



OPERATIONAL DIRECTIVE

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Operational Approval for Operations in Reduced Vertical Separation Minimum (RVSM) Airspace

This Operational Directive contains information that is intended for mandatory compliance.

Recipients are asked to ensure that this Operational Directive is copied to all members of their staff who may have an interest in the information (including any 'in-house' or contracted maintenance organizations and relevant outside contractors).

1. Reason and Explanation

- 1.1 LYCAR Part SPA Subpart D requires operators to obtain operational approval from the LYCAA.
- 1.2 The purpose of this Operational Directive is to set a requirement for operational approval for operations in RVSM airspace.

2. Operational Directive and Applicability

- 2.1 The Authority, in exercise of its powers under LYCARs 2019, directs the operator ('a specified operator') of any aircraft which is:
 - (a) registered in the State of Libya; and
 - (b) conducting Commercial Air Transport operations:to comply with the requirements set out in paragraphs 3 of this directive.

3. Requirement:

1 PURPOSE

This GM describes acceptable means, but not the only means, for granting operational approval for operations in Reduced Vertical Separation Minimum (RVSM) airspace.

2 REFERENCES

The requirements for the certification and operation of RVSM aircraft are contained in a number of ICAO Annexes and other guidance material. These are summarized below.

Document	Description
ICAO Annex 6, Appendix 4	Describes altimetry system performance requirements for operations in RVSM airspace
ICAO Annex 6, Section 7.2.6	Minimum RVSM aeroplane requirements (equipment, authorization, vertical navigation performance)
ICAO Annex 6, Section 7.2.7	RVSM approval requirements
ICAO Annex 6, Section 7.2.8	State responsibility for non-compliant aircraft
ICAO Annex 6, Section 7.2.9	Minimum height-keeping monitoring requirements
ICAO Annex 6, Section 7.2.10	State responsibility with regard to non-approved operators
ICAO Annex 11, Section 3.3.5.1	Requirements for initiation of an RVSM height monitoring program
ICAO Doc 4444 PANS-ATM	Various ATC procedures, Phraseologies and Appendix 2 Flight Plan
LYCARs	PART-SPA SUBPART D – RVSM Operations in airspace with RVSM
EASA CS-ACNS Airborne Communications, Navigation and Surveillance	Certification Specification
FAA AC 91-85A	Authorization of aircraft and operators for flight in RVSM
ICAO Doc. 9574	Implementation of RVSM
ICAO Doc. 9937	Operating procedures for an RMA
European Regional Supplementary Procedures Doc. 7030/5	Flight rules applicable to RVSM airspace
Implementation of a 1000 ft VS Min European Airspace. EUR Doc.009	Regional rules for implementation of RVSM in Europe

Table 1: Certification and operating requirements for RVSM airspace

3 APPLICABILITY

This Operational Directive applies to Libyan operators operating Libyan registered or foreign registered aircraft intending to fly in any RVSM airspace of the world and provides them with guidance to be granted with such RVSM approval.

Notes:

1. Operator of military or state aircraft may refer to this Operational Directive for facilitating the recognition of their operational approval in a civil airspace from their Competent Authority.
2. Operations in the North Atlantic (NAT) Region, which includes RVSM airspace, also require an additional MNPS approval from LYCAA.
3. Operations in European Upper Information Regions (UIR), which is also RVSM airspace, requires a Basic Area Navigation approval from LYCAA.
4. This Operational Directive does not describe ATC procedures or the transition between civil/military airspaces or RVSM/non-RVSM airspaces.

5 DEFINITIONS AND ABBREVIATIONS

7.1 Abbreviations

AAD	Assigned Altitude Deviation
ACAS	Airborne Collision Avoidance System
ASE	Altimetry System Error
ATC	Air traffic control
ATS	Air traffic services
ECAC	European Civil Aviation Conference
FAA	Federal Aviation Administration
FMS	Flight Management System
FMP	Flow Management Position
FPL	Flight Plan
FTE	Flight technical error
GMU	GPS Monitoring Unit
GPS	Global Positioning System
HMU	Height Monitoring Unit
ICAO	International Civil Aviation Organisation
JAA	Joint Aviation Authorities
MASPS	Minimum Aircraft System Performance Specification
MEL	Minimum Equipment List
MNPS	Minimum navigation performance Specification
RMA	Regional Monitoring Agency
RVSM	Reduced Vertical Separation Minimum
SSE	Static Source Error
SSEC	Static Source Error Correction
TC	Type Certificate
TGL	Temporary Guidance Leaflet
TVE	Total Vertical Error

7.2 Definitions

The following definitions are intended to clarify certain specialised terms used in this Operational Directive.

Aircraft Type Group:

Aircraft are considered to be members of the same group if they are designed and assembled by one manufacturer and are of nominally identical design and build with respect to all details that could influence the accuracy of height-keeping performance.

Automatic Altitude Control System: A system that is designed to automatically control the aircraft to a referenced pressure altitude.

Group Aircraft

A group of aircraft which are made RVSM MASPS compliant by a common compliance method. A group may include more than one aircraft type designator, although it more often includes specific aircraft series or variants. The height keeping performance characteristics should be the same for all aircraft in the group.

Group aircraft should satisfy all of the following conditions:

- aircraft should have been manufactured to a nominally identical design and be approved by the same Type Certificate (TC), TC amendment, or Supplemental TC, as applicable;
- the static system of each aircraft should be installed in a nominally identical manner and position. The same SSE corrections should be incorporated in all aircraft of the group;

- c) the avionics units installed on each aircraft to meet the minimum RVSM equipment requirements should be manufactured to the manufacturers same specification and have the same part number; and
- d) the RVSM data package should have been produced or provided by the airframe manufacturer or design organisation.

Height-Keeping Performance: The observed performance of an aircraft with respect to adherence to a flight level.

Non-Group Aircraft

An aircraft which has been made RVSM-compliant by a unique method or which does not qualify as a member of a group. Non-group aircraft are assessed on an individual basis and must all be regularly height-monitored.

RVSM Approval

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 LYCAA:

- a) that 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);

- b) that they have instituted procedures in respect of continuing airworthiness (maintenance and repair practices and programs;
- c) that they have instituted flight crew procedures for operations in RVSM airspace.

Note: For the purposes of the application of RVSM, the term "RVSM-APPROVED" will be used to indicate that an aircraft has been granted RVSM approval.

State Aircraft

For the purposes of Libyan RVSM, only aircraft used by the military, customs and police services will qualify as State aircraft and will therefore be entitled to claim exemption from RVSM approval status or to voluntarily elect to comply with LYCAR RVSM requirement. (ref. – ICAO Convention on International Civil Aviation, Article 3 (b)).

8 RVSM OPERATIONAL APPROVAL PROCESS

FOR AIRCRAFT OPERATED BY LIBYAN OPERATORS REGULATED UNDER LYCAR-AIR OPS

8.1 General

No operator shall operate in RVSM airspace unless approved by the LYCAA. The approval process consists of three basic elements:

- a) **Verify aircraft eligibility:** the aircraft is to be compliant with the requirements in LYCAR-SPA.RVSM.100 and SPA.RVSM.110.
- b) **Ensure that instructions for continued airworthiness are in place:** the aircraft's maintenance programme is to be compliant with the requirements of LYCAR-SPA.RVSM.100.
- c) **Assess operational aspects of the Operator:** the operator has established RVSM operating policies and procedures for pilots (and, if applicable, dispatchers) and for maintenance personnel that are acceptable to the LYCAA.

However, there will be certain circumstances where non-RVSM approved aircraft are authorised to enter the LIBYAN RVSM under categories stipulated in this Operational Directive.

8.2 Pre-application meeting

A pre-application meeting may be scheduled between the operator and LYCAA. The purpose of the meeting is to inform the operator of LYCAA requirements in regard to approval for RVSM.

The basic items of discussion should be the content of the operator's RVSM application, LYCAA evaluation process, validation flight requirements and conditions for revocation of RVSM approval.

8.3 Application

For an aircraft intended to fly in RVSM airspace, Libyan operators should contact the LYCAA Flight Operations Section and submit an application form.

A minimum of 60 working days will normally be required to review and assess the application, and issue approval. If data is missing or omitted, the process may take considerably longer time.

The applicant shall obtain and submit all documents that:

- a) establish the eligibility of the aircraft by the submission of an airworthiness approval;
- b) describes the aircraft equipment required for RVSM Operations;
- c) establish the operator's capability of operating and maintaining each aircraft or aircraft group operated (Maintenance Programme, OM, MEL, Standard Operating Procedure including height-keeping errors reporting procedure, commitment for participation in height Monitoring Performance programme, Past Performance as applicable), and
- d) ensure that each pilot and flight dispatcher, and maintenance personnel has adequate knowledge of RVSM requirements and procedures, and receives appropriate training.
- e) assure that the individual aircraft or group aircraft applied for meets the requirements of Paragraph 9.3 Height-Keeping Performance Monitoring requirement.

8.4 Demonstration of Aircraft eligibility and Airworthiness Approval

An aircraft is eligible for a RVSM operational approval when compliance with the requirements SPA.RVSM110 Equipment for operation in defined airspace with RVSM can be demonstrated.

This demonstration is generally conducted during the RVSM airworthiness approval process. An Airworthiness approval can take the form of an evidence from the Type Certificate (TC) Holder (e.g. AFM), an acceptable Service Bulletin or Supplemental TC or any other format that LYCAA finds acceptable

8.5 Description of Aircraft Equipment

The operator should provide a configuration list which details all equipment relevant to RVSM operations.

8.5.1 Equipment for RVSM operations

The minimum equipment required are (refer to LYCAR-AIR OPS-SPA.RVSM.110):

- a) two independent altitude measurement systems. Each system should comprise of the following elements:
 - i. cross-coupled static source/system, provided with ice protection if located in areas subject to ice accretion;
 - ii. equipment for measuring static pressure sensed by the static source, converting it to pressure altitude and displaying the pressure altitude to the flight crew;
 - iii. equipment for providing a digitally coded signal corresponding to the displayed

SSEC, if needed to meet the performance requirements specified in ICAO documents;

the equipment fit should provide reference signals for automatic control and alerting at selected altitude.

- b) one Secondary Surveillance Radar Transponder with altitude reporting system that can be connected to the altitude measurement system in use for altitude keeping; an altitude alert system; an automatic altitude control system.

8.5.2 Altimetry

The altimetry system of an aircraft comprises all those elements involved in the process of sampling free stream static pressure and converting it to a pressure altitude output.

The elements of the altimetry system fall into two main groups:

- a) airframe plus static sources; and avionics and/or instruments.

8.5.2.1 Altimetry system outputs

The following altimetry system outputs are significant for RVSM operations:

- a) pressure altitude (Baro Corrected) display;
- b) pressure altitude reporting data; and
- c) pressure altitude or pressure altitude deviation for an automatic altitude control device.

8.5.2.2 Altimetry system accuracy

The total system accuracy should satisfy the requirements of EASA CS ACNS or equivalent.

8.5.2.3 Static source error correction (SSEC)

If the design and characteristics of the aircraft and altimetry system are such that the standards of EASA CS ACNS are not satisfied by the location and geometry of the static sources alone, then suitable SSEC should be applied automatically within the avionics part of the altimetry system.

8.5.2.4 Altitude Reporting Capability

The aircraft altimetry system should provide an output to the aircraft transponder in accordance with regulations of the approving authority.

8.5.2.5 Altitude control output

The requirements are:

- a) the altimetry system shall provide an output which can be used by an automatic altitude control system to control the aircraft at a commanded altitude.
- b) whatever the system architecture and SSEC system the difference between the output to the altitude control system and the altitude displayed must be kept to the minimum.

8.5.2.6 Altimetry system integrity

The predicted rate of occurrence of undetected altimetry system failures shall not exceed 1×10^5 per flight hour. All failures and failure combinations whose occurrence would not be evident from cross cockpit checks, and which would lead to altitude measurement/display errors outside the specified limits, need to be assessed against this budget. No other failures or failure combinations need to be considered.

8.5.3 SSR Transponder

The SSR transponder should meet the minimum requirement of ICAO Annex 10 Volume IV.

8.5.4 Altitude alert

The altitude deviation warning system must signal an alert when the altitude displayed to the flight crew deviates from selected altitude by more than a nominal value.

For aircraft for which application for type certification or major change in type design is made before 1 January 1997, the nominal value shall not be greater than ± 300 ft (± 90 m).

For aircraft for which application for type certification or major change in type design is made after 1 January 1997, the nominal value shall not be greater than ± 200 ft (± 60 m).

The overall equipment tolerance in implementing these nominal threshold values shall not exceed ± 50 ft (± 15 m).

8.5.5 Automatic altitude control system

As a minimum, a single automatic altitude control system must be installed which is capable of controlling aircraft height within a tolerance band of ± 65 ft (± 20 m) about the acquired altitude when the aircraft is operated in straight and level flight under non-turbulent, non-gust conditions.

Note: Automatic altitude control systems with flight management system/ performance management system inputs allowing variations up to ± 40 m (± 130 ft) under non-turbulent, nongust conditions, installed in aircraft types for which an application for Type Certificate was made prior to January 1, 1997, need not be replaced or modified.

Where an altitude select/acquire function is provided, the altitude select/acquire control panel must be configured such that an error of no more than ± 25 ft (± 8 m) exists between the display selected by the flight crew and the corresponding output to the control system.

8.6 Evaluation of Operator's capability

Evaluation of Operator's capability for operating and maintaining RVSM integrity of each aircraft or aircraft group operated.

8.6.1 Instructions and Arrangement for continued airworthiness

Despite being granted with an airworthiness approval for operation in RVSM airspace, an aircraft cannot be issued with an operational approval unless arrangements concerning scheduled and unscheduled maintenance are approved by the LYCAA.

These maintenance tasks are designed to ensure that the continued airworthiness of the aircraft is maintained at all times. These arrangements will also ensure that apparent minor damage or unserviceability affecting the height keeping performance of the aeroplane, required for RVSM operations will be rectified in accordance with the relevant maintenance manual or repaired in accordance with an approved airframe Structural Repair Manual (SRM).

8.6.1.1 Maintenance Programme (MP)

As prescribed by PART V – CAR M.302, the applicant shall ensure that the MP outlines the applicable maintenance to maintain the aircraft in accordance with the requirements of LYCAR-OPS.SPA.RVSM.100 Operation in defined airspace with RVSM.

The MP shall include the following:

- a) Identification of RVSM critical components and identification of structural areas noted as RVSM critical areas.
- b) Periodic inspections, functional flight tests, and maintenance and inspection procedures with acceptable maintenance practices for ensuring continued compliance with the RVSM aircraft requirements.
- c) The maintenance requirements listed in the Instruction for Continued Airworthiness associated with any component or modification affecting RVSM capability.

8.6.1.2 Maintenance practices after exhibiting defects affecting RVSM capability of an aircraft

Aircraft exhibiting height-keeping performance errors should be investigated and stopped from operations in RVSM (e.g. the aircraft is declared as 'non-RVSM approved') until the following actions have been taken:

- a) the failure or malfunction is confirmed and isolated by maintenance action; and
- b) corrective action is carried out as required and verified to ensure RVSM approval integrity.

The operator should also demonstrate to the LYCAA that:

- a) the flying crew will be made aware of any restriction of the RVSM capability of the aircraft before the intended flight.
- b) the return to service of an aircraft will be conducted as per procedure acceptable to the LYCAA.

8.6.1.3 Reporting of changes to the aircraft affecting the RVSM capability

The operator should establish a mechanism to report to the LYCAA any rectification work or modifications, which may affect RVSM capability.

8.6.1.4 Maintenance Facilities adequacy

The operator should demonstrate that adequate maintenance facilities are available to ensure continued compliance with the RVSM maintenance requirements.

8.6.2 Operational evaluation

The operator should demonstrate to the LYCAA an acceptable maturity of its operations for conducting RVSM flights by:

- a) providing evidence of past performances (as applicable);
- b) ensuring that the Operator's operations programme is accepted by LYCAA for the area(s) applied for (including OM, MEL, Standards Operating Procedures, Height-keeping error reporting, height-keeping performance monitoring), and
- c) allowing the LYCAA to conduct validation flight(s).

8.6.2.1 Past Performance

The operator should provide:

- a) its past performance of its operations in RVSM airspace and,
- b) the reliability data of the aircraft applied for.

This past performance may consist of any events or incidents related to poor height keeping performance which may indicate weaknesses in training, procedures, or maintenance.

8.6.2.2 Operator's operations programme

The Operator should demonstrate its capability to achieve an acceptable height-keeping performance during RVSM operations by the establishment and maintenance of an adequate operational programme which includes Flight crew training/pilot knowledge and amendment as and when required of Operations Manuals.

8.6.2.2.1 Operations Manuals and Checklists

The appropriate manuals and checklists (or relevant OMA procedures for RVSM) should be revised to include information/guidance on the standard operating procedures and submitted to the LYCAA for acceptance/approval. Appropriate manuals should include a statement of the airspeeds, altitudes, and weights considered in RVSM aircraft approval to include identification of any operating restrictions established.

Note: A RVSM operational 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.

8.6.2.2.2 Reporting of Height-keeping errors

Height-keeping errors increase the risk of collision between aircraft. Operators should develop a mechanism to report to LYCAA through ROSI (using ICAO RVSM phraseology and within 72 hours) all operational and Flight Errors that have an impact on RVSM separation loss. Such reportable errors are, but not limited to:

- a) any loss of RVSM capability due to technical malfunction, Wake Turbulence or Turbulence such as:
 - i. Total Vertical Error (TVE), which is the vertical geometric difference between the actual pressure altitude flown by an aircraft and its assigned pressure altitude (flight level) equal to or greater than ± 300 ft (± 90 m);
 - ii. Altimetry System Errors (ASE), which is the difference between the pressure altitude displayed to the flight crew when referenced to ISA standard ground pressure setting of 1013.2 hPa, and the free stream pressure altitude, equal to or greater than ± 245 ft (± 75 m);
 - iii. Reported Assigned Altitude Deviation (AAD), which is the difference between the transponder Mode C altitude and the assigned altitude flight level, equal to or greater than ± 300 ft (± 90 m).
- b) Erroneous actions by ATC and flight crews;
- c) Incorrect flight planning by insertion of the letter W in Item 10 of the ICAO flight plan form for non-RVSM approved aircraft and planning to operate in RVSM airspace.
- d) ATC clearance to incorrect flight level;
- e) Climb/descent without ATC clearance;
- f) Climb/descent based on an ATC clearance issued to another aircraft;
- g) Failure to climb/descent as cleared by ATC (including level busts);
- h) Altitude insertion errors.

8.6.2.2.3 Plan for Participation in Height-Monitoring Performance Programme

The operator should provide a plan for participation in the RVSM monitoring programme managed by RMAs. This programme should normally entail a check of at least a portion of the operator's aircraft by an independent height-monitoring system as per paragraph 9 HEIGHTKEEPING PERFORMANCE MONITORING. Monitoring prior the issue of an RVSM operational approval is not mandatory, it should be completed within the limits specified under paragraph 9.4 Aircraft transferred from one operator to a new operator.

8.6.2.2.4 ACAS II

Operator Procedures Operators should specify procedures by which an aircraft climbing or descending to an assigned altitude or flight level, especially with an autopilot engaged, may do so at rate less than 1500

ft/min throughout the last 300 m (1000 ft) of climb or descent to the assigned level when the pilot is made aware of another aircraft at an adjacent altitude or flight level by an airborne traffic display.

Note: These procedures are intended to avoid unnecessary Airborne Collision Avoidance System (ACAS) resolution advisories for aircraft at adjacent levels.

8.6.3 Validation flight(s)

Prior to the granting of an operation approval, the LYCAA may decide that there is a need for one or more validation flight(s) as necessary to verify that operations procedures and practices are applied effectively. Such validation flight(s) may be combined with en-route inspection

8.7 Evaluation of Training Programmes

8.7.1 Maintenance personnel

The operator should ensure that all personnel performing maintenance on RVSM equipment (even if the maintenance is contracted) are properly trained, qualified, and knowledgeable of RVSM with emphasis on maintenance requirements that the operator needs to incorporate to ensure continued compliance with RVSM requirements.

8.7.2 Flight Crew and Flight Dispatchers

Operators should submit training syllabi and other appropriate material to the LYCAA to show that the operating practices, procedures and training items related to RVSM operations are incorporated in initial and, where warranted, recurrent training programs (training for operations control or dispatch personnel should be included, where appropriate).

Other than air carrier operators should commit by means of written statements to the LYCAA that their flight crews knowledge of RVSM operating practices and procedures is sufficient to warrant the granting of an approval to conduct RVSM operations. The LYCAA:

- a) may accept a training certificates (e.g. those from the Flight Safety Foundation or online training that have been reviewed by LYCAA);
- b) may evaluate a training course prior to accepting a training certificate;
- c) may accept a statement in the operators application that the operator will ensure that its pilots will be knowledgeable on RVSM procedures contained in Appendix 1 to this OD; or
- d) may accept a statement by the operator that it has or will conduct an in-house training programme.

Practices and procedures in the following areas should be standardized (refer to Appendix 1):-

- a) flight planning;
- b) pre-flight procedures at the aircraft for each flight;
- c) procedures prior to RVSM airspace entry;
- d) in-flight procedures; and
- e) flight crew training procedures.

Flight crew and, where applicable, operations control and flight dispatchers should be knowledgeable on contingency and other procedures unique and specific to the areas of operation.

8.8 Issuance of RVSM Operational approval

Once all requirements are satisfied, a RVSM operational approval, covering the aircraft and designated areas applied for, will be granted by the LYCAA through amendment of OpsSpecs.

Upon approval, the operator should provide the LYCAA (ops@flightsafety.gov.ly) with the following information for dissemination to MID RMA:

Descriptions	Sample Data
Aircraft Make Model as per ICAO 8643 type designator	B77W or A346
MSN (Manufacture serial number)	13501
Current Mode S assigned	8967F1
Date of C of A	dd mmm yyyy
Date of overflying (GMU) if any	dd mmm yyyy

Failing to provide those information before operating in RVSM airspace may cause unnecessary alert from MID RMA to the LYCAA.

9 HEIGHT-KEEPING PERFORMANCE MONITORING

RVSM monitoring has the primary objective of observing and evaluating aircraft height-keeping performance to ensure that an acceptable level of safety is being maintained. Monitoring is undertaken to identify, and measure the stability of Altimetry System Error (ASE) and to determine the Total Vertical Error (TVE).

9.1 Middle East Regional Monitoring Agency (MIDRMA)

The need for a global monitoring of RVSM operations supports the concept of having a Regional Monitoring Agency (RMA) for each region, which has proved to be essential to safety. The RMA has a significant role to play in all aspects of the monitoring process. One of its priorities is to maintain a database of aircraft approved by the respective State of Operator in that region. The main responsibilities of the Middle East Regional Monitoring Agency (MIDRMA) are to conduct statistical safety assessments, monitor height-keeping performance and verify the approval status of aircraft operating in the Middle East RVSM airspace. Note: Middle East RVSM is applied in the volume of airspace between FL290 and FL410 inclusive in the following flight information regions/upper flight information regions (FIRs/UIRs): Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Libya, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen.

9.2 RMA Height-keeping Performance Assessment

9.2.1 The importance of the 24-bit Address

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 aircraft. Height-monitoring results include the ICAO 24-bit address (also known as the Mode S addresses) extracted from the aircraft down-linked parameters. This data provides a link to a known aircraft approval. If the RMA does not have the correct 24-bit address, then the results cannot be correlated to one specific airframe.

The following is the conversion Table Decimal, to Hexadecimal and Binary:

DECIMAL	HEXA DECIMAL	BIN
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111

Example of 24 bit Address (89648A hexa)

HEXA DECIMAL : (6 digit Mode S)	8	9	6	4	8	A
BINARY: 24 bit Aircraft address	1000	1001	0110	0100	1000	1010

9.2.2 MIDRMA, LYCAA and Operator's responsibilities

The MID 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. The LYCAA is responsible for ensuring that Libyan operators of civil registered aircraft comply with global and regional monitoring targets.

For any failure to meet the height-keeping performance requirement or negative trend of performance, the RMA will require the LYCAA to investigate. In return, the LYCAA will acknowledge the notification and will inform MID RMA of the actions undertaken to address the problem.

Operators are responsible for:

- applying initial RVSM operational approval and addition of the aircraft for the same group which will be updated to the RVSM database by end of the month;
- notifying the LYCAA (ops@flightsafety.caa.gov.ly) the RVSM capability of an aircraft before its first RVSM flight under Libyan Certificate of Airworthiness;
- monitoring the RVSM approval as well as height keeping monitoring status as available on [MIDRMA website](#); and
- reporting to the LYCAA any incident found (e.g. if the aircraft is not available or incorrect to avoid automatic rejection from flight planning system that are incorporated with RVSM database).

9.3 Height-Keeping Performance Monitoring requirement

9.3.1 Over flight Assessment requirement

RVSM Height-keeping performance programme has the primary objective of observing and evaluating aircraft height-keeping performance to gain confidence that airspace users are maintaining an acceptable level of safety.

Libyan operators holding a RVSM Operational approval shall perform RVSM HMU/GMU height monitoring:

- a) Group aircraft: Operators shall be required to establish a requirement which ensures that a minimum of two aircraft of each aircraft type grouping operated have their height keeping performance monitored, at least once every two years or within intervals of 1000 flight hours per aircraft, whichever period is longer.
- b) Non-group aircraft: the monitoring of that aeroplane shall be accomplished at least once every two years or within intervals of 1000 flight hours, whichever period is longer.

The operator should inform the LYCAA of the date of each height monitoring conducted.

9.3.2 Acceptable means to perform a height-keeping performance monitoring

To perform a height-keeping performance monitoring, operators should:

- a) arrange with ops@flightsafety.caa.gov.ly to coordinate with MIDRMA for the carriage of a Global Positioning System (GPS) monitoring unit (GMU). If monitoring occurs before the LYCAA

has informed the appropriate RMA, the accrued data may still be used provided that it is dated after the installation/inspection of the GMU was completed; or

- b) overfly the Height Monitoring Unit (HMU) near the following locations;
- Strumble, UK
 - Linz, Austria
 - Nattenheim, Germany
 - Geneva, Switzerland
 - Other any other HMU subject to acceptance by the LYCAA

9.3.3 Verification of height-keeping performance monitoring result

The Height keeping result may be checked on the following website: http://www.midrma.com/rvsm_approval_details.php?country=ae

Note: The data are amended at the end of each month; a delay of up to 60 days is expected for web updating process.

The Operator shall contact the LYCAA (ops@flightsafety.caa.gov.ly) or check on MIDRMA website for height monitoring result, or other inquiry or error **only**.

A successful over-flight assessment conducted by a RMA is acceptable for all RMAs.

9.4 Aircraft transferred from one operator to a new operator

9.4.1 Newly produced Aircraft

If a newly produced aircraft has been successfully determined (via flight test or using transmitted data from transponder/ADS-B) as RVSM-compliant within a 3-month period preceding its date of delivery, then this monitoring can be used to meet the RVSM height monitoring programme requirements, provided the aircraft flight hours are still within 1000 flight hours.

Example 1: If, on 10 June 2019, an operator purchases an aircraft successfully monitored for RVSM-compliance on 20 March 2019 and it has been maintained in accordance with standard manufacture approved maintenance programme, then the monitoring remains valid up to 19 March 2021 or 1000 flight hours, whichever is longer.

9.4.2 Aircraft transferred from one operator to a new operator

If an aircraft from one operator has been successfully monitored previously and the new operator can demonstrate that the aircraft has been continuously maintained in accordance with an approved maintenance programme, the previous monitoring can be used to meet the RVSM height monitoring programme requirements. The time frames associated with the RVSM monitoring policy apply.

Example 1: If an operator purchases an aircraft and requires issuance of a RVSM operational approval and can demonstrate that the aircraft has a previous successful monitoring and meets the airworthiness and monitoring requirements above, the operator may be granted as credit the remaining balance of the monitoring time to have the aircraft monitored (e.g., 2 years or 1000 flight hours, whichever is longer from the last successful monitoring).

Example 2: If an operator requires issuance of a RVSM operational approval for an aircraft that has not been monitored (or can't be shown to have been monitored) within the previous 2 years or 1000 flight hours, whichever is longer, Height monitoring performance requirement should be completed as soon as possible but not later than 6 months after the issue of RVSM approval and thereafter as stated in paragraph 9.3.1 Over flight Assessment requirement.

9.5 Operators with less than 1000 flight hours over 2 years

The requirement states that aircraft will be monitored every two years or 1000 flight hours, whichever is longer. However, if an aircraft has not had a valid monitoring in the last 2 years, the operator should provide the LYCAA (ops@flightsafety.caa.gov.ly) with data that shows that the aircraft flown less than 1000 hours since the last monitoring as well as the planned date for the next height monitoring exercise. These data should be submitted 1 month prior to the expiry of the 2year period and thereafter 1 month prior to the planned date.

9.6 Operators failing to comply with height-monitoring requirement

If an operator does not complete the requirements within the allotted time:

- a) It is the operator's responsibility to contact the LYCAA to discuss the situation and provide an updated plan for completing the monitoring requirements.
- b) The operator's updated monitoring plan should be provided and should ensure that the operator completes minimum monitoring requirements within 3 months after the original due date. During this time, the operator may continue to operate in RVSM airspace.
- c) Failure to complete monitoring requirements within the additional 3 months or to notify the LYCAA as per point a) above will result in operators being excluded from RVSM airspace and its Ops Specs amended accordingly (refer to Paragraph 10 VIOLATION OR FAULTY EQUIPMENT), unless the LYCAA determines that circumstances prevented the operator from completing the requirements.

10 VIOLATION OR FAULTY EQUIPMENT

10.1 Surrender, limitation, or revocation of RVSM operational approval

An operator that consistently incurs equipment or operational errors may be required to surrender its RVSM operational approval. If the operator does not address any height-keeping error effectively or in timely manner, the LYCAA may consider revoking the RVSM operational approval until the root causes of these errors are shown to be eliminated and RVSM programmes and procedures are proven effective. If the identified issue is related to one specific aircraft type, then RVSM operational approval may be limited by the removal of that specific type from the RVSM Operational Approval.

Should a RVSM operational approval be withdrawn, the LYCAA will notify MID RMA.

10.2 Re-instatement of Approval.

Following any rectification work or limitation of RVSM Operational Approval, the operator should demonstrate compliance with the RVSM requirements by an independent height monitoring system.

11 SPECIAL AUTHORISATION

11.1 Non-RVSM Aircraft

Non-RVSM approved aircraft may request entry in an RVSM Airspace on an ad hoc basis. The letter "W" shall NOT be inserted in field 10 (Equipment) of the ICAO flight plan.

Non-RVSM approved civil aircraft may not flight plan between FL290 and FL410 inclusive within RVSM airspace, except if the aircraft is unable to fly to the destination at or below FL280 or at or above FL430 and provided it:

- a) is being delivered for initial acceptance, change of ownership, or lease.; (e.g. Delivery Flights for Aircraft that are RVSM Compliant paragraph below);
- b) was formerly RVSM approved but has experienced an equipment failure and is being flown to a maintenance facility for repair to meet RVSM requirements and/or obtain approval;
- c) is being utilized for mercy or humanitarian purposes.

For civil, state and military aircraft, operators requesting ATC approval for non-RVSM approved aircraft to operate within or transit through the Libyan RVSM Airspace should:

- a) for operations wholly within the Libyan FIR, co-ordinate with the ACC Centre by telephone normally not more than 12 hours and not less than 1 hour prior to the intended flight; or
- b) for aircraft departing from within the Libyan FIR that are to enter adjacent and other FIRs, co-ordinate with the ACC Centre by telephone normally not more than 12 hours and not less than 4 hours prior to the intended flight; or
- c) after approval is received from the ACC Centre, notify all other affected centers prior to departure. Filing of a flight plan is not considered appropriate notification; and
- d) include the remarks "STS/NONRVSM" in field 18 of the ICAO flight plan.

This provision is exclusively intended for the purposes indicated above and not as a means to circumvent the normal RVSM approval process. The telephone numbers for ACC Centre can be obtained in the AIP.

11.2 Libyan Specific RVSM Exemptions

Operators of Civil Registered Aircraft may obtain exemptions from the LYCAA for the circumstances stated below. These procedures are not applicable to RVSM airspace outside the Libyan FIR.

11.3.1 Exemptions circumstances

The following categories of flights of non-RVSM approved aircraft may be granted exemption to enter Libyan RVSM airspace:

- a) Aircraft using GMU equipment to complete a RVSM monitoring flight;
- b) Flight testing. Whether for the purpose of prototype testing or in association with the approval of a modification to an existing type designed aircraft (e.g. trailing Cone flights for the purpose gaining RVSM approval);
- c) Flight Test (e.g. Post Maintenance);
- d) Special Military flights - or Department of Defence;
- e) Calibration flight (e.g. Radio Navigational Aids).

11.3.2 Exemptions Procedure

LYCAA is the appropriate authority for issuing RVSM exemptions to operators for the purposes outlined above. An application for an RVSM exemption will be treated on an individual basis. RVSM exemptions will be issued for a limited period of time to an individual aircraft or series of aircraft. The operator should apply for this exemption to the relevant FOI.

MIDRMA and ATC should be notified accordingly for the concerned flights.

APPENDIX 1: TRAINING PROGRAMS AND OPERATIONAL PROCEDURES

INTRODUCTION

Flight crews will need to have an awareness of the criteria for operating in RVSM airspace and be trained accordingly. The items detailed in sections 2 to 6 of this appendix should be standardized and incorporated into training programs and operating practices and procedures. Certain items may already be adequately standardized in existing procedures. New technology may also remove the need for certain actions required of the flight crew. If this is so, then the intent of this guidance can be considered to be met.

Note: This document is written for all users of RVSM airspace, and as such is designed to present all required actions. It is recognized that some material may not be necessary for larger public transport operators.

FLIGHT PLANNING

During flight planning the flight crew OR flight dispatcher (If applicable) should pay particular attention to conditions that may affect operations in RVSM airspace. These include, but may not be limited to:

- a) verifying that the airframe is approved for RVSM operations;
- b) reported and forecast weather on the route of flight;
- c) minimum equipment requirements pertaining to height keeping and alerting systems; and
- d) any airframe or operating restriction related to RVSM approval.

PRE-FLIGHT PROCEDURES AT THE AIRCRAFT FOR EACH FLIGHT

The following actions should be carried out during the pre-flight procedure:

- a) review technical logs and forms to determine the condition of equipment required for flight in RVSM airspace. Ensure that maintenance action has been taken to correct defects to required equipment;
- b) during the external inspection of aircraft, particular attention should be paid to the condition of static sources and the condition of the fuselage skin near each static source and any other component that affects altimetry system accuracy. This check may be accomplished by a qualified and authorized person other than the pilot before take-off, the aircraft altimeters should be set to the QNH of the airfield and should display a known altitude, within the limits specified in the aircraft operating manuals. The two primary altimeters should also agree within limits specified by the aircraft operating manual. An alternative procedure using QFE may also be used. Any required functioning checks of altitude indicating systems should be performed; and

Note: The maximum value for these checks cited in operating manuals should not exceed 75 ft (23 m).

- c) before take-off, equipment required for flight in RVSM airspace should be operative and any indications of malfunction should be resolved.

PROCEDURES PRIOR TO RVSM AIRSPACE ENTRY

The following equipment must be operating normally for entry into RVSM airspace:

- a) two primary altitude measurement systems;
- b) one automatic altitude-control system;
- c) one altitude-alerting device; and
- d) an operating transponder.

Note: Dual equipment requirements for altitude-control systems will be established by regional agreement after an evaluation of criteria such as mean time between failures, length of flight segments and availability of direct pilot-controller communications and radar surveillance.

Note: An operating transponder may not be required for entry into all designated RVSM airspace. The operator should determine the requirement for an operational transponder in each RVSM area where operations are intended. The operator should also determine the transponder requirements for transition areas next to RVSM airspace.

Note: Should any of the required equipment fail prior to the aircraft entering RVSM airspace, the pilot must request a new clearance to avoid entering this airspace.

IN-FLIGHT PROCEDURES

General

The following practices should be incorporated into flight crew training and procedures:

- a) flight crews will need to comply with any aircraft operating restrictions, if required for the specific aircraft group.
- b) emphasis should be placed on promptly setting the sub-scale on all primary and standby altimeters to 1013.25 hPa (29.92 in.Hg) when passing the transition altitude, and rechecking for proper altimeter setting when reaching the initial cleared Flight Level;
- c) in level cruise it is essential that the aircraft is flown at the cleared Flight Level. This requires that particular care is taken to ensure that ATC clearances are fully understood and followed. The aircraft should not intentionally depart from cleared Flight Level without a positive clearance from ATC unless the crew are conducting contingency or emergency manoeuvres;
- d) when changing levels, the aircraft should not be allowed to overshoot or undershoot the cleared Flight Level by more than 150 ft (45 m);

Note: It is recommended that the level off be accomplished using the altitude capture feature of the automatic altitude-control system, if installed.

- e) an automatic altitude-control system should be operative and engaged during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence require disengagement. In any event, adherence to cruise altitude should be accomplished by reference to one of the two primary altimeters. Following loss of the automatic height keeping function, any consequential restrictions will need to be observed;
- f) ensure that the altitude-alerting system is operative;
- g) at intervals of approximately one hour, cross-checks between the primary altimeters should be made. A minimum of two will need to agree within ± 200 ft (± 60 m). Failure to meet this condition will require that the altimetry system be reported as defective and notified to ATC;
- h) the usual scan of flight deck instruments should suffice for altimeter cross-checking .
- i) before entering RVSM airspace, the initial altimeter cross check of primary and standby altimeters should be recorded;

Note: Some systems may make use of automatic altimeter comparators.

- j) in normal operations, the altimetry system being used to control the aircraft should be selected for the input to the altitude reporting transponder transmitting information to ATC;
- k) if the pilot is advised in real time that the aircraft has been identified by a height monitoring system as exhibiting a TVE greater than ± 300 ft (± 90 m) and/or an ASE greater than ± 245 ft (± 75 m) then the pilot should follow established regional procedures to protect the safe operation of the aircraft. This assumes that the monitoring system will identify the TVE or ASE within the set limits for accuracy; and
- l) if the pilot is notified by ATC of an assigned altitude deviation which exceeds ± 300 ft (± 90 m)
- m) then the pilot should take action to return to the cleared Flight Level as quickly as possible.

Contingency procedures after entering RVSM airspace

The pilot should notify ATC of contingencies (equipment failures, weather) which affect the ability to maintain the cleared Flight Level and co-ordinate a plan of action appropriate to the airspace concerned.

Examples of equipment failures which should be notified to ATC are:

- a) failure of all automatic altitude-control systems aboard the aircraft;
- b) loss of redundancy of altimetry systems;
- c) loss of thrust on an engine necessitating descent; or
- d) any other equipment failure affecting the ability to maintain cleared Flight Level.

The pilot should notify ATC when encountering greater than moderate turbulence.

If unable to notify ATC and obtain an ATC clearance prior to deviating from the cleared Flight Level, the pilot should follow any established contingency procedures and obtain ATC clearance as soon as possible.

POST-FLIGHT PROCEDURES

In making technical log entries against malfunctions in height keeping systems, the pilot should provide sufficient detail to enable maintenance to effectively troubleshoot and repair the system. The pilot should detail the actual defect and the crew action taken to try to isolate and rectify the fault.

The following information should be recorded when appropriate:

- a) primary and standby altimeter readings;
- b) altitude selector setting;
- c) sub-scale setting on altimeter;
- d) autopilot used to control the aeroplane and any differences when an alternative autopilot system was selected;
- e) differences in altimeter readings, if alternate static ports selected. Use of air data computer selector for fault diagnosis procedure; and
- f) the transponder selected to provide altitude information to ATC and any difference noted.

SPECIAL EMPHASIS ITEMS

The following items should also be included in flight crew training:

- a) knowledge and understanding of standard ATC phraseology used in each area of operations;
- b) importance of crew members cross-checking each other to ensure that ATC clearances are promptly complied with;
- c) use and limitations in terms of accuracy of stand-by 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 Note: such correction data will need to be readily available on the flight deck.
- d) problems of visual perception of other aircraft at 1 000ft (300m) planned separation during night conditions, when encountering local phenomena such as northern lights, for opposite and same direction traffic, and during turns;
- e) characteristics of aircraft altitude capture systems which may lead to the occurrence of overshoots;
- f) relationship between altimetry, automatic altitude control, and transponder systems in normal and abnormal situations; and
- g) any airframe operating restrictions, if required for a specific aircraft group, related to an RVSM airworthiness approval.

4. Queries

Any queries as a result of this Operational Directive should be addressed to Head of Flight Operations Section at the following e-mail address:

ops@flightsafety.caa.gov.ly

5. Revocation and Commencement

This Operational Directive comes into force **22 July 2019** and will remain in force until revoked by the Authority.

Head of Flight Operations Section
Abdelwahab Shugman

22/7/2019