D shows the template of the EUR RMA F3 (withdrawal of approval to operate in RVSM or airspace performance).

Annex E describes notes to aid the completion of Forms F2 and F3.

Annex F describes the document update procedures.

Annex G list all the GMs mentioned in the document.

1.13 Maintenance of this document

These EUROCONTROL Guidelines have been developed under the EUROCONTROL Regulatory and Advisory Framework (ERAF) and are maintained by EUROCONTROL in accordance with this Framework and in line with the EUROCONTROL Standards Development Procedures. The procedures are described in detail in ANNEX F.

2 European Regional Monitoring Agency

2.1 Function

The European Regional Monitoring Agency was established by EUROCONTROL in 2003 at the request of the ICAO European Air Navigation Planning Group. The main responsibilities of the RMA are to conduct statistical safety assessments, monitor height-keeping performance and verify the approval status of aircraft operating with 1000 ft vertical separation in European RVSM airspace.

A network of Height Monitoring Unit (HMU) systems provides the data for the safety assessment and aircraft height-keeping performance, while the approval status is confirmed by comparing GAT/Instrument Flight Rules (IFR) flight plans with the database of aircraft approved for RVSM flights in Europe.

The height-keeping performance function can be further divided into a number of individual activities including:

1. Establish and maintain a list of RVSM monitoring groups defined by different compliance methods or height-keeping performance characteristics;
2. Monitor compliance with global and regional monitoring targets;
3. Conduct continuous monitoring group performance analysis; and,
4. Monitor individual airframe performance.

The RMA has developed proactive procedures to positively encourage safe operation and compliance with international requirements. However, the RMA cannot operate in isolation and it is necessary for aircraft operators and airworthiness authorities to ensure that approval records are accurate and that adequate procedures are in place to respond to concerns regarding height-keeping performance or compliance with monitoring targets.

The monitoring of the performance of the airborne altimetry became regulated as part of the execution of the network function tasks in Regulation (EU) 2019/123 of 24 January 2019.

2.2 RVSM Approval Status

Under its terms of reference, the RMA is obliged to maintain a database of RVSM approvals. Periodically the RMA compares samples of flight plan data where RVSM approval has been stated with the database of approvals. Any aircraft not listed in the database of approvals is considered non-approved and reported to the appropriate State authority. ICAO Annex 6 requires State authorities responsible for the issuing of RVSM approvals to establish provisions and procedures to ensure that appropriate action is taken in respect of operators and aircraft operating in RVSM airspace without a valid RVSM approval.

An RVSM approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate crew guidance.

2.3 Compliance with Monitoring Targets

Every operator of group-approved aircraft is required to participate in regional height-monitoring programmes. The ICAO global requirement⁶ states that every operator of RVSM group-approved aircraft is required to have a minimum of 2 aircraft of each monitoring group operated height-monitored either every 2 years or every 1000 flying hours, whichever is the greater.

The RMA maintains a table of regional minimum monitoring requirements which includes two main categories. The first category (category 1) is equivalent to the global monitoring requirement, i.e. operators of aircraft types contained in this category shall have a minimum of two airframes monitored every two years or 1,000 flight hours, whichever is longer, and is reserved for monitoring groups for which sufficient evidence exists that the RVSM MASPS is valid.

A second category (category 2) contains monitoring groups for which full verification of MASPS is incomplete. This includes new aircraft types with relatively little monitoring data and/or less than 2 years of stable ASE performance data. The RMA targets to monitor 60% of the operator fleet every two years. The types of aircraft are those constructed to standard design. Derivatives, or modified aircraft, may not be compatible with those groups listed.

The RMA conducts annual monitoring group performance reviews in cooperation with the United States Federal Aviation Administration (FAA) and recommends transfers of monitoring groups from the second category to the first where sufficient evidence exists to support final verification of the RVSM MASPS. Very occasionally, monitoring group performance deteriorates, and groups are sometimes moved back from category 1 to category 2. Any aircraft approved as a non-group aircraft (category 3) is required to be height-monitored every 2 years.

The RMA monitors operator compliance with global and regional monitoring requirements and submits reports on non-compliant operators to the competent State authorities. A summary of non-compliance with monitoring targets is included in the annual safety assessment. It is a State responsibility to ensure that operators comply with global and regional monitoring targets.

2.4 Height-keeping Performance

The database of RVSM approvals provides not only a reference when verifying the approval status of aircraft, but also allows height-keeping performance data to be correlated with individual airframes. Height-monitoring results include the aircraft address (ICAO 24-bit address) extracted from the aircraft downlinked parameters. This data provides a link to a known aircraft approval. If the RMA does not have the correct aircraft address, then the results cannot be correlated to a specific airframe.

If the global height-keeping performance requirements in a monitoring group are not fulfilled then the RMA contacts the manufacturer, or approved design organisation, as well as the authority responsible for the initial airworthiness approval in order to initiate an investigation.

With regard to individual airframe performance, the RMA has three categories of result: fully compliant, aberrant, or non-compliant. Should an aircraft be height-monitored and found to be non-compliant, the operator and appropriate State authority must be notified within 7 working days. Any subsequent action is the responsibility of the appropriate State authority; however, the

⁶ ICAO Annex 6.

RMA recommends an immediate investigation and inspection of the aircraft. The RMA can provide technical advice as well as height-monitoring data to support any investigation.

An aircraft that is aberrant either exhibits measured height-keeping performance that is significantly different from the core height-keeping performance measured for the whole population of aircraft operating in RVSM airspace or exhibits a performance trend that if continued will result in the aircraft becoming non-compliant. The RMA reviews all aberrant height-monitoring results on a monthly basis and determines which aircraft, if any, require additional investigation.

Whenever an RMA individual airframe height-keeping performance investigation is initiated, the competent authority should ensure that appropriate action is taken. This should include an initial acknowledgement followed by confirmation of what action is being taken to address the problem. Again, the RMA can provide technical advice as well as height-monitoring data to support any investigations⁷.

⁷ The responsibilities of the authorities involved in the RVSM monitoring process are described in the ICAO Doc 9574.

3 Aircraft Certification by European Authorities

3.1 MASPS and Performance Requirements

In Europe, the RVSM Minimum Aircraft Systems Performance Specifications are published under three separate documents from the European Union and EASA frameworks:

- Commission Regulation (EU) No 965/2012 laying down technical requirements and administrative procedures related to air operations [RD 1]
- EASA Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Annex V Specific approvals [Part-SPA] [RD 2].
 - Detailed operational requirements, namely the RVSM operational approvals.
- EASA Certification Specifications and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance (CS-ACNS) [RD 3].
 - Detailed technical requirements and airworthiness, namely:
 - RVSM performance;
 - Aircraft system;
 - Airworthiness approval;
 - Continued airworthiness.

State aircraft operators intending to fly aircraft with 1000 ft vertical separation in the EUR RVSM region must have a valid RVSM approval from the appropriate State authority. An RVSM approval has three components:

- The aircraft has a vertical navigation performance capability compliant with the criteria of the RVSM MASPS;
- The operator has instituted procedures related with continued airworthiness practices and programmes; and,
- The operator has instituted flight crew procedures and training for operation in EUR RVSM region.

The RVSM MASPS include requirements for continued airworthiness approval and long term ASE stability. Initial verification of the RVSM MASPS is considered part of the approval process. However, the final verification can only be made following confirmation that the continued airworthiness procedures are valid and ASE is stable.

All aircraft for which the RVSM MASPS have been verified using the same compliance method and which have similar height-keeping performance characteristics are considered to be in the same classification or monitoring group for performance evaluation. Subpart E of [RD 3], and Appendix 4 of [RD 4], define the altimetry system performance requirements that must be met by RVSM monitoring groups and individual non-group aircraft. Aircraft with an unique airframe and altimetry system fit are classified as non-group for the purposes of RVSM approval.

Individual airframes manufactured on the basis of a common compliance method (i.e. group aircraft) that has been evaluated for compliance with RVSM MASPS should not require additional performance evaluation prior to approval. However, authorities are still required to confirm that the initial certification is valid and to ensure that operator procedures for continued airworthiness and flight crew operations are correct before airworthiness or operational approval is granted.

The following should apply for an aircraft to be considered part of a monitoring group:

- The aircraft should be constructed to the same type certificate (TC), TC amendment or supplementary TC;
- Static source errors (SSE) and static source error corrections (SSEC) should be identical; and
- The avionics installed on each aircraft should comply with the same specification or at least be verified as demonstrating equivalent performance.

Any aircraft that does not meet these requirements must be individually approved, with particular emphasis on the evaluation of the altimetry system error characteristics of the aircraft throughout the flight envelope.

National Authorities should take additional steps to verify the ASE characteristics of derivative aircraft which have been ordered or modified for specific functions and which may include differences that prevent the aircraft from being included in an existing monitoring group. An aircraft originally classified as being part of a monitoring group may need to be re-classified if it is subject to any kind of modification that changes the ASE characteristics. Modifications or design changes to derivative aircraft that will require a re-evaluation of the ASE characteristic include:

- Additional external fittings that may alter the air flow over static ports or the attitude of the aircraft;
- Changes that may affect the SSE, requiring a review of SSECs;
- Changes to the flight envelope or weight characteristics; and
- Changes to avionics hardware and/or software.

It should be ensured that specifications for derivative aircraft clearly indicate whether the delivered aircraft are to be RVSM MASPS-compliant.

3.2 RVSM Approval

The RVSM approval process varies depending on whether the aircraft is a new build or already in service. For new builds, the manufacturer will submit to the competent authority in the State of manufacture the performance and analytical data supporting RVSM airworthiness approval of a defined build standard for approval.

In the case of an aircraft already in service, the manufacturer (or an approved design organisation) will submit to the competent authority in the State of manufacture or State of registry for approval the performance and analytical data supporting RVSM airworthiness approval of a defined build standard. In all cases, it is necessary for every authority issuing an RVSM approval to ensure that the initial type/derivative RVSM airworthiness approval has been completed.

If a one-off production run of a special variant is required, it is particularly important that the customer clearly indicates whether the variant is required to operate in RVSM airspace and which authority is to provide the initial airworthiness approval.

Before issuing an RVSM approval the competent authority should ensure that the RVSM approval data package is valid. As a minimum, the data package should consist of the following:

- A declaration of the aircraft RVSM MASPS compliance method and build standard, including the RVSM monitoring group to which the aircraft belongs (if any);

- A definition of the RVSM flight envelope;
- Performance and analytical data showing compliance with the RVSM requirements defined in the MASPS (RVSM performance criteria);
- Procedures to verify that all aircraft submitted for approval comply with RVSM criteria, including a reference to the applicable service bulletin (or equivalent) and amendments to the approved aircraft flight manual; and
- The maintenance instructions to ensure continued airworthiness for RVSM approval.

All the requirements of the approval authority should be met after verification of all the elements of the RVSM approval data package before an RVSM approval is issued.

3.3 Performance Data

3.3.1 Initial Performance Data Package

The RVSM approval data package should contain sufficient data to show compliance with the height-keeping performance criteria described in the [RD 3] (Subpart E) and [RD 4], across the entire operational flight envelope.

AMC1 ACNS.E.RVSM.035 (e) in [RD 3] describes four acceptable methods for precision flight calibration to quantify altimetry system performance. These are:

- Precision tracking radar;
- Trailing cone;
- Pacer aircraft; and
- Any other method acceptable to the competent authority.

Subpart E – Appendix B ([RD 3]) provides examples of methods establishing the static source errors which is a component of the altimetry system error.

3.3.2 Performance Monitoring

The European RMA operates three fixed, ground-based height monitoring units to support monitoring in European airspace. These three European height monitoring systems are deployed at the following locations:

- Geneva in Switzerland - 46°21'49"N, 005°55'34"E (near GVA VOR)
- Linz in Austria - 48°12'08"N, 014°17'35"E (near LNZ VOR)
- Nattenheim⁸ in Germany - 49°56'45"N, 006°33'25"E (near NTM VOR)

The height monitoring units use multilateration techniques to determine aircraft geometric height, which is then compared to the geometric height of the flight level as estimated by computer models which process meteorological data supplied by the UK Meteorological Office. The introduction of ADS-B technique (for aircraft installed with ADS-B version 2 or higher) is foreseen in order to enhance the ground monitoring network.

⁸ In accordance with AIP ENR 1.3-1, as published by the German Authorities on 28th February 2019, aircraft operators are required to submit a PPR at least three (3) hours in advance if they intend to fly an aircraft over the Nattenheim HMU specifically for RVSM monitoring purposes.

Any aircraft transmitting a Mode A code, or ICAO 24-bit aircraft identifier, flying between FL 290 and FL 410 within the operational coverage area of the HMUs will be detected by the HMU systems⁹.

The HMU systems are highly accurate but sensitive to external influences, particularly errors in meteorological forecasts and flight characteristics. The RMA conducts a number of quality control checks, both on the system itself and the height-keeping performance data generated by the HMU systems. Moreover, these systems provide large amounts of height-keeping performance results, which are the primary source of data for the annual statistical safety assessment.

However, the EUR RMA does not provide height monitoring results directly to the operators and data only include results from the European monitoring programme captured within the last 2 years.

A list of RVSM height monitoring groups and minimum monitoring requirements is prepared and made available by the EUR RMA¹⁰.

3.3.3 Performance-Based Communication and Surveillance

The Performance-Based Communication and Surveillance (PBCS) concept, as described in the ICAO Doc 9869, defines that the regional PBCS monitoring programme should coordinate, as necessary, with other regional monitoring programmes, such as those established for monitoring RVSM.

Moreover, the State of the Operator or State of Registry should establish a means to verify that aircraft operators filing PBCS capabilities in the flight plan are authorised, as appropriate, being that the operational approval status is maintained by regional monitoring programmes for reduced vertical separation minimum and performance-based horizontal separation minima.

PBCS offers a framework for managing communication and surveillance performance in accordance with globally accepted required communication performance (RCP) and required surveillance performance (RSP) specifications, which allocate criteria to ATS provision, including communication services, aircraft capability, and the aircraft operator. The PBCS provides air traffic services providers with some level of assurance that the aircraft and flight crew meet the communication and surveillance requirements needed for the application of the performance-based separation standards.

The association of information related to the PBCS and RVSM monitoring is translated into the aircraft approval information provided to the EUR RMA (EUR RMA Form F2 in ANNEX C).

⁹ The coverage of each HMU has a radius of 45 NM. The HMU location charts can be consulted on EUROCONTROL's website – European RMA webpage.

¹⁰ Information that can be found on the RMA webpage on EUROCONTROL website (www.eurocontrol.int).

4 Guidance and Recommendations

4.1 RVSM Technical and Operational Requirements

The regulatory framework on RVSM is substantiated by the Commission Regulation (EU) No 965/2012 of 05 October 2012 [RD 1] supported by the EASA documents Part-SPA [RD 2] and CS-ACNS [RD 3], which cover the RVSM technical and operational requirements.

Some State aircraft may fulfil the performance requirements, but their system does not fulfil some specific aircraft system requirements set out in the civil regulatory framework.

For example, modern military fighters are fitted with a type of altimetry system, often using multiple static and dynamic pressure sources connected to redundant pressure calculators, which is of a different nature from the civil commercial aircraft independent altitude measurement systems. The apparent lack of redundancy may be a safety issue if it creates a non-mitigated risk. Moreover, their height-measuring performance may be strongly influenced by the aircraft external carriage configuration, which may limit the approved aircraft configurations.

In such cases, the operator must prove that the certified altitude measurement system is compliant with SPA.RVSM.110 (a)¹¹ of [RD 1] (level of the Implementing Rule) and it could be specified by a certification specification different from the CS-ACNS (non-binding). Military authorities (or other national authorities that certify military aircraft) willing to issue an RVSM approval for such aircraft types have to demonstrate that the technical fit of the aircraft is fully compliant with the ICAO provisions and that this aircraft type does not hamper the level of safety in the RVSM airspace.¹²

It must also be noted that RVSM approval is not restricted to a specific region or airspace as the aircraft requirements are global. Aircraft that have been approved for RVSM can operate in RVSM airspace worldwide. For North America, as well as for European aircraft, FAA published Advisory Circular AC 91-85B [RD 8] on authorisation of aircraft and operators for flight in reduced vertical separation minimum airspace.

4.2 Coordination with the EUR RMA

State aircraft operators willing to fly RVSM operations with the 1000 ft vertical separation minimum in RVSM airspace must comply with a set of procedures in order to maintain the level of safety in RVSM airspace.¹³

SA-RVSM-GM1: State aircraft operators **shall**:

- Have RVSM operational approval from the competent authority to fly RVSM operations.
- Be based on evidence from the competent technical authority of the compliance to the RVSM requirements.

SA-RVSM-GM2: State aircraft operators **should** provide the EUR RMA FORM 2 (ANNEX C) to the EUR RMA to declare approved aircraft prior to RVSM operations.

SA-RVSM-GM3: State aircraft operators **shall** ensure consistency between the RVSM approval status of the aircraft and the flight plan filed by the crew.

¹¹ Equivalent level of requirements can be found in CS ACNS.E.RVSM.005 (a) of [RD 3].

¹² In that case, it is recommended to publish a dedicated RVSM approval data package, as defined in the Book 2 – AMC1 ACNS.A.GEN.010 (b) section of [RD 3].

¹³ Without prejudice to the possibility to fly within RVSM airspace with 2000 ft separation, if filling the flight plan as regards non-RVSM-approved aircraft.

SA-RVSM-GM4: State aircraft operators **should** actively participate in the EUR RMA monitoring programme and comply with its requirements.

SA-RVSM-GM5: The Competent Authority for the State aircraft¹⁴ shall nominate a national RVSM Coordination Officer¹⁵ to the EUR RMA¹⁶ as focal point for RVSM approval issues and to resolve monitoring or safety issues that **may** occur while operating in RVSM airspace. EUR RMA FORM 1 (ANNEX B) is to be used to nominate this coordinating officer.

SA-RVSM-GM6: For RVSM operations, the aircraft address **should:**

- Not be different than the one provided to the EUR RMA.
- Not rotate¹⁷ within RVSM airspace when operating GAT/IFR the aircraft addresses
- Remain unique and unchanged for each aircraft.

SA-RVSM-GM7: The State aircraft operator **should:**

- Ensure that appropriate action is taken when informed by the EUR RMA of a non-approved aircraft in the RVSM airspace by the RMA.
- Include an initial acknowledgement followed by confirmation of the approval status of the aircraft in question.

If the aircraft holds a valid approval, then this information, including date of issue of the RVSM operational approval, **shall** be provided to the RMA as soon as possible so that the database¹⁸ of approvals maintained in the RMA can be updated; no further action would then be required.

SA-RVSM-GM8: The Competent Authority for the State aircraft provides the coordination between State aircraft operators and the EUR RMA with regard to safety issues that occur while State aircraft are operating in the EUR RVSM region.

SA-RVSM-GM9: The Civil-Military Coordination Division (CMC) in EUROCONTROL **should** assist Military Aviation Authorities and the EUR RMA in administrative and technical issues if requested by these entities.

The following sections provide guidance material to help the military to comply with the practices described above.

4.2.1 RVSM Approval Database

The document [RD 5] requires State authorities to also maintain a database of RVSM approvals. In order to reduce workload and enable RMA resources to be most efficiently utilised, it is important that all aircraft operators ensure that this database is regularly updated and available to the RMA in the most practical way possible.

To minimise workload and enable the RMA to best support the States, relevant authorities shall ensure that valid contact information and regular updates to approval records are provided to the RMA. This includes de-registrations and withdrawals of approval as well as new approvals. EUR

¹⁴ Often Military Aviation Authority (MAA).

¹⁵ The State authorities are requested to nominate as far as practicable a single RVSM coordination officer (RCO). If internal national organisation requires more than one RCO, the EUR RMA must be informed of the list of aircraft or aircraft types each RCO is responsible for as well as its area of responsibility (e.g. approval process, monitoring, or safety) if split, when submitting the EUR RMA FORM F1.

¹⁶ The EUR RMA should involve the RVSM military officer in EUROCONTROL/CMC when reporting safety issues that occur while State aircraft operating in the EUR RVSM region and make available the RVSM approvals provided by State aircraft operators if necessary.

¹⁷ State aircraft authorities sometimes rotate aircraft addresses for operational reasons, but because of the role of the aircraft addresses in the statistical accuracy of the RVSM monitoring function, it is expected to meet as much as practicable Annex 10 volume III - Appendix to chapter 9 - 5.2 c) SARPS.

¹⁸ The responsibility to issue certification and operational approval resides with National Authorities. The data base mentioned in GM-7 refers only to the information used at the level of RMA. Data bases of operational approvals maintained locally are managed by the aircraft operators as the entities responsible for the operational use of individual aircraft (whereas the Airworthiness Authorities are responsible for the design and certification of a fleet).

RMA Form 2 (ANNEX C) must be filled in and sent to the EUR RMA to declare approved aircraft prior to RVSM operations.

In relation to new aircraft types or variants, airworthiness authorities should provide details of any new RVSM MASPS compliance methods, including Supplementary Type Certificates (STCs) and service bulletins, to the RMA so that any adjustments required can be made to the monitoring group configuration. If it is not possible to determine the compliance method and hence the correct monitoring group from the approval data, the aircraft must be classified as non-group and subject to mandatory height monitoring every two years.

4.2.2 Monitoring Programme and Maintenance of the RVSM Approval Database

The monitoring programme defines three categories with two different monitoring approval methods and requirements.

A newly approved aircraft type starts in category 2 and may be upgraded to category 1 by a decision of the EUR RMA once a sufficient number of aircraft have been monitored and have generated a high level of confidence in the group monitoring data.

MONITORING IS REQUIRED IN ACCORDANCE WITH THIS TABLE		
NOTE: MONITORING PRIOR TO THE ISSUE OF RVSM APPROVAL IS <u>NOT</u> A REQUIREMENT		
	Category¹⁹	Minimum monitoring requirement
1	Group approved: monitoring data indicates compliance with the RVSM MASPS	A minimum of 10% or two airframes from each fleet of an operator to be monitored, whichever is the greater Monitored every 2 years or 1000 flying hours, whichever is the greater
2	Group approved: insufficient monitoring data on approved aircraft	60% of airframes (round up if fractional) from each fleet of an operator or individual monitoring Monitored every 2 years or 1000 flying hours, whichever is the greater
3	Non-group	100% of aircraft shall be monitored Monitored every 2 years

Table 1. Minimum monitoring requirements per aircraft category.

For category 2, it is acceptable that a minimum of two airframes are monitored, providing that this applies to each configuration and separately to all design variations constructed to different STCs.

Category 3 only applies to aircraft constructed to unique design specifications and so, in practice, will rarely involve more than one or two airframes. If multiple airframes are constructed to the same design specification then a category 2 group will be defined and the two airframe rule will apply.

¹⁹ For questions regarding categories, contact EUR RMA at EurRMA.Support@eurocontrol.int.

The Competent Authority for the State aircraft should ensure that appropriate action is taken when informed of a non-approved aircraft in the RVSM airspace by the RMA. This should include an initial acknowledgement followed by confirmation of the approval status of the aircraft in question. If the aircraft holds a valid approval, then this information, including date of issue of the RVSM approval, should be provided to the RMA as soon as possible so that the database of approvals can be updated; no further action would then be required.

If an aircraft is found to be operating without an approval, the Competent Authority for the State aircraft must be notified and the operator should immediately be instructed to stop flying RVSM. An investigation should be initiated by the competent authority into the circumstances surrounding the breach of flight rules. Any action resulting from the investigation is the responsibility of the approval authority. The RMA includes a summary report regarding operations by non-approved aircraft in the annual safety assessment.

It should be noted that a bulletin of non-approved aircraft is now published by the EUR RMA, for the benefit of States within the EUR RVSM region. States monitoring the bulletin may take action to restrict operations within their airspace for non-approved aircraft listed on the bulletin. This bulletin includes State aircraft.

Figure 1 shows a flowchart of recommended action upon receipt of a report of possible non-approved aircraft operating with 1000 ft vertical separation in RVSM airspace.

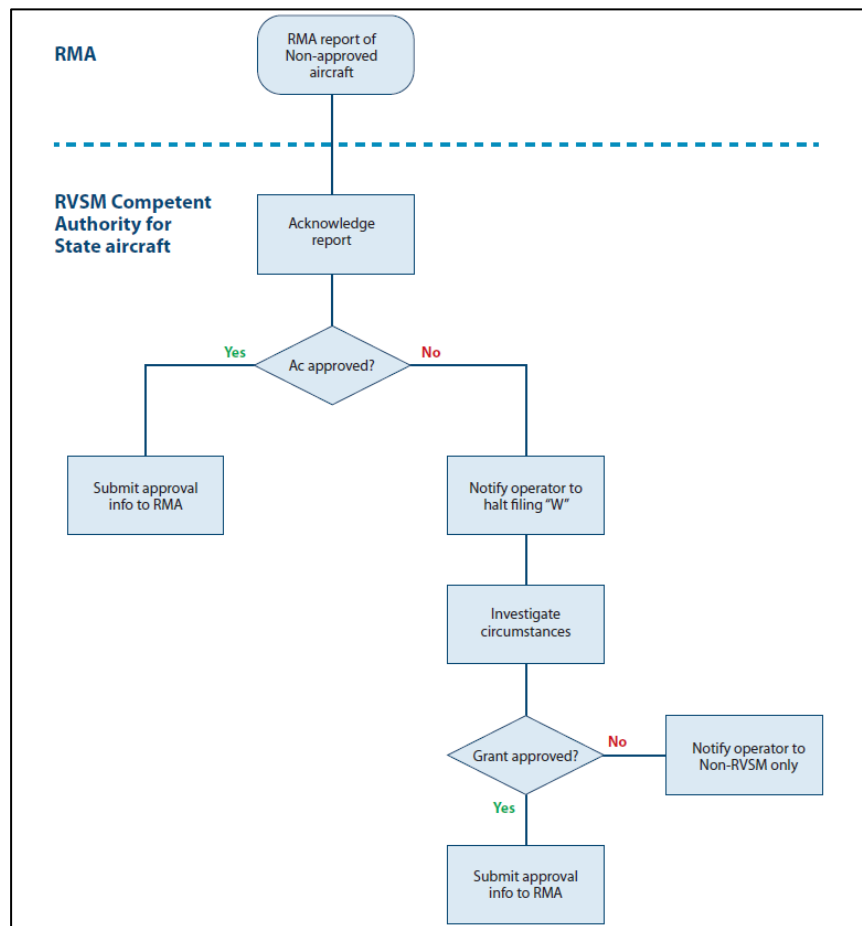


Figure 1. Action upon receipt of a report of non-approved aircraft in EUR RVSM airspace.

4.3 Flight Planning

4.3.1 General Procedures

All flight planning requirements for the European RVSM region are contained in [RD 6]²⁰. Flight planning for RVSM airspace must be clear and unequivocal:

SA-RVSM-GM10: Only operators and aircraft with a valid RVSM approval **may** submit a flight plan requesting 1000 ft vertical separation in RVSM airspace.

SA-RVSM-GM11: State aircraft which are not RVSM-compliant **may** file a flight plan to fly inside RVSM airspace with 2000 ft vertical separation.

SA-RVSM-GM12: No formation flights are permitted to operate with 1000 ft vertical separation in RVSM airspace.

Despite the RVSM status of an aircraft, the separation for a **formation flight** in RVSM airspace is always as outside RVSM airspace: 2000 ft.

According to ICAO Doc 7030, within the RVSM airspace, the vertical separation minimum shall be:

- a) 300 m (1.000 ft) between RVSM-approved aircraft
- b) 600 m (2.000 ft) between:
 - 1) Non-RVSM-approved State aircraft and any other aircraft operating within RVSM airspace;
 - 2) All formation flights of State aircraft and any other aircraft operating within RVSM airspace; and
 - 3) Non-RVSM-approved aircraft and any other aircraft operating within the airspace designated in accordance with 9.7.1.1 from ICAO Doc. 7030.

SA-RVSM-GM13: State aircraft operators **shall** insert the aircraft identification in Item 7 of the ICAO flight plan following the guidance contained in the EUROCONTROL NM IFPS Users Manual [RD 7].

4.3.2 Flight Planning for State Aircraft

State aircraft filing GAT flight plans in RVSM airspace fall into one of three categories: RVSM-approved, non-RVSM approved and formation flights [RD 7]²¹.

RVSM-Approved State Aircraft:

SA-RVSM-GM14: Operators of RVSM-approved aircraft **shall** list a 'W' in item 10 of the ICAO flight plan, regardless of flight level and the requested flight plan, and in addition indicate the registration in item 18 of the ICAO flight plan under REG/ (or the equivalent field in ADEXP or B2B).

Non-RVSM Approved State Aircraft:

SA-RVSM-GM15: Operators of non-RVSM approved aircraft wishing to operate in RVSM airspace **shall** submit an "M" in item 8 of the ICAO flight plan, and in addition "STS/NONRVSM" in item 18. No "W" **shall** be submitted. These aircraft will be provided with 2000 ft vertical separation.

²⁰ Any changes to this document will take precedence over the present guidelines.

²¹ Any changes to this document will take precedence over the present guidelines.

State Formation Flights:

SA-RVSM-GM16: Regardless of the RVSM approval status of any individual aircraft, no “W” shall:

- Be submitted for any flight plan relating to formation flights.
- Include an “M” in item 8 of the ICAO flight plan, and in addition “STS/NONRVSM” in item 18.

A flowchart indicating the flight planning and separation minima for State aircraft is contained in Figure 2.

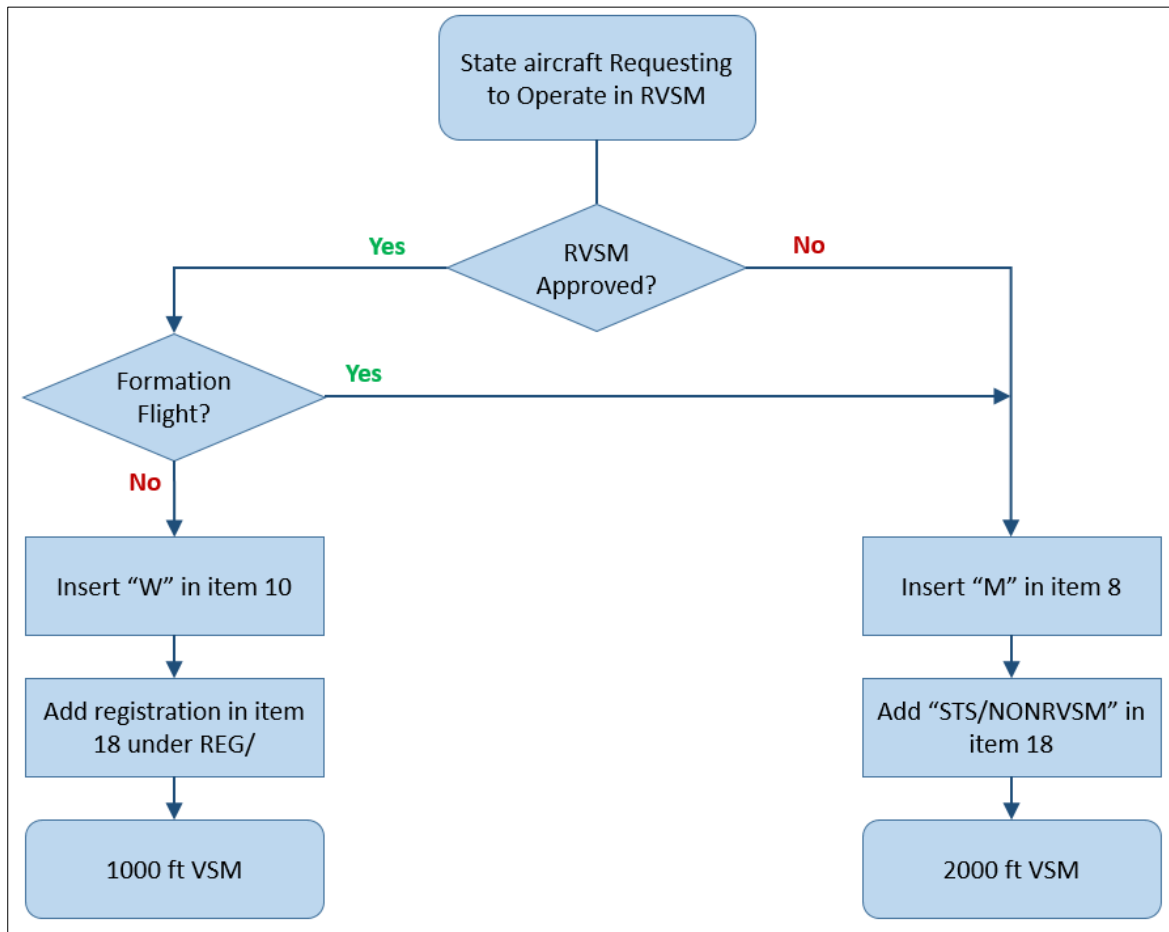


Figure 2. Flight planning requirements for State aircraft in EUR RVSM airspace.

4.3.3 Action with non-RVSM Approved Aircraft

In the event that a State aircraft is to be operated with a 1,000 ft. vertical separation in RVSM airspace, it is important to verify that it does not constitute a risk to civilian aircraft. States are therefore strongly encouraged to issue RVSM approvals for these aircraft. Non-RVSM State aircraft are still able to operate in RVSM airspace, with a 2,000 ft. vertical separation minimum. The EUR RMA audits the status of State aircraft operating as RVSM approved in the same way that it does civil aircraft.

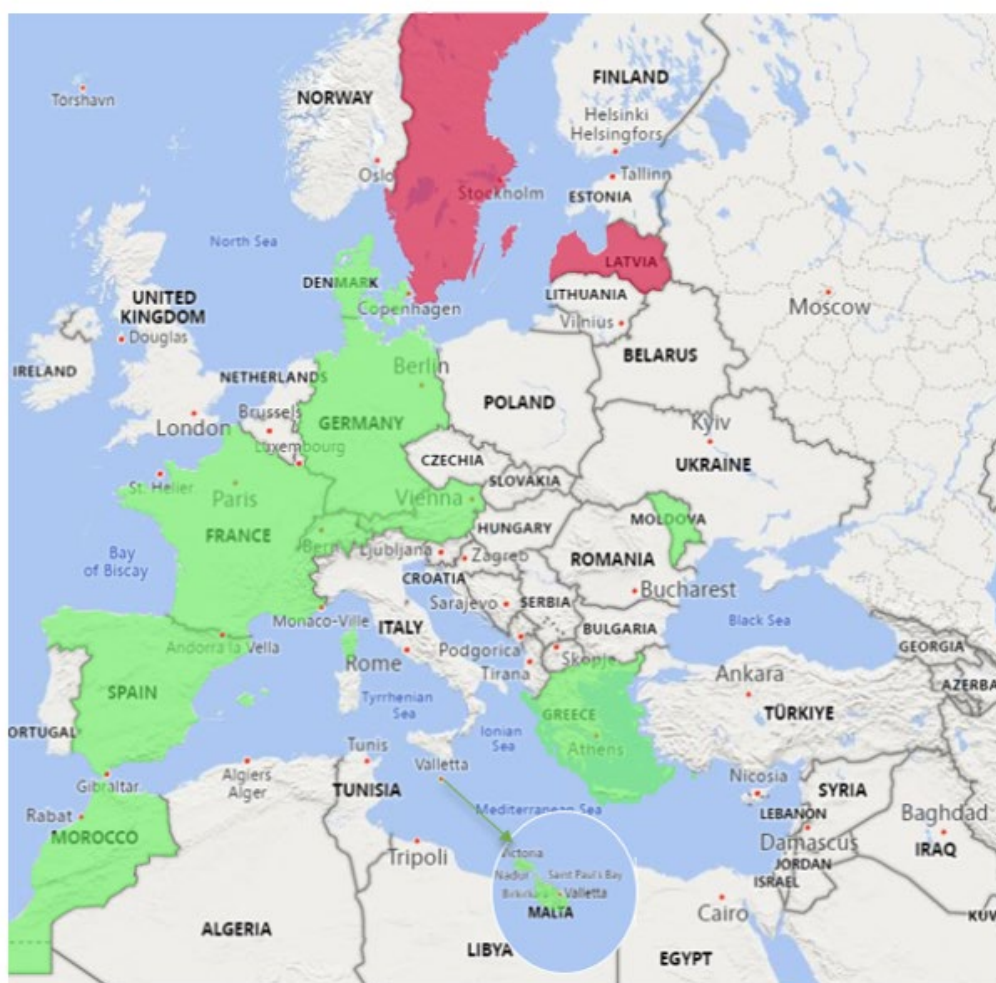
The EUR RMA conducts quarterly audits of flight plans to identify aircraft operating as RVSM approved, when no formal approval has been published. Following a coordinated investigation with the appropriate authorities, any aircraft found to be continuing to operate without an approval, is included on the EUR RMA Bulletin of non-RVSM approved aircraft operating in RVSM airspace, with a 1,000 ft. vertical separation minimum.

Aircraft listed on the EUR RMA Bulletin for more than 2 months are included on the RVSM European Restriction List (ERL)²². The ERL is embedded in the EUROCONTROL Integrated Initial Flight Plan Processing System (IFPS). Any aircraft listed on the ERL, including clearly identifiable State aircraft, will have their initial flight plan submissions rejected if they request clearance into the RVSM airspace of any participating State. Operators can file manual flight plans, providing a verbal declaration of RVSM approval status to obtain a clearance, however, the veracity of these declarations will be followed up by the EUR RMA.

The area covered by the RVSM ERL is detailed below in green in Figure 1. Those areas in red are States which have specifically requested not to be included. States retain the right to exempt their own aircraft from inclusion within this scheme.

Current RVSM ERL

● Positive reply to RVSM flight plan initiative ● Negative reply



²² The RVSM European List is to be shared by EUR RMA with EUROCONTROL/CMC's RVSM PoC whenever a State aircraft is part of such list.

4.4 Altimetry System Error

Altimetry system error is the difference between the altitude indicated by the altimeter display assuming a correct altimeter barometric setting and the pressure altitude corresponding to the undisturbed ambient pressure. Errors in measuring the ambient air pressure or converting this into the altitude readout are major sources of ASE.

The major concern with ASE is that it is in most circumstances invisible to pilots, ground controllers and other aircraft, so that any increased risk due to ASE cannot be mitigated operationally. To complicate matters, ASE is extremely difficult to measure in an operational environment.

4.4.1 Causes of ASE

The components of the altimetry system error are extensively described in Subpart E – Appendix A of [RD 3]. Investigations conducted by the RMA have highlighted a number of issues for airworthiness authorities. The issues of greatest concern to the RMA experts are the undetected rapid deterioration of ‘no life limit’ components, particularly modern integrated pitot/static probes, and the rapid rate of deterioration associated with them (up to 50 ft per month), as well as the inability of some in situ checks to adequately identify faults.

4.4.2 Resolving ASE Problems

Upon request, the RMA can provide a checklist for European operators and regulators to follow when trying to identify why an aircraft has an excessive ASE.

Not all of the following items will be required, although investigators should be aware that there may be more than one contributory factor:

- a. Is the approved maintenance programme compliant with the RVSM MASPS requirements?
- b. Are the aircraft minimum equipment list (MEL) and master minimum equipment list (MMEL) RVSM-compliant?
- c. Basic checks to ensure that an approved RVSM MASPS compliance method has been incorporated into the aircraft. The compliance method may be applicable to a single airframe or to a group of aircraft having the same or similar performance characteristics and equipment fit. MASPS compliance documents are typically service bulletins, supplemental type certificates, aircraft service changes, type certification compliant or similar regulator approved documents. MASPS compliance methods have been formulated to be in line with the requirements contained in EASA CS-ACNS [RD 3] or FAA AC91 RVSM.
- d. Is the data package submitted by the operator in full compliance with the requirements of in EASA CS-ACNS or the equivalent FAA document, AC 91-85, Authorization of Aircraft and Operators for Flight in RVSM?
- e. Has the airframe been modified since it was made MASPS-compliant?
- f. Are there added external devices in RVSM-sensitive areas which will change the airflow, resulting in high/low ASE?
- g. Is there a MASPS compliance document in the maintenance records along with a correct reference number?
- h. Have approved continuous maintenance programme requirements been logged into the maintenance records?

- i. Have all technical log items been resolved and all required SBs applied?
- j. Is the paint scheme to the required RVSM specifications?
- k. Have decals or company logos been applied to “sterile” areas of the fuselage?
- l. Are the pitot heads within the allowable tolerance range? (Requires test gauges).
- m. Is the radome correctly seated and secured to OEM standards?
- n. Do AoA vanes have correct and free movement?
- o. Has a pitot static leak test been done?
- p. Are the static vents rigged to the required settings?
- q. Does the FMS have the correct software version installed?

ANNEX A – General Requirements for RVSM Operations for State Aircraft

1. CERTIFICATION PHASE

- Technical work: compliance with RVSM MASPS, airworthiness issues;
- Crew proficiency: education, procedures and training;
- Authority: issuing of RVSM approvals, organisation of contacts with EUR RMA (PoCs).

2. RVSM OPERATIONS PHASE

- Authority:
 - Provide RVSM approvals to RMA, update list of approved aircraft;
 - Provide relevant information to EUR RMA as described in chapter 4.
- Operator:
 - Participate in monitoring programme
 - organise flights over HMUs;
 - collaborate with EUR RMA whenever necessary.
 - Maintain crew proficiency;
 - Maintain list of RVSM-approved aircraft / submit list to EUR RMA;
 - Maintain aircraft airworthiness in line with maintenance programme.
- Crews:
 - File flight plans as described in Figure 2;
 - Follow RVSM procedures.

ANNEX B – EUR RMA FORM F1

Note: The EUR RMA FORM F1 is herein presented for illustration purposes. The EUR RMA Reporting Forms can be downloaded from the EUR RMA's website.²³

CONTACT DETAILS FOR MATTERS RELATING TO RVSM APPROVALS

This form should be used to supply the contact information of people/positions responsible for coordinating RVSM information on behalf of their State with the EUR RMA.²⁴

A new form should be submitted whenever any of the required information changes. In the event that there are multiple contacts, please submit separate forms for each one. (PLEASE USE BLOCK LETTERS.)

Area of Responsibility: (delete as appropriate) RVSM
APPROVALS/AIRWORTHINESS/OPERATIONAL INCIDENT REPORTS/OTHER
(please specify).....

Name of State or Registry: ²⁵	
Post/Position: ²⁶	
Name:	
Address:	
Telephone Number:	
E-mail:	
Fax Number:	

Please send completed forms to the EUR RMA at the following e-mail address or fax number:

E-mail **EURRMA.support@eurocontrol.int**

Fax +32 27 29 51 85

²³ <https://www.eurocontrol.int/publication/rvsm-eur-rma-reporting-forms>

²⁴ The EUR RMA does not accept approval information directly from operators without supporting evidence from the appropriate State authority.

²⁵ States: Enter full name or one- or two-letter ICAO identifier as contained in the latest version of ICAO Doc. 7910

Operators: Enter the full operator name as contained in ICAO Doc. 8585 or full legal name.

²⁶ Indicate the full job title, unit.

ANNEX C – EUR RMA FORM F2

Note: The EUR RMA FORM F2 is herein presented for illustration purposes. The EUR RMA Reporting Forms can be downloaded from the EUR RMA's website.²⁷

RECORD OF APPROVAL TO OPERATE IN RVSM AIRSPACE OR AIRSPACE PERFORMANCE

APPROVAL NOTIFICATION BY AN OPERATOR MUST BE VALIDATED BY THE APPROPRIATE STATE AUTHORITY

This form must be completed and returned to the address below, without delay, when the State of Registry or State of the Operator approves or amends the approval of an operator/aircraft for RVSM and/or RCP240/RSP180 operations. (PLEASE USE BLOCK LETTERS.)

State of Registry ¹ :			
Name of Operator ² :			
State of Operator ¹ :			
Aircraft Type ³ :			
Aircraft Mark/Series ⁴ :			
Manufacturers Serial/Construction No:			
Registration:			
Aircraft Mode S Address Code ⁵ :			
Airworthiness Approval ⁶ :			
Date Airworthiness Approval Issued ⁷ :			
RVSM Approval ⁶ :			
Date RVSM Approval Issued ⁷ :			
Date of Expiry of RVSM Approval (if any) ⁷ :			
Date RCP240 Authorisation Issued ⁷ :			

²⁷ <https://www.eurocontrol.int/publication/rvsm-eur-rma-reporting-forms>

Date RSP180 Authorisation Issued ⁷ :							
Date of Expiry of RSP/RCP Approval (if any) ⁷ :							
Remarks ⁸ :							

Note: The superscript numbers are explained in ANNEX E.

Approvals from States accredited to the EUR RMA should be sent to:

E-mail **EURRMA.support@eurocontrol.int**

Fax +32 27 29 51 85

ANNEX D – EUR RMA FORM F3

Note: The EUR RMA FORM F2 is herein presented for illustration purposes. The EUR RMA Reporting Forms can be downloaded from the EUR RMA’s website²⁸.

WITHDRAWAL OF APPROVAL TO OPERATE IN RVSM OR AIRSPACE PERFORMANCE

NOTIFICATION BY AN OPERATOR MUST BE VALIDATED BY THE APPROPRIATE STATE AUTHORITY

This form must be completed and returned to the address below, by the most appropriate method, when the State of Registry or State of the Operator has cause to withdraw the approval of an operator/aircraft for operations within the RMA airspace. (PLEASE USE BLOCK LETTERS.)

State of Registry ¹ :			
Name of Operator ² :			
State of Operator ¹ :			
Aircraft Type ³ :			
Aircraft Mark/Series ⁴ :			
Manufacturers Serial/Construction No:			
Registration:			
Aircraft Mode S Address Code ⁵ :			
Date Airworthiness Approval Withdrawn ⁷ :			
Reason for Withdrawal of RVSM Approval ⁸ :			
Date RCP240/RSP180 Approval Withdrawn ⁷ :			
Reason for Withdrawal of RCP240/RSP180 Approval ⁸ :			
Remarks ⁸ :			

²⁸ <https://www.eurocontrol.int/publication/rvsm-eur-rma-reporting-forms>

Note: The superscript numbers are explained in ANNEX E.

When complete, the form should be sent to:

E-mail **EURRMA.support@eurocontrol.int**

Fax +32 27 29 51 85

ANNEX E – Notes to Aid Completion of Forms F2 and F3

EUR RMA FORM F2 – Record of Approval to Operate in RVSM or Airspace Performance-Based Separation Standards are Applied

Those recipients without electronic databases should complete an F2 form for **each aircraft** granted the appropriate Airworthiness/RVSM, RCP240 or RSP180 approval. The numbers below refer to the superscript numbers on the blank F2 form.

1. Enter the 2-letter ICAO identifier as per ICAO Doc 7910. In the event of there being more than one identifier for the same State, the one that appears first in the list should be used.
2. Enter the operator's 3-letter ICAO identifier as per ICAO Doc 8585. If **military**, write 'MIL' and put the name of the aircraft's unit in the 'Remarks' field. If IGA, write 'IGA' and put the name of the operator/owner in the 'Remarks' field.
3. Enter the ICAO designator as per ICAO Doc 8643 (e.g. B767-200 = B762).
4. Enter Mark or Series of aircraft type (e.g. 200).
5. Enter Aircraft Mode S address code in hexadecimal format.
(e.g. 0001 0010 0011 0100 1101 1111 is equivalent to 1234DF in hexadecimal.)
6. Enter Yes or No.
7. Enter in DD MM YY format (e.g. 24 01 18).
8. Use a separate sheet of paper if insufficient space available.

EUR RMA FORM F3 – Withdrawal of Approval to Operate in RVSM or Airspace Performance-Based Separation Standards are Applied

The above numbers also refer to those superscript numbers used in Form F3.

Withdrawal of approval (F3 forms) must be completed and forwarded to the EURRMA by the most expeditious means available and no later than the next business day after any withdrawal of RVSM and/or RCP240/RSP180 approval.

Databases

Recipients with large databases of approvals information are requested to send the information at the appropriate time intervals to the EURRMA by e-mail: eurrma.support@eurocontrol.int

ANNEX F – Document Update Procedures

It is necessary to periodically check this EUROCONTROL Guideline for consistency with referenced material. In addition, the content of these guidelines can evolve following feedback from implementation projects and field experience, as well as advances in technology.

The main objectives of a regular review are:

- a) to improve the quality of the guidance (e.g. clarity, testability, etc.);
- b) to verify that the level of detail published is adequate;
- c) to ensure that design-oriented requirements, imposing unnecessary constraints to technical solutions, have been avoided;
- d) to ensure that advances in technology are properly reflected;
- e) to make all stakeholders including industry aware of the latest developments.

The update of these guidelines is expected to be initiated by stakeholders directly or through specific EUROCONTROL working arrangements like the Civil-Military CNS Focus Group (CNS FG), the Military Harmonisation Group (MILHAG), the Military ATM Board (MAB) or the Joint CNS Stakeholder Platform (JCSP) (or its subgroups). Any stakeholder that wishes to request a change to these guidelines can submit a change request (CR) to the document editors (page 2) or the generic email address: standardisation@eurocontrol.int

The CR needs to provide following minimum elements:

- Originator information (name, Organisation, contact details);
- Guideline title, number and edition date;
- Page, chapter, section (subsection) where the issue appears;
- Description of the issue and reason for change;
- Specific change proposal text (incl. potential alternatives, if any).

Main steps towards a revised version:

- EUROCONTROL will assess each CR and consult relevant working arrangements (e.g. CNS FG, MILHAG, MAB, JCSP);
- The CR will be classified in terms of urgency and impact;
- A resolution proposal(s) will be prepared and, if needed, discussed with the originator;
- Agreed changes will be integrated into a revised version “Proposed Issue” including a summarised list of changes in the document record;
- The “Proposed Issue” will be consulted with relevant working arrangements (e.g. CNS FG, MILHAG, MAB, JCSP).

Note: Identified errors which may cause potential problems when implementing, may be corrected directly via separate “Corrigendum”.

The Agency will apply this process in an objective and impartial way and will consult stakeholders as needed and in line with the formal Standards Development Process.

ANNEX G – List of Guidance Material (GM)

GM	DESCRIPTION	STAKEHOLDER
SA-RVSM-GM1	State aircraft operators shall: <ul style="list-style-type: none"> • Have RVSM operational approval from the competent authority to fly RVSM operations. • Be based on evidence from the competent technical authority of the compliance to the RVSM requirements. 	State aircraft operators
SA-RVSM-GM2	State aircraft operators should provide the EUR RMA FORM 2 (Annex C) to the EUR RMA to declare approved aircraft prior to RVSM operations.	State aircraft operators
SA-RVSM-GM3	State aircraft operators shall ensure consistency between the RVSM approval status of the aircraft and the flight plan filed by the crew.	State aircraft operators
SA-RVSM-GM4	State aircraft operators should actively participate in the EUR RMA monitoring programme and comply with its requirements.	State aircraft operators
SA-RVSM-GM5	The Competent Authority for the State aircraft ²⁹ shall nominate a national RVSM Coordination Officer ³⁰ to the EUR RMA ³¹ as focal point for RVSM approval issues and to resolve monitoring or safety issues that may occur while operating in RVSM airspace. EUR RMA FORM 1 (Annex B) is to be used to nominate this coordinating officer.	Competent authority
SA-RVSM-GM6	For RVSM operations, the aircraft address should: <ul style="list-style-type: none"> • Not be different than the one provided to the EUR RMA. • Not rotate³² within RVSM airspace when operating GAT/IFR the aircraft addresses • Remain unique and unchanged for each aircraft. 	State aircraft operators
SA-RVSM-GM7	The State aircraft operator should : <ul style="list-style-type: none"> • Ensure that appropriate action is taken when informed by the EUR RMA of a non-approved aircraft in the RVSM airspace by the RMA. • Include an initial acknowledgement followed by confirmation of the approval status of the aircraft in question. 	State aircraft operators

²⁹ Often Military Aviation Authority (MAA).

³⁰ The State authorities are requested to nominate as far as practicable a single RVSM coordination officer (RCO). If internal national organisation requires more than one RCO, the EUR RMA must be informed of the list of aircraft or aircraft types each RCO is responsible for as well as its area of responsibility (e.g. approval process, monitoring, or safety) if split, when submitting the EUR RMA FORM F1.

³¹ The EUR RMA should involve the RVSM military officer in EUROCONTROL/CMC when reporting safety issues that occur while State aircraft operating in the EUR RVSM region and make available the RVSM approvals provided by State aircraft operators if necessary.

³² State aircraft authorities sometimes rotate aircraft addresses for operational reasons, but because of the role of the aircraft addresses in the statistical accuracy of the RVSM monitoring function, it is expected to meet as much as practicable Annex 10 volume III - Appendix to chapter 9 - 5.2 c) SARPS.

	If the aircraft holds a valid approval, then this information, including date of issue of the RVSM operational approval, shall be provided to the RMA as soon as possible so that the database ³³ of approvals maintained in the RMA can be updated; no further action would then be required.	
SA-RVSM-GM8	The Competent Authority for the State aircraft provides the coordination between State aircraft operators and the EUR RMA with regard to safety issues that occur while State aircraft operating in the EUR RVSM region.	Competent authority
SA-RVSM-GM9	The Civil-Military Coordination Division (CMC) in EUROCONTROL should assist Military Aviation Authorities and the EUR RMA in administrative and technical issues if requested by these entities.	CMC division in Eurocontrol
SA-RVSM-GM10	Only operators and aircraft with a valid RVSM approval may submit a flight plan requesting 1000 ft vertical separation in RVSM airspace.	State aircraft operators
SA-RVSM-GM11	State aircraft which are not RVSM-compliant may file a flight plan to fly inside RVSM airspace with 2000 ft vertical separation.	State aircraft operators
SA-RVSM-GM12	No formation flights are permitted to operate with 1000 ft vertical separation in RVSM airspace.	Competent authority
SA-RVSM-GM13	State aircraft operators shall insert the aircraft identification in Item 7 of the ICAO flight plan following the guidance contained in the EUROCONTROL NM IFPS Users Manual [RD 7].	State aircraft operators
SA-RVSM-GM14	Operators of RVSM-approved aircraft shall list a 'W' in item 10 of the ICAO flight plan, regardless of flight level and the requested flight plan, and in addition indicate the registration in item 18 of the ICAO flight plan under REG/ (or the equivalent field in ADEXP or B2B).	State aircraft operators
SA-RVSM-GM15	Operators of non-RVSM approved aircraft wishing to operate in RVSM airspace shall submit an "M" in item 8 of the ICAO flight plan, and in addition "STS/NONRVSM" in item 18. No "W" shall be submitted. These aircraft will be provided with 2000 ft vertical separation.	State aircraft operators
SA-RVSM-GM16	Regardless of the RVSM approval status of any individual aircraft, no "W" shall: Be submitted for any flight plan relating to formation flights. Include an "M" in item 8 of the ICAO flight plan, and in addition "STS/NONRVSM" in item 18.	State aircraft operators

³³ The responsibility to issue certification and operational approval resides with National Authorities. The data base mentioned in GM-7 refers only to the information used at the level of RMA. Data bases of operational approvals maintained locally are managed by the aircraft operators as the entities responsible for the operational use of individual aircraft (whereas the Airworthiness Authorities are responsible for the design and certification of a fleet).



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