INTERNATIONAL CIVIL AVIATION ORGANIZATION

Seventh Meeting of Civil Aviation Authorities of the SAM Region (RAAC/7)

(Salvador, Bahia, Brazil, 1-3 July 2002)

Agenda Item 4: **Transition to the CNS/ATM systems**

c) **RVSM Implementation**

(presented by the Secretariat)

Summary

The aim of this working paper is to make a general review of the RVSM implementation process in the CAR/SAM Regions and, in particular, to get the aeronautical authorities of the SAM Region to consider the possibility of preparing a national RVSM implementation plan that would cover the administrative, economic, institutional and technical/operational aspects needed for its execution.

References:

- GREPECAS 10 Report (Las Palmas, Spain, 23-27 October 2001);
- CAR/SAM/3 RAN Report (Argentina, October 1999);
- Project RLA 98/003; and
- Doc. 9574 – RVSM Implementation Manual

1 Introduction

1.1 The 1000-ft reduced vertical separation minimum (RVSM) between FL 290 and FL 410 has been successfully introduced in many ICAO regions, such as the North Atlantic airspace (NAT), the WATRS area (airspace corresponding to Northern Puerto Rico), Asia/Pacific, Europe, the South Atlantic (SAT) EUR/SAM corridor, etc. Other ICAO Regions also have short- and medium-term plans to implement RVSM. (See the chart in **Appendix A**).

1.2 The CAR and SAM Regions, for their part, have drawn up an RVSM implementation programme for 2004, which was approved by GREPECAS 10 through Conclusion 10/11, based on the evolution of Air Traffic Management (ATM) included in the Air Navigation Plan Facilities and Services Document (FASID).

1.3 Inasmuch as the United States of America has started an RVSM implementation programme in its domestic airspace, GREPECAS deemed it advisable for the two programmes to be compatible and

jointly implemented in order to avoid, insofar as possible, any incompatibilities that could jeopardise the safety of air operations on the borders of those regions.

2 Analysis

2.1 It is widely accepted that RVSM implementation will make it possible to use the airspace more efficiently without jeopardising flight safety and that implementation planning should be carried out on a region-wide basis. It has also been acknowledged that RVSM application within the region requires a formal risk assessment and the establishment of safety management procedures.

2.2 In view of the above, GREPECAS developed an implementation strategy that ensures an acceptable level of system safety in RVSM airspace at all times. It was agreed that an analysis of its impact on air traffic services (ATS) was needed.

2.3 In general terms, it might be said that the main challenge faced by States, service providers and airline operators after the maintenance of flight safety is the management of the foreseen traffic growth. The growing congestion of the routes makes it necessary to develop new and more effective ways of separating aircraft.

2.4 In this connection, RVSM enables the aeronautical community to take advantage of improvements in aircraft design and avionics precision, thus deriving sizeable economic benefits.

2.5 The main benefit of RVSM is more efficient airspace use that permits a larger number of aircraft to fly at their optimum flight levels or as close as possible to them, with the resulting saving of fuel that translates into lower operating costs. This could result in cost savings for end consumers if possible increases in air fares can be delayed or reduced.

2.6 According to information obtained from other regions where RVSM has already been implemented, the savings in fuel brought about by flying at more optimum levels amounts to between 1% and 1.5% per flight, resulting in larger economic benefits and lower costs than expected.

2.7 Additional benefits include mainly access to tracks that are also more fuel-efficient, have more availability of altitudes for meteorological reasons, more availability of altitudes to resolve traffic conflicts, a greater capacity to offer users staggered ascents, an improvement in environmental conditions, etc.

2.8 In order to obtain these benefits, many requirements need to be met and a series of commitments established before carrying out the RVSM implementation programme. This covers a series of aspects that need to be evaluated, such as administrative and economic, institutional and technical/operational matters, which will have a direct impact on the successful implementation of this programme.

3. Administrative and economic aspects

3.1 The experience obtained in other regions indicates that implementation of this programme will require a complex and costly effort by all of the parties and a formal commitment on the part of each of the actors involved, users, States, service providers and international organisations.

3.2 Users must assume the costs of inspection, modification and certification of their aircraft by aircraft type or group. The first important step is the approval of aircraft and operators by the aeronautical authority. One of the major pitfalls that the Region must face is the characteristics of the fleet that operates in the CAR/SAM Regions, particularly its obsolescence.

3.3 Some of these aircraft will never be able to obtain approval to fly in RVSM environments because the very high costs of any modifications, replacements or additions necessary for their approval would make its implementation virtually impossible.

3.4 This is an aspect that has been taken into consideration in the approval of the implementation programme. Even so, it was decided that it would be advisable to continue by making an review of the fleet in order to determine exactly what percentage of aircraft operating in the region will be unable to receive approval for RVSM flight. According to the results, the two-stage RVSM implementation programme approved by GREPECAS could be reviewed. It has been considered that if the percentage of aircraft that will be unable to obtain RVSM approval is small, RVSM implementation should be carried out in a single phase to avoid the problems of two-phase implementation, in the understanding that the negative impact on aircraft lacking RVSM approval would be kept to the minimum required.

3.5 In turn, the States will have to meet requirements with regard to regulations, safety oversight, procedure development, personnel training, quality assessment, preparation of handbooks and publications and, most important, the establishment of a national RVSM implementation programme.

3.6 The national RVSM programme should be compatible with and fall within the Regional RVSM implementation programme, with the assignment of officials who will be responsible for the programme and, at the same time, have sufficient authority to act as counterparts of the Regional Programme. Each State and service provider must make a commitment to obtain the necessary funds and have an assigned budget so that the programme can be carried out without mishaps, by means of active participation in regional events, training programmes, dissemination of the programme, etc.

4 Institutional aspects

4.1 As we have already seen, the RVSM implementation strategy is based on its execution in all of the CAR/SAM Flight Information Regions (FIRs), which means that regional agreements will be required for its implementation. Aspects such as the approval of the common documentation needed for the approval of RVSM aircraft, the training programmes for both pilots and controllers, airspace safety assessments and implementation of a monitoring agency are all regional issues and should be addressed as such.

4.2 Today, more than ever, a joint effort is required by all of the agents involved in order to make the most of the few available economic resources, utilise the capacities of the ATS systems to the fullest, lower operating costs, make more efficient use of the airspace and raise the levels of safety.

4.3 ICAO promotes and encourages agreements to this effect. The digital network implementation programme (REDDIG) and Project RLA 98/003– Transition to the CNS/ATM Systems in the CAR/SAM Regions itself are examples of this policy in the CAR/SAM Region.

4.4 This regional strategy will permit the States to fulfil the objectives of the RVSM programme and, without a doubt, will keep the highly valuable resources of each of the States and service providers from being under-utilised.

4.5 On examining the implementation aspects, the GREPECAS 10 meeting not only acknowledged that the Regional Project RLA 98/003 had become a powerful aid to States and institutions, but also that it considered the existence of that Project as an implementation mechanism in the CAR/SAM Regions to be highly positive.

4.6 By virtue of the foregoing, the Regional Group, through Conclusion 10/16, urged the participating States, Territories and International Organisations to continue giving their support to Project RLA 98/003. It also requested the NACC and SAM Regional Offices, using the available regional mechanisms, to encourage all States, Territories and International Organisations that have not yet done so to join and participate actively in that project.

4.7 In this connection, the Fourth Coordination Meeting of Project RLA 98/003, held in Lima, Peru on 4-5 December 2001, decided to include in its working programme those tasks that GREPECAS at its tenth meeting had decided to entrust to the project with regard to RVSM implementation, RNP and to continue the implementation of RNAV routes throughout the entire region. The Meeting of ATM authorities and planners of the CAR/SAM Regions was deemed to be the most suitable mechanism for carrying out the programmes for region-wide implementation.

4.8 We could say, then, that this regional strategy is just beginning and that there are other global and regional plans and challenges that we must confront. For that reason, the States in the SAM Region must continue to follow the same institutional courses that have proven to be so successful in the past.

5 Technical/operational Aspects

5.1 The technical/operational aspects are being duly examined by the GREPECAS ATM/CNS Subgroup through the ATM and CNS Committees and their Task Forces and by the meetings of ATM authorities and planners sponsored by Project RLA 98/003.

5.2 The CAR/SAM/3 RAN Meeting, for its part, through Recommendation 5/29, agreed that the introduction and continued use of RVSM should be subordinated to the prime consideration that the risk of collision be equal to or better than a target level of safety (TLS) of $5X10^{-9}$ mortal accidents per flight hour during loss of vertical separation for all causes of risk.

5.3 Approval has also been given to collecting the necessary statistical data for RVSM implementation, which will be used in the safety assessment that should be carried out before the implementation of this reduced separation.

5.4 The GREPECAS 10 meeting (Conclusion 10/12) accepted the kind proposal of Brazil to establish an agency to monitor the performance of safety systems in the CAR/SAM airspace until a regional agreement is reached for the implementation of a regional monitoring agency. This CAR/SAM Monitoring Agency (CAR/SAM MA), in coordination with the parties involved, should take appropriate measures to collect the relevant and necessary information for executing the implementation programme and carrying out the continuous monitoring of RVSM operations to ensure that the established minimum requirements are not violated.

5.5 For a better reference, **Appendix B** to this working paper contains a summary of the RVSM implementation programme for the CAR/SAM Regions, establishing the various tasks to be completed to ensure successful RVSM implementation.

6 Conclusions

6.1 It is known world-wide that implementation of the reduced vertical separation (RVSM) will yield the benefits of more efficient airspace use, thus allowing a larger number of aircraft to fly at their optimum flight levels, access to tracks that are more fuel-efficient, more availability of altitudes for meteorological reasons, more availability of altitudes to resolve traffic conflicts, greater capacity to offer users staggered ascents, improved environmental conditions, etc.

6.2 It could be concluded that, as is the usual case with any process, the implementation of these improvements will involve a series of requirements that will have to be met by the agents involved in the process.

6.3 The best way to confront these new challenges is through a regional strategy in which each of the parties formally commits itself to meet those requirements by means of a planning effort in line with the architecture of the regional plan, for which it will ensure the personnel, participation, and support at the management, administrative and budget levels. This implementation policy would also enable those States that are not equipped to undertake these new activities on their own to acquire the necessary capacity and experience to allow them to gradually carry out their own local management processes.

7. Suggested action

7.1 The meeting is invited to take note of the information provided, examine the aspects pointed out in this working paper and, if applicable, agree upon a commitment by all of the parties to permit RVSM to be implemented with total success. By virtue of the foregoing, the following draft conclusion is placed before the Meeting for its consideration:

DRAFT CONCLUSION 7/X - DEVELOPMENT OF A NATIONAL RVSM IMPLEMENTATION PLAN IN THE SAM STATES

All of the SAM States are urged to prepare a national plan for RVSM implementation within the framework of the CAR/SAM regional RVSM implementation programme that would consider the administrative, economic, institutional and technical/operational aspects required for its execution.

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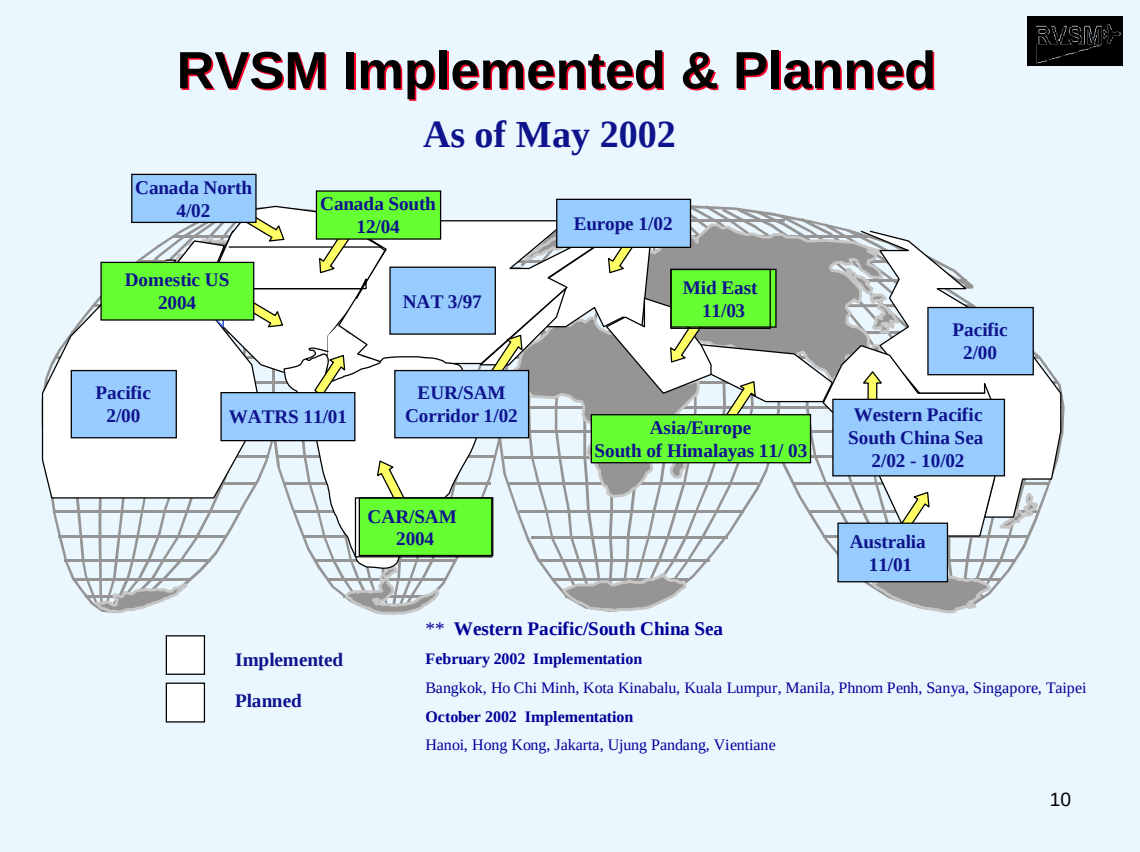
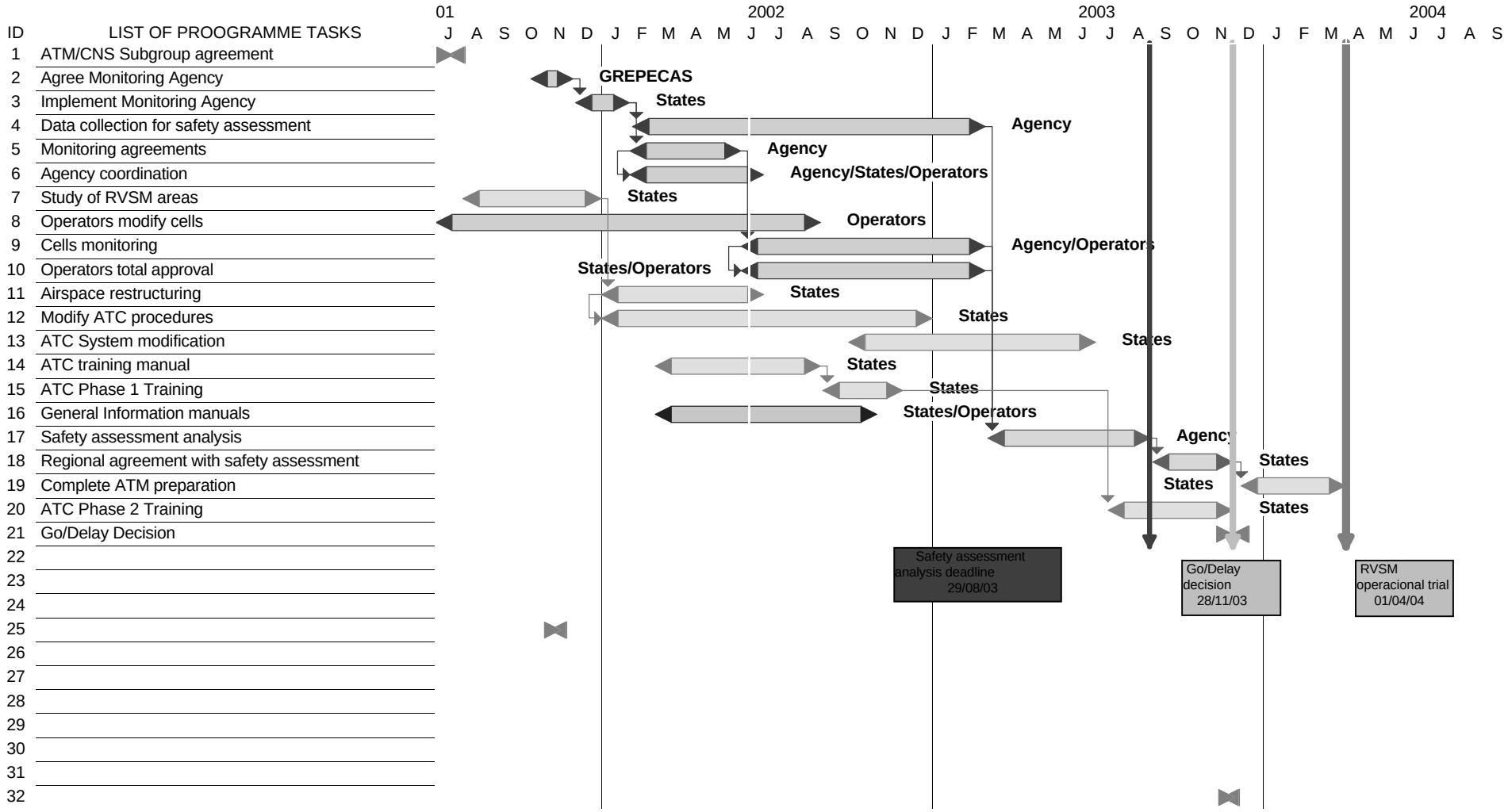
APPENDIX A

RVSM AREAS IMPLEMENTED AND PLANNED AT GLOBAL LEVEL



Kindness of the United States FAA

RAAC/7-WP/08-Appendix B Proposed basic work programme for the implementation of RVSM in the CAR/SAM Regions



Project: RVSM Project
Start: Mon 02/07/01
End: Mon 12/04/04

Task
Division
Progress
Target
Summary
Summarized task
Summarized division
Summarized target
Summarized Progress
External tasks
Project Summary
External Milestone
Deadline