INTERNATIONAL CIVIL AVIATION ORGANIZATION
South American Regional Office - Regional Project RLA/06/901
Assistance for the implementation of a Regional ATM System, taking into account the ATM operational concept and the corresponding CNS technological support
Eighth Workshop/Meeting of the SAM Implementation Group (SAM/IG/8)
(Lima, Peru, 10-14 October 2011)

SAM/IG/8-WP/04
14/09/11

Agenda Item 2: Optimisation of the ATS route structure

Results of the SAM ATS/RO/3 Meeting

(Presented by the Secretariat)

Summary

This working paper presents the economic and environmental benefits of implementing Phase 2 of Version 1 of the ATS Route Network, and suggests the measures that should be taken into account for the subsequent development of Phase 3, involving the implementation of Version 2 of the SAM ATS route optimisation programme, as a result of the post-implementation analysis of Version 1.

References: • Annex 11 to the ICAO Convention • SAM/IG meetings • SAM ATS/RO meetings/workshops • SAM/RA/2 meeting/workshop	
ICAO strategic objectives:	*A – Safety* *C – Environmental protection*

1 Background

1.1 The States of the ICAO SAM Region, with the assistance of Project RLA/06/901, developed a SAM route network optimisation programme and its corresponding action plan, which were initially approved at the SAM/IG/3 meeting through Conclusion SAM/IG/3-1, which urged SAM States to take appropriate action to follow the guidelines and meet the deadlines established in the Optimisation Programme.

1.2 The successive SAM/IG meetings reviewed and amended the action plan associated to the Optimisation Programme as required, and the SAM States got together to implement the action plan of the route optimisation programme, taking into account, as a general principle, that the ATS route network should serve as the basis for airspace organisation and for air traffic service requirements.

1.3 The third Meeting/Workshop on SAM ATS Route Network Optimisation (SAM ATSRO/3) was held at ICAO Regional Office in Lima, Peru, on 4-8 July 2011, with the support of Regional Project RLA/06/901.

1.4 At this meeting/workshop, the participants took note of the successful implementation in March 2011 of **Phase 2** of Version 1 of the ATS Route Optimisation Programme, with the implementation of 15 new RNAV routes, the realignment of 19 routes, and the elimination of 18 routes, both conventional and RNAV. Likewise, they took note of the change in the implementation date of **Phase 1** of the programme, concerning the implementation of RNAV 5 on **20 October 2011**.

1.5 Regarding the development of **Phase 3,** which involves the implementation of **Version 2** of the ATS route network, the States were informed that the SAM/IG/7 meeting had analysed and adjusted the planning of the tasks in its associated Action Plan with a view to implementing Version 2 of the ATS route network.

2 Discussion

2.1 As may be recalled, after a successful implementation of Phase 2 of Version 1 of the ATS route network optimisation, IATA, at the ATS/RO/3 meeting, did a predictive calculation of fuel savings and reduction of CO2 released into the atmosphere as a result of this implementation.

2.2 The predictive calculation for 13 AIRAC cycles estimated savings in the order of U$S 7'638,047 at a cost of U$S 1.06 per kg of fuel. The calculation also showed that atmospheric pollution had been reduced by 22'697,971 kg of CO2. These preliminary figures resulting from the implementation of Phase 2, Version 1, of the ATS Route Optimisation Programme, were considered to be quite encouraging for all the ATM community.

2.3 Likewise, the SAM ATS/RO/3 meeting identified some difficulties and other aspects that should be borne in mind when analysing Version 2 of the ATS route optimisation programme. These difficulties, together with other lessons learnt, were defined during the post-implementation risk assessment conducted at the SAM/RA/2 meeting, whose conclusions appear in WP/5 of this meeting.

2.4 Taking into account that Phase 3 should consist of the complete restructuring of the route network, seeking full integration among ATS routes, control sectors, TMA, etc., through the application of the flexible use of airspace concept, the SAM ATS/RO/3 meeting reviewed in detail the adjustments made to the Action Plan by the SAM implementation group at its last meeting, and after a fruitful debate in which users and air navigation service providers expressed their opinion, agreed to approve the modifications and introduce some improvements to the Action Plan, Phase 3, Version 2, of the SAM ATS Route Network Optimisation Programme.

Improvements to the Action Plan, Phase 3, Version 2, of the SAM ATS Route Network Optimisation Programme

2.5 Amongst the improvements to the Action Plan that appear in **Appendix A** to this working paper, great importance was assigned to a seminar/workshop on airspace planning, aimed at training airspace planners of the States of the Region. It was agreed that the activity could be carried out during the last week of February 2012. For conducting this task, the meeting agreed to request the Secretariat to study the possibility of obtaining support from Project RLA/06/901, and to request the cooperation of DECEA of Brazil for the secondment, if possible, of two experts on the subject. Likewise, other States or organisations were requested to study the possibility of supporting this event.

2.6 Regarding the revised Action Plan and in light of subsequent analyses where note was taken of the lessons learnt and the difficulties in the implementation of Version 1, it is necessary to take into account the updating of the Letters of Operational Agreement, as well as the contingency plans, amongst other considerations that should also be included in the Action Plan.

2.7 Likewise, taking into account the extent of the optimisation in Phase 3, Version 2, the ATSRO/3 meeting deemed it necessary to conduct studies on airspace modelling and accelerated-time simulation in order to assess the scenarios developed. This tool was available only in Brazil, and thus the Secretariat was requested to study, together with the aeronautical authority of Brazil, the possibility of conducting this study during the second half of 2012. In case this was feasible, the support of Regional Project RLA/06/901 would be requested to allow two experts of the States of the Region to cooperate in this study.

2.8 In this respect, the participants at the SAM ATSRO/3 meeting agreed that, once the scenarios had been defined, and Version 2 of the ATS route network had been identified, a workshop/seminar should be held in 2013 to conduct the corresponding risk analysis, for which the support of Regional Project RLA/06/901 would also be required. In this respect, it was concluded that the most appropriate date for the implementation of Phase 3, Version 2, was 17 October 2013.

2.9 IATA considered that the proposed date was not satisfactory, since the expectation was to continue with the implementation of some routes that had been assessed by the ATS route *ad-hoc* group, and although a date had not been established, it expected it to be as soon as possible, given the significant benefits that could be derived in terms of reduced fuel consumption and CO2 emissions, and it would not be appropriate to wait so long to start obtaining such benefits.

2.10 Following an extensive debate on the topic and recognising that conditions were not mature enough for making a decision, since the optimisation programme had been approved at the meetings of the SAM Implementation Group, within the framework of Regional Project RLA/06/901, the meeting felt that any modification or amendment to this programme should be submitted by the States and/or users through a working paper covering the elements that needed to be taken into account by the SAM/IG/8 meeting to be held in October 2011.

2.11 Therefore, it was agreed that the programme and its associated action plan, as modified by the SAM ATSRO/3 meeting, should be presented at the SAM/IG/8 meeting and that the States and users could submit justified proposals of amendment to the programme and the action plan, for analysis by the aforementioned meeting.

Concepts and requirements still in force and that should be taken into account in the new process

2.12 The SAM ATSRO/3 meeting considered that there were some concepts and requirements that had been noted during the first analysis of the SAM ATS route network, which should also be taken into account for the implementation of Version 2 of the ATS route network.

2.13 Regarding the above, the ATS/RO/3 meeting agreed to take into account the requirements for requesting the implementation of a new RNAV route, the airspace planning principles, the information to be included by users in their request, the importance of identifying the gateways of the main TMAs in the SAM Region, the flexible use of airspace, the identification of special use areas and airspaces, and the systematic review of contingency plans and letters of operational agreement. These concepts and requirements appear in **Appendix B** to this working paper.

2.14 Likewise, the Meeting was informed of the work being done in Brazil for the redesign of its main TMAs. The presentation made was receive quite favourably, and the Meeting acknowledged the delegation of Brazil for the presentation, and requested that it be posted on the Regional Office website, to serve as reference material. It also requested the Secretariat to study the possibility of conducting a

course on airspace planning, preferably during the first quarter of 2012, with the support of Regional Project RLA/06/901.

3. Suggested action

3.1 In view of the above, the Meeting is invited to establish an *ad-hoc* group to analyse the content of this working paper, with its **Appendices A and B**, and to make the corresponding modifications to the Action Plan for the optimisation of the route network in the South American Region.

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APPENDIX A (REVISED 07/07/11)

PROGRAMME FOR OPTIMISING THE ATS ROUTE NETWORK IN THE SOUTH AMERICAN REGION (GPIs 1, 5, 7, 8, 10, 11)

Activity	Start	End	Responsible party	Observations
1. **Phase One – RNAV-5 Implementation**				
1.1. RNAV-5 implementation in the SAM Region	**Apr 2008**	**Oct 2011**	**Regional Project RLA/06/901**	The implementation will be carried out according to the Implementation Programme approved at the SAM/IG/2 meeting.
2. **Phase Two – Implementation of Version 1 of the SAM ATS Route Network**				
Activity	**Start**	**End**	**Responsible party**	**Observations**
2.1. Conduct a Feasibility Study for Optimising the SAM Route Network	March 2009	Apr 2009	Regional Project RLA/06/901	**Completed**
2.2. Airspace Concept				
2.2.1 Collect traffic data to understand air traffic flows	June 2008	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901) States	**Completed** Secretariat sent request to States for data collection through letter LT 2/3A.13-LN 3/24.6.1-SA364 dated 8 June 2009. Deadline reply: 9 September 2009. Except for French Guyana and Panama all SAM States sent data collection.

2.2.2	Analyse the fleet navigation capacity	June 2008	SAM/IG/4	SAM/PBN/IG (Projects RLA/06/901 and RLA/99/901) States IATA	**Completed** Task 1.3 of the RNAV-5 Implementation Project
2.2.3	Determine the gateways of the main TMAs in the SAM Region	SAM/IG/3	SAM/IG/4	States	**Completed** Argentina, Bolivia, Brazil, Chile, Colombia, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela.
2.2.4	Determine and obtain the necessary tools to make the study mentioned in item 2.2.5 (aeronautical charts, specific software)	SAM/IG/3	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901)	**Completed** Flight Star.(Verify if the acquisition of another software is necessary)

2.2.5 Make a detailed study of the SAM ATS route network, with a view to preparing version 1 of the route network, including the following: • Indicate the domestic and international ATS routes that should be eliminated, in accordance with their use; • Propose the volume of exclusionary airspace for RNAV-5 application • Indicate the "conventional" RNAV routes that should be eliminated or replaced by RNAV routes in the exclusionary RNAV-5 airspace. • Indicate the RNAV routes that should be realigned, in accordance with the gateways of the main SAM TMAs (see 2.2.3). • Describe in detail the proposed new SAM route network, based on the analysis of the aforementioned items. • Describe in detail the interface between the SAM route network and the CAR route network. • Propose the initial draft Proposal of Amendment to the CAR/SAM ANP	SAM/IG/4	March 2010	SAM/PBN/IG (Project RLA/06/901)	**Completed** Three persons for a period of 3 weeks in order to carry out study. This requirement will be presented to the RLA/06/901 RCC meeting. 3 persons for a 3 week period. IATA and operators would be invited to select one person to assist in the development of this task.
2.2.6 Prepare safety assessment required, applying a qualitative methodology through the use of SMS	April 2010	May 2010	Project RLA/06/901	**Completed** This task requires the hiring of 1 expert in order to carry out required assessment applying SMS. This requirement will be presented to the RLA/06/901 RCC meeting. One person two weeks

2.2.7 Hold the Workshop of Experts from the SAM States to review and validate the study made under item 2.2.5.	SAM/IG/5	June 2010	SAM/PBN/IG (Project RLA/06/901) States	**Completed** This task requires the approval of the RCC meeting, in order to be able to count with RLA/06/901 support. Further to SAM/IG/5
2.3 Implementation of Version 1 of the SAM ATS Route Network				
2.3.1 Process the proposal of amendment to the CAR/SAM Air Navigation Plan	TBD		SAM Regional Office	**Completed** Shall depend on the decisions to be adopted by the routes workshop of 2.2.6
2.3.2 Publish version 1 of the SAM ATS Route Network	TBD		States	**Completed** Shall depend on the decisions adopted in the routes workshop of 2.2.6.
2.3.3 Entry into effect of version 1 of the SAM ATS Route Network	TBD			**Completed**
3. **Phase Three – Implementation of Version 2 of the SAM ATS Route Network**				
Activity	**Start**	**End**	**Responsible party**	**Observations**
3.1. **Flexible Use of Airspace**				

3.1.1. Develop guidance material for the application of the Flexible Use of Airspace concept, including: • Model for using non-permanent routes similar to that applied in EUROCONTROL (Conditional Routes – CDR). • Criterion for defining scenarios in which non-permanent routes are applied • Criterion for categorising non-permanent routes • Harmonised publication of non-permanent routes • Representation of non-permanent routes in aeronautical charts	SAM/IG/7	SAM/IG/9	SAM/PBN/IG (Project RLA/06/901)	Request for support of Regional Project RLA/06/901 to hire an expert for a two-week period.
3.1.2. Establish the Civil-Military Coordination Committee to evaluate application of the Flexible Use of Airspace concept mentioned in 3.1.1.	SAM/IG/7	SAM/IG/9	States	The Civil/Military Committees should be implemented in those States which have not done so. Civil/Military Meeting/Workshop to be carried out in Lima from 16 to 19 August 2011.
3.1.3. Develop proposals for route implementation and/or realignment, in keeping with the utilisation of FUA	SAM/IG/7	SAM/IG/9	States	See 3.1.2
3.2. **Airspace Concept**				
3.2.1. Collect traffic data to understand air traffic flows	SAM/IG/7	Sept. 2011	SAM/PBN/IG (Project RLA/06/901) States	Secretariat will send request to States. Reply date September 2011.
3.2.2. Analyse the fleet navigation capacity	SAM/IG/7	SAM/IG/9	SAM/PBN/IG (Projects RLA/06/901 and RLA/99/901) States IATA	The information on RNAV5 approval is being sent to CARSAMMA and air operators and aircraft are

				expected to be ready for the implementation date (October 2011). The navigation capacity data base will be completed as provided in SAM/IG/2 and SAM/IG/4 (Conclusion SAM/IG/4-3).
3.2.3. Determine the gateways of the main TMAs in the SAM Region	SAM/IG/7	SAM/IG/9	States	
3.2.4. Make a detailed study of the SAM ATS route network with a view to developing version 2 of the route network, including: • Determine necessary tools for the holding of the study mentioned in item 3.2.5 (Aeronautical Charts, specific software). • Definition of scenarios for the SAM airspace structure, including ATS routes, control sectors, TMA interface, for assessment using airspace modelling and fast-time ATC simulation tools. • Indicate the ATS routes that should be eliminated in accordance with their utilisation; • Propose, if necessary, the extent of exclusionary airspace volume for RNAV-5 application • Indicate, as necessary, the "conventional" ATS routes that should be eliminated or replaced by RNAV routes in accordance with the possible extension of the exclusive RNAV-5 airspace volume. • Indicate the RNAV routes that should be realigned in keeping with possible modifications to the gateways of the main	SAM/IG/7	Nov 2011	SAM/PBN/IG (Project RLA/06/901)	Hiring of an expert is programmed for a two-week period during 2011.

TMAs in the SAM Region. • Detail possible scenarios for version 2 of the SAM route network and of control sectors, based on the analysis of the previous items • Detail the interface between the SAM route network and the CAR route network • Propose the initial draft Proposal of Amendment to the CAR/SAM ANP. • Define the required safety assessment (qualitative or quantitative). • With the air traffic data, consider the possibility to implement RNAV5 parallel routes with adequate separation.				
3.2.5. Carry out a Seminar/Workshop on Airspace Planning	ATSRO/3	March 2012	Regional Project RLA/06/901	Request support of Regional Project RLA/06/901 and DECEA (Brazil). The objective is to prepare airspace planning from States of the Region.
3.2.6. Carry out the Fourth ATS Routes Network Optimisation Workshop/Meeting for the SAM Region (SAM ATSRO/04)	ATSRO/3	April 2012	Regional Project RLA/06/901	
3.2.7. Make Airspace Modelling and Fast-Time Simulation studies to assess the scenarios developed in 3.2.5	August 2012	SAM/IG/10	Regional Project RLA/06/901	Ask on the use of the tool available in Brazil. If its use is feasible, procure, through Regional Project RLA/06/901, the participation of two Experts from States of the Region.

3.2.8.	Hold the Fifth Workshop/Meeting for the ATS routes network optimisation of the SAM Region (SAM ATSRO/05), s to review and validate the studies made in items 3.2.4, and 3.2.7	SAM/IG/10	March 2013	Project RLA/06/901 States	
3.2.9.	Carry out the Third Workshop/Seminar on risk analysis of Version 02 of the ATS routes network for the SAM Region	March 2013	SAM/IG/11	Regional Project RLA/06/901	
3.3.	**Implementation of Version 2 of the SAM ATS Route Network**				
3.3.1.	Process the proposal of amendment to the CAR/SAM Air Navigation Plan	August 2013		SAM Regional Office	
3.3.2.	Publish version 1 of the SAM ATS Route Network	22 August 2013		States	
3.3.3.	Entry into effect of version 2 of the SAM ATS Route Network	17 October 2013			

APPENDIX B

Concepts and requirements that continue to be valid and that should be taken into account in the new ATS route optimization process in the SAM Region

1 Updating of statistical data about upper airspace traffic in the SAM Region

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1.1 The ATSRO/3 Meeting, on analyzing ATS route Version 02 corresponding to Phase 3 of the optimization programme, acknowledged that it would be advisable to once again collect statistical data about all flights made in the SAM upper airspace (FL245 or above), on national and international routes, over the period from 01 to 31 August 2011 and their remittance to the SAM Regional Office before 30 September 2011. This would allow an assessment to be made of the evolution of the air traffic demand in the Region. The new form for collecting data about air traffic movements and the corresponding orientations needed for its completion are to be found in the Report of the ATS/RO/3 Meeting, Agenda Item 2, Appendix A.

2 General principles

2.1 The ATSRO/3 Meeting recognized some general principles that should be borne in mind:

a) the development of a harmonized and coherent route network requires the active participation of States in the international working groups created to establish or review the regional route network;

b) in order to identify deficiencies in the route network and in the organization of the ATC sectors, it is necessary to identify the main regional air traffic flows, together with those that extend beyond the Region and that have a direct impact on the regional route network;

c) the ATS route network and the supporting sectors need to be established and reviewed, in order to accommodate the main air traffic flows and thereby reduce the complexity of the airspace structure and balance the ATC workload;

d) the needed routes should be integrated into the network, so as to provide access to the regional route network to/from airports that are not served by it. It is also necessary to incorporate temporary or non-permanent routes, in order to relieve the air traffic load on the main ATS routes and ensure that flights are made with the most optimum profile possible;

e) ensure connectivity with the ATS route network from/to TMA airspace; and

f) provide for phased implementation, in order to ensure consistency with State implementation.

3 Planning Principles

3.1 The ATSRO/3 Meeting also stressed that airspace planners need to take into account the following planning principles:

a) Consider the air traffic volume on the existing and proposed routes;

b) Establish the shortest possible paths for most flights;

c) Give priority in planning to the areas with the heaviest traffic volume;

d) Meet the needs of civil and military users;

e) Carry out the route integration and sectorization of support during the early planning stages;

f) Integrate the route network and TMA arrival and departure paths (SIDs and STARs);

g) Check to see that at least 30 flights per month are made on the requested route. This criterion should also be applied whenever the possibility of eliminating existing routes is being considered; and

h) Avoid implementing independent routes, except when absolutely necessary.

4 User requirements

4.1 At the same time, in order to facilitate the study, users should file the following information:

a) Points of origin and destination of the proposed RNAV route;

b) Address of the proposed route;

c) Airspace affected;

d) Navigation specifications;

e) Number of expected annual operations;

f) Distance in NM between the points of origin and destination on existing routes;

g) Reduction in miles, comparing those of existing routes with the total number of NM between the points of origin and destination;

h) Annual operational savings in the amounts of fuel used (in kg), according to the types of aircraft that would operate on the route (the average, when appropriate);

i) Annual reduction of CO2 emissions into the atmosphere using the new route;

j) Preliminary geographic coordinates of the significant points on FIR borders and when the route crosses another, already established route;

k) List of FIRs involved on the proposed RNAV route; and

l) Comments/observations.

Note: whenever possible, a graph showing the approximate route path will be presented.

4.2 The form that was developed using the data for the implementation, realignment or elimination of RNAV routes is shown in the report of the ATS/RO/3 Meeting, Agenda Item 2, Appendix B.

5 Identification of the arrival and departure points of the main TMAs in the South American Region

5.1 In order to develop an optimum structure with a route network that is duly integrated with airport arrival and departure operations, it is necessary for ATS route planners and terminal area planners to design the new structures jointly and in harmony. This will avoid airspace constrictions that impede orderly, flexible and safe flows to and from airports, as well as guarantee the continuous, seamless airspace established in the ICAO global air navigation plan and the ATM operational concept.

5.2 Another important aspect to be taken into account is the tendency, when speaking of the ***design*** of the terminal to associate that development with the design or construction of approach procedures like those established in the PANS/OPS. The fact is that this is actually a supplement to the design itself of the terminal area, with a much broader significance that refers to the design of the terminal airspace concept, together with its routes, waits, airspace structure and the sectorization itself that integrates the whole with the ATS route network.

5.3 As established in the ***ATS route*** optimization programme, considering the need to reduce the workloads of pilots and air traffic controllers, mainly through more effective use of flight management systems (FMS) and by reducing the ground/air/ground communications burden, the integration of the RNAV route network and the TMA arrival and departure paths should be considered during the initial planning phase for the implementation of the new route network.

5.4 The challenges airspace planners will face in designing the airspace will be, in addition to the expected growth in air traffic, the following, among other things:

a) To satisfy ATS demands to ensure that the capacity is kept at at least the current levels and that delays stemming from terminal airspace constriction are minimized;

b) To satisfy operational safety requirements;

c) To satisfy requirements for ensuring environmental protection; and

d) To satisfy the various demands and requirements of airspace users, by taking account of new and varying user development plans.

5.5 For those reasons, planners, in designing their TMAs, should avoid the tendency to create an airspace that is "independent" of the route network and, together with the designers of PANS/OPS procedures, should consider ATC operational requirements, while obviously taking into account the protection of the environment and the associated costs and benefits.

5.6 In this connection, it is very important for adjacent States to hold bilateral working meetings for the purpose of harmonizing airspaces that include border areas or sectors, particularly on routes that could be affected by the traffic flow between adjacent FIRs and/or TMAs, by adopting operational agreements that should be published in their respective AIPs.

5.7 In regard to the foregoing, the ATS/RO/3 Meeting deemed that it would be timely to urge States to carry out the tasks associated with 3.2.3 of the action plan for Phase 3 of the ATS route optimization programme. This numeral stipulates that the arrival and departure points of the principal TMAs should be identified, in order to integrate them with Version 02 of the ATS route network and that it is necessary, in designing the TMAs and Approaches, to consider the following:

a) systematic FUA application and progress in implementing PBN in TMAs and approaches;

b) improving or at least keeping operational safety at its current levels, by complying with ICAO SARPs in this area and conducting the corresponding risk assessment;

c) ensuring that the design meets operational requirements by maintaining a balance between the interests of the ATC, airspace users and the environment, thereby promoting flexible use of airspace;

d) designing the airspace by applying the principle of collaborative decision-making (see the SAM CDM Manual); as a result, the TMA redesign project should provide for the involvement of a team of multidisciplinary specialists with representatives of all parties involved;

e) designing the airspace terminal as an integral part of the airspace from both the lateral and vertical viewpoints, in order to guarantee a continuous flow of operations; and

f) using continuous descent operations techniques, in order to maximize operational efficiency in the face of airspace requirements and restrictions, while considering the establishment of the maximum number possible of optimized arrivals (Doc. 9931).

5.8 The ATS/RO/3 Meeting, furthermore, urged States in the Region to present the advances made in their planning of TMAs and Approaches at the SAM/IG/8 Meeting and the final document at the SAM/IG/9 Meeting.

6 Flexible use of airspace

6.1 In examining this issue, the Meeting recognized that flexible use of airspace is an airspace management concept described by the International Civil Aviation Organization (ICAO) that seeks to achieve optimized, balanced and equitable airspace use among the different civil and military

users; that strategic coordination and dynamic interaction contribute to the accomplishment of this aim; and that it is grounded in the Resolutions of the 35th Meeting of the ICAO Assembly, Initiative GPI-1 of the Global Air Navigation Plan (ICAO Doc. 9750), and that of GREPECAS.

6.2 The ATS/RO/3 Meeting also took into account the existence of activities that require the reserving of a certain volume of airspace for their exclusive or special use (SUA) during particular periods of time, given the characteristics of their flight profile, the importance of their operations or the risks involved in the operations to be conducted in that airspace and the need to separate them effectively and safely from other types of air activities.

6.3 It went into greater depth, as well, in its analysis of the notion of flexible use of airspace (FUA) as an airspace management concept based on the principle of accommodating all users as fully as possible in that airspace, considering effective communications, cooperation and the necessary coordination to guarantee operational safety, efficiency and environmental sustainability, acknowledging the great importance of the management of flexible use of airspace.

6.4 It was stressed that some SAR activities, exercises or military actions could require the coordination and cooperation of more than one State at a given moment and that the importance of having Civil/Military Coordination and Cooperation Committees in place in each State takes on even more significance in those cases.

6.5 On the other hand, several States recognized that Civil-Military Cooperation and Coordination in the South American Region have been traditionally based on the development of a dialogue between civil and military authorities, with a view to seeking better airspace use for both parties and improving cooperation in the use and integration, when possible, of their respective air traffic control facilities.

6.6 ICAO also asks States to inform military authorities about ICAO's effective provisions, such as Article 3 of the Convention on International Civil Aviation, Resolution A37-15 of the ICAO Assembly, Appendix O, and Annex 11, sections 2.16 and 2.17) and the guidance documents [the Manual concerning safety measures relating to military activities potentially hazardous to civil aircraft operations (Doc. 9554) and the Manual concerning interception of civil aircraft (Doc 9433) relating to civil-military coordination], as well as the promotion of familiarization visits by military personnel to air traffic services (ATS) units.

6.7 While the Standards, Recommended Practices, Recommendations and Conclusions of different events that have been approved for Regional application are aimed at the achievement of mutual cooperation among civil and military authorities, not all States have formally established Civil-Military Cooperation and Coordination Committees in place.

6.8 Participants at the Meeting pointed out that these cooperation and coordination committees or bodies make it possible to ensure the interlinkage of the parties at all levels, in order to reach decisions about problems of civil and military airspace management and air traffic control, which are an essential element for the implementation of Version 02 of the ATS route network, for the agreements reached between the parties for the application of flexible use of airspace depend directly on them.

6.9 Considering all of the foregoing, the Meeting considered it advisable to urge States that have not yet done so to:

a) take the necessary action to create civil/military cooperation and coordination committees or another similar body, in which representatives of civil aviation and military representatives concerned with the implementation of Civil/Military Cooperation and Coordination Committees participate, together with other airspace users; and

b) use, for guidance purposes, the manuals on the management of flexible use of airspace that are listed in the Report of the ATS/RO/3 Meeting, Agenda Item 2, Appendix D.

6.10 In regard to this same matter, it was considered that the simultaneous elaboration of a Model Letter of Agreement between civil and military units on flexible use of airspace would be highly useful to States in the Region. The Secretariat was accordingly asked to look into the most advisable mechanisms for developing this model.

7 Identification of special use areas and airspaces in the South American Region

7.1 The Region is in agreement that, in order to arrive at a comprehensive ATS route network that meets the needs of all users, including commercial, military, general and sports aviation and of unmanned aircraft systems, it is necessary to set up a civil/military cooperation system that will make it possible to analyze all restricted, prohibited and hazardous areas that have been created in the South American region, in order to implement the concept of flexible use of airspace.

7.2 It was also acknowledged that the analysis does not seek to arbitrarily eliminate or reduce airspace for special assigned uses, but to implement collaborative decision-making. This concept bears with it the search for best options capable of satisfying all airspace users and ensuring that needs that arise are met, regardless of the application of airspace restrictions.

7.3 Chapter 4 of the PBIP, on analyzing gaps in the existing ATM system in the SAM Region, identified one of the principal deficiencies as being the lack of policies and, therefore, of procedures for implementing flexible use of airspace. This creates problems for airspace design and management and does not permit the application of an optimum airspace structure and the use of optimum flight paths. (See PBIP, 4.3.1 c).

7.4 While the implementation of flexible use of airspace has improved considerably in recent years, there are sectors where limitations on the existing ATM system still exist, making tactical operations necessary in most cases.

7.5 In this connection, States are recommended to examine the different situations in which, for operational safety reasons, procedures or Letters of Agreement need to be established, in order to avoid tactical airspace management, for this would mean that the Control System would have to take all decisions in real time. While all action plans must allow for the possibility of tactical management, this should be the final option, for the most suitable solution cannot be applied when time is short and several data must be considered.

7.6 Furthermore, the existence of permanent reserved airspace has been identified, mainly for military purposes. This could, in a certain way, impede proper airspace planning in failing to allow for direct flights between origin and destination airports and/or city pairs, result in operation at inadequate flight levels and/or speeds that keep aircraft from maintaining optimum flight profiles, and also constitute an important element in ground and/or en-route delays associated with the system.

7.7 There is a consensus in the Region that SAM States should establish policies for the use of reserved airspace, both temporary and permanent, in order to, insofar as possible, avoid the adoption of restrictions on airspace use. Unmanned aircraft systems (UAS) should also be considered and integrated into SAM air navigation systems, thereby adding a new component to the aeronautical system that should begin to be taken into account.

7.8 From the foregoing, it can be deduced that Flexible use of airspace should start being implemented with the evaluation of hazardous, restricted or prohibited airspace that affects or could affect the routes with the heaviest traffic flows.

7.9 The ATS/RO/3 Meeting took note of the prohibited, restricted and hazardous areas published in State AIPs. The States, with a view to undertaking a preliminary study to allow for a more thorough and qualitative analysis to be made of these special use areas, requested the Secretariat to propose a form that could be used to continue collecting data from the States.

7.10 A simple analysis of the information that has been supplied reveals that a large percentage of special use airspace should be examined in the context of Civil/Military cooperation in each State in the Region. There are 124 prohibited areas, 421 restricted zones, 41 hazardous areas and 83 special areas published in the Region, including both the volcanic areas defined by Chile as special areas for air sports and recreational activities identified by Panama. This information will be processed later to determine the percentages of special use airspace located in the Region and the affect of these zones on civil aviation operations in the Region. This information could be presented at the SAM/IG/8 Meeting for analysis.

7.11 Understanding that implementation of the Flexible Airspace concept could create a problem for airspace optimization, ICAO deemed that it would be advisable to encourage States in the Region to participate in Seminars on Civil/Military Cooperation, inasmuch as events of this kind help to establish good communications between the parties involved, thereby making it possible to improve civil/military cooperation, coordination and interoperability.

7.12 In the light of the foregoing, the Meeting agreed that a survey should be conducted on the use and management of Restricted, Prohibited and Hazardous Areas in the Region, in order to update pertinent information, analyze their impact on airspace and consider their modification, elimination or change in category. The conclusions reached were that:

a) the Secretariat should circulate among the States the Form that appears in the Report of the ATS/RO/3 Meeting, Agenda Item 2 Appendix E, in order to update the information about the use and management of Restricted, Prohibited and Hazardous Areas in the SAM Region;

b) States should undertake an evaluation of hazardous, restricted and prohibited airspace that affects or could affect air circulation and process and subsequently present that information to the SAM/IG/8 Meeting and submit it in final form to the SAM/IG/9 Meeting; and

c) States should identify possible users of volumes of segregated airspace, thus making it necessary to prepare Operational Letters of Agreement (for example: UAS, MIL OPS, recreational activities, anti-hail campaigns, etc.).