INTERNATIONAL CIVIL AVIATION ORGANIZATION
SOUTH AMERICAN OFFICE

SECOND MEETING OF THE INFORMAL COORDINATION GROUP OF THE EAST CARIBBEAN AND NORTH EASTERN SOUTH AMERICAN (E-CAR/SAM-NE ICG/2)

(Caracas, Venezuela, 1 to 5 December 2003)

Agenda Item 1: Review of ATM matters

d) Review of operational letters of agreement between ACCs

(Presented by the Secretariat)

Summary

This working paper shows an example of the RVSM matters that should be included in the corresponding Letters of Agreement (LOAs) by the corresponding States/International Organizations

References

- Reports of the AP/ATM/5 and AP/ATM/6 Meetings/Workshops
- ICAO Annex 2
- Manual of implementation of a 300 m (1000 ft) vertical separation minimum between FL 290 and FL 410 inclusive
- CAR/SAM RVSM Operational Concept – CONOPS

1 Background

1.1 The programme for the RVSM implementation in the CAR/SAM Regions, foreseen for 20 January 2005, includes a List of RVSM Tasks required for the success of such implementation. One of the tasks is to update RVSM issues to be included in the corresponding Letters of Operational Agreement (LOAs) signed between the corresponding States/International Organizations.

2 Analysis

2.1 During the AP/ATM/5 Meeting/Workshop, Panama City, Panama, June 2003, it was approved that the States/International Organizations should include in their corresponding LOAs, through **Conclusion AP/ATM/5/28**, the Table of Cruising Levels contained in Appendix 3 to ICAO Annex 2 for

allocation of flight levels in the RVSM airspace or other, when required, to assist predominant traffic directions, and through **Conclusion AP/ATM/5/32,** those Contingency Procedures for RVSM Suspension due to weather, turbulence, equipment failures or other factors.

2.2 In the CAR/SAM RVSM Concept of Operations (CONOPS), approved during the AP/ATM/6 Meeting/Workshop, San José, Costa Rica, October 2003, a Table of allocation of flight levels in the RVSM airspace for use in the CAR/SAM Regions, is included. Such table has been prepared, based on ICAO Annex 2, Appendix 2.

2.3 Also, and taking as a reference the contents of ICAO Doc 9574, Manual of implementation of a 300 m (1000 ft) vertical separation minimum between FL 290 and FL 410 inclusive, the Procedures for RVSM Suspension due to weather, turbulence, equipment failures or other factors, have been included in the CONOPS.

2.4 **Appendix A** to this information paper shows the part corresponding to the Procedures for RVSM Suspension due to weather, turbulence, equipment failures or other factors contained in the CONOPS; **Appendix B,** contains the Table of allocation of flight levels in the RVSM airspace for use in the CAR/SAM Regions, also included in the CONOPS; and in **Appendix C**, there is an example of the issues mentioned and others related with coordinations between ACCs, regarding RVSM, included in a Letter of Operational Agreement (LOA).

3 Suggested Action

3.1 The meeting is invited to note the information provided in this document, and if deemed pertinent, initiate actions in order to incorporate in the pertinent letters of operational agreement, those aspects related with RVSM.

APPENDIX A

Extracted from CONOPS

4.5 Weather/Turbulence Procedures/Suspension of RVSM Operations

4.5.1 RVSM operations can be particularly impacted by the presence of turbulence. This includes turbulence caused by either severe weather activity or the phenomenon known as orographic flow, or mountain wave turbulence.

4.5.2 Numerous FIRS within the CAR/SAM region are impacted by turbulence caused by orographic flow/mountain wave. The RVSM implementation NOTAM/AIC contains the following language:

The pilot must notify ATC whenever the aircraft:

- **Encounters turbulence that affects the capability to maintain flight level.**

4.5.3 This will normally occur when the aircraft is in areas of greater than moderate turbulence. When ATC service providers receive reports of greater than moderate turbulence, they should evaluate the situation to determine if RVSM operations should be suspended.

4.5.4 Turbulence/mountain wave activity can also be forecast with high levels of accuracy. During periods of forecast mountain wave activity, controllers should ask for pilot reports on a regular basis in order to quickly identify any potential problem. Technology that predicts and models orographic flow is also becoming more and more advanced, giving ATC service providers highly accurate forecasts.

4.5.5 When an ATC service provider becomes aware that turbulence/mountain wave conditions will interfere with an aircraft's ability to maintain the assigned altitude, the first step is to insure that 2000 feet vertical separation is established for any aircraft that are, or will be affected by this turbulence. After 2000 feet vertical separation has been established, the next step is to define the area within which the activity is occurring. The ATC service provider should then consider the option to suspend RVSM operations within the defined area. Some of the factors to consider when deciding whether or not to suspend RVSM are:

- Current/ Expected traffic volume
- Availability of other separation methods
- Other impacts on traffic, such as equipment outages

4.5.6 If necessary, the ATC service provider should take the required action to suspend RVSM operations within the defined area. In addition to taking action to restore 2000 feet of vertical separation between aircraft operating with 1000 feet of separation, the service provider must immediately coordinate with surrounding service providers to advise them of any suspension of RVSM operations. This coordination should include at a minimum:

- The reason for RVSM suspension

- The airspace and routes affected
- The time that RVSM operations are/will be suspended
- The expected time RVSM operations will resume, if known
- Any traffic flow management restrictions
- Revised flight data for any aircraft that will enter the adjacent airspace from the airspace where RVSM operations were suspended
- Revised flight date for any aircraft that are leaving the area where RVSM has been/will be suspended.

4.5.7 The suspension of RVSM does not necessarily mean that controllers cannot still utilize any available flight level within RSVM airspace. Suspension of RVSM for any other operational reason should be handled as above, except that the coordination should include the reason for the suspension. ATC service providers must insure that adequate notice is given to all affected facilities in order to insure an orderly transition to conventional separation standards. In those cases where numerous aircraft are affected by turbulence/mountain wave activity within a relatively small area, controllers may consider the use of other means of separation, such as lateral or longitudinal separation.

APPENDIX B

Extracted from CONOPS

9. FLIGHT LEVEL ALLOCATION SCHEME (FLAS)

9.1 Because RVSM adds additional usable flight levels to the operating environment, the current system of allocating flight levels no longer applies. ICAO Annex 2 provides a flight level allocation scheme that can be used to develop a procedural system for the CAR/SAM region.

9.2 Assignment of flight levels within RVSM airspace using the following flight level allocation system:

Flight Level Allocation Scheme (FLAS) For the CAR/SAM Regions TABLE OF CRUISING LEVELS OF APPENDIX 3 TO ICAO ANNEX 2	
Track from 180° to 359°	**Track from 000° to 179°**
← **FL 430**	***(non-RVSM level)***
	FL 410 →
← FL 400	
	FL 390 →
← FL 380	
	FL 370 →
← FL 360	
	FL 350 →
← FL 340	
	FL 330 →
← FL 320	
	FL 310 →
← FL 300	
	FL 290 →
← **FL 280**	***(non-RVSM level)***

9.3 It is important to remember that any aircraft, RVSM approved or non-RVSM approved, can be assigned any flight level in compliance with the above system. However, 2000' vertical separation **must** be applied to all non-RVSM approved aircraft within RVSM transition airspace, if any. This provides a significant benefit for non-RVSM approved aircraft on domestic flights as they can achieve some of the same fuel economy benefits as approved aircraft. Aircraft not in compliance with the above system must be coordinated and approved by each receiving controller.

9.4 **Operation of non-RVSM aircraft within RVSM airspace**

9.4.1 RVSM approved aircraft will be given operational preference for level allocation over non-RVSM approved aircraft, unless an operational advantage is gained by giving operational preference to the non-RVSM approved aircraft. The vertical separation minimum between non-RVSM approved aircraft operating in the RVSM airspace and all other aircraft is 2,000 ft. ATC may clear non-RVSM aircraft to climb or descend *through* RVSM airspace, provided they **DO NOT** climb or descend at less than standard rate and they **DO NOT** stop at any intermediate flight level within the RVSM airspace.

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APPENDIX C

Sample on RVSM issues that should be included in a Letter of Operational Agreement (LOA)

x.1 Flight levels

x.1.1 Allocation of RVSM Flight Levels

The allocation of flight levels for transference will be as follows:

Reporting Point	Track xxx°-yyy°	Track ttt°-zzz°
Key name	Odd levels	Even levels
Key name	Odd levels	Even levels
Key name	Odd levels	Even levels
Key name	Odd levels	Even levels

y.1 Vertical separation

AIRCRAFT	SEPARATION		
	FL 290 AND BELOW	FL290 – FL410	FL 410 AND ABOVE
RVSM approved	1000 feet	1000 feet	2000 feet
Non-RVSM approved		2000 feet	

z.1 Coordinations for RVSM Operations

z.1.1 Estimate messages (EST) shall be transmitted for all flights crossing the common FIR boundary, at least **xx** minutes before the estimate time of the aircraft over the transference of the control point when non-RVSM approved aircraft are involved, with the intention to operate within RVSM airspace, as a mean to facilitate planning for the integration of such air traffic, according to a 2000 feet vertical separation minimum.

z.1.2 A clear indication should be made on the status of approval of non-RVSM approved aircraft and its request for a special treatment as an integral part of the estimated message:

- As a confirmation of the data filed in the flight plan
- To anticipate the case of performance degradation of the flight planning systems; and
- To anticipate the case the accepting unit has not received the flight plan.

z.1.3 Oral coordination of estimate messages (EST)

z.1.3.1 When an oral coordination process is being used, the ACC transmitting an estimate message shall include at the end of the same, the information included in box 18 of ICAO flight plan on RVSM operations.

z.1.3.2 If applicable, at the end of the estimate message, the term "RVSM Negative" or "Aircraft with Negative RVSM", shall be included.

z.1.3.3 For the case in which only one aircraft experiences a flight contingency, the associated coordination messages shall be provided orally, with a description of the reason of the contingency.

The associated coordination messages shall incorporate either the term:

- RVSM inability due to the equipment, or
- RVSM inability due to turbulence, as the case may be.

t.1 RVSM operations suspension

t.1.1 The ACCs of *(ACC Identification)* and *(ACC Identification)* shall coordinate the procedures for RVSM suspension within areas affected in the FIR *(FIR Identification)* and *(FIR Identification)*, when pilots reports on turbulence that is greater than moderate. Within the areas where RVSM procedures have been suspended, the vertical separation minimum between all aircraft shall be 2000 feet.