

CHAPTER 13

Reduced Vertical Separation Minima (RVSM OPS) Certification

1.0 PURPOSE

This Chapter is issued for the guidance on the Reduced Vertical Separation Minima (RVSM) Certification. Reduced Vertical Separation Minima refers to a vertical separation minimum of 300 m (1000 ft) between FL 290 and FL 410 inclusive.

2.0 REFERENCES

- 2.1 Regulation [8.8.1.21](#) and [8.10.1.16](#) of the Nigeria Civil Aviation Regulations.
- 2.2 Regulation [7.4.1.3](#) and [7.4.1.5](#) of the Nigeria Civil Aviation Regulations.
 - 2.2.1 CHECKLIST: [CL:O-OPS013](#)
- 2.3 ICAO Doc 9574 - Manual on Implementation of a 300 m (1000 ft) Vertical Separation Minimum between FL 290 and FL 410 Inclusive is the source guidance reference for RVSM operations.
- 2.4 The RVSM Minimum Aircraft System Performance Specification (MASPS) include specifications and procedures for the separate aspects of type approval, release from production and continued airworthiness and is included in the following documents for global application:
 - 2.4.1 European Joint Aviation Authority (JAA) Temporary Guidance Leaflet (TGL) No.6 – Guidance Material on the Approval of Aircraft and Operators for Flight in Airspace above FL 290 where a 300m (1000 ft) Vertical Separation Minimum is Applied - or any subsequent version thereof; or
 - 2.4.2 USA Federal Aviation Administration (FAA) Document 91-RVSM, Interim Guidance Material on the Approval of Operators/Aircraft for RVSM Operations.
- 2.5 The above documents were developed in compliance with the guidance material in ICAO Doc 9574 and have been cited in ICAO Doc 9574 as being acceptable means for RVSM approval.
- 2.6 Additional guidance may be found in the following documents:
 - 2.6.1 FAA Advisory Circulars 90-96 and 91-70;
 - 2.6.2 Global Change GC-59 (MMEL);
 - 2.6.3 EUR Doc 009;
 - 2.6.4 North Atlantic MNPS, Ninth Edition.



2.7 The guidance in this manual is based on FAA 91-RVSM.

3.0 ACTION

3.1 Using the guidance provided in NCAA TGM VOL 3, Approval of Aircraft and Operators for Flight in Airspace Above Flight Level (FL) 290 Where a 1,000 Foot Vertical Separation Minimum is Applied (as amended), inspectors shall ensure that operators meet the standards of Regulation 8.8.1.21 of the Nigeria Civil Aviation Regulations.

3.2 Inspector Approval or Acceptance. The terms approval and Acceptance are used in this order. The approval or acceptance of an operator's proposal by the Authority is accomplished by writing a Letter of Acceptance or approval to the operator.

4.0 BACKGROUND

4.1 RVSM Airspace

RVSM airspace is any airspace or route where aircraft are separated by 1,000 feet vertically between flight level (FL) 290 and FL 410, inclusive. Generally, aircraft and operators that have not been authorized to conduct RVSM operations cannot operate at FLs where RVSM is applied. Exceptions to this rule are published by individual Air Traffic Service Providers. Air Traffic Service Providers have elected to implement RVSM as a means to provide more fuel/time efficient altitudes and routes to operators and to enhance en route airspace capacity.

5.0 SOURCES OF INFORMATION

5.1 FAA RVSM Homepage

The RVSM homepage provides information on RVSM programs in various areas of the world. The RVSM homepage can be accessed at: www.faa.gov/ats/ato/rvsm1.htm.

5.2 Regulations

5.2.1 Regulation 8.8.1.21 of the Nigeria Civil Aviation Regulations prohibits operations in airspace designated as Reduced Vertical Separation Minimum airspace without the written authorization of the Authority. Regulations 7.4.1.3 and 7.4.1.5 of the Nigeria Civil Aviation Regulations, are the regulations for instruments and equipment requirements;

5.2.2 Aircraft and operators must be authorized by the Authority to conduct operations in RVSM airspace. The criteria evaluated to issue this authorization consist of three basic elements as follows:

- a) An aircraft must be determined to comply with the requirements of Regulation 8.8.1.21 of the Nigeria Civil Aviation Regulations, Regulations 7.4.1.3 and 7.4.1.5 of the Nigeria Civil Aviation Regulations. and ICAO Document 9574;



- b) The operator's maintenance programme must be found to comply with the requirements of 91-RVSM and (ICAO) Document 9574 It must be established that the operator has adopted RVSM operating policies and procedures for pilots and flight operations officers that are acceptable to the Authority.

6.0 OVERVIEW OF THE AUTHORIZATION PROCESS

6.1 The Flight Operations Inspector (FOI), and the Airworthiness Inspector (AWI) should coordinate the issue of OpSpecs to grant the operator authorization to conduct RVSM operations for a specific aircraft type or group. The CAA will issue the OpSpecs paragraphs if the following conditions exist:

6.1.1 The Authority determines that the operator's aircraft comply with RVSM standards -

- a) For in-service aircraft, the Authority determines that inspections and aircraft system modifications are completed as required by the applicable Service Bulletin (SB), Service Letter, Supplemental Type Certificate (STC) or other Aircraft Certification Office approved documents.
- b) For aircraft manufactured in an RVSM compliant-condition, the Authority determines that the Aeroplane Flight Manual (AFM) or Type Certificate Data Sheet (TCDS) contain a statement of RVSM eligibility;

6.1.2 The NCAA approves the operator's RVSM maintenance programme;

6.1.3 The NCAA approves the operator's RVSM operations programme;

6.1.4 The NCAA accepts the operator's plan to participate in monitoring programmes;

6.1.5 If required by the FOI in coordination with the AWI, the operator successfully completes a validation flight.

7.0 RVSM AUTHORIZATION PROCESS AND POLICY

7.1 Coordination between Inspectors. Before issuing RVSM authorizations, there must be coordination between the FOI and the AWI assigned to the project.

7.2 Authorization Process Events. Nig CARs 7.4.1.3, 7.4.1.5 titled Reduced vertical separation minimum provides guidance on the major events in the RVSM authorization process. Also, the Getting Started section of the RVSM Documentation Web page contains an outline or checklist of the events or steps in the authorization process. It includes references to applicable document paragraphs and sections.

7.3 **Issue of LOA.** LOAs must be issued for initial RVSM authorization for each operator airframe. An operator is not, however, required to obtain a new or amended LOA to start RVSM operations with an aircraft for which he has previously received RVSM approval in an RVSM area of operations that



is new to him. Operators are responsible for compliance with any operational policy and procedures specific to the new area of operations.

- 7.4** Relationship between RVSM Authorization and Horizontal Navigation Authorizations. Currently, in designated oceanic airspaces, operators are required to obtain both RVSM authorization and certain horizontal navigation authorizations. These are separate, specific authorization actions. For example, to operate in North Atlantic Minimum Navigation Performance Specification (NAT MNPS) airspace, operators are required to obtain both RVSM and NAT MNPS authorization. In Pacific oceanic airspace, operators are required to obtain both RVSM and Required Navigation performance 10(RNP-10) authorization. Nig. CARs 7.4.1.1(b).
- 7.5** Determining Aircraft RVSM Compliance. The phrases, determining aircraft RVSM compliance and initial RVSM airworthiness approval both appear in RVSM documents to indicate that the NCAA has determined that the operator's aircraft comply with RVSM standards. The following are guidance for determining aircraft RVSM compliance:
- 7.5.1** For most in-service aircraft, the RVSM airworthiness documents take the form of SBs, Service Letters or STCs. These documents contain requirements that are specific to individual aircraft types or groups and generally require inspections and/or hardware or software modifications. The operator must submit documents to the NCAA to show that the required actions have been completed for each airframe that will operate in RVSM airspace;
- 7.5.2** For aircraft manufactured RVSM-compliant, the AFM or TCDS must contain statements that show the aircraft to be eligible for RVSM operations;
- 7.5.3** When the inspector determines that individual operator airframes is RVSM compliant, the Operator's file must be updated against the airframes listed in the OpSpecs or in a Letter of Authorization (LOA), as appropriate.
- 7.6** RVSM Maintenance Programme Approval. NCAA TGM VOL 4 contains airworthiness inspector guidance for the evaluation and approval of an operator's RVSM maintenance programme. It also, contains guidance on the content of maintenance programmes in Paragraph 10.
- 7.7** An applicant for authorization to operate within RVSM airspace shall apply in a form and manner prescribed by Authority. The application must include the following:
- (1) An approved RVSM maintenance program outlining procedures to maintain RVSM aircraft in accordance with the requirements of this TGM. Each program must contain the following:
 - (i) periodic inspections, functional flight tests, and maintenance and inspection procedures, with acceptable maintenance practices, for ensuring continued compliance with the RVSM aircraft requirements.
 - (ii) A quality assurance program for ensuring continuing accuracy and reliability of test equipment used for testing aircraft to determine compliance with the RVSM aircraft requirements.
 - (iii) Procedures for returning noncompliant aircraft service.
 - (2) For an applicant who operates under Part 8 and 9 of Nig CARs initial and recurring pilot training requirement.
 - (3) Policies and procedures: An applicant who operates under Part 8 and 9 of Nig CARs policies and procedures that will enable it to conduct RVSM operations safely.
 - (c) Validation and Demonstration. In manner prescribed by the Administrator, the operator must provide evidence that
 - (1) It is capable to operate and maintain each aircraft group for which it applies for approval to operate in RVSM Airspace; and

(2) Each pilot has an adequate knowledge of RVSM and procedures requirements, policies, And procedures

7.7.1 Pilot Knowledge. Inspectors should consider any one of the options listed below to be an acceptable method for the operator to show the NCAA that pilot knowledge of RVSM policy/procedures is adequate prior to operating in RVSM airspace. The inspector may:

- a) Accept certificates documenting completion of a course of instruction on RVSM policy and procedures;
- b) Accept an operator's in-house training program;
- c) Evaluate a training course prior to accepting a training certificate by reviewing the syllabus, attending the course, or administering a written or oral exam.

7.7.2 Operations Manuals. In accordance with Nig CARs, operators must incorporate RVSM operating practices and procedures into their operations manuals or documents. Any one of the options listed below may be considered acceptable. The inspector may:

- a) Accept an operator's stand-alone RVSM operations manual as part of the application for RVSM authority after reviewing it for completeness and correctness.
- b) Accept documentation of the operator's RVSM operations policy/procedures provided as a section of the operator's application for RVSM authority after reviewing it for completeness and correctness.

7.7.3 Operating Practices and Procedures. Nig CARs, provides operating practices and procedures applicable to all R V S M operations. Appendix 4, paragraph 7, lists special emphasis items for pilot training.

7.7.4 Specific Practices and Procedures for RVSM operations in oceanic airspace. Nig CARs, and TGM VOL 3, provides specific practices and procedures for RVSM operations in oceanic airspace. International NOTAMs and other countries' Aeronautical Information Publications also contain operational policy/procedures for RVSM operations.

7.7.5 Operations Training and Operating Practices and Procedures. Operators may use Nig CARs and, TGM VOL 3 and 4, as the basis for their RVSM operations training and operating practices/procedures. Operators will be responsible for incorporating this material into their programmes prior to conducting RVSM operations.

7.8 Validation Tests and Flights.

7.8.1 NCAA TGM Vol 3 chapter 13 and checklist O-OPS013 provides guidance on the RVSM validation test. In some, cases review of the operator's RVSM application and programme documents will suffice for validation test purposes. However, as determined by the FOIs and AWIs, the final step of the approval process may be the completion of a validation flight. The NCAA may accompany the operator on a flight to verify that RVSM operations and maintenance procedures and practices are used effectively. The validation flight may be accomplished during a revenue flight, as determined by the NCAA on a case-by-case basis;



- 7.8.2 Validation flights are NOT required to be conducted in conjunction with the monitoring flights described below. Also, the validation flight may be conducted before monitoring requirements are completed.

8.0 MONITORING PROGRAMMES

- 8.1 Objective of Monitoring.** The primary goal of monitoring is to provide a quality control check on the altitude-keeping performance of the wide variety of operators and aircraft. It has been determined that this may be accomplished by sampling a number of airframes of each aircraft type that an operator will operate in RVSM airspace. Altitude-keeping performance data is analysed to determine that the aircraft fleet, as well as individual operators, exhibits performance that is consistent with RVSM standards.
- 8.2 Operator Plan and Monitoring Requirements.** In its application for RVSM authorization, Nig CARs calls for each operator to submit a plan to participate in monitoring programs. It further notes that the current monitoring requirements for individual operators.

Note: Operators are not required to complete monitoring prior to being granted an LOA.

- 8.3 Monitoring Procedures.** Monitoring procedures for ground-based and Global Positioning System (GPS)-based monitoring systems are published on the RVSM Documentation Web page. Operator aircraft of a specific type or group are monitored after they have been determined to be RVSM compliant. Currently, the operator can have his aircraft monitored by either the ground - based Height Monitoring Unit (HMU) or a portable GPS-based Monitoring Unit (GMU) that can be placed on the aircraft.

9.0 DATABASE OF RVSM COMPLIANT AIRCRAFT

- 9.1** The Authority is in the process of developing a database listing RVSM compliant aircraft on its register. The data will include the following:
- 9.1.1 Operator identification;
 - 9.1.2 Aircraft make/model/series;
 - 9.1.3 Aircraft registration mark (5N-mark);
 - 9.1.4 Manufacturer's serial number;
 - 9.1.5 Initial RVSM Airworthiness Approval date for each individual airframe;
 - 9.1.6 For in-service aircraft, the date work was completed to comply with appropriate RVSM airworthiness document (e.g., SB, SL, STC).
 - 9.1.7 For in-production or new-production aircraft, the date that the OpSpecs or LOA was issued.

9.2 Following operational approval of an operator and aircraft type, the date operational approval was granted (refers to the date that operations specifications or LOA is issued to the operator) must be entered in the database.

10.0 RVSM CERTIFICATION

10.1 Pre-Application Phase

10.1.1 Compliance Statement

The “RVSM Certification” Compliance Statement should be used for this certification process. The applicant will provide the Authority with either an electronic or paper copy of this Compliance Statement.

10.1.2 Required Documents

The applicant will be provided with a copy of Tables 8-1, 8-2, and 8-3 from Appendix 8 of the AOC manual annotated in the right (R) column to show the documents that must be included in their formal application submission:

- Compliance Statement
- Schedule of Events
- Flight Operations Manual Revisions (AWO policies)
- Condensed and Expanded Checklists (AWO procedures incorporated)
- Minimum Equipment List (AWO dispatch requirements and provisos incorporated)
- Flight Crew Aircraft Operating Manual (AWO procedures and systems operations)
- Route Guide (Airports and Minima)
- Flight Crew Training and Checking (AWO syllabus, checking, line experience)
- MCM/MME (revisions to incorporate AWO Maintenance Control processes)
- Aircraft and Component Maintenance Program (incorporation of necessary checks and standards)
- Maintenance Task Cards (required to provide for the necessary checks)
- Maintenance Planning Document
- Component Manufacturer’s Maintenance Manual
- Individual Aircraft RVSM Compliance Statements

10.1.3 Schedule of Events

The applicant will submit the Schedule of Events in electronic and hard paper copies.

The CPM will ensure that all necessary NCAA actions are entered in the Schedule of Events (SOE).

Subsequently, the CPM will enter a running record of the return-for-work or acceptable determinations.

The CPM will printout the SOE each Monday morning.

10.1.4 Formal Application Phase

Operations Certification Report

The certification team leader should initiate an operations certification report and immediately annotate the evaluations that are not applicable.

Airworthiness Certification Report

The CPM should initiate an airworthiness certification report and immediately annotate those evaluations that are “not applicable” to this particular certification process.

10.1.5 Document Evaluation Phase

10.1.5.1 Early Training Evaluation and Initial Approval

The following items should be scheduled for evaluation as soon as possible after completion of the formal application phase for the necessary training approvals:

- Aircraft-specific Checklists
- Flight Crew Operating Manual
- Crew and Maintenance Training Contracts
- Aircraft-Specific Ground Training Curricula
- Aircraft-Specific Simulator and Flight Training Curricula
- Aircraft-Specific Simulator to be used
- Proposed Aircraft-Specific Proficiency Check
- Proposed Aircraft-Specific Check Pilots
- Aircraft-Specific Systems Maintenance Training

10.1.6 Inspection and Demonstration Phase

10.1.6.1 Minimum Required Inspections

The minimum inspections that must be conducted prior to certification are: (assuming no special certification issues)

10.1.7 Operations

The Operations team will complete all appropriate job tasks before the validation flights.

During the validation flight the Operations Team will complete all appropriate job tasks.

10.1.8 Airworthiness

The Airworthiness team will complete inspections all appropriate job tasks before the validation flight(s).

10.1.8.1 Demonstration Flight

A validation flight will be accomplished with the first flights.

10.1.9 Approval Phase

10.1.9.1 AOC and Operations Specifications

E9 will be added to the Operations Specifications.

10.1.9.2 Completed Certification Report

No special instructions.

10.2 Operational approval

10.2.1 General

Airspace where RVSM is applied should be considered special qualification airspace. The specific aircraft type or types that the operator intends to use will need to be approved by the responsible authority before the operator conducts flight in RVSM airspace. In addition, where operations in specified airspace require approval in accordance with an ICAO Regional Navigation Agreement, an operational approval will be needed. This document provides guidance for the approval of specific aircraft type or types, and for operational approval.

10.2.2 Approval of Aircraft

Each aircraft type that an operator intends to use in RVSM airspace should have received RVSM airworthiness approval from the NCAA, prior to approval being granted for RVSM operations, including the approval of continued airworthiness programmes.

It is accepted that aircraft, which have been approved in compliance with JAA Information Leaflet No. 23 or FAA Interim Guidelines 91-RVSM, satisfy the airworthiness type certification.

10.2.3 Continued Airworthiness Maintenance Procedures

RVSM maintenance requirements are detailed in the NCAA TGM VOL 4 Airworthiness Handbook.

10.2.4 Maintenance Documents

The following items should be reviewed, as appropriate:

- (a) Maintenance Manuals.
- (b) Structural Repair Manuals.
- (c) Standard Practices Manuals.
- (d) Illustrated Parts Catalogues.
- (e) Maintenance Programme.
- (f) MMEL/MEL.

10.2.5 Operational Approval

Approval will be required for each aircraft group and each aircraft to be used for RVSM operations. Approval will be required for each operator and the responsible authority will need to be satisfied that

- (a) Each aircraft holds airworthiness approval;
- (b) Each operator has continued airworthiness programmes (maintenance procedures);
- (c) Where necessary, operating procedures unique to the airspace have been incorporated in operations manuals;
- (d) High levels of aircraft height keeping performance can be maintained.

10.2.6 Content of Operator RVSM Application

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

- (a) *Airworthiness Documents* Documentation that shows that the aircraft has RVSM airworthiness approval.
- (b) *Description of Aircraft Equipment* A description of the aircraft equipment appropriate to operations in an RVSM environment.
- (c) *Training Programmes and Operating Practices and Procedures* Holders of Air Operators Certificates (AOC) may need to submit training syllabi for initial, and where appropriate, recurrent training programmes together with other appropriate material to the responsible authority. The material will need to show that the operating practices, procedures and training items, related to RVSM operations in airspace that requires NCAA operational approval, are incorporated. Non-AOC operators will need to comply with local procedures to satisfy the responsible authority that their knowledge of RVSM operating practices and procedures is equivalent to that set for AOC Holders, sufficient to permit them to conduct RVSM operations.
- (d) *Operations Manuals and Checklists* The appropriate manuals and checklists should be revised to include information/guidance on standard operating

procedures. Manuals should include a statement of the airspeeds, altitudes and weights considered in RVSM aircraft approval; including identification of any operating limitations or conditions established for that aircraft group. Manuals and checklists may need to be submitted for review by the authority as part of the application process.

- (e) *Past Performance* Relevant operating history, where available, should be included in the application. The applicant should show that changes needed in training, operating or maintenance practices to improve poor height keeping performance, have been made.
- (f) *Minimum Equipment List* Where applicable, a minimum equipment list (MEL), adapted from the master minimum equipment list (MMEL) and relevant operational regulations, should include items pertinent to operating in RVSM airspace.
- (g) *Maintenance* When application is made for operational approval, the operator should establish a maintenance programme acceptable to the NCAA.
- (h) *Plan for Participation in Verification/Monitoring Programmes* The operator should establish a plan acceptable to the responsible authority, for participation in any applicable verification/ monitoring programme. This plan will need to include, as a minimum, a check on a sample of the operator's fleet by an independent height monitoring system.

10.2.6.1 Validation Flight(s)

The content of the RVSM application may be sufficient to verify the aircraft performance and procedures. However, the final step of the approval process may require a validation flight. The NCAA may appoint an inspector for a flight in RVSM airspace to verify that all relevant procedures are applied effectively. If the performance is satisfactory, operation in RVSM airspace may be permitted.

10.2.6.2 Form of Approval Documents

- (a) *Holders of an Air Operator's Certificate* Approval to operate in designated RVSM airspace areas will be granted an Approval issued by the responsible authority in accordance with Nig. CARs, or in compliance with national regulations where operational approval is required by an ICAO Regional Agreement. Each aircraft group for which the operator is granted approval will be listed in the Approval.
- (b) *Non-AOC Holders* These operators will be issued with an Approval as required by national regulations or with Nig. CARs. These approvals will be valid for a period specified in national regulations and may require renewal.

Note: Subject to compliance with applicable criteria, an RVSM Approval combining the airworthiness approval and the operational approval is available from the NCAA.

10.2.6.3 Airspace Monitoring

For airspace where a numerical Target Level of Safety is prescribed, monitoring of aircraft height keeping performance in the airspace by an independent height monitoring system is necessary to verify that the prescribed level of safety is being achieved. However, an independent monitoring check of an aircraft is not a prerequisite for the grant of an RVSM approval.

10.2.6.4 Suspension, Revocation and Reinstatement of RVSM Approval

The incidence of height keeping errors that can be tolerated in an RVSM environment is small. It is expected of each operator to take immediate action to rectify the conditions that cause an error. The operator should report an occurrence involving poor height keeping to the responsible authority within 72 hours. The report should include an initial analysis of causal factors and measures taken to prevent repeat occurrences. The need for follow up reports will be determined by the responsible authority.

10.2.6.5 Operators Actions

The operator should make an effective, timely response to each height keeping error. The NCAA may consider suspending or revoking RVSM approval if the operator's responses to height keeping errors are not effective or timely. The NCAA will consider the operator's past performance record in determining the action to be taken.

10.2.6.6 Reinstatement of Approval

The operator will need to satisfy the responsible authority that the causes of height keeping errors are understood and have been eliminated and that the operator's RVSM programmes and procedures are effective. At its discretion and to restore confidence, the NCAA may require an independent height monitoring check of affected aircraft to be performed.