

**CIVIL AVIATION AUTHORITY, BANGLADESH  
AIR NAVIGATION ORDERS  
FLIGHT OPERATIONS REQUIREMENTS**

**PART A – Flight Crew Licensing, Training and Authorization**

**ANO (OPS) A-8 – REQUIREMENTS OF TRAINING FOR FLIGHT CREW IN  
IMPLEMENTING REDUCED VERTICAL SEPARATION MINIMUM (RVSM)**

**SECTIONS**

1.	INTRODUCTION	5.	<b>OPERATIONAL APPROVAL</b>
2.	APPLICABILITY	6.	AIRCRAFT SYSTEMS AND REPORTING ALTITUDE KEEPING ERRORS
3.	DEFINITIONS	7.	REMOVAL OR AMENDMENT OF AUTHORITY
4.	BASIC REQUIREMENTS		
Appendix-A	Training Programs and Operating Practices / Procedures		
Appendix-B	Contingency Procedures		
Appendix-C	Verification / Monitoring Programs		
Appendix-D	RVSM Aircraft & Operational Approval Application Form		

**1. INTRODUCTION:**

- 1.1 Rule 143 (2)(d) of CAR'84 stipulates that every airplane shall be fitted with instrument and equipment, including radio apparatus and special equipment, as may be specified according to the use and circumstances under which the flight is to be conducted.
- 1.2 In the mid 1970's, the world fuel shortage and the resultant rapid increase in the fuel prices led to the growing demand for a more optimum and efficient utilization of the available airspace. **This, in consequence,** emphasized the need to reduce the Vertical Separation Minimum (VSM) above FL 290 from 600 m (2000 ft) to 300 m (1000 ft). Various studies by several countries revealed that a separation of 300 m (1000 ft VSM above FL 290 is technically feasible and does not compromise with the safety of the aircraft.
- 1.3 Bangladesh Airspace and its neighboring airspaces are RVSM airspaces between FL 290 and FL 410, inclusive of FL 290 and FL 410.

Deleted: 11

## 2. APPLICABILITY:

- 2.1 This ANO is intended to provide necessary guidance for RVSM operations. It establishes an acceptable means, but not the only means, that can be used in the approval of aircraft and operators to conduct flight in airspace or on routes where Reduced Vertical Separation Minimum (RVSM) is applied. It lays down guidance and requirements on operations programs for RVSM operations.
- 2.2 Non RVSM approved aircraft intending to climb/descend through RVSM airspace and other operations such as humanitarian, maintenance, ferry flights and State/military aircraft shall be dealt with by Chairman, CAAB on case to case basis with limitations/ restrictions as may be considered necessary.
- 2.3 The contents of this ANO are consistent with the provisions of ICAO Annex 6 and ICAO Doc 9574 on the above subject.

## 3. DEFINITIONS:

- 3.1 **Aircraft Group:** A group of aircraft that are of nominally identical design and build with respect to all details that could influence the accuracy of height keeping performance. Formatted: Font: Bold
- 3.2 **Altimetry System Error (ASE):** The difference between the pressure altitude displayed to the flight crew when referenced to the International Standard Atmosphere ground pressure setting (1013.25 hPa /29.92 in. Hg) and free stream pressure altitude. Formatted: Font: Bold
- 3.3 **Assigned Altitude Deviation (AAD):** the difference between the transponder Mode C altitude and the assigned altitude/ flight level. Formatted: Font: Bold
- 3.4 **Automatic Altitude Control System:** Any system that is designed to automatically control the aircraft to a referenced pressure altitude. Formatted: Font: Bold
- 3.5 **Avionics Error (AVE):** The error in the processes of converting the sensed pressure into an electrical output, of applying any Static Source Error Correction (SSEC) as appropriate, and of displaying the corresponding altitude. Formatted: Font: Bold
- 3.6 Basic RVSM Envelope: The range of Mach numbers and gross weights within the altitude ranges FL 290 to FL 410 (or maximum attainable) where an aircraft can reasonably be expected to operate most frequently.
- 3.7 **Flight Technical Error (FTE):** Difference between the altitude indicated by the altimeter display being used to control the aircraft and the assigned altitude/flight level. Formatted: Font: Bold
- 3.8 **Full RVSM Envelope:** The entire range of operational Mach numbers, W/6, and altitude values over which the aircraft can be operated within RVSM airspace. Deleted: //  
Formatted: Font: Bold

- 3.9 **Height keeping Capability:** Aircraft height keeping performance that can be expected under nominal environmental operating conditions, with proper aircraft operating practices and maintenance. Formatted: Font: Bold
- 3.10 **Height keeping Performance:** the observed performance of an aircraft with respect to adherence to a flight level. Formatted: Font: Bold
- 3.11 **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. Formatted: Font: Bold
- 3.12 **Residual Static Source Error:** The amount by which Static Source Error (SSE) remains under-corrected or overcorrected after the application of SSEC. Formatted: Font: Bold
- 3.13 **RVSM Airspace:** RVSM airspace is any designated airspace/route between FL 290 and FL 410 inclusive where aircraft are separated vertically by 1 000 ft (300 m) Formatted: Font: Bold
- 3.14 **Static Source Error:** The difference between the pressure sensed by the static system at the static port and the undisturbed ambient pressure. Formatted: Font: Bold
- 3.15 **Static Source Error Correction (SSEC):** A correction for static source error. Formatted: Font: Bold
- 3.16 **Total Vertical Error (TVE):** Vertical geometric difference between the actual pressure altitude flown by an aircraft and its assigned pressure altitude (flight level). Formatted: Font: Bold

#### 4. BASIC REQUIREMENTS

No person shall operate Bangladesh registered aircraft in airspace designated as Reduced Vertical Separation Minimum (RVSM) airspace unless:

- (a) The operator's aircraft comply with the requirements of the ANO (AW) E.11 and Airworthiness approval for the specific aircraft by registration marks have been accorded by the Chairman;
- (b) The operator's flight crews have completed a training programme approved by the Chairman and Operational in respect of the Operator has been accorded by the Chairman; and
- (c) The Operations Specifications of the operator's AOC are endorsed by Chairman, CAAB which authorizes the operator to conduct RVSM operation.

Deleted: 11

5. OPERATIONAL APPROVAL:

Operator is required to obtain CAAB approval to operate in airspace designated as RVSM airspace. The following criteria must be fulfilled by an operator to acquire an approval :

- 5.1 The operator shall submit, prior to conducting RVSM operations, operational programs including the flight crew training Programmes, Operating Practices/Procedures and check list that should be included in the Operator's operations manual, for approval. (Note : The requirements for the Flight Crew Training Programs and Operating Practices/Procedures detailed in Appendix-A shall be complied with);
- 5.2 Each aircraft type group utilized by an operator shall be capable of height keeping performance which does not exceed a mean Total Vertical Error of 25m (80ft). Chairman, CAAB may verify this by evaluating the Altimetry System Error (ASE) and Flight Technical Error (FTE) components of Total Vertical Error (TVE) separately;
- 5.3 The standard deviation about the mean TVE shall not exceed the following:
  - a) Standard Deviation (ft):  $82 - 0.004z^2$  where z equals mean TVE for the aircraft type in feet;
  - b) Standard Deviation (m):  $25 - 0.016z^2$  where z equals mean TVE for the aircraft type in meters.
- 5.4 A Minimum Equipment List (MEL) adopted from the Master Minimum Equipment List (MMEL) and relevant operational regulations, should include items pertaining to the RVSM operations.

**Formatted:** Font: 13 pt

**Formatted:** Indent: Left: 0.5", Hanging: 0.5"

**Deleted:**

**Deleted:** training

**Deleted:**

**Deleted:** as

**Deleted:** well as

**Deleted:** s

**Deleted:** and check list

6. AIRCRAFT SYSTEMS AND REPORTING ALTITUDE KEEPING ERRORS

- 6.1 The aircraft shall be equipped to meet the minimum equipment for RVSM operations, for which detailed requirements are stated in the ANO (AW) E.11.
- 6.2 Each operator shall develop a system of reporting each event in which the operator's aircraft has exhibited the height deviations which are in magnitude equal to or, greater than, the following criteria:
  - (a) Total Vertical Error 300 feet
  - (b) Altimetry System Error 245 feet; and
  - (c) Assigned Altitude Deviation - 300 feet.

**Deleted:** 5.5

**Deleted:** The requirements for the Flight Crew Training Programs and Operating Practices/Procedures detailed in Appendix-A shall be complied with

**Deleted:** .¶

**Formatted:** Font: 7 pt

**Formatted:** Indent: Left: 0.5"

**Formatted:** Indent: Left: 0.5"

**Deleted:** 11

7. **ISSUE/RESTRICT/REVOKE OF RVSM AUTHORIZATION**

Chairman, CAAB ~~may restrict or~~ revoke an RVSM authorisation if it is found that the operator is not complying, or is unable to comply with the requirements of this ANO.

Chairman, Civil Aviation Authority, Bangladesh is pleased to issue this ANO (OPS) A-8, Approval Requirements for Reduced Vertical Separation Minimum (RVSM) in pursuance of Rule 4 and 143 (2) (d) of CAR'84 and the ANO will come into effect immediately.

Chairman  
Civil Aviation Authority, Bangladesh

**Deleted: REMOVAL OR AMENDMENT**

**Deleted: AUTHORITY**

**Deleted:** Chairman, Civil Aviation Authority, Bangladesh is pleased to issue this ANO (OPS) A-8, Approval Requirements for Reduced Vertical Separation Minimum (RVSM) in pursuance of Rule 4 and 143 (2) (d) of CAR'84 and the ANO will come into effect immediately.¶

**Inserted:** Chairman, Civil Aviation Authority, Bangladesh is pleased to issue this ANO (OPS) A-8, Approval Requirements for Reduced Vertical Separation Minimum (RVSM) in pursuance of Rule 4 and 143 (2) (d) of CAR'84 and the ANO will come into effect immediately.¶

**Deleted:** may amend Operations Specifications of the operator to

**Deleted:** or restrict

**Deleted:** (OPS) A-8

**Deleted:** Chairman, Civil Aviation Authority, Bangladesh is pleased to issue this ANO (OPS) A-8, Approval Requirements of Training for Flight Crew in Implementing Reduced Vertical Separation Minimum (RVSM) order in pursuance of Rule 4 and 143 (2) (d) of CAR'84 and the ANO will come into effect immediately.

**Deleted:** ¶  
¶  
¶

**Deleted:** 11

APPENDIX – A

Training Programs and Operating Practices / Procedures

1. 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 this appendix shall be standardised and incorporated into training programs and operating practices and procedures.

Deleted: Certain items may already be adequately standardised 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.

2. FLIGHT PLANNING

During flight planning the flight crew shall pay particular attention to conditions that may affect operation in RVSM airspace. These include, but may not be limited to:

- (a) Verifying that the aircraft is approved for RVSM operations;
- (b) Reported and forecast weather on the route of flight;
- (c) Minimum equipment requirements pertaining to height keeping & alerting systems;
- (d) Any operating restriction of aircraft related to RVSM approval.

Deleted: airframe

Deleted: airframe of

3. PRE-FLIGHT PROCEDURES AT THE AIRCRAFT FOR EACH FLIGHT

The following actions shall 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 shall 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 (e.g. a flight engineer or ground engineer);
- (c) Before takeoff, the aircraft altimeters shall be set to the QNH of the airfield and shall display a known altitude, within the limits specified in the aircraft operating manuals. The two primary altimeters shall also agree within limits specified by the aircraft operating manual. An altitude indicating systems shall be performed; and
- (d) Before take-off, equipment required for flight in RVSM airspace shall be operative, and any indications of malfunction shall be resolved.

Deleted: ¶  
¶  
¶

4. IN-FLIGHT PROCEDURES

4.1 General

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

Deleted: ¶

- (a) Flight crews will need to comply with any aircraft operating restrictions, if required for the specific aircraft group, e.g. limits on indicated Mach number, given in the RVSM airworthiness approval.
- (b) Emphasis shall 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 shall not intentionally depart from cleared Flight Level without a positive clearance from ATC unless the crew are conducting contingency or emergency maneuvers;
- (d) When changing levels, the aircraft shall 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 shall be operative and engaged during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence requiring disengagement. In any event, adherence to cruise altitude shall 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 shall be made. A minimum of two will need to agree within  $\pm 200$  ft ( $\pm 60$  m). Failure to meet this condition will require that the altimetry system be reported as defective and notified to ATC:
  - i) The usual scan of flight deck instruments shall suffice for altimeter cross-checking on most flights;
  - ii) Before entering RVSM airspace, the initial altimeter cross check of primary and standby altimeters shall be recorded;

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

- (h) In normal operations, the altimetry system being used to control the aircraft shall be selected for the input to the altitude reporting transponder transmitting information to ATC;
- (i) 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  $\pm 300$  ft ( $\pm 90$  m) and / or an ASE greater than  $\pm 245$  ft ( $\pm 75$  m) then the pilot shall 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

Deleted:

Deleted: e

Deleted: 11

If the pilot is notified by ATC of an assigned altitude deviation, which exceeds ±300 ft (±90 m), the pilot shall take action to return to the cleared Flight Level as quickly as possible.

Deleted: It  
Deleted: then

4.2 Procedures Prior to RVSM Airspace Entry

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

- a) Two primary altitude measurement systems;
- b) One automatic altitude-control system;
- c) One altitude-alerting device; and
- d) An operating transponder.

Formatted: Font: 6 pt

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.

Formatted: Font: 7 pt

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

Note: If 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.

4.3 Contingency Procedures after Entering RVSM Airspace

The pilot shall 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 shall 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 shall 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 shall follow any established contingency procedures and obtain ATC clearance as soon as possible.

Formatted: Font: 2 pt

Formatted: Font: 4 pt

5. Post-Flight Procedures

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

Deleted: //

- (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.
- (f) The transponder selected to provide altitude information to ATC and any difference noted.

**6. Special Emphasis Items: The following items shall also be included in crew training:**

- (a) Knowledge and understanding of standard ATC phraseology use 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 shall 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 1000 ft (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.

Deleted: 11

APPENDIX – B**Contingency Procedures****1. THE BASIC CONCEPTS FOR CONTINGENCIES ARE:**

- (a) Guidance for contingency procedures shall not be interpreted in any way, which prejudices the final authority and responsibility of the pilot in command for the safe operation of the aircraft.
- (b) If the pilot is unsure of the vertical or lateral position of the aircraft or the aircraft deviates from its assigned altitude or track for cause without prior ATC clearance, then the pilot must take action to mitigate the potential for collision with aircraft on adjacent routes or flight levels. In this situation, the pilot should alert adjacent aircraft by making maximum use of aircraft lighting and broadcasting position, flight level, and intentions on 121.5 MHz (as a back-up, the appropriate VHF inter-pilot air-to-air frequency may be used);
- (c) Unless the nature of the contingency dictates otherwise, the pilot should advise ATC as soon as possible of a contingency situation and if possible, request at ATC clearance before deviating from the assigned route or flight level.
- (d) If a revised ATC clearance cannot be obtained in a timely manner and action is required to avoid potential conflict with other aircraft, then the aircraft should be flown at an altitude and/or on a track where other aircraft are least likely to be encountered. This can be accomplished by offsetting from routes or altitudes normally flown in the airspace. The recommendations on the order of preference for pilot actions are:
  - i) The pilot may offset half the lateral distance between routes or tracks.
  - ii) The pilot may offset half the vertical distance between altitudes normally flown.
  - iii) The pilot may also consider descending below FL 285 or climbing above FL 410.
- (e) When executing a contingency maneuver the pilot should:
  - i) Watch for conflicting traffic both visually and by reference to ACAS, if quipped.
  - ii) Continue to alert other aircraft using 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency may be used) and aircraft lights.
  - iii) Continue to fly offset tracks or altitudes until an ATC clearance is obtained.
  - iv) Obtain an ATC clearance as soon as possible.

**2. Guidance to the Pilot (Including Expected ATC Actions) in the Event of Equipment Failures or Encounters with Turbulence after Entry into RVSM Airspace.**

In addition to emergency conditions that may make it impossible for an aircraft to maintain its Cruising Flight Level (CFL) appropriate to RVSM. Controllers should react to such conditions but these actions cannot be specified, as they will be dynamically affected by the real-time situation.

Deleted: 11

- (a) Objective: The following material is provided with the purpose of giving the pilot guidance on actions to take under certain conditions of equipment failure and encounters with turbulence. It also describes the expected ATC controller actions in these situations. It is recognized that the pilot and controller will use judgment to determine the action most appropriate to any given situation. For certain equipment failures, the safest course of action may be for the aircraft to maintain the assigned FL and route while the pilot and controller take precautionary action to protect separation. For extreme cases of equipment failure, however, the safest course of action may be for the aircraft to depart from the cleared FL or route by obtaining a revised ATC clearance or if unable to obtain prior ATC clearance, executing the established contingency maneuvers for the area of operation.
- (b) Contingency Scenarios: These scenarios summarize pilot actions to mitigate the potential for conflict with other aircraft in certain contingency situations. These should be reviewed in conjunction with the expanded contingency scenarios detailed in Paragraph 3, which contain additional technical and operational detail.

**Scenario 1: The pilot is:**

- (1) Unsure of the vertical position of the aircraft due to the loss or degradation of all primary altimetry systems, or
- (2) Unsure of the capability to maintain Cruising Flight Level (CFL) due to turbulence or loss of all automatic altitude control systems.

<b>The Pilot should:</b>	
Maintain CFL while evaluating the situation;	
Watch for conflicting traffic both visually and by reference to ACAS, if equipped;	
If considered necessary, alert nearby aircraft by	
1) Making maximum use of exterior lights;	
2) Broadcasting position, FL, and intentions on 121.5 MHz (as a back up, the VHF inter-pilot air-to-air frequency may be used).	
	<b>ATC can be expected to:</b>
Notify ATC of the situation and intended course of action. Possible courses of action include:	Obtain the pilot's intentions and pass essential traffic information.
1) Maintaining the CFL and route provided that ATC can provide lateral, longitudinal or conventional vertical separation.	If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.
2) Requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain CFL and ATC cannot establish adequate separation from other aircraft.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.

Deleted: 11

3) Executing the Doc 7030 contingency maneuver to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	3) If adequate separation cannot be established and it is not possible to comply with the pilot’s request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.
	4) Notify adjoining ATC facilities/sectors of the situation.

**Scenario 2:** There is a failure or loss of accuracy of one primary altimetry system (e.g., greater than 200 foot difference between primary altimeters).

**The Pilot should**

Cross check standby altimeter, confirm the accuracy of a primary altimeter system and notify ATC of the loss of redundancy. If unable to confirm primary altimeter system accuracy, follow pilot actions listed in the preceding scenario.

3. Expanded Equipment Failure and Turbulence Encounter Scenarios: Operators may consider this material for use in training programs.

**Scenario 1:** All automatic altitude control systems fail (e.g., Automatic Altitude Hold).

The Pilot should: Initially  
 Maintain CFL  
 Evaluate the aircraft’s capability to maintain altitude through manual control.

**Subsequently**

Watch for conflicting traffic both visually and by reference to TCAS, if equipped.  
 If considered necessary, alert nearby aircraft by

- 1) Marking maximum use of exterior lights.
- 2) Broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency may be used.)

Notify ATC of the failure and intended course of action. Possible courses of action include:	ATC can be expected to
1) Maintaining the CFL and route, provided that the aircraft can maintain level.	1) If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.
2) Requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain CFL and ATC cannot establish lateral, longitudinal or conventional vertical separation.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.

Deleted: 11

3) Executing the contingency maneuver to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.
	4) Notify adjoining ATC facilities/sectors of the situation.

**Scenario 2:** Loss of redundancy in primary altimetry systems

The Pilot should	ATC can be expected to
If the remaining altimetry system is functioning normally, couple that system to the automatic altitude control system, notify ATC of the loss of redundancy and maintain vigilance of altitude keeping.	Acknowledge the situation and continue to monitor progress.

**Scenario 3:** The primary altimeters diverge by more than 200 ft (60m)

## The Pilot should

Attempt to determine the defective system through established trouble shooting procedures and/or comparing the primary altimeter display to the standby altimeter (as corrected by the correction cards, if required).

If the defective system can be determined, couple the functioning altimeter system to the altitude keeping device.

If the defective system cannot be determined, follow the guidance in Scenario 3 for failure or unreliable altimeter indications of all primary altimeters.

**Scenario 4:** All primary altimetry systems are considered unreliable or fail:

## The Pilot should

Maintain CFL by reference to the standby altimeter (if the aircraft is so equipped).

## Alert nearby aircraft by

- 1) Making maximum use of exterior lights;
- 2) Broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency may be used).

	ATC can be expected to
Consider declaring an emergency. Notify ATC of the failure and intended course of action. Possible course of action include:	Obtain pilot's intentions, and pass essential traffic information.

Deleted: 11

1) Maintaining CFL and route provided that ATC can provide lateral, longitudinal or conventional vertical separation.	If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.
2) requesting ATC clearance to climb above or descend below RVSM airspace if ATC cannot establish adequate separation fro other aircraft.	2) If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
3) Executing the Doc 7030 contingency maneuver to offset from the assigned track and FL, if ATC clearance cannot be obtained.	3) If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.
	4) Notify adjoining ATC facilities/sectors of the situation.

**Scenario 5:** Turbulence (greater than moderate) which the pilot believes will impact the aircraft's capability to maintain flight level.

The Pilot should

Watch for conflicting traffic both visually and by reference to TCAS, if equipped.

If considered necessary, alert nearby aircraft by:

- 1) Making maximum use of exterior lights;
- 2) Broadcasting position, FL, and intentions on 121.5 MHz (as a back-up, the VHF inter-pilot air-to-air frequency may be used).

Notify ATC of intended course of action as soon as possible. Possible courses of action include:	ATC can be expected to
1) Maintaining CFL and route provided ATC can provide lateral, longitudinal or conventional vertical separation.	1) Assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.
2) Requesting flight level change, if necessary.	2) If unable to provide adequate separation, advise the pilot of essential traffic information and request pilot's intentions.
3) Executing the Doc 7030 contingency maneuver to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	Notify other aircraft in the vicinity and monitor the situation
	4) Notify adjoining ATC facilities/sectors of the situation.

Deleted: 11

4. Special Procedures for In-Flight contingencies Published for Individual ICAO Regions in Doc 7030.
  - a) The Doc 7030 should be considered the source document for specific contingency procedures applicable to individual ICAO regions. Doc 7030 should always be consulted before training material or manuals are developed.
  - b) In-flight contingency procedures applicable to Pacific oceanic operations are published in the Regional Supplementary Procedures for the Pacific and the Middle East/Asia (Mid/Asia).
  - c) In-flight contingency procedures applicable to NAT oceanic operations are published in NAT Regional Supplementary Procedures.

**5. Wake Turbulence Procedures.**

These procedures provide for the contingency use of a 2 NM lateral offset to avoid exposure to wake turbulence. The procedures are published in NOTAMS, AIPs, and Regional Supplementary Procedures. These procedures should be incorporated in pilot training programs and manuals.

**6. Transponder Failure and RVSM Transition Areas.**

Transition areas are planned to be established between airspaces where different vertical separation standards are applied. The specific actions that ATC will take in the event of transponder failure in RVSM transition areas will be determined by the provider States.

Deleted: 11

## Appendix – C

**Verification / Monitoring Programs****1. GENERAL**

A program to monitor or verify aircraft height-keeping performance is considered a necessary element of RVSM implementation for at least the initial area where RVSM is implemented. A height-monitoring system based on Global Positioning System (GPS) satellites or an earth-based system may fulfill this function.

**2. MONITORING AGENCY FOR ASIAN REGION (MAAR)**

MAAR is the agency responsible for this function in the Asian region. Current RVSM minimum monitoring requirements and information on Global Monitoring System (GMS) flights are detailed in MAAR website <http://www.aerothai.co.th/maar>.



Deleted: 11

## Appendix – D

**RVSM Aircraft & Operational Approval Application Form****Part 1 – Operator Details**

1. Operator	2. Aircraft Registration	3. Aircraft Type(s)	4. Date
5. Operator's Address:			
6. Whether the aircraft is/are approved for RVSM operation by Airworthiness?			
7. If yes to No 6, attach the following documents:			
a) Description of Aircraft Equipment b) Airworthiness Approval Certificate c) Revised Operations Manuals & Checklists d) Height Keeping Past Performance e) Revised Minimum Equipment List f) RVSM Training Programs & Operating Practices / Procedures g) Any other related information.			
8. Is Monitoring required by MAAR?			
9. If yes, state whether on Global Positioning System (GPS) satellites or GPS-Based Monitoring System (GMS):			
10. Applicant's Name	11. Position	12. Signature	

**Part 2 – Scrutiny**

1. Comments by FOI: (Include results of verification flight/inspection of operator & aircraft)
--

**Part 3 – Approval by DFSR**

1. Comments by DFSR/FOI:		
2. Any Limitations and/or Conditions:		
3. Name and Signature of Approving Authority.	4. Position	5. Date

Deleted: 11