



**International Civil Aviation Organization
UNDP/ICAO Regional Project RLA/98/003
Transition to the CNS/ATM Systems in the CAR and SAM Regions**

**Sixth Meeting/workshop of Air Traffic Management (ATM) Authorities and
Planners for RVSM, RNAV routes and RNP implementation in the CAR and SAM Regions**

(San José, Costa Rica, 29 September-3 October 2003)

Agenda Item 4 Other matters

Results of RVSM simulations in Colombia

(Presented by Colombia)

Summary

Reports the results obtained from RVSM simulations in Colombian airspace.

1. Introduction

1.1 In order to analyse the behaviour of peak hour traffic in Colombian airspace, as well as the behaviour of air traffic control in different RVSM scenarios, simulations were carried out during the first half of September 2003, with the participation of controllers from the Bogota and Barranquilla ACCs.

2. Analysis

2.1 RVSM simulations were carried out for 120 hours, both under normal conditions as well as under bad weather, with upper winds, communication failures, lack of radar coverage, aircraft in distress, and with very precise objectives, namely:

- a. determine the restrictions for non-RVSM aircraft
- b. identify applicable RVSM procedures, such as traffic re-routing and contingency procedures
- c. determine the convenience of using offset procedures
- d. determine the need to modify airspaces
- e. identify the necessary work aids, such as level tables, charts, etc.
- f. decide upon the modification of existing letters of agreement
- g. decide upon the modification of the rated capacity of the sector
- h. assess the impact of RVSM in levels below FL290 in an exclusive environment
- i. assess the possibility of applying combined horizontal/vertical separation for tactical operations in Colombian airspace
- j. assess the need and advisability of properly timing the take-off of non-RVSM aircraft in order to facilitate tactical control.

3. Results and suggested action

3.1 After conducting the corresponding simulations, it was concluded that:

- a. Under normal weather conditions, there are no traffic problems and airspace capacity increases.
- b. Under bad weather conditions, it is necessary to divert aircraft from the route and provide radar control services to ensure separation.
- c. Changing the level of overflying aircraft complicates the work of controllers and might have a negative impact on the target level of safety (TLS). It is suggested that letters of agreement be adjusted to avoid changing levels of overflying aircraft.
- d. In the event of contingencies, excellent systems of coordination with adjacent FIRs are required; it would be dangerous otherwise. In case of diversion due to bad weather and contingencies, excellent communications and radar coverage ensure compliance with the target levels of safety.
- e. Under current conditions, additional restrictions for non-RVSM aircraft are not required.
- f. Use of the OFF SET procedure in a radar environment provides an additional safety margin in the event of loss of RVSM capabilities and turbulence.
- g. With the implementation of RVSM, it would be advisable to modify the sectorisation of the Bogota UTA to a vertical one, eliminating the existing horizontal sectorisation. This would allow for a better distribution of the work load and eliminate congestion in the frequency. A technical solution for the coverage issue (modification of the extended VHF range) is required.
- h. It is suggested that the existing letters of agreement be modified to reflect specific RVSM requirements.
- i. Control sectors increase their rated capacity.
- j. In an exclusive environment, RVSM implementation in levels below FL290 would cause losses to airlines and congestion in levels 280, 270 and 260 inclusive.
- k. The application of a combined horizontal/vertical separation for tactical operations in Colombian airspace would facilitate the work of controllers.
- l. Timing of take-off operations of non-RVSM aircraft facilitates tactical control and increases the target level of safety (TLS).

4. **Suggested action**

4.1 The meeting is invited to take note of the information presented in this working paper and to study the possibility of supporting the implementation of the proposed measures in Colombian airspace in order to expedite the harmonious implementation of RVSM in the CAR/SAM Regions.