



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

**Sixth Meeting/Workshop of ATM authorities and planners in the CAR/SAM Regions for RVSM,
RNAV routes and RNP Implementation (AP/ATM/6 RVSM-RNAV-RNP)**

(San Jose, Costa Rica, 29 September to 3 October 2003)

**Agenda Item 3: Review of the issues related with RVSM Implementation in the CAR/SAM
Regions**

a) ATC Operations Working Group (ATC/WG)

RVSM ATC Simulations in the Chile Unified ACC

(Presented by Chile)

Summary

The objective of this Working Paper is to inform about the RVSM simulation developed for Air Traffic Controllers of the Unified Area Control Center (ACCU).

1. Introduction

1.1 In accomplishing the RVSM ATC National Training programme and, also, accomplishing regional agreements in this respect, the RVSM ATC simulation was carried out between 7 and 25 April 2003, with the collaboration of designated Air Traffic Control Instructors, to Air Traffic Controllers working in sectors 1 – 2 and 4 assigned to area control sectors, from the 8 sectors that form the Unified Area Control Center. The results are detailed in this Working Paper.

2. Objective

- a) Determine the feasibility of Air Traffic Control Services to accommodate civil and State non-RVSM approved aircraft in the domestic RVSM airspace, between FL 290 and FL 410 inclusive, in the Control sectors responsibility of the Unified Area Control Center.

- b) Identify situations and possible conflict points that may affect air operations safety in regarding traffic flows in relation to:
 - Current traffic
 - Foreseen traffic
 - Controllers workload
- c) Identify delicate or possible conflict situations.

3. **Participation**

3.1. ATC RVSM simulation considered a theoretic presentation on RVSM regulatory aspects and simulation objectives, every Controller qualified in the three (3) control sectors participated.

4. **Simulation**

4.1 **General**

The ATC simulation was developed within the following guidelines:

- a) Area Control Service was provided by the use of the Radar, creating real scenarios of the airspace responsibility of the sectors;
- b) Use of the current traffic volumes, identifying “peak” hours according to the air movement compiled in December 2002, increased in 20%;
- c) In the first exercise of each sector, a greater number of non-approved aircraft was considered in respect of RVSM approved and, in the second exercise, a similar RVSM non-approved and approved aircraft percentage;
- d) Routes and traffic flows with preference flight direction currently used for aircraft routing;
- e) Use of RVSM flight levels according to the track established in the Rules of the Air (DAR 02 – ANNEX 2);
- f) Application of the longitudinal separation:
 - 1) Among aircraft with the same track and same FL:
 - *Distance-based*:
 - Radar Environment: 20 NM, similar performance, same MNT or less
 - *Time-based*:
 - Procedural Control (Non-Radar): 5 minutes adjusted by MNT.
 - 2) Among aircraft with the same track and different FL:

- *Distance-based:*
 - Radar Environment: 10 miles
- *Time-based:*
 - Procedural Control (Non-Radar): 3 minutes

5. **Evaluation**

5.1 From the evaluation of the participant ATCs, it is unanimously concluded that it is possible to accommodate non-RVSM approved traffic, and that airspace efficiency is increased applying RVSM. However, the opinion in respect of the workload reflects that flexibility in non-RVSM approved traffic treatment impacts in different ways in the ATCs working in the different control sectors due to:

- a) The structure and of some routes and specially the converging routes;
- b) The experience level of the ATC of the sectors in which control is mainly Procedural Control (Non-Radar)-based;
- c) Change in the way of using flight levels FL310, FL350 and FL390;
- d) RVSM phraseology;
- e) RVSM contingencies.

6. **Conclusion**

6.1 The RVSM ATC simulation carried out in sectors 1, 2 and 4 of the Unified Area Control Center (CCAU) let us conclude that it is possible to “accommodate” non-RVSM approved aircraft in the continental RVSM airspace. However, this operational flexibility increases the controllers workload and the indefinite application of this exception or the increment of users with non-RVSM approved aircraft may, also, decrease airspace capacity, specially in bi-directional routes, where vertical separation needs to be increased when aircraft with different approval status operate in opposite tracks.

6.2 Therefore, it is necessary to adopt measures so that non-RVSM approved aircraft operation do not have a negative impact, but may decrease the actual ATC workload levels. Among these measures, in general, the following are suggested:

- a) Radar Service availability;
- b) Modification of the visualization automated systems, updating them for RVSM scenarios;
- c) Operational planning;
- d) Initial longitudinal separation;
- e) Flight Level tactical use;

- f) Establishment of advanced navigation routes systems (RNAV/RNP/GNSS) laterally separated, specially in those areas with no radar coverage;}
- g) Review the application of the Required Navigation Performance 5 (RNP 5) or more exactly, in current and future ATS routes of the RVSM airspace;
- h) Air Traffic Management.

6.3 Air Traffic Management basic initiatives will be developed as a measure to reduce Controllers workload.

7. **Suggested Action**

7.1 The meeting is invited to:

- a) Take note of the information contained in this Working Paper;
- b) Suggest CAR/SAM Civil Aviation Administrations to develop training initiatives with a view to train in full Air Traffic Controllers who will work in airspaces with RVSM environment.