



International Civil Aviation Organization

CAR/SAM REGIONAL PLANNING AND IMPLEMENTATION GROUP (GREPECAS)

**First Meeting of the Communications, Navigation and Surveillance /Air Traffic Management Subgroup (CNS/ATM/SG/1)**

Lima, Peru, 15 to 19 March 2010

**Agenda Item 2: Review of Global and CAR/SAM CNS/ATM developments**

**CNS/ATM Implementation Activities in the SAM Region**

(Presented by the Secretariat)

**Summary**

This working paper contains information on the main CNS/ATM activities being carried out in the SAM Region for the implementation of the ATM operational concept under the regular programme, with the support of Project RLA/06/901. The main activities to be carried out include the optimisation of the ATS route network, performance-based navigation, air traffic flow management, CNS system improvements, and automated system integration.

**References:**

- Doc 9854, Global air traffic management operational concept;
- Doc 9750, ICAO Global air navigation plan;
- Report of the fifth meeting of the ATM/CNS Subgroup (Lima, Peru, 13-17 November 2006);
- Report of the GREPECAS/14 meeting (San José, Costa Rica, 16–20 April 2007);
- Fifth meeting of the ATM/CNS Subgroup (Boca Chica, Dominican Republic, 30 June - 4 July 2008);
- Project RLA/06/901 Document, *Assistance for the implementation of a regional ATM system, taking into account the ATM operational concept and communications, navigation and surveillance technological support; and*
- Report of the workshops/meetings of the SAM implementation group: SAMIG/1 (Lima, Peru, 21-25 April 2008), SAMIG/2 (Lima, Peru, 3-7 November 2008), SAMIG/3 (Lima, Peru, 20-24 April 2009) and SAM IG/4 (Lima, Peru, 19-23 October 2009).

**ICAO Strategic Objectives:**

A – Safety  
 C - Environmental Protection  
 D – Efficiency  
 E - Continuity

## 1. Introduction

1.1 The current air navigation planning approach of ICAO is aimed at the implementation of the global ATM operational concept (Doc 9854), the main purpose of which is a global, inter-operational air traffic management system for all users, during all flight phases, that meets the agreed safety levels, provides for economically optimum operations, is environmentally sustainable, and meets national safety requirements.

1.2 The ICAO global air navigation plan (Doc 9750) describes a strategy for achieving short- and medium-term ATM benefits based on ATM infrastructure and the existing and foreseen aircraft capabilities. It also contains guidelines on the ATM improvements that are required for a smooth transition to the ATM system foreseen in the global air traffic management operational concept.

1.3 Planning will focus on performance objectives, with the support of a set of “Global Plan Initiatives” (GPIs). The States and the Regions should select those initiatives that meet their performance objectives, as identified through an analytical process, and that specifically meet the particular needs of a State, region, homogeneous ATM area, or main air traffic flow.

1.4 Accordingly, the implementation of the global air navigation plan initiatives in the SAM Region that will result in an air traffic management system, as envisaged in the global ATM operational concept, is supported by the regular programme and, mainly, by ICAO technical cooperation project RLA/06/901, *Assistance for the implementation of a regional ATM system, taking into account the ATM operational concept and the corresponding communications, navigation and surveillance (CNS) technological support*, the main tool being the South American Implementation Group (SAM/IG) meetings. Other activities are conducted within the framework of informal meetings, bilateral or multilateral coordination meetings, courses, seminars and workshops.

1.5 Project RLA/06/901 started its activities in early 2008 with the participation of the following States: Argentina, Bolivia, Brazil, Chile, Panama, Paraguay, Peru, Uruguay and Venezuela. The project will last five years; estimating the conclusion of its activities by 31 December 2012.

1.6 With the assistance of project RLA06/901, the SAM Region has proposed the implementation of the following programmes: the optimisation of the ATS route network, the implementation of performance-based navigation (PBN), the implementation of air traffic flow management (ATFM), the improvement of CNS capabilities for en-route and terminal area operations, the operational implementation and integration of automated air traffic management systems in the SAM Region, activities related to the safety programme (SSP), the safety management system (SMS), institutional, airport, meteorological, and aeronautical information aspects.

1.7 For the implementation of these programmes, four workshops/meetings of the SAM implementation group (SAM/IG) have been held to date.

## 2. Analysis

2.1 A summary of the status of implementation of the programmes in the SAM Region follows:

- a) Optimisation of the ATS route network;
- b) Performance-based navigation (PBN);
- c) Air traffic flow management (ATFM);

- d) Improvement of CNS capabilities for en-route and terminal area operations; and
- e) Operational integration of automated air traffic management systems.

*ATS route network optimisation implementation programme*

2.2 The 36th General Assembly of ICAO requested the Council to encourage Contracting States to improve air traffic efficiency, which results in emission savings, to report progress in this field, and to expedite the development and implementation of routings and procedures that permit efficient fuel consumption to reduce aviation emissions.

2.3 Likewise, the ALLPIRG/5 meeting, held in March 2006, concluded that a global, consolidated and prioritised list of route and terminal (TMA) improvements should be established in close coordination with airspace users, and that neighbouring PIRGs/States/air navigation service providers (ANSPs) should work to expedite international route improvements.

2.4 In the SAM Region, a feasibility study was initially conducted for the optimisation of the SAM route network (*SAM ATS route network optimisation programme*), with a view to:

- a) establishing planning criteria, which were used for evaluating the SAM ATS route network;
- b) analysing and presenting a general diagnosis of the SAM ATS route network; and
- c) proposing a phased SAM ATS route network optimisation programme, aimed at establishing a methodology for introducing modifications to said route network, leading to gradual improvements in the regional airspace structure.

2.5 The SAM ATS route network optimisation programme, together with the corresponding action plan, was approved through Conclusion SAMIG/3-1. **Appendix A** to this working paper contains the SAM ATS route network optimisation action plan. The SAM ATS route network optimisation programme can be found on the ICAO South American Regional Office website: <http://www.lima.icao.int>, *eDocuments, ATM*.

2.6 The following activities of the SAM ATS route optimisation action plan have been carried out to date:

- a) Feasibility study for the optimisation of the SAM route network and the *SAM ATS route network optimisation programme*;
- b) Collection of traffic data at FL245 and above, in domestic and international routes, within a specified period of time, in order to understand traffic flows in SAM airspace;
- c) Analysis of the navigation capability of the fleet in the SAM Region;
- d) Identification of gateways of the main TMAs in the SAM Region;
- e) Development of the SAM route network Version 1; and
- f) First workshop on the optimisation of the SAM ATS route network.

*Performance-Based Navigation (PBN) Implementation Programme**Implementation of RNAV-5*

2.7 The SAM/IG has developed the Short-Term PBN Implementation Programme for En-Route Operations, which defines the deliverables, with the corresponding dates, needed for RNAV-5 implementation, which has been set for November 2010. Taking into account the need for regional harmonisation of PBN implementation for en-route operations, the SAM/IG SAM/PBN/IG is coordinating and carrying out RNAV-5 implementation tasks, with the support of Regional Project RLA/06/901. **Appendix B** to this working paper contains the updated RNAV-5 implementation action plan.

2.8 Relevant activities carried out to date include the development of a model AIC to report RNAV-5 implementation plans (see **Appendix C** to this working paper). States were also urged to prepare their national plan based on ICAO guidance material. To date, 9 SAM States have submitted their PBN national plan.

2.9 Likewise, aircraft and operator (pilots, dispatchers and maintenance personnel) approval requirements were analysed, as established in the PBN Manual. With the assistance of the Regional Safety Oversight Cooperation System (SRVSOP) of SAM Project RLA/99/901 (*Regional safety oversight cooperation system*), the following advisory circulars and job aids were developed for the approval of aircraft and operators requesting to conduct RNP/RNAV 10 and RNAV 5 operations.

- a) AC 91-001 - Approval of aircraft and operators for RNAV/10 operations (designated and authorised as RNP 10); and
- b) AC 91-002 - Approval of aircraft and operators for RNAV 5.

**Note:** Information on the aforementioned ACs can be found on the ICAO South American Regional Office website:

<http://www.lima.icao.int>, *eDocuments*, *ATM*.

*Implementation of PBN for TMA and approach operations*

2.10 Project RLA/06/901 developed a model for short-term implementation of PBN for TMA and approach operations, which describes the activities required for the implementation of performance-based navigation for TMA and approach operations in the South American Region, with a view to the application of RNAV-1 / RNP APCH / RNP AR and APV BARO/VNAV. The document also specifies the results that should be obtained from each of the activities of the plan, in order to better understand the activities and expected results. Furthermore, the document contains the model action plan for PBN implementation for TMA operations, and the action plan for short-term PBN implementation for approach operations. The project model served as a basis for SAM States for the development of national PBN implementation plans.

2.11 In order to support SAM States in the implementation of PBN for TMA and approach operations, the following advisory circulars and job aids for the approval of aircraft and operations requesting to conduct RNAV 1, RNAV 2, basic RNP 1, RNP APCH, RNP AR APCH and APV/baro-VNAV operations were developed:

- a) AC 91-003 – Approval of aircraft and operators for RNAV 1 and RNAV 2 operations;
- b) AC 91-006 – Approval of aircraft and operators for basic RNP 1 operations;

- c) AC 91-008 – Approval of aircraft and operators for RNP APCH operations;
- d) AC 91-009 – Approval of aircraft and operators for RNP AR APCH operations; and
- e) AC 91-010 – Approval of aircraft and operators for APV/baro-VNAV operations.

**Note:** Information on the aforementioned ACs can be found on the ICAO South American Regional Office website:

<http://www.lima.icao.int>, *eDocuments*, *ATM*.

2.12 One of the weaknesses identified in PBN implementation has been the dearth of skilled personnel for the design of RNAV and RNP procedures. In this respect, through project RLA 06/901, a special implementation project (SIP), and the cooperation of Brazil and Chile, an RNAV/RNP approach procedure design course was held on 1-11 September 2009, and an RNP with authorisation required (RNP AR APCH) procedure design course on 5-16 October. As a result, 12 experts from the States of the Region were trained in procedure design. A new course on APV Baro/VNAV procedure design has been scheduled for April 2010.

#### *Implementation of air traffic flow management (ATFM) in the SAM Region*

2.13 GREPECAS approved the ATFM Operational Concept (ATFM CONOPS) for application in the CAR/SAM Regions. Based on this document, the current level of development of traffic management has been determined, and an ATFM roadmap and an ATFM implementation action plan have been prepared and approved. Also, with the assistance of the ATFM Task Force and Project RLA 06/901, an ATFM procedural handbook was developed for application by traffic management units of the SAM Region. This document is contained in WP/11 of this meeting.

2.14 In March 2009, a course on the methodology to calculate airport and ATC sector capacity was held under the auspices of Project RLA 06/901 and the Brazilian Administration. Additionally, the use of a guide for the application of a common methodology for calculating airport and ATC capacity was approved.

2.15 Two courses/workshops have been scheduled for the first quarter of 2010, one on air traffic flow management (ATFM) and the other for the introduction to decision making, both addressed to planners responsible for ATFM implementation.

2.16 **Appendix D** to this paper contains the Action plan for ATFM implementation in the SAM Region.

**Note:** Information on the ATFM Manual, the SAM ATFM Roadmap, and the Guide for the implementation of a common methodology for calculating airport and ATC capacity can be found on the ICAO South American Regional Office website:

<http://www.lima.icao.int>, *eDocuments*, *ATM*.

*Programme for the implementation of CNS capacity improvements for en-route and terminal area operations*

2.17 The initial activities envisaged in the programme for improving CNS capacity for en-route and terminal area operations are:

- a) Action plans for improving CNS systems;
- b) Interconnection of AMHS systems;
- c) VOR/DME coverage database; and
- d) ADS B trials.

*Action plans for improving CNS systems*

2.18 In order to analyse and diagnose the status of CNS systems, identify short- and medium-term operational requirements for en-route, terminal and aerodrome operations, and propose the required improvements to CNS systems to support en-route, terminal and aerodrome operations in the SAM Region, the SAM/IG, with the support of Project RLA/06/901, prepared a *Guide for improving CNS systems in order to meet short- and medium-term operational requirements for en-route and terminal area operations*. The Guide was reviewed and used by SAM States to prepare their national action plan for the implementation of CNS improvements in order to meet short- and medium-term en-route, terminal and aerodrome operational requirements.

2.19 Action plans for improving CNS systems of SAM States will be of great help for regional CNS implementation planning and to support implementation programmes, such as that for ATS route optimisation, PBN, and ATFM.

**Note:** Information on the guide for CNS improvement, and on national action plans of most SAM States can be found on the ICAO South American Regional Office website: <http://www.lima.icao.int>, *eDocuments*, *CNS*.

*Interconnection of AMHS systems*

2.20 In order to support SAM States in the homogeneous implementation of AMHS and other ATN applications at both national and regional level, the SAM/IG, with the support of Project RLA/06/901, following the guidelines of the initial ATN transition plan prepared by the ATN Task Force of the GREPECAS ATM/CNS Subgroup CNS Committee, and the related ICAO standards and documents, prepared the following material:

- a) Guide for the implementation of national digital IP networks to support current and future aeronautical applications;
- b) Guide for the operational interconnection of AMHS systems in the SAM Region;
- c) Model Memorandum of Understanding (MoU) for the interconnection of AMHS systems.

2.21 Taking into account the aforementioned material, MoUs were developed for the interconnection of AMHS systems between Argentina-Paraguay, Argentina-Brazil and Brazil-Paraguay. Considering that AMHS systems have also been implemented in the SAM Region in Chile, Colombia and Peru, the Meeting prepared an action plan for the interconnection of AMHS systems between:

- Argentina-Chile;
- Argentina-Peru;

Brazil-Colombia;  
Brazil-Peru;  
Chile-Peru; and  
Colombia-Peru.

**Note:** Information on the Guide for the implementation of national digital IP networks to support existing and future aeronautical applications, the Guide for the operational interconnection of AMHS systems in the SAM Region, the model Memorandum of Understanding (MoU) and the MoUs prepared for the interconnection of CNS systems in the Region, can be found on the ICAO South American Regional Office website:

<http://www.lima.icao.int>, *eDocuments*, *CNS*.

#### *VOR/DME coverage database*

2.22 The first part of a database with information on the estimated coverage of VOR and DME radio aids in the SAM Region to meet navigation specifications, and especially, the navigation reversal mode in case of loss of GNSS, was developed.

2.23 The database of the estimated coverage of all VOR/DME radio aids in the Region is to be presented at the SAM/IG/5 meeting (Lima, Peru, 10-14 May 2010).

#### *ADS B trials*

2.24 Regarding this activity, Project RLA/06/901 developed an ADS-B trial implementation action plan. A Thales, family AS-68X, series AS680 ADS B receiver station was installed and the collection and analysis of ADS B data was performed.

#### *Programmes for the operational implementation and integration of automated air traffic management systems*

2.25 Air traffic control centres of the SAM Region have encountered difficulties in the implementation of the appropriate procedures for air traffic coordination. This has been identified as the main cause of air traffic incidents, which would be significantly reduced through the implementation of automatic data transfer to minimise the performance of manual procedures for completing the required ATC coordination.

2.26 The integration of automated systems between air traffic control facilities would allow for the automated transmission of information on flight plans and surveillance of flights in transition between adjacent FIRs, thus improving air traffic control coordination between the air traffic control centres involved.

2.27 In this respect, the SAM Region was of the opinion that Project RLA/06/901 should continue with the tasks aimed at the regional integration of automated ATC facilities, which was started under Project RLA/98/003 (*Transition to CNS/ATM Systems in the CAR and SAM Regions*).

2.28 Thus, the SAM/IG went on, first, to update the documentation produced by Project RLA/98/003, specifically the Interface Control Document (SICD) and the Initial Regional Plan for the interconnection of ACC automated systems.

2.29 The SAM/IG prepared an action plan for the interconnection of automated systems, which appears as **Appendix E** to this working paper. The activities carried out include the drafting of the Preliminary Document on automated system requirements (SSS), containing the automation requirements for an Area Control Centre.

2.30 Also, in order to support States in the interconnection between automated systems of adjacent ACCs, a model memorandum of understanding (MoU) was prepared, defining the technical, operational, and administrative aspects of automated systems. MoUs have been signed for the interconnection of automated systems between the following aeronautical administrations: Argentina–Uruguay, Argentina-Brazil, and Brazil-Uruguay. The signing of the MoUs represents the intention of the States involved to implement the interconnection. Information on the interconnection of automated systems between other ACCs of the Region can be found in Appendix E to this working paper.

2.31 A course on Asterix and AIDC is scheduled for mid 2010 in Lima, Peru, with the main objective of training the personnel responsible for the interconnection of automated systems.

**Note:** Information on the cited documents for the interconnection of automated systems can be found in the ICAO South American Regional Office website:  
<http://www.lima.icao.int>, *eDocuments*, *CNS*.

*Strategy for the Implementation of Amendment 1 to the PANS ATM*

2.32 In order to support SAM States in the drafting of their action plan for the implementation of Amendment 1 to the 15<sup>th</sup> edition of the ICAO PANS ATM (Doc. 4444), Project RLA/06/901 developed a strategy for the implementation of the amendment. The strategy was presented at the SAM/IG/4 meeting, which reviewed it and agreed with its implementation. Copy of the strategy appears in WP/17 of this Meeting.

**3. Suggested action**

3.1 The Meeting is invited to:

- a) take note of the information contained in this working paper;
- b) review and analyse the implementation programmes presented in section 2 of this working paper;
- c) review and analyse the guidance material produced in the SAM Region for the implementation of the programmes described in section 2, so that it may be used as reference material for the work of the CNS/ATM Subgroup and the implementation of the programmes underway; and
- d) take any other action it may deem appropriate.

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## APPENDIX A

**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
<b>1. Phase One – RNAV-5 Implementation</b>				
1.1. RNAV-5 implementation in the SAM Region	Apr 2008	Nov 2010	Regional Project RLA/06/901	The implementation will be carried out according to the Implementation Programme approved at the SAM/IG/2 meeting
<b>2. Phase Two – Implementation of Version 1 of the SAM ATS Route Network</b>				
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 The Secretariat sent a request to States: Re. LT 2/3A.13-LN 3/24.6.1-SA364 DATED 8 June 2009. Deadline for reply: September 2009 Except for French Guyana and Panama, all SAM States sent the 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 Data base in progress
2.2.3 Determine the gateways of the main TMAs in the SAM Region	SAM/IG/3	SAM/IG/4	States	Completed Argentina, Bolivia, Chile, Colombia, Guyana, Paraguay, Peru, Suriname and Venezuela. Brazil, and Guyana shall inform o March 2010.

Activity	Start	End	Responsible party	Observations
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)	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: <ul style="list-style-type: none"> <li>• Indicate the domestic and international ATS routes that should be eliminated, in accordance with their use;</li> <li>• Propose the volume of exclusionary airspace for RNAV-5 application</li> <li>• Indicate the “conventional” RNAV routes that should be eliminated or replaced by RNAV routes in the exclusionary RNAV-5 airspace.</li> <li>• Indicate the RNAV routes that should be realigned, in accordance with the gateways of the main SAM TMAs (see 2.2.3).</li> <li>• Describe in detail the proposed new SAM route network, based on the analysis of the aforementioned items.</li> <li>• Describe in detail the interface between the SAM route network and the CAR route network.</li> <li>• Propose the initial draft Proposal of Amendment to the CAR/SAM ANP</li> <li>• Prepare a performance measuring plan including gas emissions safety, efficiency etc.</li> </ul>	SAM/IG/4	March 2010	SAM/PBN/IG (Project RLA/06/901)	This task requires the hiring of three experts to develop the study. This requirement will be presented to RCC Meeting of RLA/06/901.  3 persons for a period of three weeks.  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	October 2010	Project RLA/06/901	This task requires the hiring of one expert in order to perform the assessment required, applying SMS.
2.2.7 Hold the Workshop of Experts from the SAM States to review and validate the study made under item 2.2.5 and 2.2.6.	SAM/IG/5	June 2010	SAM/PBN/IG (Project RLA/06/901) States	This task requires RCC Meeting authorization in order to count with the support of RLA/06/901.  Later to SAM/IG/5
<b>2.3 Implementation of Version 1 of the SAM ATS Route Network</b>				
2.3.1 Process the proposal of amendment to the CAR/SAM Air Navigation Plan	TBD		SAM Regional Office	Shall depend on the decisions to be adopted by the routes workshop of 2.2.6

Activity	Start	End	Responsible party	Observations
2.3.2 Publish version 1 of the SAM ATS Route Network	TBD		States	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			
<b>3. Phase Three – Implementation of Version 2 of the SAM ATS Route Network</b>				
Activity	Start	End	Responsible party	Observations
<b>3.1. Flexible Use of Airspace</b>				
3.1.1. Develop guidance material for the application of the Flexible Use of Airspace concept, including: <ul style="list-style-type: none"> <li>•Model for using non-permanent routes similar to that applied in EUROCONTROL (Conditional Routes – CDR).</li> <li>•Criterion for defining scenarios in which non-permanent routes are applied</li> <li>•Criterion for categorising non-permanent routes</li> <li>•Harmonised publication of non-permanent routes</li> <li>•Representation of non-permanent routes in aeronautical charts</li> </ul>	SAM/IG/5	SAM/IG/6	SAM/PBN/IG (Project RLA/06/901)	
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/6	SAM/IG/7	States	The Civil/Military Committees should be implemented in those States which have not done so. Plan Civil/Military Meeting/Workshop in 2011.
3.1.3. Develop proposals for route implementation and/or realignment, in keeping with the utilisation of FUA	SAM/IG/6	SAM/IG/7	States	See 3.1.2
<b>3.2. Airspace Concept</b>				
3.2.1. Collect traffic data to understand air traffic flows	SAM/IG/6	SAM/IG/7	SAM/PBN/IG (Project RLA/06/901) States	

Activity	Start	End	Responsible party	Observations
3.2.2. Analyse the fleet navigation capacity	SAM/IG/6	SAM/IG/7	SAM/PBN/IG (Projects RLA/06/901 and RLA/99/901) States IATA	
3.2.3. Determine the gateways of the main TMAs in the SAM Region	SAM/IG/6	SAM/IG/7	States	
3.2.4. Determine the necessary tools for making the study mentioned in item 3.2.5 (aeronautical charts, specific software)	SAM/IG/6	SAM/IG/7	SAM/PBN/IG (Project RLA/06/901)	
3.2.5. Make a detailed study of the SAM ATS route network with a view to developing version 2 of the route network, including: <ul style="list-style-type: none"> <li>•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.</li> <li>•Indicate the ATS routes that should be eliminated in accordance with their utilisation;</li> <li>•Propose, if necessary, the extent of exclusionary airspace volume for RNAV-5 application</li> <li>•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.</li> <li>•Indicate the RNAV routes that should be realigned in keeping with possible modifications to the gateways of the main TMAs in the SAM Region.</li> <li>•Detail possible scenarios for version 2 of the SAM route network and of control sectors, based on the analysis of the previous items</li> <li>•Detail the interface between the SAM route network and the CAR route network</li> <li>•Propose the initial draft Proposal of Amendment to the CAR/SAM ANP.</li> </ul>	SAM/IG/7	June 2011	SAM/PBN/IG (Project RLA/06/901)	

Activity	Start	End	Responsible party	Observations
3.2.6. Prepare a safety assessment and routes spacing	SAM/IG/7	July 2011	CARSAMMA	Quantitative assessment in order to determine spacing between routes to be applied in item 3.2.5
3.2.7. Make Airspace Modelling and Fast-Time Simulation studies to assess the scenarios developed in 3.2.5	August 2011	SAM/IG/9		
3.2.8. Hold the Workshop of Experts from the SAM States to review and validate the studies made in items 3.2.5, 3.2.6, and 3.2.7.	SAM/IG/9	June 2012	Project RLA/06/901 States	
<b>3.3. Implementation of Version 2 of the SAM ATS Route Network</b>				
3.3.1. Process the proposal of amendment to the CAR/SAM Air Navigation Plan	TBD		SAM Regional Office	
3.3.2. Publish version 1 of the SAM ATS Route Network	TBD		States	
3.3.3. Entry into effect of version 2 of the SAM ATS Route Network	TBD			

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## APPENDIX B

**SHORT-TERM EN-ROUTE PBN ACTION PLAN (RNAV-5)  
(GPIs 1, 4, 5, 7, 8, 10, 11, 12, 16, 21, 23)**

<b>1. Airspace concept</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
1.1 Establish and prioritize strategic objectives (safety, capacity, environment, etc.)	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901)	Completed
1.2 Collect traffic data in order to understand traffic flows in a given airspace	June/2008	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901)	Completed
1.3 Analyze the navigation capacity of the aircraft fleet	June/2008	SAM/IG/4	SAM/PBN/IG (Projects RLA/06/901 and RLA/99/901) States IATA	Valid During SAM/IG/4 Meeting, the database was analysed. Will continue to improve with the assistance of States.
1.4 Analyze ground-based means of communication, navigation (VOR, DME) and surveillance to meet navigation specifications and the navigation reversal mode	June/2008	SAM/IG/5	SAM/PBN/IG (Projects RLA/06/901 and RLA/99/901) States	In process. During SAM/IG/4 initial information was presented (WP/35). The final result will be presented to SAM/IG/5.
1.5 Optimize airspace structure, reorganizing the network or implementing new routes based on the strategic objectives of the airspace concept, taking into account airspace modelling, ATC simulations (fast time and/or real time), live tests, etc.	SAM/IG/2	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901) States IATA	In process.
				The meeting examined this task and decided that it was more appropriate to incorporate to the action plan of the optimisation programme of the SAM Region ATS routes network
				No activity has been initiated yet. Id above.

2	Safety assessment	Start	End	Responsible party	Remarks
2.1	Prepare safety assessment execution using a qualitative methodology through the application of SMS	SAM/IG/2	SAM/IG/5	CARSAMMA Project RLA/06/901 Regional Office	RLA/06/901 in order to provide guidance material to CARSAMMA The utilisation of qualitative methodology initially defined through the application of SMS processes

3	Establish a collaborative decision-making process (CDM)	Start	End	Responsible party	Remarks
3.1	Coordinate planning and implementation requirements with air navigation service providers, regulators, users, aircraft operators and military authorities	SAM/IG/2	SAM/IG/4	SAM/PBN/IG States	States have published an initial AIC
3.2	Establish the implementation date	SAM/IG/1	SAM/IG/4	SAM/PBN/IG States	<b>Completed.</b> 18 November 2009 was established as tentative date. States must analyse the feasibility of the tentative date in coordination with domestic operators and military authorities
3.3	Establish the documentation format in the SAM PBN website	SAM/IG/1	SAM/IG/2	SAM Regional Office	<b>Completed</b>
3.4	Report planning and implementation progress to the corresponding Regional Office. Conclusion to present national plans at SAM/IG/4	SAM/IG/2	SAM/IG/4	SAM/PBN/IG States	<b>Completed.</b> Eight SAM States presented a draft of their national PBN implementation plans and it was agreed that for 31 December 2009, States shall present the final version of the plan. The Secretariat was requested to as States that have not done so yet, submit their respective plans.

4	ATC automated systems	Start	End	Responsible party	Remarks
4.1	Assess PBN implementation in ATC automated systems, taking into account amendment 1 to the PANS/ATM (FPLSG).  Note: It is not a requirement for RNAV5 implementation	June/2008	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901)	<b>Completed</b> According to the programme presented in ICAO guidelines (WP/09), it is not a requirement for the RNAV5 implementation. CNS/ATM sub-group will revise this issue.
4.2	Implement necessary changes in automated ATC systems	SAM/IG/2	TBD	States	<b>Completed</b>

<b>5</b>	<b>Aircraft and operator approval</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
5.1	Analyze aircraft and operator approval requirements (pilots, dispatchers and maintenance personnel) in keeping with the PBN manual, and develop the necessary documentation.	June/2008	SAM/IG/2	Regional Project RLA/99/901- Regional Safety Oversight Cooperation System	<b>Completed</b>
5.2	Publish national regulations for the implementation of the RNAV-5 navigation specification	SAM/IG/2	SAM/IG/4	States	<b>Valid</b> There are some States in development process of their regulations, and for this reason, this task is pending.
5.3	Begin the approval of aircraft and operators	SAM/IG/3	SAM/IG/5	States	<b>Valid</b> This is a continuous task that States have initiated and shall continue to carry out upon requirement of operators
5.4	Establish and keep up to date a registry of approved aircraft and operators	SAM/IG/3	Permanent	CARSAMMA States Regional Office	<b>Valid</b> This is an activity being developed permanently by each on of the States.
5.5	Verify the operation of the continuous monitoring programme (aircraft and procedures)	Nov/2010	Permanent	States	<b>Completed</b> This is an activity being developed permanently by each on of the States and is considered in the surveillance plans.

<b>6</b>	<b>Standards and procedures</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
6.1	Assess and, if applicable, publish the regulations on the use of GNSS.	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901) States	<b>Completed</b>
6.2	Finalize WGS-84 implementation	TBD	TBD	States	<b>Completed</b> States which have not done so, should provide the information
6.3	Develop an AIC model to report PBN implementation plans	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901)	<b>Completed</b>
6.4	Publish the AIC reporting PBN implementation plans	SAM/IG/2	SAM/IG/4	States	<b>Completed</b> States should publish on 9 April 2009

<b>6</b>	<b>Standards and procedures</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
6.5	Develop an AIP Supplement model containing applicable standards and procedures, including the corresponding in-flight contingencies	SAM/IG/4	SAM/IG/5	SAM/PBN/IG (Project RLA/06/901)	RLA/06/901 should carry out this task
6.6	Publish the AIP Supplement containing applicable standards and procedures, including the corresponding in-flight contingencies	SAM/IG/5	SAM/IG/6	States	
6.7	Review the Procedural Handbook of the ATS units involved	SAM/IG/5	SAM/IG/6	States	
6.8	Update the letters of agreement between ATS units	SAM/IG/5	SAM/IG/6	States	
6.9	Develop an amendment to regional documentation, if necessary	SAM/IG/3	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901)	RLA/06/901 should carry out this task
6.10	Submit a proposal of amendment to Doc. 7030, if necessary	SAM/IG/5	SAM/IG/6	SAM Regional Office	
					The meeting considered that this task is associated to task 2.1 and should be included in the action plan of the optimisation programme of the SAM Region ATS routes network

<b>7.</b>	<b>Training</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
7.1	Develop a training and documentation programme for operators (pilots, dispatchers and maintenance personnel)	SAM/IG/4	SAM/IG/5	Regional Project RLA/99/901	<b>Completed</b> The matters to be incorporated into each one of the training programmes of operators have been included in the corresponding advisory circulars
7.2	Develop a training and documentation programme for air traffic controllers and AIS operators	SAM/IG/4	SAM/IG/5	SAM/PBN/IG (Project RLA/06/901)	RLA/06/901 should execute this task.
7.3	Develop a training programme for regulators (aviation safety inspectors)	SAM/IG/4	SAM/IG/5	RLA/99/901 States	<b>Completed</b> The SRVSOP technical committee has proposed a training programme oriented to the authorities

<b>7. Training</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
7.4 Conduct training programmes	SAM/IG/5	SAM/IG/6	States	<b>Valid</b> Only some States have initiated this process.
7.5 Conduct seminars for operators, explaining plans and expected operational and economic benefits	SAM/IG/1	SAM/IG/6	States	<b>Valid</b> There is information that only some States have initiated the process

<b>8. Implementation decision</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
8.1 Assess the available operational documentation (ATS, OPS/AIR)	SAM/IG/5	N/A	States	
8.2 Assess the percentage of aircraft and operators (non-exclusionary airspace)	SAM/IG/5	N/A	States	
8.3 Analyze the results of the safety assessment	SAM/IG/5	N/A	States	
8.4 Publish trigger NOTAM	Nov/2010	N/A	States	

<b>9. Performance monitoring system</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
9.1 Develop a post-implementation en-route operations monitoring programme	SAM/IG/4	SAM/IG/5	SAM/PBN/IG (Project RLA/06/901)	
9.2 Implement a post-implementation en-route operations monitoring programme	Nov/2010	Nov/2011	States	
<b>Pre-operational implementation date</b>	18 November 2010	N/A		SAM/IG/4 defined the tentative implementation date 18 November 2010.
<b>Definitive implementation date</b>	Nov/2011	N/A		

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## APPENDIX C

## INITIAL AIC MODEL FOR RNAV-5 IMPLEMENTATION

<b>Telephone:</b> <b>Fax:</b> <b>E-mail:</b> <b>Sitatex:</b> <b>Telex:</b>	<b>STATE</b>  <b>AERONAUTICAL  INFORMATION SERVICE</b>	<b>AIC N°</b>  <b>DATE</b>
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## 1. Introduction

1.1. Continuous aviation growth makes it necessary to increase airspace capacity and points to the need for optimum use of available airspace. The improvement in operational efficiency deriving from the application of area navigation (RNAV) has resulted in the development of navigation applications in different regions and in all flight phases.

1.2. In planning navigation applications in specific routes or within a given airspace, it is necessary to define the requirements clearly and concisely. The reason for this is to ensure that the flight crew and the ATC are aware of the capacity and limitations of the navigation system (RNAV) and to guarantee that RNAV system performance is appropriate for airspace characteristics.

1.3. RNAV systems are used today in a way similar to ground-based conventional systems. An RNAV system is normally identified and its performance assessed through a combination of analyses and flight tests. The airspace concept is developed on the basis of information about RNAV equipment performance, being it necessary to determine whether different equipment models are appropriate for use in a given airspace.

1.4. In order to avoid this type of prescriptive RNAV specifications based on navigation equipment performance that result in delays in introducing new RNAV system capabilities and higher costs for appropriate maintenance and certification, ICAO developed the Performance-Based Navigation Concept (PBN).

1.5. This concept specifies the RNAV system performance requirements in terms of the accuracy, integrity, availability, continuity and functionality needed for the proposed operations in the context of the concept of a particular airspace. The PBN concept represents a shift away from systems-based navigation towards performance-based navigation. PBN application offers the following advantages:

- a) Reduces the need to maintain routes and procedures based on specific systems and, as a result, reduces the associated costs;
- b) Avoids the need to prepare operations based on specific systems for each new navigation system development, which would be prohibitively expensive;
- c) Allows for more efficient airspace use (fuel savings, noise reduction); and
- d) Facilitates operational approval of operators due to the application of a limited set of navigation specifications intended for global use.

1.6. The ICAO Manual on Performance-Based Navigation (Doc. 9613) establishes various different navigation specifications that can be applied globally. Given the air traffic characteristics for en-route operations in the South American Region, RNAV-5 is most appropriate for use there, inasmuch as the approval requirements will make it possible for most aircraft equipped with RNAV systems to meet those requirements. RNAV-5 use does not demand a navigation database, specify compliance with the ARINC 424 “leg types” nor require dual area navigation systems. RNAV-5 implementation aims to optimize the use of aircraft RNAV capacity as soon as possible, without requiring significant changes in airborne equipment for most aircraft.

## 2. Purpose

2.1. This AIC serves as a Note of Intent to implement RNAV-5 in the \_\_\_\_\_ FIR, on \_\_\_ November 2010.

## 3. Area of application

3.1. RNAV-5 will be implemented on all RNAV routes in the \_\_\_\_\_ FIR with the exception of routes \_\_\_\_\_ (applicable in routes which have other navigation specification – i.e.: UL780 and UL 302)

## 4. RNAV-5 operations within the \_\_\_\_\_ FIR.

4.1. Starting on November 18, 2010, only aircraft approved for RNAV-5 (airworthiness and operations approval) will be authorized to operate on RNAV routes in the \_\_\_\_\_ FIR.

4.2. RNAV-5 will be implemented in accordance with the Regional Air Navigation Agreements. Airworthiness and operations approval will be granted by state of operator or by state of registry, according to each case, under national regulations.

4.3. Updated documentation and information about RNAV-5 implementation may be found at the following website of the ICAO South American Office:  
<http://www.lima.icao.int/submenu1.asp?Url=/ICAOSAMNET/AirNav-eDocumentsMenu.asp>.

4.4. Additional information, could be obtained through the following contacts:

- (States must add the RNAV-5 contacts for each ATS provider here)
- ICAO Lima

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## APPENDIX D

<b>ACTION PLAN FOR THE IMPLEMENTATION OF ATFM AT SAM AIRPORTS</b>				
<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
<b>1. Airport demand/capacity analysis</b>	<b>Sep 2008</b>	<b>Apr 2010</b>		
1.1 Prepare ATFM survey	N/A	Aug 2008	Project RLA/06/901 RO	<b>Finalised</b>
1.2 Send survey to the States of the Region	Aug 2008	SAM/IG/2	RO	<b>Finalised</b>
1.3 Analyse the methodology presented by Brazil for estimating airport capacity	June 2008	SAM/IG/2	ATFM/IG	<b>Finalised</b> and analyzed through WP/8, WP/16.
1.4 Send response to survey	N/A	SAM/IG/2	E	<b>Finalised</b> Except for French Guyana, Guyana, and Suriname.
1.5 Assess survey results	N/A	SAM/IG/3	ATFM/IG	<b>Finalised</b>
1.6 Course offered by Brazil on Airport Capacity Estimate	Mar 2009	Mar 2009	Brazil	<b>Finalised</b> The course was carried out from 23 – 27 March 2009, as planned
1.7 Development of the Methodology for the Calculation of Airport and Airspace Capacity in the SAM Region	Nov 2008	Jan 2009	Brazil and USA RLA/06/901	<b>Finalised</b> Result to be presented at SAM/IG/4
1.8 Carry out exercise of Calculation of Airport and Airspace Capacity in the SAM Region as per the Course offered by Brazil	Sept 2009	SAM/IG/4	E	<b>Finalised</b>
1.9 Carry out Calculation of Airport and Airspace Capacity of main airports by States.	Sept 2009	SAM/IG/5	E	
1.10 Identify airports where periods exist where the demand is greater than existing capacity including simulations, if necessary, by States.	Sept/Oct 2009	SAM/IG/5	E	

<b>ACTION PLAN FOR THE IMPLEMENTATION OF ATFM AT SAM AIRPORTS</b>				
<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
1.11 Determine operational factors affecting airport demand and capacity to optimise utilisation of existing capacity, including simulations, is necessary.	Sept/Oct 2009	SAM/IG/5	E	
<b>2. Coordination with the ATM community</b>	<b>Sep 2008</b>	<b>Jun 2009</b>		
2.1 Present initial AIC model	SAM/IG/2	SAM/IG/2	ATFM/IG	<b>Finalised</b>
2.2 Publish initial AIC	SAM/IG/2	Next AIRAC date/2009 after SAM/IG/3	E	<b>Finalised</b>
2.3 Promote seminars to the ATFM community, taking into account the CDM concept for ATFM implementation, and begin the relevant coordination		Second half 2010	E	
2.4 Inform the GREPECAS ATM Subgroup			RO	
<b>3. Infrastructure and database</b>		<b>Aug 2008</b>		
3.1 Send the results of the survey developed by the hired expert to the Automation Group.		Dec 2008		<b>Finalised</b>
3.2 Send to the Automation Group the information obtained by the expert hired on the data bases used in the Brazil, United States and Eurocontrol units	Jan 2009	TBD		
3.3 Coordinate implementation activities with the Automation Group			ATFM/IG	Permanent
<b>4. Policy, standards, and procedures</b>			<b>Nov 2008</b>	
4.1 Hire expert to draft the manuals on ATFM measures for airports and FMU and FMP procedures			N/A	Task included in 4.2
4.2 Hiring of an expert for the elaboration of the ATFM Manual		February 2009	RO	<b>Finalised.</b> Task developed from 6 to 17 July 2009
4.3 Detailed development of ATFM Manual chapters	Dec 2008	SAM/IG/5	RO	Valid Approved partial draft, including ATFM concepts for airspace and airports at SAM/IG/2 Meeting

<b>ACTION PLAN FOR THE IMPLEMENTATION OF ATFM AT SAM AIRPORTS</b>				
<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
				To acknowledge status of implementation at SAM/IG/4. The initial task shall be developed from 6-17 Jul 2009.
4.4 Detailed development of the second part of ATFM Manual Chapters.	Dec 2009	Jun 2010	RO (RLA/06/901)	
4.5 Present the model AIC Supplement		SAM/IG/6	ATFM/IG	
4.6 Approve the AIC Supplement		SAM/IG/6	ATFM/IG	
4.7 Publish the AIP Supplements		AIRAC date prior to SAM/IG/7	E	
4.8 Develop CDM Manual		SAM/IG/5	RO (RLA/06/901)	
<b>5. Training</b>	<b>Sep 2008</b>			
5.1 Draft ATFM training plans and submit them		SAM/IG/5	E	RO shall request this requirement to States.
5.2 Train the team on decision-making at airports		Aug 2009	E	Permanent
5.3 Hire expert to draft Manual on the Introduction to ATFM for the ATM Community		TBD	RO	Guidelines to inform ATM community on ATFM and CDM general concepts. These guides may be provided in courses, seminars or others TBD.
5.4 Present and assess the Manual for the Introduction to ATFM for the ATM Community		First half of 2010	RLA/06/901	
5.5 CDM Course/Workshop for ATFM planners.				
5.6				
5.6 Train the members of the ATM community in the CDM and ATFM concepts		TBD	E	

<b>ACTION PLAN FOR THE IMPLEMENTATION OF ATFM AT SAM AIRPORTS</b>				
<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
5.7 Train the staff in ATFM measures for airports			E	Permanent
5.8 Monitor the training of the ATM community			E	Permanent
<b>6. Final implementation decision</b>				
6.1 Identify and review factors that may affect the implementation decision		SAM/IG/6	ATFM/IG	
6.2 Declare the pre-operational implementation in the defined area		TBD	E	
6.3 Declare the final operational implementation in the defined area		TBD	E	
<b>7. Monitor system performance</b>				
7.1 Draft the ATFM post-implementation follow-up programme at airports	SAM/IG/7	SAM/IG/8		
7.2 Implement the ATFM post-implementation follow-up programme at airports	SAM/IG/6	SAM/IG/7	ATFM/IG	
7.2 Implement the ATFM post-implementation follow-up programme at airports	SAM/IG/7	SAM/IG/X	E	
<b>Tentative pre-operational implementation date</b>				
		N/A	Oct 2010	
<b>Tentative definitive implementation date</b>				
		N/A	Dec 2010	

**Note:**

E	States
SAM/IG	SAM Implementation Group
ATFM/IG	ATFM Implementation Group
OR	Regional Office

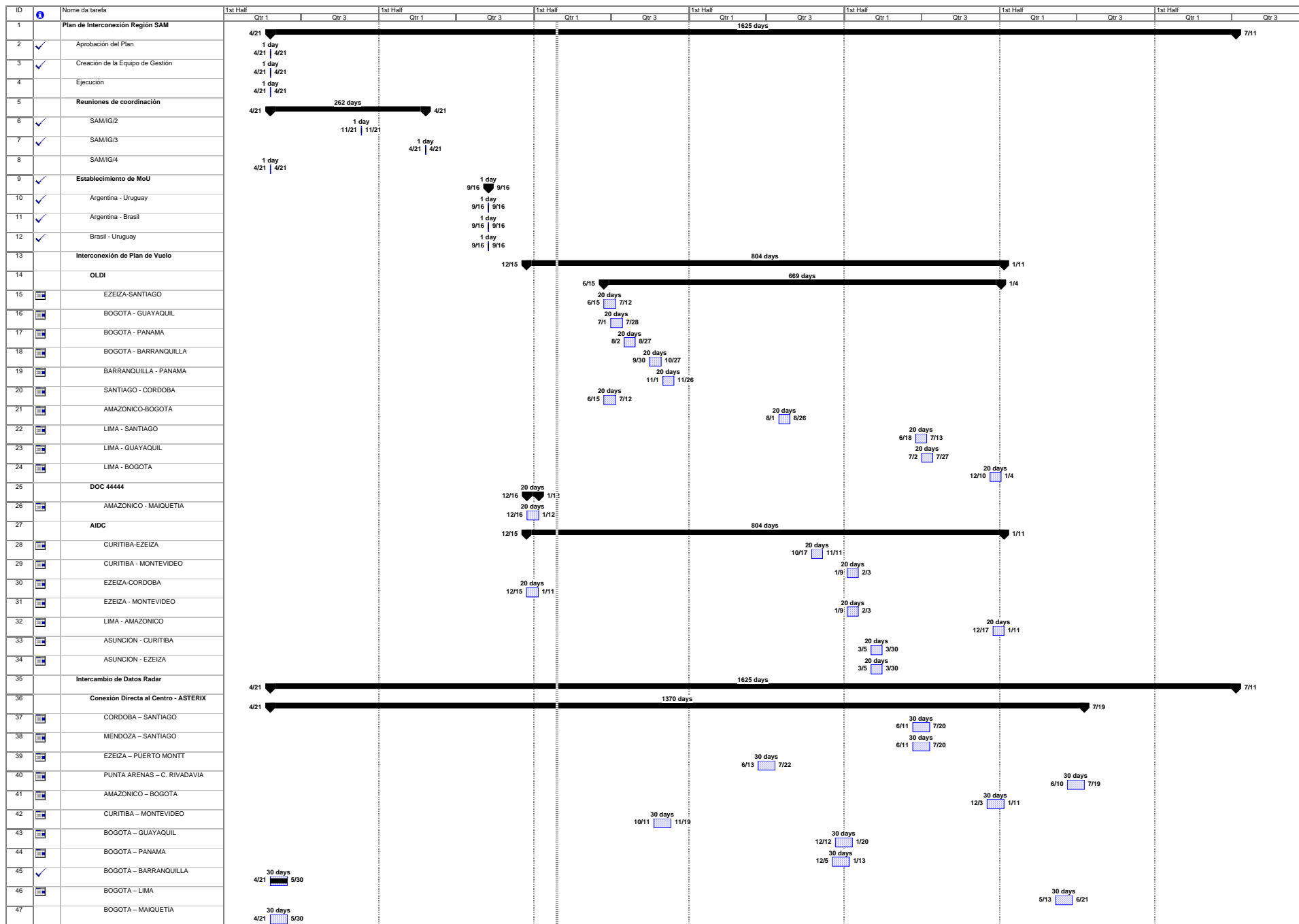
<b>ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION</b>				
<b>B- AIRSPACE</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or office in charge)</b>	<b>Remarks</b>
<b>1. Airspace demand and capacity analysis</b>				
1.1 Analyse the methodology to estimate ATC sector airspace capacity presented by Brazil	Jun 2008	SAM/IG/2		<b>Finalised</b>
1.2 Prepare an airspace demand survey	TBD	TBD		
1.3 Attend the course on Airspace Capacity Estimate	<b>TBD</b>	<b>TBD</b>		
1.4 Carry out the States estimate airspace ATC sector capacity at the major airports	<b>TBD</b>	<b>TBD</b>		
1.5. Identify airspace sectors where demand sometimes exceeds capacity, including simulations by the States, if necessary	<b>TBD</b>	<b>TBD</b>		
1.6 Identify factors affecting airspace demand and capacity in order to optimise the use of existing capacity, including simulations if necessary and present conclusions	<b>TBD</b>	<b>TBD</b>		
<b>2. Coordination with the ATM community</b>				
2.1 Coordinate with the ATM community considers the implementation of ATFM in the airspace	Sep 2008	Aug 2010		
2.2 Review the flexible use of restricted, dangerous and prohibited airspaces.		SAM/IG/6	E	Consider the results of the civil/military coordination meeting carried out in Montreal in October 2009.
<b>3. Infrastructure and database</b>				
3.1 Send requirements to the Automation Group, as stipulated in Appendix B of the ATFM CONOPS	TBD	TBD		
3.2 Coordinate implementation activities with the Automation Group	N/A	Dec 2013		
<b>4. Policy, standards, and procedures</b>				
4.1 Develop ATFM policies, taking into account the	<b>TBD</b>	<b>TBD</b>		

<b>ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION</b>				
<b>B- AIRSPACE</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or office in charge)</b>	<b>Remarks</b>
objectives and principles established in the CAR/SAM ATFM CONOPS				
4.2 Develop Draft CDM Manual		SAM/IG/5	RO Regional Project RLA/06/901	
<b>5. Training</b>	<b>TBD</b>	<b>May 2013</b>		
5.1 Train the team on airspace data collection	Jun 2009			Permanent
5.2 Air Traffic Flow Management Course/Workshop			Brazil	Hosted by RLA/06/901
5.3 Train personnel in ATFM strategic measures for airspace	<b>TBD</b>	TBD		
5.4 Prepare plans and ATFM training material	TBD	TBD		
5.5 Conduct training of personnel involved.				
<b>6. Final implementation decision</b>	<b>N/A</b>	<b>Sep 2013</b>		
6.1 Analyse factors affecting the implementation decision	<b>N/A</b>	<b>TBD</b>		
6.2 Declare pre-operational implementation in the area defined	<b>N/A</b>	<b>TBD</b>		
6.3 Declare definitive operational implementation in the area defined	<b>N/A</b>	<b>TBD</b>		
<b>7. Monitor system performance</b>	<b>TBD</b>	<b>N/A</b>		
7.1 Draft ATFM post-implementation follow-up programme	TBD	Aug 2013		
7.2 Implement ATFM post-implementation follow-up programme	Dec 2013	N/A		
<b>Tentative pre-operational implementation date</b>	<b>N/A</b>	<b>Jul 2013</b>		
<b>Tentative definitive implementation date</b>	<b>N/A</b>	<b>Dec 2013</b>		

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PLAN ACCION IMPLANTACION SISTEMAS AUTOMATIZADOS/ACTION PLAN IMPLEMENTATION AUTOMATED SYSTEMS





PLAN ACCION IMPLANTACION SISTEMAS AUTOMATIZADOS/ACTION PLAN IMPLEMENTATION AUTOMATED SYSTEMS

