

**GREPECAS RVSM TASK FORCE MEETING/3  
(RVSM TF/3)**

*(Lima, 8-9 August, 2002)*

**Agenda Item 4: Aircraft operation and airworthiness Working Group (OPS/AIR/WG)**

**Tasks and Issues for the ATC Operations Working Group**

*(Presented by the United States)*

**SUMMARY**

This paper outlines ongoing issues and tasks of the ATC Operations Working Group necessary for RVSM implementation in the Caribbean/South American regions. It also identifies some tasks that require resolution in the near-term timeframe.

**1. Introduction**

1.1 The ATC Working Group (ATC/WG) is responsible for addressing air traffic issues related to RVSM implementation in the Caribbean and South American regions. In addition to the specific terms of references assigned by the full RVSM Task Force, the ATC W/G is also charged with working with each CAR/SAM State to assist them in RVSM implementation. The ATC W/G will develop a detailed implementation plan based on the agreements reached by the States related to altitude stratum and exclusionary airspace.

**2. Background**

2.1 The ATC W/G has been assigned a comprehensive task list based on previous global RVSM implementations. The task list is included as Appendix A to this working paper. The group will customize those elements that require changes specific to the CAR/SAM region. This working paper will address many of these tasks and divide them into near-term, mid-term, and long-term issues.

### 3. Narrative

3.1.1 In the near-term, the ATC W/G must complete the Operational Concept (CONOPS) for CAR/SAM RVSM operations. The CONOPS will put into writing the decisions of the States related to the limits of RVSM implementation and will represent our view of how RVSM operations will be carried out in the day-to-day ATC environment. The CONOPS will also provide the Safety and Monitoring Group with information needed to complete the safety analysis. ATC simulations will be conducted during this timeframe, providing data to support, or modify, the decisions reached on the issues noted below. Three items of note that have been identified by previous RVSM implementations are:

- The time required to train operators and controllers on RVSM procedures is less than might be expected.
- RVSM implementation can actually reduce traffic congestion below the RVSM altitude stratum by allowing more aircraft into the higher altitudes.
- RVSM does not “build airplanes”. Many service providers have concerns that RVSM will increase flow management problems, however, previous implementations have shown that RVSM actually assists in ATFM by providing controllers with additional tools to reduce congestion and complexity.

3.1.2 In order to complete the CONOPS, the ATC W/G and the full Task Force must reach consensus as to the altitude stratum to be used, the extent of exclusionary airspace, and the accommodation of unapproved aircraft. Reference the altitude stratum to be used, a single phase approach implementing from FL290 to FL410 across the CAR/SAM region has several advantages:

- Harmonization with the NAM region, as well as the NAT, WATRS, and PAC airspace
- The ability to conduct one safety analysis for the entire region at one time
- The highest level of benefit to the RVSM approved user fleet
- The least complicated operational environment for both users and controllers

3.1.3 Reference the designation of exclusionary airspace, several factors must be considered. By designating most of the FIRS in the CAR/SAM exclusionary within the noted altitude stratum, there will be a harmonized area of RVSM exclusionary airspace from the northern portions of Canada south to the northernmost FIRs of Argentina and Chile. By requiring RVSM approval to operate in this airspace (except as noted in the CONOPS), the highest level of safety and operational efficiency can be achieved. Because of their unique geographical location and traffic patterns, Chile and Argentina could operate the majority of their FIRs as either exclusionary or transition airspace, while still providing the maximum benefit to long distance international flights.

3.1.4 The question of handling non-approved aircraft is one that must be answered in the near-term in order to allow the necessary modeling for the safety analysis. Each State and service provider can determine, with the assistance of the ATC W/G, how they will accommodate non-approved aircraft in RVSM exclusionary airspace. Given the level of infrastructure (communications and radar) in the region, it may be possible to allow individual controllers some latitude when deciding whether or not to permit non-approved operators to operate in exclusionary airspace within their FIRs/Countries. In addition, the group will develop procedures to handle certain non-approved aircraft identified in ICAO RVSM procedures. However, it must be noted that allowing non-approved aircraft into RVSM altitudes can influence our ability to meet the Target Level of Safety. A suggested starting point would be to require RVSM approval for all long haul international flights (except as noted) while at the same time developing ways to accommodate domestic traffic with less restriction.

3.1.5 In the mid-term, the ATC W/G must develop the necessary documentation for operational application of RVSM. These include changes to the regional 7030 documents, manuals for RVSM training and operations, AIP and Supplement changes, and tracking documents. In addition, contingency procedures must be developed to deal with weather deviations, equipment failures, and other operational problems. It should be noted that many other regional groups have already prepared these types of documents, providing us with valuable examples to start with. Several examples of these documents are included as appendices to this working paper. Procedures for the use of lateral offsets by pilots during situations of equipment outages, weather deviations, wake turbulence, etc, are already in place, and can be easily modified to function in the unique environment of the CAR/SAM regions. The ATC W/G will also study the problems caused by the “Andes Rule” relating to loss of pressurization. Where practical, the ATC working group will also assist States in developing ATC simulations for their unique environments.

3.1.6 Work in the long term will be greatly affected by the decisions made over the next few weeks and months. Completion of the required training manuals, a regional RVSM operational guide, and the completion of required Letters of Agreement between States and FIRs will be shaped during this time frame. The ATC W/G will also track the progress of each State related to completion of the required task and report this progress regularly to the full RVSM Task Force, the ATM/CNS Subgroup, and GREPECAS. This tracking form will be available on the CAR/SAM RVSM website so that the overall implementation plan can be monitored.

#### **4. Current Progress**

4.1 The CONOPS is currently in draft form and should be available for review at the RVSM T/F 4 meeting in September. It is important that the group reach decisions at this meeting as to altitude stratus, exclusionary airspace, and the accommodation of non-approved aircraft. This will allow for completion of the CONOPS so that it can be used for the safety analysis. An ATC training manual is also under development and should be ready for review by November. States that wish to conduct simulations should advise the ATC W/G no later than RVSM T/F 4 so that the group can assist them with development. A draft “trigger” NOTAM is also nearly completed and will be made available at this meeting. This NOTAM will contain much of the information needed by both operators and service providers to begin development of their States’ RVSM operations guidance material.

4.2 It is important to note that much of the work of the ATC W/G has already been completed during other RVSM implementations, and merely needs to be revised for our regions. Those problems and issues that are unique to the CAR/SAM are easily addressed, as long as we remember the key word:

### HARMONIZATION

If every State, every service provider, every aircraft operator, and every pilot has the same basic set of rules and procedures to deal with any situation we will have the highest probability of achieving the regional target level of safety, thereby ensuring that we can maintain or increase safety while providing a valuable tool to our controllers and a critical cost benefit to the airspace users. At the same time, States and ATC service providers can customize the use of RVSM within their sovereign airspace, provided that both controllers and pilots are educated as to the effect this will have on the regional ATC system.

## **5. Conclusion**

5.1.1 The meeting is invited to take note of the above information.

5.1.2 The meeting is requested to take action on the issues of altitude stratum, exclusionary airspace, and non-approved aircraft.

## Appendix A

The ATC/WG is responsible for addressing all matters relating to air traffic services within the RVSM and transition airspace, to include the following:

- a) To identify the airspace in which exclusionary RVSM will be applied
- b) To develop a CAR/SAM RVSM “Operational Concept”
- c) To identify transition RVSM airspace
- d) To develop the procedures for all facets of RVSM operations, including:
  - RVSM operations within and between exclusionary and transitional airspace
  - RVSM operations between FIRs and ATC service providers
  - Weather deviation procedures
  - Turbulence mitigation procedures
  - Necessary contingency procedures
  - Procedures for discontinuing the use of RVSM for temporary periods
  - Procedures for the accommodation non-approved civil aircraft, including emergency and humanitarian flights
  - Procedures for the accommodation of non-approved State aircraft
  - Procedures for providing RVSM flight data to controllers at the operational position, including any necessary changes to existing Flight Data Processing (FDP) systems.
- e) To consider controller workload issues and identify the need for simulations
- f) To assist States and Organizations with airspace changes
- g) To recommend and develop RVSM training material and methods for ATC staff
- h) To provide to the States common aeronautical information publications and AIP supplements related to RVSM implementation.
- i) To develop necessary changes to regional documentation
- j) To develop ATC procedures for switchover day
- k) To provide appropriate material to the RVSM web site administrator
- l) To assist the SAM with developing a mechanism for receiving, collating, and analyzing information concerning operational errors
- m) To track the progress of the States in implementing ATC-related RVSM tasks, and to report this progress regularly to the RVSM Task Force
- n) To accomplish other tasks as directed by the full RVSM Task Force

## Appendix B

### CARIBBEAN/SOUTH AMERICA (CAR/SAM) REDUCED VERTICAL SEPERATION MINIMUM (RVSM) NOTAM

#### Operational Procedures for RVSM within the CAR/SAM Region

##### 1.0 Introduction

1.1 The ICAO Caribbean/South America Regional Planning and Implementation Group (GREPECAS), in consideration of the significant benefits to be gained by aircraft operators and air traffic services (ATS) providers, has approved the use of RVSM in the CAR/SAM region beginning in XXX 2004/05 . This date will allow for a harmonized implementation with the United States and other States of the North American ICAO region. ICAO Document 9574, *Manual on Implementation of a 300 m [1 000 ft] Vertical Separation Minimum Between FL 290 and FL 410 Inclusive* contains an explanation of RVSM.

1.2 In anticipation of the implementation of RVSM for CAR/SAM airspace on XXXXXXXX 2004, operational procedures have been developed. They apply to both 1000' and 2000' vertical separation environments

1.3 Benefits to be gained from RVSM include:

- the adoption of an ICAO endorsed navigation requirement;
- improved utilization of airspace for ATC conflict resolution; and
- fuel savings of  $\approx 1\%$  for flight closer to optimum cruise altitude.

1.4 CONTENT: The following guidance is addressed in the paragraphs of this document:

Paragraph:

- 2- Implementation of CAR/SAM RVSM
- 3- RVSM Transition Areas
- 4- Airworthiness, Operational Approval, Approvals Database and Monitoring
- 5- In-flight Procedures Within RVSM Airspace
- 6- Special Procedures for In-flight Contingencies – General Procedures
- 7- In-flight Contingency Procedures for Subsonic Aircraft Requiring Rapid Descent, Turn-back or Diversion
- 8- Weather Deviation Procedures
- 9- Special Procedures to Mitigate the Effects of Wake Turbulence
- 10- Height Deviation Reporting
- 11- Flight Planning Requirements
- 12- Procedures for Operation of Non-RVSM Compliant Aircraft in RVSM airspace
- 13- Procedures for Suspension of RVSM

##### 2.0 Implementation of CAR/SAM RVSM

2.1 Effective XXXXXXXX 2004 at 0901 UTC, the airspace contained in the following CAR/SAM FIRs between FL 290 and 410 (inclusive) will be designated as RVSM airspace:

- Mazatlan Oceanic
- Mazatlan
- Monterrey
- Houston
- Miami Oceanic
- Port au Prince
- Santo Domingo
- Habana
- San Juan
- Piarco
- Mexico
- Merida
- Kingston
- Curacao
- Central American
- Panama
- Barranquilla
- Maiquetia
- Georgetown
- Paramaribo
- Rochambeau
- Bogota
- Guayaquil
- Lima
- Porto Velho Manaus
- Belem
- Recife
- Brasilia
- La Paz
- Asuncion
- Resistencia
- Curitiba
- Antofagasta
- Cordoba
- Montevideo

*Note: Use of the term “RVSM Airspace” refers to the RVSM exclusive environment. Airspace where both RVSM compliant and non-compliant operators may be accommodated at all altitudes is referred to as “RVSM Transition Areas”.*

2.2 RVSM is currently applied in the Pacific oceanic FIRs between FL 290-390. RVSM is currently applied in the adjacent North Atlantic FIRs between FL 310-390 (inclusive). On 24 January 2002, RVSM was scheduled for expansion to FL 290-410 (inclusive) in the NAT. RVSM was implemented in Europe and the Recife Corridor in XXXXXXXXX 2001

### **3.0 RVSM Transition Areas**

3.1 Transition areas where RVSM may be applied between FL290-410 will be the airspace within the Santiago, Mendoza, Ezeiza, Puerto Montt, Punta Arenas, and Comodoro Rivadavia FIRs. RVSM approval is **not** required in order to operate within RVSM Transition areas.

3.2 Operators are advised that on XXXX 2004, RVSM separation may be applied between all RVSM approved operators within the transition areas, including those approved flights that are not entering RVSM exclusionary airspace.

### **4.0 Airworthiness, Operational Approval, Approvals Database and Monitoring**

4.1 APPROVAL PROCESS. Operators must obtain operational approval from the State of Registry or State of the Operator, as appropriate, to conduct RVSM operations. On behalf of international civil aviation authorities and operators, the FAA is maintaining a website containing documents and policy for RVSM approval. The web address is: [www.faa.gov/ats/ato/rvsm1.htm](http://www.faa.gov/ats/ato/rvsm1.htm). In the “RVSM Documentation” section, under “Documents Applicable to All RVSM Approvals”, it is recommended that operators first review the following documents to orient themselves to the approval process.

- (1) “RVSM – US Approvals” or “RVSM – International Approvals” (as applicable). These are job aids or check lists that show aircraft/operator approval process events with references to related information in RVSM documents published on the website.
- (2) “RVSM Area New to the Operator”. This document provides a guide for operators that are conducting RVSM operations in one or more areas of operation, but are planning to conduct RVSM operations in an area where they have not previously conducted RVSM operations.

4.2 REGISTRATION ON CARIBBEAN/SOUTH AMERICA MONITORING AGENCY (CARSAMMA) APPROVALS DATABASE. In accordance with regional agreements, State civil aviation authorities must register operators and airframes for which they are responsible that have been approved for RVSM operations. RVSM approved aircraft/operators will be registered on the CARSAMMA database. (Operator/airframes already listed in either the NAT, Pacific, or European database for RVSM operations need not be re-submitted).

- a) US Operators. The FAA Technical Center (ACT-520) maintains the US database of RVSM approved airframes and operators. ACT-520 obtains the required information on US operators and airframes directly from the FAA Flight Standards (AFS) Program Tracking and Reporting Subsystem (PTRS). AFS Handbook Bulletin HBAT 99-11A and HBGA 99-17A provide guidance to AFS inspectors for completing the PTRS entries. Once an operator has completed the approval process with the appropriate AFS field office, no further action is required on the part of the operator.
- b) Non-US Operators. Policy/procedures to register non-US Operators on the CARSAMMA database will be listed in documents located on the CAR/SAM RVSM website.

4.3 AIRCRAFT MONITORING. Operators are required to participate in the RVSM aircraft monitoring program. This is an essential element of the RVSM implementation program in that it confirms that the aircraft altitude-keeping performance standard is being met. For further information on RVSM monitoring, see the document: "Procedure for the Monitoring of Technical Height Keeping Performance, North Atlantic Region." This document can be found in the "RVSM Documentation" page on the FAA website mentioned in paragraph 4.1 above. This information will also be posted on the CAR/SAM RVSM website.

4.4 TCAS RECOMMENDATION. CAR/SAM States and ATC Providers should note that their RVSM Notice of Proposed Rulemaking (NPRM) must require that operators already mandated to carry TCAS equipment use Version 7.0 by the CAR/SAM RVSM implementation date.

If TCAS is installed in RVSM compliant aircraft, the equipment should be updated to Version 7.0, or a later approved version, for optimum performance in RVSM airspace.

## 5.0 In-flight Procedures within RVSM airspace

5.1 Before entering RVSM airspace, the pilot should review the status of required equipment. (See **Appendix 4 of FAA Interim Guidance 91-RVSM for pilot RVSM procedures**). The following equipment should be operating normally:

- two primary altimetry systems;
- one automatic altitude-keeping device; and
- one altitude-alerting device.

5.2 The pilot must notify ATC whenever the aircraft:

- is no longer RVSM compliant due to equipment failure; or
- experiences loss of redundancy of altimetry systems; or
- encounters turbulence that affects the capability to maintain flight level.

**(See Appendix 5 of FAA Interim Guidance 91-RVSM for pilot and controller actions in such contingencies)**

5.3 TRANSITION BETWEEN FLIGHT LEVELS. During cleared transition between levels, the aircraft should not overshoot or undershoot the assigned FL by more than 150 ft (45 m).

5.4 PILOT LEVEL CALL. Except in a radar environment, pilots shall report reaching any altitude assigned within RVSM airspace.

## 6.0 Special Procedures for In-flight Contingencies - General procedures

6.1 Paragraphs 6.0, 7.0 and 8.0 below contain procedures for in-flight contingencies that have been updated for RVSM operations.

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6.2 The following general procedures apply to both subsonic and supersonic aircraft and are intended as guidance only. Although all possible contingencies cannot be covered, they provide for cases of inability to maintain assigned level due to:

- weather;
- aircraft performance;
- pressurization failure; and
- problems associated with high-level supersonic flight.

6.3 The procedures are applicable primarily when rapid descent and/or turn-back or diversion to an alternate airport is required. The pilot's judgment shall determine the sequence of actions to be taken, taking into account specific circumstances.

6.4 If an aircraft is unable to continue flight in accordance with its air traffic control clearance, a revised clearance shall, whenever possible, be obtained prior to initiating any action, using a distress or urgency signal as appropriate.

6.5 *If prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time and, until a revised clearance is received, the pilot shall:*

- a) if possible, deviate away from an organized track or route system;*
- b) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: flight identification, flight level, aircraft position, (including the ATS route designator or the track code) and intentions on the frequency in use, as well as on frequency 121.5 MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45);*
- c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);*
- and*
- d) turn on all aircraft exterior lights (commensurate with appropriate operating limitations).*

## **7.0 In-flight Contingency Procedures for Subsonic Aircraft Requiring Rapid Descent, Turn-back or Diversion**

### Initial action

7.1 If unable to comply with the provisions of paragraph 6.3 to obtain a revised ATC clearance, the aircraft should leave its assigned route or track by turning 90 degrees right or left whenever this is possible. The direction of the turn should be determined by the position of the aircraft relative to any organized route or track system (for example, whether the aircraft is outside, at the edge of, or within the system). Other factors to consider are terrain clearance and the levels allocated to adjacent routes or tracks.

### Subsequent action

7.2 **AIRCRAFT ABLE TO MAINTAIN LEVEL.** An aircraft able to maintain its assigned level should acquire and maintain in either direction a track laterally separated by 30 NM from its assigned route or track and once established on the offset track, climb or descend 500 ft (150 m).

7.3 **AIRCRAFT UNABLE TO MAINTAIN LEVEL.** An aircraft NOT able to maintain its assigned level should, whenever possible, minimize its rate of descent while turning to acquire and maintain in either direction a track laterally separated by 30 NM from its assigned route or

track. For subsequent level flight, a level should be selected which differs by 500 ft (150 m) from those normally used.

7.4 **DIVERSION ACROSS THE FLOW OF ADJACENT TRAFFIC.** Before commencing a diversion across the flow of adjacent traffic, the aircraft should, while maintaining the 30 NM offset, expedite climb above or descent below levels where the majority of aircraft operate (*e.g., to a level above FL 410 or below FL 290*) and then maintain a level which differs by 500 ft (150 m) from those normally used. However, if the pilot is unable or unwilling to carry out a major climb or descent, the aircraft should be flown at a level 500 ft above or below levels normally used until a new ATC clearance is obtained.

7.5 **ETOPS AIRCRAFT:** If these contingency procedures are employed by a twin engine aircraft as a result of an engine shutdown or a failure of an ETOPS critical system, the pilot should advise ATC as soon as practicable of the situation, reminding ATC of the type of aircraft involved and requesting expeditious handling.

## **8.0 Weather Deviation Procedures**

### General procedures

8.1 The following procedures are intended to provide guidance for deviations around thunderstorms. All possible circumstances cannot be covered. The pilot's judgment shall ultimately determine the sequence of actions taken and ATC shall render all possible assistance.

8.2 If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an air traffic control clearance shall be obtained at the earliest possible time. In the meantime, the aircraft shall follow the procedures detailed in paragraph 8.6 below.

8.3 The pilot shall advise ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the centerline of its cleared route.

8.4 Obtaining priority from ATC when weather deviation is required.

8.4.1 When the pilot initiates communications with ATC, rapid response may be obtained by stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response.

8.4.2 The pilot still retains the option of initiating the communications using the urgency call '**PAN PAN PAN**' to alert all listening parties to a special handling condition which will receive ATC priority for issuance of a clearance or assistance.

8.5 Actions to be taken when controller-pilot communications are established

8.5.1 The pilot notifies ATC and requests clearance to deviate from track, advising, when possible, the extent of the deviation expected.

8.5.2 ATC takes one of the following actions:

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- 1 if there is no conflicting traffic in the horizontal dimension, ATC will issue clearance to deviate from track; or
- 2 if there is conflicting traffic in the horizontal dimension, ATC separates aircraft by establishing vertical separation; or
- 3 if there is conflicting traffic in the horizontal dimension and ATC is unable to establish vertical separation, ATC shall:
  - a) advise the pilot unable to issue clearance for requested deviation;
  - b) advise pilot of essential traffic; and
  - c) request pilot's intentions.

*SAMPLE PHRASEOLOGY:*

*“Unable to clear (requested deviation), traffic is (call sign, position, altitude, direction), advise intentions.”*

8.5.3 The pilot will take the following actions:

1. Advise ATC of intentions; and
2. Comply with air traffic control clearance issued; or
3. Execute the procedures detailed in 6.6.4. below. (ATC will issue essential traffic information to all affected aircraft).
4. If necessary, establish voice communications with ATC to expedite dialogue on the situation

8.6 Actions to be taken if a revised air traffic control clearance cannot be obtained

8.6.1 The pilot shall take the actions listed below under the provision that the pilot may deviate from rules of the air, when it is absolutely necessary in the interests of safety to do so.

8.6.2 If a revised air traffic control clearance cannot be obtained and deviation from track is required to avoid weather, the pilot should take the following actions:

- 1 if possible, deviate **away** from an organized track or route system;
- 2 establish communication with and alert nearby aircraft by broadcasting, at suitable intervals: flight identification, flight level, aircraft position (including the ATS route designator or the track code) and intentions (including the magnitude of the deviation expected) on the frequency in use, as well as on frequency 121.5 MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45).
- 3 watch for conflicting traffic both visually and by reference to ACAS (if equipped);
- 4 turn on all aircraft exterior lights (commensurate with appropriate operating limitations);
- 5 for deviations of less than 10 NM, aircraft should remain at the level assigned by ATC;
- 6 for deviations of greater than 10NM, when the aircraft is approximately 10 NM from track, initiate a level change based on the following criteria:

Route center line track	Deviations >10 NM	Level change
EAST (000-179 magnetic)	LEFT RIGHT	<i>DESCEND 300 ft</i> <i>CLIMB 300 ft</i>
WEST (180-359 magnetic)	LEFT RIGHT	<i>CLIMB 300 ft</i> <i>DESCEND 300 ft</i>

*Note: 8.6.2.2 and 8.6.2.3 above call for the pilot to: broadcast aircraft position and pilot's intentions, identify conflicting traffic and communicate air-to-air with near-by aircraft. If the pilot determines that there is another aircraft at or near the same FL with which his aircraft might conflict, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.*

- 7 if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.
- 8 when returning to track, be at its assigned flight level, when the aircraft is within approximately 10 NM of center line.

## **9.0 Special Procedures to Mitigate the Effects of Wake Turbulence**

*Note.— ATC will not issue clearances for lateral offsets and will not normally respond to the actions of the pilots.*

9.1 The following special procedures are applicable to mitigate wake turbulence encounters in the CAR/SAM where RVSM is applied.

9.2 An aircraft that encounters wake vortex turbulence and needs to deviate shall notify ATC and request a revised clearance. However; in situations where a revised clearance is not possible or practicable, the pilot may initiate the following temporary lateral offset procedure with the intention of returning to the center line as soon as practicable:

- a) consider establishing contact with the other aircraft on 123.45 MHz; and
- b) one (or both) aircraft may initiate lateral offset(s) not to exceed 2 NM from the assigned route or track, provided that:
  - 1) as soon as it is practicable to do so, offsetting aircraft notify ATC that temporary lateral offset action has been taken and specify the reason for doing so (*ATC will not normally respond*); and
  - 2) offsetting aircraft notify ATC when re-established on assigned route or track (*ATC will not normally respond*).

## **10.0 Height Deviation Reporting**

10.1 The successful implementation of RVSM in any airspace is dependent on regular monitoring of the safety. An important part of that monitoring program is the reporting of height deviations 300 feet or more from the assigned flight level. Any deviation which is 300 feet or more from the assigned level in RVSM or RVSM Transition airspace, whether intentional or not, should be reported to the CARSAMMA.

10.2 Historically, these events have been spawned by several causes:

- a) misunderstandings between aircrew and ATC facility regarding the assigned flight level;
- b) maneuvering an aircraft away from the assigned flight level
- c) responding to contingency events, prior to laterally separating 30NM to the adjacent track;
- d) negotiating meteorological effects (turbulence);
- e) equipment failure;
- f) responding to TCAS RA and TA.

10.3 Reporting these events to the CARSAMMA is accomplished using the form contained as attachment XXX to the CAR/SAM RVSM Operations Manual, which is available on the CAR/SAM RVSM website. It may be filed at the completion of flight or it may be filed by the controlling ATC facility, as appropriate. The forms should be sent to:

Caribbean/South America Monitoring  
Agency

Brazil

Federal Aviation Administration  
William J. Hughes Technical Center  
NAS and International Airspace Analysis  
Branch  
ACT-520  
Atlantic City, NJ 08405  
Fax: +01 609 485 5117

10.4 The data compiled from these forms is reviewed regularly and summarized to prepare an estimate of safety for the CAR/SAM airspace. From this information, improved procedures and practices are recommended.

### **11.0 Flight planning requirements**

11.1 Unless special arrangement is made as detailed below, RVSM approval is required for aircraft to operate within designated RVSM airspace. The operator must determine that the appropriate State authority has approved the aircraft and will meet the RVSM requirements for the filed route of flight and any planned alternate routes. The letter "W" shall be inserted in item 10 (Equipment) of the ICAO standard flight plan to indicate that the aircraft is RVSM approved aircraft.

### **12.0 Procedures for Operation of Non-RVSM Compliant Aircraft in RVSM airspace**

12.1 **FLIGHT PRIORITY.** It should be noted that RVSM approved aircraft will be given priority for level allocation over non-RVSM approved aircraft.

12.2 **VERTICAL SEPARATION APPLIED.** The vertical separation minimum between non-RVSM aircraft operating in the RVSM stratum and all other aircraft is 2,000 ft.

### 12.3 CONTINUOUS CLIMB/DESCENT OF NON-COMPLIANT AIRCRAFT THROUGH RVSM AIRSPACE.

12.3.1 Non-RVSM compliant aircraft may be cleared to climb to and operate above FL410 or descend to and operate below FL290 provided that they:

- a) do not climb or descend at less than the normal rate for the aircraft; and
- b) do not level off at an intermediate level while passing through the RVSM stratum.

### 12.4 SPECIAL COORDINATION PROCEDURES FOR CRUISE OPERATION OF NON-RVSM COMPLIANT AIRCRAFT IN RVSM AIRSPACE.

12.4.1 Non-RVSM compliant aircraft may not flight plan across FIR boundaries between FL 290 and FL410, inclusive, within RVSM exclusionary airspace unless they meet the qualifications below, and only after completion of the special coordination as detailed in 12.4.3 below. The aircraft:

- (a) Is being initially delivered to the State of Registry or Operator; or
- (b) was formally RVSM approved but has experienced an equipment failure and is being flown to a maintenance facility for repair in order to meet RVSM requirements and/or obtain approval; or
- (c) is transporting a spare engine mounted under the wing; or
- (d) is being utilized for mercy or humanitarian purposes

12.4.2 ATC Notification of non-RVSM compliant State aircraft (those aircraft used in military, custom and police services shall be deemed state aircraft) is accomplished through filing of an ICAO flight plan. In Field 18 of the ICAO Flight Plan, include "STS/APVD NONRVSM".

*Note: Each FIR will coordinate non-RVSM status with any affected adjacent FIR or facility.*

12.4.3 Aircraft operators requesting approval as detailed in 12.4.1 above shall:

- (a) obtain approval from their departure control facility (or departure FIR control facility) normally not more than 24 hours and not less than 8 hours prior to intended departure time.
- (b) include "STS/APVD NONRVSM" in Field 18 of the ICAO Flight Plan.
- (c) after departure, the pilot shall notify the first ATC facility (on VHF) that approval has been obtained for their non-RVSM aircraft to operate in RVSM exclusionary airspace.

(NOTE: APPROVAL MEANS ABLE TO OPERATE IN THE RVSM STRATUM. AIRCRAFT OPERATING LEVELS WILL BE SUBJECT TO AIR TRAFFIC CONTROL.)

12.4.4 Contact details for approval request are as follows:

XXXXXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

12.4 This approval process is intended exclusively for the purposes indicated above and not as a means to circumvent the normal RVSM approval process.

12.5 Approval for non-RVSM approved aircraft to operate within a single FIR (or airspace control) shall be obtained using the procedures established by each ATC service provider.

**13.0 Procedures for Suspension of RVSM**

13.1 Air Traffic Service providers will consider suspending RVSM procedures within affected areas of their FIRs and any adjacent transition areas when there are pilot reports of greater than moderate turbulence. Within areas where RVSM procedures are suspended, the vertical separation minimum between all aircraft will be 2,000 ft. Service providers should make every effort to coordinate in advance with adjacent service providers/Central Traffic Management Facility prior to suspending RVSM operations. Any suspension should also include an expected time when RVSM operations may resume. Suspension of RVSM operations for any other reason shall only be implemented after prior coordination with adjacent service providers.

<b>Caribbean/South American RVSM Implementation Plans Status Report</b>			
<b>State</b>	<b>FIR</b>	<b>RVSM Implementation Date</b>	<b>Comments</b>
Argentina	Comodoro Rivadavia	4-Dec-04	Transition Airspace
Argentina	Cordoba	4-Dec-04	Transition Airspace
Argentina	Ezeiza	4-Dec-04	Transition Airspace
Argentina	Mendoza	4-Dec-04	Transition Airspace
Argentina	Resistencia	4-Dec-04	Transition Airspace
Aruba	Curacao	4-Dec-04	Exclusionary Airspace
Belize, El Salvador, Costa Rica, Guatemala, Honduras, Nicaragua	Central American	4-Dec-04	Exclusionary Airspace
Bolivia	La Paz	4-Dec-04	Exclusionary Airspace
Brazil	Belem	4-Dec-04	Exclusionary Airspace
Brazil	Brasilia	4-Dec-04	Exclusionary Airspace
Brazil	Curitiba	4-Dec-04	Exclusionary Airspace
Brazil	Manaus	4-Dec-04	Exclusionary Airspace
Brazil	Porto Velho	4-Dec-04	Exclusionary Airspace
Brazil	Recife	4-Dec-04	Exclusionary Airspace
Chile	Antofagasta	4-Dec-04	Exclusionary Airspace
Chile	Puerto Montt	4-Dec-04	Transition Airspace
Chile	Punta Arenas	4-Dec-04	Transition Airspace
Chile	Santiago	4-Dec-04	Transition Airspace
Columbia	Barranquilla	4-Dec-04	Exclusionary Airspace
Columbia	Bogota	4-Dec-04	Exclusionary Airspace
Cuba	Havana	4-Dec-04	Exclusionary Airspace
Dominican Republic	Santo Domingo	4-Dec-04	Exclusionary Airspace
Ecuador	Guayaquil	4-Dec-04	Exclusionary Airspace
French Guiana	Rouchambeau	4-Dec-04	Exclusionary Airspace
Grenada, Barbados, St. Vincent, St. Lucia, Martinique, Guadeloupe, Dominica, Antigua, Barbuda, St. Kitts, Nevis, St.	Piarco	4-Dec-04	Exclusionary Airspace
Guyana	Georgetown	4-Dec-04	Exclusionary Airspace
Haiti	Port Au Prince	4-Dec-04	Exclusionary Airspace
Jamaica	Kingston	4-Dec-04	Exclusionary Airspace
Mexico	Mazatlan	4-Dec-04	Exclusionary Airspace
Mexico	Merida	4-Dec-04	Exclusionary Airspace
Mexico	Mexico	4-Dec-04	Exclusionary Airspace
Mexico	Monterrey	4-Dec-04	Exclusionary Airspace
Mexico	Mazatlan Oceanic	4-Dec-04	Exclusionary Airspace
Paraguay	Asuncion	4-Dec-04	Exclusionary Airspace
Peru	Lima	4-Dec-04	Exclusionary Airspace
Suriname	Paramaribo	4-Dec-04	Exclusionary Airspace
Uruguay	Montevideo	4-Dec-04	Exclusionary Airspace
Venezuela, Trinidad, Tobago	Maiquetia	4-Dec-04	Exclusionary Airspace

<b>Caribbean/South American RVSM Implementation Plans Status Report</b>		
<b>FIR</b>	<b>RVSM Implementation Date</b>	<b>Comments</b>
Antofagasta	4-Dec-04	Exclusionary Airspace
Asuncion	4-Dec-04	Exclusionary Airspace
Barranquilla	4-Dec-04	Exclusionary Airspace
Belem	4-Dec-04	Exclusionary Airspace
Bogota	4-Dec-04	Exclusionary Airspace
Brasilia	4-Dec-04	Exclusionary Airspace
Central American	4-Dec-04	Exclusionary Airspace
Comodoro Rivadavia	4-Dec-04	Transition Airspace
Cordoba	4-Dec-04	Transition Airspace
Curacao	4-Dec-04	Exclusionary Airspace
Curitiba	4-Dec-04	Exclusionary Airspace
Ezeiza	4-Dec-04	Transition Airspace
Georgetown	4-Dec-04	Exclusionary Airspace
Guayaquil	4-Dec-04	Exclusionary Airspace
Havana	4-Dec-04	Exclusionary Airspace
Kingston	4-Dec-04	Exclusionary Airspace
La Paz	4-Dec-04	Exclusionary Airspace
Lima	4-Dec-04	Exclusionary Airspace
Maiquetia	4-Dec-04	Exclusionary Airspace
Manaus	4-Dec-04	Exclusionary Airspace
Mazatlan	4-Dec-04	Exclusionary Airspace
Mazatlan Oceanic	4-Dec-04	Exclusionary Airspace
Mendoza	4-Dec-04	Transition Airspace
Merida	4-Dec-04	Exclusionary Airspace
Mexico	4-Dec-04	Exclusionary Airspace
Monterrey	4-Dec-04	Exclusionary Airspace
Montevideo	4-Dec-04	Exclusionary Airspace
Paramaribo	4-Dec-04	Exclusionary Airspace
Piarco	4-Dec-04	Exclusionary Airspace
Port Au Prince	4-Dec-04	Exclusionary Airspace
Porto Velho	4-Dec-04	Exclusionary Airspace
Puerto Montt	4-Dec-04	Transition Airspace
Punta Arenas	4-Dec-04	Transition Airspace
Recife	4-Dec-04	Exclusionary Airspace
Resistencia	4-Dec-04	Transition Airspace
Rouchambeau	4-Dec-04	Exclusionary Airspace
San Juan	4-Dec-04	Exclusionary Airspace
Santiago	4-Dec-04	Transition Airspace
Santo Domingo	4-Dec-04	Exclusionary Airspace