International Civil Aviation Organization
Organisation de l'aviation civile internationale
Organización de Aviación Civil Internacional
Международная организация гражданской авиации
منظمة الطيران المدني الدولي
国际民用航空组织

LN 3/24.1 – SA386
LT 2/6B.13

23 June 2011

To: Mr. Pierre Dubois, Directeur Régional de l'Aviation Civile aux Antilles et en Guyane (France)
Mr. Zulficar Mohamed, Director General, Civil Aviation Authority, Guyana
Mr. Stanley Betterson, Acting Director of Civil Aviation, Suriname

Subject: **RLA/06/901 - Seminar/Workshop on the Air Navigation System Implementation of the Performance Based Air Navigation Plan for the South American Region Regional Project -** Lima, Peru, 9 to 13 May 2011

Sir,

I have the honour to send you this letter to refer to the Seminar/Workshop on the Air Navigation System Implementation of the Performance Based Air Navigation Plan for the South American Region held in Lima, Peru, from 9 to 13 May 2011. This event was carried out as part of the programme of activities approved by the Coordination Committee of Regional Project RLA/06/901.

In this regard, please note that the Final Report has been published at the ICAO SAM Regional Office web Page: **http://www.lima.icao.int.**

Accept, Sir, Madame, the assurances of my highest consideration.

Franklin Hoyer
Regional Director
ICAO South American Office
Lima

Enclosure
As indicated

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

South American Office

Seminar/Workshop on the Air Navigation System Implementation of the Performance Based Air Navigation Plan for the South American Region

SUMMARY

(Lima, Peru, 9 to 13 May 2011)

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

HISTORY OF THE SEMINAR/WORKSHOP

ii-1 PLACE AND DURATION OF THE MEETING

The Seminar/Workshop on the Implementation of the Air Navigation System Performance Based Air Navigation Plan for the South American Region was held at the ICAO SAM Regional Office premises, in Lima, Peru, from 9 to 13 May 2011, under the auspices of Regional Project RLA/06/901.

ii-2 OPENING CEREMONY AND OTHER MATTERS

Mr. Franklin Hoyer Regional Director of the ICAO South American Office, greeted the participants for the continuous support provided to activities developed at regional scale by the South American Office, as well as to the civil aviation authorities and national and private organizations of the ICAO South American Region for the continuous support to the activities of the SAM Implementation Group. He highlighted the importance of Regional Project RLA/06/901, which hosts these events. On the other hand, he emphasized the importance of this matter, which shall enable the Region a performance-based planning for the forthcoming five years.

ii-3 SCHEDULE, ORGANIZATION, WORKING METHODS, OFFICERS AND SECRETARIAT

The Seminar/Workshop agreed to hold its sessions from 08:30 to 16:30 hours, with appropriate breaks. The seminar was dictated and then, for the workshop part, Ad-hoc Groups were created. At the end of the event, final conclusions were provided.

Mr. Onofrio Smarrelli, ICAO SAM Regional Officer, CNS, acted as Secretary, being assisted by Messrs. Roberto Arca Jaurena, ICAO SAM Regional Officer, ATM/SAR/AIM, and Jorge Fernández, ATM/SAR Expert, ICAO SAM Regional Office, Lima.

ii-4 WORKING LANGUAGES

The working language was the Spanish with simultaneous translation in English and the documentation of the seminar/workshop was presented in both languages.

ii-5 AGENDA

The following agenda was adopted:

Agenda Item 1: Analysis and evaluation of the global ATM operational concept

Agenda Item 2: Air Navigation System Performance Based Air Navigation Plan for the South American Region

Agenda Item 3: Analysis to the plan components

3.1 The air traffic in the SAM Region and planning considerations
3.2 Air traffic management and search and rescue
3.3 Communications, navigation and surveillance
3.4 Aeronautical meteorology
3.5 Aeronautical information services
3.6 Aerodromes and ground aids/aerodrome operational planning
3.7 Human resources development, competency management and safety

Agenda Item 4: Other business

ii-6 **ATTENDANCE**

The meeting was attended by 32 participants from 10 States of the SAM Region Argentina, Bolivia, Brazil, Chile, Guyana, Panama, Paraguay, Perú, Uruguay and Venezuela, and 1 International Organization, IATA. The list of participants is shown in pages iii-1 to iii-7.

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SUMMARY OF THE WORK CARRIED OUT DURING THE SEMINAR/WOKSHOP

Taking as a basis the agenda approved, ICAO presentations were made on Monday and Tuesday with regard to the different air navigation aspects, and especially on the Global ATM operational concept and the ICAO air navigation plan. These have been basic documents. These have been basic documents which have served as reference for the drafting of the regional implementation plan.

Then, all the chapters of the implementation plan were presented, so that delegates could have a clear vision of the document content and could have a holistic, global view of the same.

Finally, a presentation was made on the metrics, since it was one of the aspects that ICAO and GREPECAS must have clear, in order to make an assessment on the progress of the status of execution of the implementation plan. An Executive Summary of the presentations is shown in **Appendix A**.

Eight Ad-hoc Groups were created in the part corresponding to the workshop, which thoroughly analysed all chapters of the implementation plan.

The outcome has been a document which is adequate to the current requirements of stakeholders in the application and utilisation of the air navigation system, thoroughly analysing in all it parts, including the performance framework forms (PFF), which shall be the metrics to be used in the Region to carry out follow-up of implementation. Such document is shown in **Appendix B**.

This document shall be presented for revision and approval to the Twelfth Civil Aviation Directors Meeting to be carried out in the South American Regional Office, from 3 to 6 October 2011.

A matter which was thoroughly discussed was the name of the document itself. Some delegates expressed that the word “performance” confused the plan with performance-based navigation (PBN) and that a term which avoided such confusion should be used.

APPENDIX A

PRESENTATIONS OF THE SEMINAR/WORKSHOP ON THE AIR NAVIGATION SYSTEM PERFORMANCE-BASED NAVIGATION IMPLEMENTATION PLAN FOR THE SOUTH AMERICAN REGION

In **Module I**, a presentation was made on the ICAO vision, mission and strategic objectives for the 2011-2013 triennium, explaining the purpose of ICAO activities and highlighting the result- and performance-based approach and the importance of programmes, projects and metrics.

In **Modules II and III,** the background of the ATM operational concept was presented together with a detailed analysis of the vision statement underlying the concept and its rationale: importance of the ATM community, ruling principles, expectations and key conceptual changes, analysis of the concept components and importance of information management**.**

In **Module IV, t**he Global Air Navigation Plan (Doc.9750) was presented, together with the evolution towards the Global Plan Initiatives and their integration, detailing the scope of each initiative and its components associated to the operational concept, highlighting those initiatives that had already been, or were being, implemented in the Region.

A thorough analysis of the Plan was made in **Module V**, with a revision of Chapters 1, 2 and 3 of the Plan, analysing the background, content, objective, scope, and planning considerations, and presenting the homogeneous areas with their main flows, as well as the expected evolution of the Plan.

Chapter 4 of the Plan, concerning ATM, was presented in **Module VI,** with an analysis of the current situation, the strategy for the implementation of performance objectives, benefits and relationship with ICAO strategic objectives, as well as the metrics and related tasks**.**

Chapter 5 of the Plan in the CNS field was addressed under **Module VII**, which contained the regional planning for the improvement and strengthening of aeronautical communications, navigation and surveillance, through the identification of specific performance objectives, and the strategy for the implementation of performance objectives, benefits and relationship with ICAO strategic objectives, as well as the metrics and related tasks.

Chapter 6 of the Plan in the MET field was presented under **Module VIII**, which contains the regional plans to improve MET support to ATM in high-density airspace, the text-to-data transition to improve access, display and interoperability with tools to support decision-making.

Chapter 7 of the Plan in the SAR area was presented in **Module IX**, with an analysis of the current situation, the strategy for the implementation of performance objectives, benefits and relationship with ICAO strategic objectives, as well as the metrics and related tasks.

Chapter 8 of the Plan in the AIM field was presented in **Module X**, with an analysis of the current situation, the strategy for the implementation of performance objectives, benefits and relationship with ICAO strategic objectives, as well as the metrics and related tasks.

Chapter 9 of the Plan in the AGA/AOP field was presented in **Module XI**, with an analysis of the current situation, the difficulties encountered in meeting airport demand and the capacity improvement objective, the strategy for the implementation of performance objectives, benefits and relationship with ICAO strategic objectives, as well as the metrics and tasks related to airport certification, training of inspectors and manuals.

Chapter 10 of the Plan is presented in **Module XII**, highlighting the importance of taking into account human resource planning and competence management, bearing in mind the global air navigation plan initiatives as well as new regulations and requirements for their implementation in the short and medium term, and the associated components of the ATM operational concept.

In **Module XIII,** the presentation addressed Chapter 11, concerning safety, an element that cuts across all air navigation areas, with emphasis on the State Safety Programme (SSP) and Safety Management Systems (SMS).

Finally, in **Module XIV**, introductory information was provided on the performance-based approach and on the formulation of metrics and an initial group of key performance areas and associated metrics, to serve as a basis for measuring the performance of the SAM Regional Air Navigation Performance-Based Implementation Plan.

APPENDIX B

AIR NAVIGATION SYSTEM PERFORMANCE-BASED IMPLEMENTATION PLAN FOR THE SAM REGION

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SOUTH AMERICAN REGIONAL OFFICE

AIR NAVIGATION SYSTEM PERFORMANCE-BASED IMPLEMENTATION PLAN FOR THE SAM REGION

Version 1.1

May 2011

TABLE OF CONTENTS

ATTACHMENTS TO THE DOCUMENT

FOREWORD

The Air Navigation System Performance-Based Air Navigation System Implementation Plan for the SAM Region is published by the ICAO South American Regional Office on behalf of States accredited and International Organizations involved. It considers implementations at short and mid-term, as indicated in the guidelines contained in the Global Air Navigation Plan and the plan initiatives required for evolution to a Global ATM System, as shown in the Global ATM Operational Concept.

The Regional Office, on behalf of States and Organizations involved, will publish the required revised versions of the plan to reflect current implementation activities.

Copies of the plan can be obtained by contacting:

ICAO SOUTH AMERICAN OFFICE

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The present edition (Version 1.1) includes all revisions and modifications until May 2011. Subsequent amendments and corrigenda will be indicated in the Record of Amendment and Corrigenda Table, according to the procedure established in page 5.

It should also be mentioned that a list of reference documents used in the preparation of this document is presented in **Attachment F.**

The issue of amendments and corrigenda is announced regularly through correspondence with States and International Organizations, and in the ICAO website, which holders of this publication should consult. The blank boxes facilitate the recording of amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS			
No.	**Date applicable**	**Date entered**	**Entered by**

CORRIGENDA			
No.	**Date applicable**	**Date entered**	**Entered by**

1. Chapter 1: Foreword

1.1 Objective

1.1.1 This Air Navigation System Performance-Based Implementation Plan for the SAM Region has been drafted taking into account the Global Air Navigation Plan (Doc 9750), and its objective is to implement the Global Plan Initiatives (GPIs) as specified in that document, in order to begin the migration to the ATM operational concept as foreseen by ICAO.

1.1.2 Likewise, this Plan seeks to establish an implementation strategy so that benefits can be obtained for the ATM community, based on the ATM-related infrastructure and available and foreseen aircraft capabilities, including unmanned aircraft system (UAS). The document contains the Regional vision for the air navigation system (AGA/AOP, AIM, ATM, CNS, MET, SAR, Human Resources and Safety), giving high priority to environmental protection, training and safety, aspects required to support such evolution.

1.2 Scope

1.2.1 This migration plan covers the SAM Region up to its boundaries, and includes the short- and medium-term implementations between 2012 and 2018. The long-term initiatives required for the evolution to a global ATM system, as shown in the Global ATM Operational Concept, will be added to this Plan as they are developed and approved.

1.3 Background

1.3.1 Following the progress made by States and Regional Planning and Implementation Groups in the implementation of CNS/ATM systems within the framework of the Global Air Navigation Plan (formerly Global Navigation Plan for CNS/ATM Systems), it was recognised that technology was not an end in itself and that an integrated global ATM system concept was required, based on clearly established operational requirements. This concept, in turn, would serve as the basis for the coordinated implementation of CNS/ATM technologies based on clearly established requirements. In order to develop the concept, the ICAO Air Navigation Commission created the Air Traffic Management Operational Concept Panel (ATMCP).

1.3.2 The Global ATM Operational Concept developed by the aforementioned panel was approved by the Eleventh Air Navigation Conference (September-October 2003) and published as Doc. 9854 AN/458, through Recommendation 1/1, which reads as follows:

a) ICAO, the States and the regional planning and implementation groups (PIRG) should consider the concept as the global common framework for guiding ATM system implementation planning and channelling ATM development work;

b) The global ATM operational concept should be used as high-level guidance for the development of ICAO provisions concerning CNS/ATM systems;

c) The States, with the support of other members of the ATM community, must undertake the task of validating the seven components of the global ATM operational concept (see Figure 1);

d) ICAO, the States and the PIRGs should develop migration strategies for the implementation of ATM systems based on the global ATM operational concept; and

e) ICAO should align its technical programme to facilitate the future work related to the ATM operational concept.

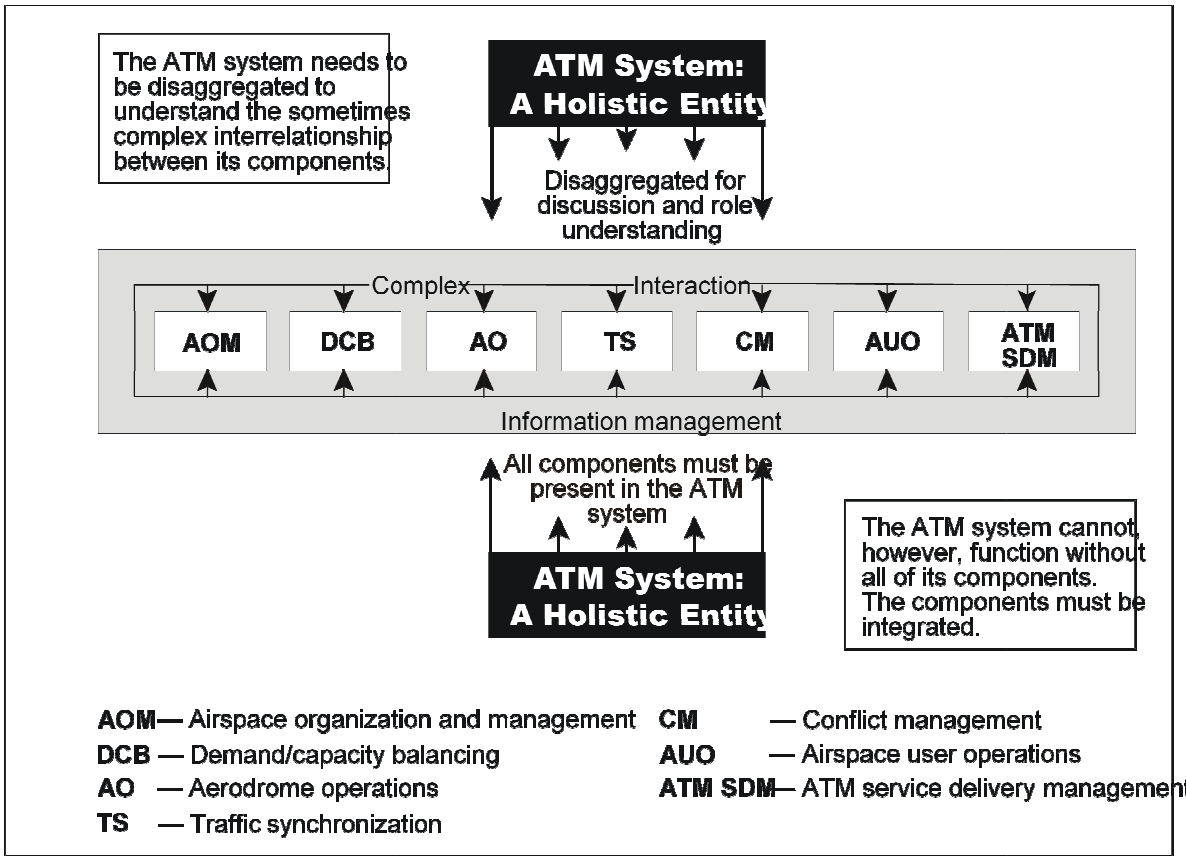

Figure 1: ATM system components

1.3.3 Following the AN-Conf/11, the Sixth Meeting of ANC Consultation with Industry was held in Montreal, on the topic "Promoting the implementation of the recommendations of the 11th Air Navigation Conference". Amongst the topics discussed, "Global ATM - From Concept to Reality" generated the following conclusion:

"That all partners capable of doing so, work together in the preparation of a common roadmap or global action plan, with the purpose of deriving operational benefits in the short and medium term, and that said document be available for use by ICAO by mid October 2004 for submission to the Air Navigation Commission and be considered for inclusion in the Global Plan."

1.3.4 The industry roadmap included the short- and medium-term implementation activities related to CNS/ATM systems, while long-term objectives are contemplated in the operational concept. Accordingly, the Commission felt that the roadmap was fully consistent with the operational concept and that if positive results continued to be obtained, convergence would be achieved with the ATM system foreseen in the operational concept. The Global Plan and the aforementioned concept would form a complete planning structure.

1.3.5 In order to align global planning with the conclusions of the Eleventh Air Navigation Conference, mainly in relation to the Global ATM Operational Concept, as well as with the Industry Roadmap, ICAO began the development of the new Global Air Navigation Plan. In addition to including the Global ATM Operational Concept, the Global Air Navigation Plan focuses on a set of "Global Plan Initiatives" (GPIs), providing the necessary conditions for the implementations that seek to attain benefits for the ATM community in the short and medium term.

1.3.6 Within this context, the GREPECAS/15 (October 2008) took note of the significant progress made by ICAO in the drafting of the relevant guidance material. These documents include: a) the Global Air Traffic Management Operational Concept (Doc 9854); b) the Air Traffic Management System Requirements (Doc 9882); the Manual on the Global Performance of the Air Navigation System (Doc 9883); and d) the Global Air Navigation Plan (Doc 9750).

1.3.7 Likewise, GREPECAS/15 approved Conclusion 15/1 for the development by the Group of a regional performance-based plan, in keeping with the Global Air Navigation Plan and the Global ATM Operational Concept. This plan should include the identification of the regional performance objectives and the performance framework forms to be completed by all air navigation areas, such as ATM, CNS, SAR, AIM, MET and AGA/AOP. In a similar way, the States would develop their national performance-based plans.

1.3.8 Finally, the First GREPECAS CNS/ATM Subgroup Meeting analysed the documentation existing in the Caribbean and South American Regions an through Decision CNS/ATM/SG/1-1, States were requested to prepare, with the assistance of ICAO, a performance-based implementation plan for the South American Region, to be completed by June 2011.

1.4 Evolution and Migration

1.4.1 When considering the general system concept, evolution and migration issues are of great importance. It will be necessary to ensure the harmonisation of regional CNS/ATM implementation,

1.4.2 Likewise, it is necessary to make sure that the different levels of development worldwide will not create incompatibility amongst the various components of the ATM Operational Concept in the ICAO Regions. Given the broad scope of these components, the aforementioned considerations require judicious coordination of planning at regional and global level in order to achieve an optimum implementation of these systems.

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2. Chapter 2: Air Traffic in the SAM Region

2.1 Traffic Forecast in the SAM Region

2.1.1 Aircraft movement forecasts are important for anticipating when and where may airspace or airport congestion occur, and thus, are essential for planning capacity increases. These forecasts play an important role in the implementation of CNS/ATM systems.

2.1.2 For purposes of this Plan, use has been made of the 2007-2027 forecasts prepared at the seventh meeting of the CAR/SAM Forecasting Group (Doc. 9917) that are relevant for the SAM Region within the framework of main traffic flows (see section 3.2 of this Plan). Accordingly, it is interesting to analyse the percentage of growth expected for that period, as shown in the tables contained in **Attachment A** to this document.

2.1.3 In summary, passenger traffic in the South American Region during the 2007-2027 period is expected to increase at an annual rate of 8.8%, reaching 73 million passengers in 2027. The aircraft movement forecast for the same period shows an annual increase of 7.9%, reaching 497.000 movements for 2027. See Attachment A – Tables 1A – 1B.

2.1.4 Always within the 2007-2027 period, it is expected that passengers between South American and Central America and the Caribbean will increase 8.9%, reaching 27 million passengers in 2027. Aircraft movement for that period may reach a figure of 8.2%, with 282.000 movements in 2027. See Attachment A – Tables 2A – 2B.

2.1.5 Between South America and North America for the period 2007 – 2027, an increase of 5.7% is expected per year, reaching a figure of about 173 million passengers for 2027. Aircraft movements may reach 5%, or 1.625.700 movements in 2027. See Attachment A – Tables 3A – 3B.

2.1.6 Finally, with respect to the South Atlantic, the Europe-South America corridor specifically, a growth of 5.4% a year is expected, reaching an approximate figure of 21.5 million passengers for 2027 and a growth in aircraft movements of 5.5%, reaching more than 90.000 movements in 2027. See Attachment A – Tables 4A – 4B.

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3. Chapter 3: Planning

3.1 Introduction

3.1.1 As traffic volume increases throughout the world, the demands on air navigation service providers in a given airspace increase, and air traffic management becomes more complex. Increased traffic density brings about an increase in the number of flights that cannot fly their optimum path.

3.1.2 It is foreseen that the implementation of the components of the ATM operational concept will provide sufficient capacity to meet the growing demand, generating additional benefits in terms of more efficient flights and higher levels of safety. Nevertheless, the potential of new technologies to significantly reduce the cost of services will require the establishment of clear operational requirements.

3.1.3 Taking into account the benefits of the ATM operational concept, it is necessary to make many timely decisions for its implementation. An unprecedented cooperation will be required at both global and regional level.

3.1.4 The regional planning process is the main factor in ICAO planning and implementation work. It is here where the top-down approach, which includes global guidance and regional harmonisation, converges with the bottom-up approach of States and aircraft operators, UAS and their proposals concerning implementation alternatives.

3.1.5 In its most elementary form, the result of the regional planning process is a list of air navigation facilities and the dates in which they could be available, information that is required for the implementation of the Global Plan Initiatives, leading to a gradual transition towards the ATM Operational Concept. These lists will be incorporated into the CAR/SAM Regional Air Navigation Plan (ANP), and will be kept up to date by the CAR/SAM Regional Planning and Implementation Group (GREPECAS), with the assistance of the ICAO Regional Offices.

3.1.6 The period considers for planning purposes starts on 2012 up to 2018 and is oriented towards the gradual, coordinated, timely, cost-effective and global implementation of the components of the ATM operational concept, taking into account the Global Plan Initiatives (GPIs) that may be implemented in the short and medium term. Accordingly, the plan fulfils two main functions:

a) It provides guidelines to regional planning organisations, States/Territories, service providers and users for the migration to the ATM operational concept.

b) It measures implementation progress.

3.1.7 The planning of the implementation of the components of the ATM operational concept, as well as the development of guidelines to ensure a harmonious and integrated implementation, should be basically a regional responsibility, while the implementation is the responsibility of the States/Territories or groups of States/Territories and International Organisations, working together within the concept framework and the implementation strategy developed by GREPECAS for the two Regions. However, it is essential that each CAR and SAM State develop and publish its own air navigation system performance-based air navigation implementation plan (Ref. Conclusion GREPECAS/15-1).

3.1.8 Regional planning should take into account the intrinsic characteristics of the components of the ATM operational concept, whose application on facilities may go beyond national boundaries, thus requiring the implementation of multinational facilities to avoid duplication of resources and services. The relevant institutional aspects should be taken into account for the implementation of multinational facilities. These aspects, in general, cover all matters related to technical, operational, administrative, financial and legal issues, which should be taken into account when considering the establishment of multinational facilities.

3.1.9 In view of the above and the need to develop an appropriate structure for the planning and implementation of multinational facilities, regional coordination is underway to establish a SAM Regional Multinational Organisation, aimed at ensuring the optimisation of the investments required for the implementation and maintenance of the ATM System.

3.2 Planning Methodology

3.2.1 After identifying ATM Systems with homogeneous areas and the main traffic flows, GREPECAS conducted a study of the current and foreseen fleet of aircraft and their capabilities, the forecast traffic figures and ATM System infrastructure, including human resource availability and requirements, amongst other elements. The analysis of the collected data revealed “gaps” in the foreseen results. Global Plan Initiatives were assessed with respect to these gaps in order to identify those that would provide the operational improvements required to meet the performance objectives in the SAM Region, and will be detailed in the following chapters.

3.2.2 This planning process will continue with the development of different options for the implementation of the initiatives; a profitability analysis of these different options, and the preliminary development of auxiliary requirements concerning infrastructure. In addition, the drafting of implementation plans and funding profiles should include a more in-depth analysis of human resource requirements to support the initiatives identified, as well as additional profitability analyses. Finally, national and regional implementation plans should be drafted or amended based on the selected initiatives. It is a process that may require the repetition of several steps until the initiatives are finally selected. Once available, planning tools will help GREPECAS to carry out the aforementioned steps. Figure 2 shows a planning flow diagram.

3.2.3 The work for the SAM Region is organised based on project management techniques and clearly defined performance objectives to support the Global Plan strategic objectives aligned with the ICAO strategic plan.

3.2.4 All of the activities listed in the performance objectives will be designed based on strategies, concepts, action plan models and roadmaps that may be shared in order to align the inter-regional work with the main objective of maximising interoperability and transparency.

3.2.5 Planning of all the activities should ensure an efficient use of resources, avoiding duplicated or unnecessary activities or tasks, so as to make sure that such activities/tasks can be easily adjusted to the SAM Region. Planning must also encourage the optimisation of human resources, financial savings, and the use of electronic media, such as the Internet, videoconferences, teleconferences, e-mail, telephone and others.

3.2.6 The new processes and work methods must make sure that performance objectives can reflect based on timetables and regional progress reports to Regional Civil Aviation Authorities, GREPECAS, the ICAO Council and the ICAO Air Navigation Commission.

3.2.7 Based on this Implementation Plan, the States should develop their own national plan, containing the work programme, timetable, responsible parties and status of implementation, in order to monitor and report on the progress made in such activities. Additionally, it should also consider detailed information about the activities required for implementation, the means to provide feedback on the progress made through an annual reporting process, which will help administrations to prioritise the required actions and support, and identify annual assistance requirements of each ICAO Region.

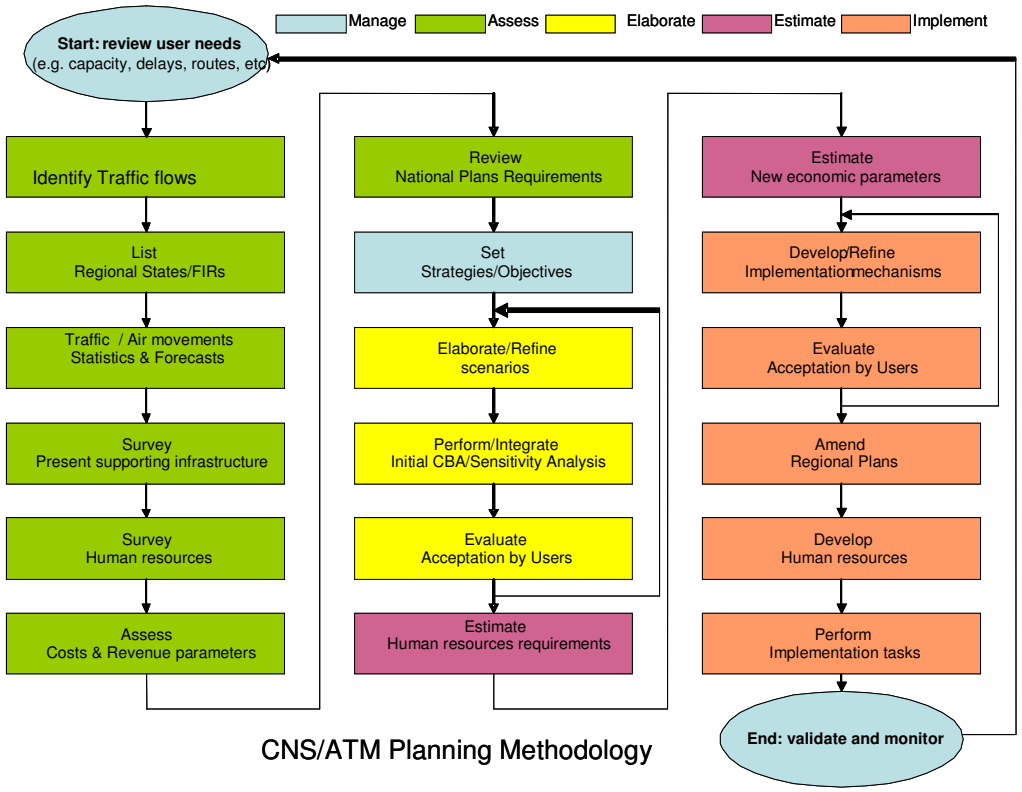

Figure 2. Planning flow diagram

3.2.8 The development of work programmes is based on the experience gained and lessons learned during the previous cycle of the CNS/ATM implementation process. Consequently, this Implementation Plan is aimed at maintaining a uniform regional harmonisation and improving implementation efficiency, taking advantage of infrastructure capacity and existing regional applications.

3.3 Planning Tools

3.3.1 This Implementation Plan will be supported by the planning tools of the Global Plan, which will provide the various electronic formats (*e.g.,* software applications, planning documentation, web-based reporting forms, project management tools, etc.), with a view to following up and ensuring coordination of projects, in which GPIs, performance objectives and target implementation dates, as well as timetables and the resulting action plans are defined. As States contemplate the implementation of the initiatives, they may use common programme templates as a basis for establishing performance objectives and implementation target dates, and develop comprehensive timetables and planning activities to meet the work programme associated to global initiatives (GPIs).

3.4 Evolution

3.4.1 The SAM ATM system will be based on the provision of integrated services. In order to describe how these services will be provided Global Air Traffic Management Operational Concept (Doc. 9854) defines seven components of the ATM operational concept (see Figure 1 of this Plan), together with key conceptual changes. Performance objectives were merged with the components of the ATM operational concept to ensure that tasks developed are aimed at achieving the ATM system described in the operational concept. The term Components of the ATM Operational Concept used in this Plan refers to the seven components described in the ATM operational concept, namely:

a) airspace organisation and management (AOM)

b) aerodrome operations (AO)

c) demand/capacity balancing (DCB)

d) traffic synchronisation (TS)

e) conflict management(CM)

f) airspace user operations (AUO)

g) ATM service delivery management (ATM SDM)

3.4.2 In all cases, the initiatives must meet the global objectives based on the ATM operational concept. Accordingly, planning and implementation activities refer to:

Phase 1: Application of available procedures, processes and capacities.

Phase 2: Evolution would then lead to the implementation of emerging procedures, processes, and capacities.

Phase 3: Transition to the ATM system based on the operational concept.

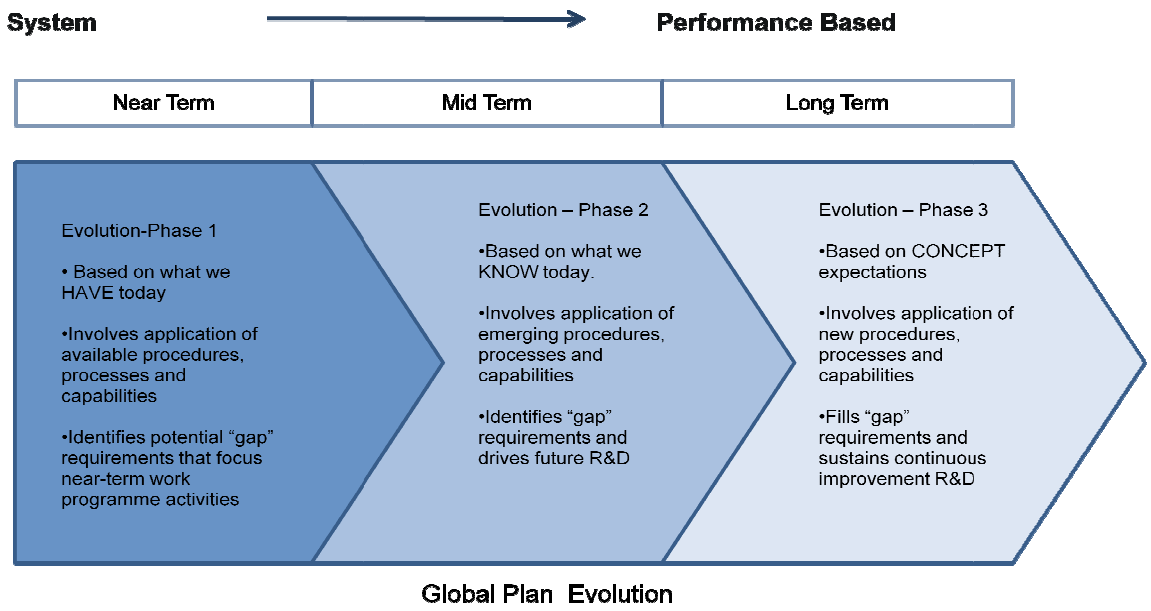

Figure 3 shows the evolution of the Global Plan.

3.5 Global Plan Initiatives

3.5.1 In order to achieve the desired ATM system, numerous initiatives will be gradually implemented in the course of several years. These initiatives were established in order to support the planning and implementation of performance objectives in the SAM Region. The set of initiatives contained in this Transition Plan is aimed at facilitating and harmonising the work already underway in the SAM Region, and providing aircraft operators the benefits they need in the short and medium term. ICAO will continue developing new initiatives, based on the operational concept that will be included in the Global Plan; consequently, this implementation Plan becomes a dynamic document, and will be in constant development, being permeable to any amendment originated in the South American Region Implementation Group (SAMIG). This will enable a continuous improvement based on lessons learned.

3.5.2 **Attachment B** to this Plan lists the Global Plan Initiatives (GPIs) that should be taken into account by GREPECAS and the States. In this Transition Plan, the initiatives will be inserted in each of the following chapters, divided by operational area: ATM, CNS, AGA, MET, AIM, SAR, etc. The planning and implementation of each of the performance objectives should start in the short term and proceed in an evolutionary manner. Long-term initiatives, which are necessary to guide the evolution to a global ATM system as foreseen in the operational concept, will be added to the Global Plan and, consequently, to this Implementation Plan, as they are developed and approved.

Note: The Global Plan lists the objective and the relevant implementation strategy for each initiative.

3.6 Integration of Initiatives

3.6.1 GPIs are provided to expedite the planning process, and should not be considered as independent but rather, in many cases, as interrelated tasks. Therefore, initiatives may be integrated and support each other. In fact, integration is one of the objectives of a global ATM system.

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4. Chapter 4: Air Traffic Management (ATM)

4.1 Introduction

4.1.1 According to the Global ATM Operational Concept, the general objective of ATM is to achieve a global, inter-operational air traffic management system for all users during all flight phases, that meets the agreed levels of safety, provides optimum operations, is environmental sustainable, and meets national security requirements.

4.1.2 The future system must evolve from the current system so as to, inasmuch as possible, meets the needs of the users, according to clearly established operational requirements. The reality is that migration and integration are the most difficult institutional issues facing ATM system designers.

4.1.3 Airspace boundaries and divisions should not restrict the development of the airspace structure. Planning should be coordinated between adjacent areas in order to achieve a seamless airspace, in which the user does not perceive any division. The airspace should be free of operational discontinuities and inconsistencies, and should be organised in such as way as to accommodate the requirements of the different types of users. The migration between areas should be seamless to users at all times.

4.1.4 The planning and implementation of the components of the ATM Operational Concept should include a study of their impact and requirements in terms of human factors.

4.1.5 Some of the benefits that are expected from the implementation of these components are improved safety, reduced operating fuel costs for users, reduced delays and gas emissions, and increased system capacity.

4.1.6 The evolution of air traffic management in the SAM Region has been carefully planned to avoid the degradation of the performance of the existing system. The safety level attained to date must be preserved during the transition, as a minimum, gradually improving air navigation efficiency. Consideration has also been given to avoiding an unnecessary overloading of aircraft with multiple CNS equipment, both existing and new, during the extended transition period.

4.2 General Principles

4.2.1 Unrestricted access to air navigation services listed in this document must be guaranteed to all SAM States.

4.2.2 The need for SAM States to fully comply with national plans, as well as with the standards governing the use of the new systems, is acknowledged.

4.2.3 SAM States must accept the global nature of the ATM Operational Concept and the objective of providing integration mechanisms for its timely implementation.

4.2.4 CNS infrastructure must be carefully planned based on the requirements identified for the appropriate level of air traffic management in the SAM Region.

4.2.5 The new CNS elements shall be gradually introduced, taking into account the benefits to be derived by the ATM community.

4.3 Analysis of the current situation (2011)

Gaps of the Current ATM System in the SAM Region

4.3.1 The ATM system currently available in the SAM Region presents some gaps, including the following:

a) Incipient implementation of Performance-Based Navigation (PBN) and, in general, absence of airspace management (ASM).

b) The lack of a systematic use of cost-benefit analyses for the implementation of new airspace structures causes difficulties in the definition of air navigation infrastructure implementation priorities, and prevents measuring the benefits obtained by the ATM community.

c) The lack of a policy and procedures for the flexible use of airspace hinders airspace design and management, preventing the implementation of an optimum airspace structure and the use of optimum flight paths.

d) The lack of air traffic flow management (ATFM) in most airspaces of the SAM Region causes congestion in some airspaces and airports, and prevents optimum use of ATC and airport capacity, thus affecting users.

e) The lack of coordination in the provision of the existing CNS/ATM services sometimes generates a duplication of resources and services;

f) The inadequate quality of communication media and language difficulties create problems in the provision of air traffic services. Operations still rely on increasingly congested voice radio-communications for air-ground exchanges;

g) The lack of an ATS surveillance service in some portions of the airspace of the Region prevents a harmonised reduction of aircraft spacing, due to the application of different separation criteria in FIR boundaries (with and without ATS surveillance), thus restricting the use of optimum flight profiles;

h) The lack of harmonisation of automated ATM systems in the SAM Region, as well as the scarce sharing of ATS surveillance data, generates discontinuity in ATS services.

i) Limited facilities for real-time exchange of information between ATM, aerodromes and aircraft operators, leading to a poor response to changes made in the operational requirements of users.

4.3.2 While in the later years, improvements have substantially occurred in some sectors, the limitations of the current ATM system result in inefficient aircraft operations. These limitations include:

a) The requirement to fly circling patterns in departure and arrival procedures;
b) Existence of airspaces of a permanent nature reserved for military purposes mainly;
c) Inadequate airspace planning prevents direct flights between the origin-destination airports and/or city pairs, and also operations at incorrect flight levels and/or speeds that make it difficult for aircraft to maintain optimum flight profiles;
d) Excessive ground and en-route delays related to the system;
e) Insufficient flexibility to properly address disturbances in airline operations caused by meteorological conditions, unexpected failures in CNS systems and airport services interruption.
f) Lack of harmonization in aeronautical publications, mainly instrumental procedures.
g) Lack of compliance of AIRAC cycles and deficient dissemination of aeronautical information.

4.4 Strategy for the Implementation of Performance Objectives

4.4.1 ATM evolution in the SAM Region has been planned taking into account the GPIs that could be applied in the short and medium term. ATM performance objectives, in addition to the requirements for the implementation of ATM improvements, determine the implementation dates of planned improvements, as well as the performance objectives and the main tasks related to GPI implementation.

4.4.2 The planning period considered is 2012 to 2018.

4.4.3 ATS evolution is based on Global Plan Initiatives applicable to:

a) En-route operations;
b) TMA operations; and
c) Air operations in general

4.4.4 ATM Planning is based on seven global aspects, as shown in **Attachment C**, and as listed below:

a) En-route airspace optimisation. (SAM/ATM/ 01 PFF)
b) TMA airspace structure optimisation. (SAM/ATM/02 PFF)
c) Implementation of RNP approaches. (SAM/ATM/03 PFF)
d) Flexible use of the airspace (SAM/ATM 04 PFF)
e) ATFM implementation (SAM/ATM/05 PFF)
f) Improvement of ATM situational awareness (SAM/ATM/06 PFF)
g) Implementation of the new flight plan. (SAM/ATM/07 PFF)

4.4.5 It should be noted that the different specialties (CNS, AIS; MET; AGA/AOP; SAR) developed in this Implementation Plan support ATM development and, in turn, constitute *per-se* an integrated, indivisible system. In particular, this Implementation Plan contains some cross-cutting issues that the States must especially address, namely:

a) Development of human resources and competence management (see Chapter 10).
b) Safety management – SMS (see Chapter 11).

4.5 En-Route Operations

4.5.1 The evolution of ATM for en-route operations took into account the main GPIs applicable to the SAM Region and was planned in order to permit optimum airspace management and organisation.

PBN Implementation for En-Route Operations

4.5.2 PBN implementation will foster the use of advanced aircraft navigation capabilities, which, combined with the air navigation system infrastructure, will permit airspace optimisation, including the ATS route network. Thus, it will promote an ATS routing environment that meets the needs of airspace users, reducing the workload of controllers and pilots and aircraft concentration in certain parts of the airspace that may generate congestion on the system.

4.5.3 The implementation of PBN for en-route operations will require the establishment of exclusionary airspaces, considering that these would provide the conditions for making the necessary changes to the airspace structure. So as not to exclude a significant number of users, the vertical limits of the airspace where PBN will be implemented shall be examined in depth, and so will the fleet operating in the Region.

Short Term

4.5.4 Taking into account the low density of air traffic in oceanic airspaces, no changes are expected in the existing airspace structure. In those airspaces where RNP-10 is applied (EUR/SAM Corridor, the Lima-Santiago route and the South Atlantic Random Route System), no short-term changes are expected. Nevertheless, designation RNP-10 (RNAV10) must be completed in oceanic routes of the Pacific Ocean.

4.5.5 It is expected that RNAV-5 will be implemented in continental airspace where it can be supported by the available CNS infrastructure.

Medium Term

4.5.6 It is expected that RNP-4 will be implemented in the EUR/SAM Corridor, in the Santiago-Lima segment and in selected routes of the Pacific, using ADS/CPDLC, in order to permit the use of a 30-NM lateral and longitudinal separation. This implementation will depend on the evolution of the aircraft fleet operating in these airspaces. Also, the need for the use of the Aeronautical Mobile Satellite Service (AMSS) must be assessed, for situations in which immediate intervention of the air traffic controller is necessary, to ensure 30 NM horizontal separation.

4.5.7 During this phase, it is expected that RNP-2 will be implemented in selected continental airspaces, using mandatory GNSS, taking into account that the ground infrastructure will not support RNAV applications. It will be necessary to establish a back-up system for GNSS and to develop contingency procedures in case of GNSS failure. The implementation of RNP-2 will facilitate the implementation of PBN in airspaces with no ATS surveillance service. With the mandatory use of GNSS, more information about the GNSS signal will be required.

Situational Awareness and En-Route Data Relationship Applications

4.5.8 The use of ADS-C and CPDLC in oceanic airspaces will foster the necessary conditions for using 30-NM horizontal separation minima in the EUR/SAM Corridor and in the Santiago-Lima route segment. The need for Aeronautical Mobile Satellite Service (AMSS) will be assessed to ensure such separation. Furthermore, in other oceanic airspaces with less traffic density, ADS-C and CPDLC will provide reliable surveillance and communication media, reducing the workload of controllers and pilots.

4.5.9 In the continental airspace, the use of enhanced surveillance techniques (ADS-B and/or multilateration) will help reduce horizontal separation minima, enhance safety, increase capacity, and improve the cost-effectiveness of flights. The use of CPDLC instead of voice communications could bring significant benefits in terms of safety and pilot and controller workload; however its use must be assessed taking into account that it might not be feasible due to the characteristics of ATC interventions.

4.5.10 These benefits may be achieved by providing surveillance in areas that lack primary or secondary radar when so warranted by cost-benefit analyses. In airspaces where radar is used, improved surveillance may help enhance the quality and reliability of surveillance information both on the ground and in the air. The States shall conduct a consistent cost-benefit analysis to determine if, when the time comes, PSR and/or SSR systems should be replaced by ADS-B systems or multilateration.

4.5.11 The gradual implementation of ATS inter-facility data communication (AIDC) will enhance airspace safety and reduce coordination errors between ATS units.

4.5.12 The implementation of ATS surveillance systems and data Relationship applications should take into account the corresponding automation aspects, mainly with respect to the need for harmonisation between the systems applied, with a view to ensuring system interoperability.

4.5.13 Furthermore, the implementation of ATS surveillance systems and data Relationship applications should consider ATM automation tools (minimum safe altitude warning; conflict prediction; conflict alert; conflict resolution advisory; path conformance control; functional integration of ground and airborne systems, etc.).

4.5.14 Amongst others, the following applications that may assist with an improvement of the situational awareness, are identified:

a) TFMS - SYNCHROMAX or similar
b) Surveillance tools to identify the boundaries of the airspace sector.

c) Use of A-SMGC at specific aerodromes, as required
d) Availability of SIGMET in graphical format
e) Dissemination of AIS
f) Implementation of D-VOLMET

4.6 TMA Operations

4.6.1 The evolution of air traffic management in terminal areas shall be harmonised with the evolution of ATM for en-route operations, providing for a harmonious and integrated ATM system.

4.6.2 The evolution of ATM for TMA operations took into account the combination of different GPIs applicable to the SAM Region, and was planned so as to permit an optimum airspace management and organisation.

4.6.3 The TMA structure optimisation combined GPIs 5, 10, 11 and 12, taking into account that they are all related to the optimisation of the TMA airspace structure through the use of approach procedures, SIDs, STARs, based on RNAV and RNP, the application of TMA design and management techniques, and the functional integration of ground and airborne systems.

4.6.4 As regards situational awareness and implementation of data Relationship applications GPIs 9 and 17 were combined, taking into account the close relationship between the implementation of enhanced surveillance techniques (ADS-B and/or MLAT) and the use of data Relationship applications.

4.6.5 There are many factors that should be taken into account when planning the requirements for a TMA air navigation service infrastructure. In addition to traffic volume, consideration should be given to other factors, such as: number and location of aerodromes, traffic characteristics, terrain, meteorological conditions, etc. Therefore, the States should analyse each particular TMA and determine, in coordination with the users, the requirements for the implementation of the corresponding air navigation services.

TMA Structure Optimisation

4.6.6 TMA airspace structure optimisation will be achieved through the following measures:

a) PBN implementation, which includes the implementation of SIDs and STARs with RNP and/or RNAV, and RNP approach procedures.
b) Implementation of continuous descent operations (CDO).
c) The functional integration of ground and airborne systems.
d) The use of improved design and management techniques.

Implementation of PBN for TMA Operations

4.6.7 TMA operations have specific characteristics, taking into account the separation minima applicable between aircraft, and between aircraft and obstacles. This also involves the diversity of aircraft, including low-performance aircraft that carry out arrival and departure procedures on the same path as, or close to the paths of, high-performance aircraft.

4.6.8 In this sense, the States shall develop their own national TMA PBN implementation plans, based on the CAR/SAM PBN Roadmap and in the Action Plan Model developed by SAMIG meetings. They shall seek harmonisation of aircraft separation criteria and the applicable RNAV and/or RNP criteria, in order to avoid the need for multiple approvals for intra- and inter-regional operations.

4.6.9 The efficiency of TMA operations in a PBN environment depends on aerodrome design and management (GPI 13) and runway operations (GPI 14), taking into account that any air traffic flow increase in TMA operations shall be absorbed by airport infrastructure.

Short Term

4.6.10 It is expected that States will apply RNAV-1 in selected TMAs, in environments with ATS surveillance service and adequate ground-based navigation infrastructure, permitting DME/DME and DME/DME/INS operations. During this phase, operations with equipped and non-equipped aircraft will be permitted, and RNAV-1 operations shall start when an adequate percentage of approved operations is reached.

4.6.11 In environments with no ATS surveillance service and/or where there is no adequate navigation infrastructure on the ground, it is expected that the States will apply Basic RNP-1 in selected TMAs, applying mandatory GNSS, provided there is an adequate percentage of approved aircraft. Nevertheless, operations with approved and non-approved aircraft will be permitted in these TMAs once the corresponding operational benefits are verified. The implementation of overlay procedures and exclusive RNP procedures will depend on air traffic complexity and density.

4.6.12 It is expected that approach procedures with vertical guidance (APV) Baro-VNAV RNP APCH in all instrument flight runways, as per Resolution 37/11 of the 37th Assembly maintaining conventional approach procedures for non-equipped aircraft.

4.6.13 It is expected that RNP with Mandatory Clearance approach procedures (RNP AR APCH) will be applied at airports in which obvious operational benefits can be obtained, based on the existence of significant obstacles. It has also been identified that RNP AR APCH application in the Region may improve interference problems among airports, due to the proximity existing among them.

4.6.14 It is expected that States apply PBN for TMA operations, in order to flight implement procedures that provide more efficient trajectory during approach of an aircraft to the destination aerodrome. These procedures shall enable an un-interrupted flight trajectory from the beginning of the descent until the aircraft is stabilised for the landing. Recognizing environmental benefits and operations efficiency, with the aim to ensure safety, States should include continuous descent operations (CDO) implementation in their plans, according to the ICAO CDO Manual (Doc 9331).

Medium Term

4.6.15 During this phase, it is expected that the States will extend the implementation of RNAV or RNP-1 applications to selected TMAs, depending on ground infrastructure and aircraft navigation capacity. At more complex TMAs, RNAV or RNP-1 equipment will be mandatory (exclusionary airspace). At less complex TMAs, equipped and non-equipped aircraft will still be admitted.

4.6.16 During this phase, it is expected that the implementation of APV RNP APCH with Baro-VNAV and LNAV only in conformity with Resolution 37/11 of the 37th Assembly and RNP AR APCH procedures will be extended to selected airports. It is also expected that the GLS procedure will start to be used to improve the transition between the TMA and approach phases, basically using GNSS for the two phases.

4.6.17 In the mid-term, the application of navigation specifications that are still under development by ICAO, must be assessed and will be inserted into Doc 9613. These navigation specifications are the following:

a) Advanced RNP.

b) RNP 0.3 for helicopter operations.

c) Application of RF legs in Advanced RNP, Basic RNP1, RNP 0.3 and RNP APCH, according with specific operational requirements.

d) RNP AR DEP.

Functional Integration of Ground and Airborne Systems

4.6.18 The optimisation of TMA efficiency will depend on a maximum use of automation. Likewise, aircraft will be increasingly equipped with time of arrival calculation. Thus, functional integration of ground and onboard systems will enable identification of times of arrival at specific fixes. These schedules should help in the landing sequencing process, allowing aircraft to remain close to their preferred 4D path, contributing to the application of one of the components of the ATM Operational Concept, which is Air Traffic Synchronisation.

Use of Improved Design and Management Techniques

4.6.19 Airspace planners should apply design techniques for TMA restructuring, with a view to:

a) Validating the proposed airspace structure.

b) Assessing the impact of PBN implementation, including RNAV and/or RNP SID and STAR procedures, and FMS-based arrival procedures, using ATC simulations as needed.

c) Ensuring a favourable cost-benefit ratio.

d) Optimising sectoring so as to make it seamless for users and balanced in terms of workload.

Situational Awareness and Data Relationship Applications for TMA

4.6.20 In addition to the considerations contained in the section on en-route operations, which also apply to TMA operations, the States should consider the following aspects for the implementation of ATS surveillance services and data Relationship applications in the TMA.

4.6.21 The implementation of surveillance systems (ADS-B and/or multilateration) at the TMAs will provide the conditions required for the integration of en-route and TMA operations.

4.6.22 The use of ATS surveillance systems (SSR, ADS-B and/or multilateration) will permit the use of RNAV-based navigation specifications, taking into account that surveillance will permit flight monitoring for the detection of any path deviation. Thus, it will be possible to include in TMA operations those users that would not be approved for RNP operations.

4.6.23 The implementation of improved surveillance systems will facilitate the operation of aircraft not approved for RNAV/RNP, taking into account that the controller will be able to vector them to the final approach.

4.6.24 The implementation of CPDLC in the TMA is not expected, taking into account the characteristics of ATC intervention in these airspaces. However, other data Relationship applications will reduce the workload of controllers and pilots, such as: D-ATIS and digital flight plan clearance (DCL).

4.6.25 It should be noted that TMA users might not be equipped with data Relationship systems, since there is a significant number of low performance aircraft that fly in this airspace and might not be capable of being properly equipped. In that case, procedures must be developed to allow non-equipped aircraft to fly, unless air traffic density warrants the use of exclusionary airspaces.

Air operations in general

4.6.26 This part of the Plan contains the Global Plan Initiatives applicable to general air operations that cannot be considered as en-route and/or TMA operations.

Flexible Use of Airspace (FUA)

4.6.27 The optimum, balanced and equitable use of airspace by civil and military users, facilitated by strategic coordination and dynamic interaction, will permit the establishment of optimum flight paths, while reducing the operating cost of airspace users.

4.6.28 SAM States should establish policies for temporary or permanent use of restricted airspaces, in order to avoid the adoption of airspace restrictions inasmuch as possible, and also consider and integrate in its air navigation system unmanned aircraft systems (UAS), a new component of the aeronautical system.

4.6.29 The implementation of the flexible use of airspace should start with an assessment of hazardous, restricted and prohibited airspaces that affect or could affect traffic flow.

4.6.30 The establishment of letters of agreement between ATS and military units or other users for the dynamic and flexible use of airspace should avoid restrictions to the use of airspace, thus accommodating the needs of all airspace users.

4.6.31 In those cases in which airspace reserved is inevitable, the letters of agreement should stipulate that the activation of reserved airspace should not exceed the time required. To that end, it will be necessary to develop paths for dynamic re-routing of aircraft to avoid such airspaces.

4.6.32 The cited paths should be published in the AIP to let users know of the need to take into account such possible deviations in flight planning.

4.6.33 FUA implementation requires convincing the reserved airspaces users, mainly military authorities of the States involved, assuring them that their needs will be met whether or not airspace restrictions are applied. Consequently, seminars/meetings with such authorities will be required to demonstrate the importance of an optimised use of airspace.

Air Traffic Flow Management - ATFM

4.6.34 SAM States must seek for an adequate balance between demand and capacity, ensuring that in normal operational conditions, the ATM system is able to attend the existing demand of air traffic. Also, it is important to highlight that ATFM measures must not be used to solve eventual intrinsic deficiencies of the ATM system.

4.6.35 The implementation of timely measures for demand/capacity balancing, in case of events that reduce system capacity, for example adverse weather conditions and/or temporary problems in airport infrastructure or ATC, will avoid an overload of the ATM system and will create the conditions for maximising airport and ATC capacity. This should increase significantly airspace capacity and operational efficiency.

4.6.36 Considering that air traffic congestion and saturation problems in the Region, States that have not implemented yet, must initiate the application of air traffic flow management measures that should be initiated with the calculation and maximisation of ATC and airport capacity, particularly runway capacity.

4.6.37 ATFM implementation in the SAM Region should take into account the objective and principles established in Appendix AL to Item 3 of the GREPECAS/13 meeting, noting that ATFM measures must foster a maximum use of existing capacity without compromising safety.

4.6.38 The ATFM Operational Concept establishes a simple strategy that should be developed in stages, maximising available capacity and allowing the parties involved to gain sufficient experience.

4.6.39 The experience gained in other Regions and by some SAM States permits the application of basic ATFM procedures at airports.

4.6.40 Thus, ATFM in the SAM Region will be implemented by stages, based on the established operational requirements, in keeping with the SAM ATFM Operational Concept.

4.6.41 So as to reconcile national plans with the SAM ATFM Regional Plan, civil aviation administrations must take required measures and carry out a close follow-up of the regional development of ATFM, and draft an ATFM implementation programme, where implementation needs are determined, the impact it will have in the national ATC system, in airspace, air traffic services and in airport services, and pertinent coordination is established, to make feasible a harmonious and timely integral regional implementation.

4.6.42 In order to maximise its efficiency in a long-term, the feasibility of implementing a centralised ATFM that should be responsible for delivering the service in as much airspace as possible, provided it is homogeneous, should be assessed.

New Flight Plan Format

4.6.43 The new flight plan format is scheduled for implementation by late 2012, in keeping with Amendment N° 1 to Doc. 4444 PANS-ATM. In this sense, the States must coordinate as necessary to interconnect their automated ATC systems of the control centres of the Region, without neglecting the transition stage in which they must make sure that the flight plans in the new format are not rejected due to incompatibility with the aforementioned ATC systems.

4.6.44 The objective of the referred amendment is that the ICAO flight plan meet future aircraft needs with advanced characteristics and hast evolution requirements of ATM automated systems, keeping in mind, at the same time, compatibility with existing systems, human factors, training, costs and aspects related to the transition process. Such amendment is a provisional measure towards a future system fully updated, which would gather all information management requirements to materialise the ATM Operational Concept.

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5. Chapter 5: Communications, Navigation and Surveillance (CNS)

5.1 Introduction

5.1.1 When implementing CNS systems, SAM States must consider the ATM operational requirements contained in this Plan.

5.1.2 In view of the new requirements derived from the implementation of the ATM Operational Concept, SAM States shall consider planning improvements to, and the strengthening of, aeronautical communication, navigation and surveillance services, taking into account the global air navigation plan initiatives, and the related components of the aforementioned concept (**Attachment B**), as well as new provisions and requirements that need to be implemented in the short and medium term.

Communications

5.1.3 Communication systems contemplated in this plan respond to short- and medium-term expectations of the operational requirements in the Region. Accordingly, this plan has taken into account the following communication systems:

a) Aeronautical message handling system (AMHS).
b) ATS inter-facility data communication (AIDC).
c) Controller/pilot data Relationship communications (CPDLC).
d) Data link automatic terminal information service (D-ATIS).
e) Voice meteorological information for aircraft in flight (VOLMET) and data link (D-VOLMET).
f) Voice clearance delivery (CLRD) and data clearance (DCL).
g) SAM Aeronautical Telecommunications network (ATN).

Navigation

5.1.4 The function of navigation systems is to support en-route, terminal, approach and landing operations and surface movements.

5.1.5 The navigation systems contemplated in this plan respond to short- and medium-term operational requirements of the Region. In this respect, this plan for navigation systems has taken into account the ground navigation infrastructure and the GNSS requirements concerning the operations foreseen in the CAR/SAM PBN Roadmap.

Surveillance

5.1.6 The function of surveillance systems is to provide aircraft position information to air traffic service units (ATS).

5.1.7 The surveillance systems contemplated in this plan respond to short- and medium-term operational requirements in the Region. Accordingly, this plan considers the following:

a) ADS-B
b) ADS-C
c) MLAT
d) SSR
e) The integration of the aforementioned.

5.2 Analysis of the current situation (2011)

5.2.1 The current SAM communication, navigation and surveillance services situation in support of air navigation is described below, as per information provided in FASID CNS tables.

Communications - Aeronautical Fixed Service

5.2.2 AFTN service: The circuits foreseen have been fully implemented. However, and given their average life cycle, maintenance of the existing centres is a significant problem.

5.2.3 ATS speech service: The circuits foreseen have been fully implemented. Circuits are analogue and operate without any major problem.

5.2.4 AMHS service: This service has been implemented in most SAM States.

5.2.5 Memoranda of Understanding (MoU) have been drafted for the interconnection of AMHS systems between States.

Flight plan transfer

5.2.6 *OLDI*: It is available in several SAM States, although only one State uses it within the framework of its own administration.

5.2.7 *AIDC*: It is being implemented in many States.

Information delivery network

5.2.8 Currently, a satellite digital network (REDDIG) is available in the region to support the required aeronautical fixed services. In order to support the new services foreseen for the short and medium term, the implementation of a new network, that will represent the regional ATN, is required (REDDIG II).

Aeronautical Mobile Service

5.2.9 *VHF*: Services have been implemented as indicated in FASID Table CNS 2A, ensuring coverage in most of the selected areas, with problems at lower levels in selected airspaces. In the case of terminal areas and aerodromes, many facilities do not follow the recommendation of having different frequencies for APP and TWR services. The clearance delivery (CLRD) service has not been implemented at the level required.

5.2.10 *HF*: Although required in FASID Tables CNS 2 A and 2B, the HF service is not being operationally used in many States of the Region. It is mainly provided at some States that have oceanic areas in their FIRs.

5.2.11 ATIS: Implemented according to Table CNS 2A, but in an insufficient number. Use is made of conventional audio recorders and analogue VHF transmitters.

5.2.12 *CPDLC*:

a) Continental airspace: Not yet implemented .
b) Oceanic airspace: Service implemented at some oceanic FIRs, for FANS equipped aircraft.

5.2.13 *CLRD*: Implemented in very few airports for terminal area/aerodrome.

5.2.14 D-ATIS: Implemented in very few airports.

5.2.15 VOLMET: Implemented in only one State of the Region.

Navigation

5.2.16 Radio aids: All conventional radio navigation aid systems (NDB, VOR, DME and ILS) have been implemented and fully installed pursuant to Table CNS 3 (radio navigation aids). Regarding NDBs, a deactivation process is underway, starting with those stations where the NDB is installed next to a VOR/DME.

5.2.17 ABAS is being implemented in selected airspaces of the Region for en-route, terminal area and NPA operations.

Surveillance

5.2.18 Radar systems: Conventional surveillance systems (PSR and SSR) have been implemented and installed almost entirely in the SAM Region according to Table CNS 4 A (surveillance system). The surveillance systems specified in this table cover most of the terminal areas of the States in the Region. However, not all the routes in the Region are covered.

5.2.19 Radar data exchange: It only exists in very few States of the Region.

5.2.20 ADS-B and MLAT: No services have been enabled to date.

5.2.21 ADS-C: Service provided by some oceanic FIRs, with FANS-equipped aircraft.

5.3 Strategy for the implementation of performance objectives

5.3.1 CNS implementation shall be based on a harmonised strategy for the SAM Region, with action plans and consistent timetables, taking into account operational requirements and the corresponding cost-benefit analyses, comparing the current structure with the improvements to be achieved when the new systems are implemented. Consideration should also be given to analysing the existence of two or more technologies to meet the same operational requirement.

5.3.2 Planning has been based on four global aspects, as shown in **Attachment C**, and as listed below:

a) aeronautical fixed service in the SAM Region (PFF SAM/CNS 01)
b) aeronautical mobile service in the SAM Region (PFF SAM/CNS 02)
c) navigation systems in the SAM Region (PFF SAM/CNS 03)
d) air surveillance service in the SAM Region (PFF SAM/CNS 04)

5.3.3 A cross-cutting issue is the management of ANS personnel competencies of the air navigation system (PFF SAM/HR 01). In this sense, States must pay special attention to meet ICAO requirements (see Chapter 10).

Communications

Aeronautical Fixed Service

5.3.4 AMHS: During this period, it is expected that AMHS systems will be implemented in those States that still have an AFTN system in place. Likewise, during that period, it is expected that each one of the AMHS systems installed will be interconnected to its respective AMHS systems, as specified in FASID Table CNS 1Bb.

5.3.5 Communication services for the ATFM: States must make the necessary efforts to implement communication services that effectively support ATFM.

5.3.6 AIDC: The States must make efforts to install automated systems in all their ACCs, with AIDC capability, and use them for the automatic transfer of flight plans between adjacent ACCs.

5.3.7 Improvement of the regional ATN network: In order to implement all the new services in a harmonised manner, the current Aeronautical Telecommunication Network (REDDIG) requires improvements regarding its technological platform, communication protocols, and an increase in capacity for the delivery of information. To this end, it is expected that, during the cited period, a new ATN network will be available to support all the existing services as well as those foreseen. During this period, a study on the optimum network configuration for the region will be conducted and, once approved, it will start being implemented.

Aeronautical Mobile Service

5.3.8 VHF: States must ensure coverage of continental VHF communications for lower flight levels when so required by the operations. Likewise, separate VHF channels must be implemented for TWR and APP services in the terminal area.

5.3.9 HF: The HF service must be maintained in keeping with the requirements listed in Table CNS 2B, "HF network designators for CAR/SAM aeronautical stations".

5.3.10 CPDLC: States that have oceanic areas in their FIRs must make efforts for the provision of CPDLC services in the corresponding ACCs. Likewise, for the continental area, a technical/operational study should be carried out within the planning period, to permit its later implementation.

5.3.11 DATIS: The States must start providing DATIS services to replace similar conventional services or where they do not exist.

5.3.12 VOLMET/D-VOLMET: In attention to the MET requirement, States should start providing VOLMET services through speech communications systems and data links.

5.3.13 Protection of the radio frequency spectrum: The States must make the necessary efforts to ensure the protection and proper use of the radio frequency spectrum assigned to aviation for radiocommunication services.

Navigation

Navigation Systems

5.3.14 NDB: States must continue with the NDB phase-out plan, as defined by GREPECAS/14 (April 2007). It is estimated that, during the period defined in the plan, most NDB will be deactivated.

5.3.15 VOR/DME: During the period defined in the plan, it is felt that, as part of the transition to the GNSS, VOR/DME systems must be maintained in selected TMAs, gradually starting the deactivation of en-route VOR systems.

5.3.16 DME/DME: Taking into account en route PBN and TMA implementation, as well as the use of DME/DME navigation as a back-up to the GNSS system, States should maintain the current DME systems coverage and, if necessary, States should carry out studies permitting the coverage extension of selected airspaces.

5.3.17 ILS: It is foreseen that, within the planning period, ILS systems will remain operative.

5.3.18 GLS: Approaches based on CATI GLS will begin at airports that have an operational demand that warrants them.

5.3.19 Flight trial support systems: The States must consider modernising their in-flight and ground trial elements so as to be prepared for a PBN environment.

5.3.20 Protection of the radio frequency spectrum: The States must make the necessary efforts to ensure protection and proper use of the radio frequency spectrum assigned to aviation for radionavigation services.

Surveillance

Improvements to the Air Surveillance Service

5.3.21 ADS-B and MLAT: The main means of surveillance will continue to be collaborative surveillance in the form of SSR radars, extensively used in TMA and en-route services, and Mode S in high-density TMAs. The use of ADS-B (ES Mode S receivers) and MLAT will start providing en-route and terminal area surveillance as required; strengthening surveillance in areas covered by SSR Modes A/C and S. ADS-B (ES Mode S) will be gradually implemented on the ground to cover en-route and terminal areas.

5.3.22 A-SMGCS: It is foreseen that surface movement guidance and control systems A-SMGCS will be implemented at airports where previous studies have identified this requirement.

5.3.23 ADS-C: All States responsible of an oceanic FIR shall make operational use of ADS-C surveillance.

5.3.24 Protection of the radio frequency spectrum: The States must make the necessary efforts to ensure protection and proper use of the radio frequency spectrum assigned to aviation for air surveillance services.

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6. Chapter 6: Meteorology

6.1 Introduction

6.1.1 Aeronautical meteorology, as integrated service of Regional air navigation plans and of the Global Air Navigation Plan, should provide within the ATM operational concept a better support for ATS, the development of ATM/MET facilities and requirements and a general improvement in the provision of MET service to international air navigation. A close coordination and collaboration among all air navigation services is essential to meet ATM System objectives.

6.1.2 In this regard, the provision of meteorological information will be adjusted to accommodate its requirements in terms of content, format and timing. The main benefits of meteorological information for the ATM system will be related with:

a) A more precise and timely meteorological information will optimise flight path planning and prediction, thus enhancing the safety and efficiency of the ATM system;

b) The greater availability of meteorological information shared on board the aircraft will help to perfect the preferred path in real time;

c) A better identification, prediction and display of adverse meteorological conditions will permit to minimize their effects, thus will contribute to enhance safety and flexibility, allowing among other operational actions, the application of timely ATFM measures;

d) quality aerodrome reports and forecasts will facilitate the optimum use of available aerodrome capacity allowing, among other operational actions, the application of timely ATFM measures;

e) The appropriate availability of meteorological information (special air-reports) from airborne meteorological sensors will contribute to improve meteorological forecasts and the display of such information in real time;

f) Meteorological information obtained from routine air reports results in the improvement of forecasts and local models, thus, the active participation of the airlines operating in the SAM Region in the World Meteorological Organization (WMO) AMDAR project should be promoted, since currently automatic aircraft meteorological reports in the Region are limited; and

g) Meteorological information will contribute to minimise the environmental impact by air operations.

6.1.3 In view of the new requirements derived from the implementation of the ATM System, SAM States shall consider the planning of improvements and strengthening of aeronautical meteorological services, taking into account the global air navigation plan initiatives, as well as new

short- and medium-term implementation provisions and requirements, and the related components of the aforementioned concept (Attachment B).

6.1.4 To effectively support ATM for decision-making and in the optimization of air operations, it should be clear that improvements to the meteorological service imply compliance with every ICAO standard. In this context, most States should make efforts to comply with the standards related to MET facilities and competent meteorological personnel, which have the greatest number of deficiencies identified the Region.

6.2 **Analysis of the current situation (2011)**

6.2.1 SAM States provide an aeronautical meteorological service that has been gradually improving in recent years. Meteorological information automation processes are in a very advanced phase at the aerodromes of the Region. However, some States do not get the most of automatic systems since they do no include, for example, information about the RVR in METAR/MET REPORT and in SPECI/special. An improvement in the infrastructure of aeronautical meteorological offices and in the meteorological watch offices has also been noted, but improvements are still required in these units to support meteorological watch in the respective areas of responsibility so that they can improve the quality of aeronautical meteorological forecasts and the issuance of meteorological warnings.

6.2.2 The lack of compliance with ICAO and WMO standards and recommendations referred to personnel involved in MET units is a deficiency that should be corrected by the States of the Region.

6.2.3 . In order to implement QMS/MET in the Region, any effort by ICAO will be useless if there is not a commitment of the administrations and/or meteorological authorities.

6.3 **Strategy for the implementation of performance objectives**

6.3.1 Planning of meteorological systems in support of ATM has been done taking into account current MET deficiencies identified by the ICAO South American Regional Office, the work programmes of the different ICAO panels and operational groups (IVATF, IAWVOPSG, AWOS, METWSG, SADISOPSG, WAFSOPSG), changes introduced to SARPS and the provisions contained in Doc. 9750 - *Global Air Navigation Plan.*

6.3.2 Planning has been based on four main axes, as shown in Attachment C, and as listed below:

a) Implementation of the MET information quality management system. (SAM/MET 01 PFF).
b) Improvements in MET facilities (SAM /MET 02 PFF).
c) Improvements in the implementation of the international airways volcano watch (IAVW), in the surveillance of the accidental release of radioactive material, and in the issuance of SIGMET(s). (SAM MET 03 PFF).
d) Improvements in OPMET data exchange; and implementation and follow-up of the evolution of the WAFS (SAM/MET 04 PFF).

6.3.3 The management of personnel competencies (SAM/RRHH 01 PFF) and, in some States, the designation of meteorologists and aeronautical meteorology technicians to meet ICAO requirements (see Chapter 10) are cross-cutting issues.

6.4 Implementation of the MET Information Quality Management System (QMS/MET)

6.4.1 The implementation of QMS/MET will ensure the quality of data and services provided by MET units. As a first step towards the achievement of this goal, the QMS/MET Implementation Guide was developed and validated, and is at the disposal of the States of the Region to prepare the documentation required by Standard ISO 9001, 2008. A five-day consultancy-type seminar/workshop in Spanish has been developed in December 2010 and two in English with the same duration, in Guyana and Suriname, and three more are foreseen in Bogota, Quito and Guayaquil. Follow up to the QMS/MET implementation action plan and the actions to correct the existing MET deficiencies will be initiated in July 2011 through the Internet (GoToMeeting).

6.5 Improvements in MET Facilities

6.5.1 The provision of the appropriate infrastructure to ensure the quality of MET information generated at AOP aerodromes (CAR/SAM FASID Table AOP 1) is of vital importance. A MET equipment inspection and preventive maintenance programme would help to ensure a continuous operation. With respect to Aeronautical Meteorological Offices (AMOs) and Meteorological Watch Offices (MWOs), consideration should be given to a plan to strengthen them in order to improve meteorological watch in the FIRs.

6.6 Improvements in the Implementation of the International Airways Volcano Watch (IAVW), the Surveillance of the Accidental Release of Radioactive Material, and the Issuance of SIGMETs

6.6.1 The implementation of the QMS/MET and the improvements to MET facilities should pave the way to a substantial improvement in weather watch and to the timely preparation and transmission of SIGMET related to volcanic ash and to the release of radioactive material, as well as the monitoring of severe phenomena.

6.7 Improvements in OPMET Information Exchange; and Implementation and Follow-up to WAFS Evolution

6.7.1 The correct and timely preparation and transmission of OPMET information, as well as the implementation of the new WAFS products will help in the decision-making by operators and airspace users, as well as in aerodrome operations. States should implement contingency measures, such as the Intranet/Internet, for the dissemination of OPMET messages in cases of failure in conventional communication systems. In collaboration with COM units, the MET authority should plan the coding of OPMET messages in XML format, the implementation of uplinks from the AWOS and MWO(s) to the aircraft, as well as the dissemination of SIGMET(s) in alphanumeric and graphical format, and the updating of systems that receive WAFS products so that they may be compatible with future operational environments.

6.7.2 Regional planning will consist of two phases. The first one is related to QMS/MET implementation and the second to the evolution of ATM requirements. These phases will include roadmaps listing the activities that the States must carry out. The first phase is to be completed by **15 November 2012**, when the ICAO contracting States shall make sure that the meteorological authority has established and implemented a duly-organised quality system that includes procedures, processes and resources for ensuring the quality of meteorological information for aeronautical users in support of international civil aviation.

6.7.3 To achieve the expected results in the ATM operational concept, it is essential that the different components of the ATM system (flight crew members, air traffic services units, search and rescue services units, airport managements and others concerned with the operation or development of international air navigation) make appropriate use of this information in the performance of their respective functions. In this regard, strict control to the procedures of each unit involved in the treatment and use of MET information for each flight phase should be followed, in accordance with the valid requirements, which are graphically detailed in **Attachment E.**

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7. Chapter 7: Search and Rescue (SAR) Services

7.1 Introduction

7.1.1 The mission of SAR services is to find people in danger, help them and transport them to a safe place to receive proper care. The key for organising and having successful SAR services lies in top management, whose mission is to perform managerial tasks that will result in improved SAR operations, that is, the availability of an organised, trained and available SAR system capable of effectively helping people in danger.

7.1.2 The availability of SAR resources is often a critical initial capacity for responding and providing assistance to safe lives during the first stages of a disaster caused by natural causes or by the aviation activity *per se*. Accordingly, SAR services are sometimes part of an emergency management system.

7.1.3 SAR activities are an excellent means to encourage cooperation among States and organisations at the local, national and international level, since they involve missions that rarely create conflicting situations. Cooperation in this field may also lead to cooperation in other spheres. Such activities protect goods that may have a high value, which contributes to justify the existence of SAR services.

7.1.4 Close coordination between civil and military organisations is essential. National SAR coordination committees are a means for the establishment of such cooperation. The legislation should provide for the use of military and other public resources in support of search and rescue.

7.2 Analysis of the current situation (2011)

SAR requirements

7.2.1 The basic requirements for the establishment of an effective SAR system are:

a) The establishment of a regional framework concerning the need for availability of the SAR services that have jurisdiction over the different Search and Rescue Regions of the SAM Region;
b) Measures for using the available resources and procuring others as necessary;
c) The designation of the geographical areas of responsibility of the associated RCCs and RSCs;
d) Staffing, training and other personnel resources to manage and maintain the system in operation;
e) The appropriate and available means of communication; and
f) Agreements, plans, and related documents aimed at meeting the objectives and defining work relationships.

7.2.2 The periodic assessment of SAR requirements at regional level is very important for planning SAR resources and personnel in a coordinated manner, taking into account the respective SAR regions of the SAM States.

7.2.3 These updated and regionally harmonised requirements include, *inter alia*, the timely establishment of agreements between the different SAR services of SAM States for the provision of a regional search and rescue service, in keeping with the characteristics and needs of the aircraft fleet operating in the Region**.**

7.3 **Implementation strategy of performance objectives**

Risk management in practice

7.3.1 The use of risk management techniques gives some order to the uncertainty surrounding SAR organisations. It is an extremely useful tool for determining future work priorities and improving the capacity to meet the objective of the organisation, which is to find people in distress and take them to a safe location.

7.3.2 Risk analysis is a useful tool for those responsible for SAR organisations, since it can help in the assignment of resources that have priority for the organisation, and its results may be used to raise awareness amongst independent parties about the importance of search and rescue. SAR organisations should conduct a risk analysis and use the information thus obtained to increase their possibilities of saving lives. Planning has been based mainly on cooperation and Coordination of SAR services at a Regional level (SAM/SAR 01 PFF).

Quality management

7.3.3 Initiatives aimed at improving the quality of SAR services will substantially improve the results and reduce costs, mainly by eliminating the causes of unnecessary expenditures. These are important objectives for any administration, regardless of the volume of resources available.

7.3.4 The top management of a SAR system that assigns importance to quality tends to conduct more activities, make fewer mistakes, enjoy good reputation, and attract the resources necessary for the growth and better performance of the system.

7.3.5 In contrast, SAR organisations that do not pay attention to quality are subject to mistakes that may result in a reduced number of lives saved, the adoption of wrong or late operational decisions that create confusion, accidents and equipment failures, a deficient or inadequate use of resources, and unnecessary expenditure of economic resources.

7.3.6 Given the increasing air traffic activity and the use of large aircraft with a large passenger capacity, and its relationship with the responsibility of SAM States to protect human lives, it is important for SAR top management to develop a quality assurance programme for search and rescue (SAR) services, to be used as a quality management tool to ensure compliance with the objective of the national SAR plan of each SAM State.

7.3.7 This will also contribute to the provision of effective SAR services within the respective areas of SAR responsibility of each of these States, so as to foresee and particularly meet the many needs that would result from an accident with a large aircraft.

Competence of the search and rescue personnel

Training

7.3.8 Training is essential for operations and safety. The purpose of the SAR system is to save those who are in danger, and also to use training to reduce risks for the personnel and their means, which are very valuable. The training of personnel to conduct sound risk assessments will help ensure that the professionals who have received such training and the valuable means continue to be available for future operations.

Qualification

7.3.9 The purpose of the qualification is to validate the capacity of individuals to carry out certain tasks. They must demonstrate that they have a minimum level of knowledge and skills. This validation may be conducted in a specific position, through maintenance activities by a given team, or as a member of a group within a unit.

7.3.10 Qualification methods demonstrate the capacity of an individual to carry out concrete tasks. A qualification programme will cover the essential knowledge required to perform the functions in a given position and will test individuals in the use of the systems that they will have to manage or maintain.

Certification

7.3.11 The term certification is used in ICAO and other organisations within the context of authorising the personnel or the means to carry out certain functions. The term is also used to officially leave on record that an individual is duly trained and qualified to perform the tasks entrusted.

7.3.12 Thus, the objective of the certification is to authorise an individual to serve in a given capacity. Certificates should be issued to applicants that meet the conditions required for the service, as well as age, physical fitness, training, qualification, exam and maturity requirements. The certification must be issued in writing before the individual assumes his/her responsibilities in the surveillance service.

7.3.13 Training can only provide knowledge and skills at a basic level. Qualification and certification procedures help to demonstrate that sufficient experience, maturity and good judgment have been achieved. During the qualification process, the individual, upon showing his/her skill, should demonstrate that he/she is physically and mentally fit to be part of a group. Thus, the certification is the official acknowledgment by the organisation that it trusts the individual in the use of such skill.

7.3.14 The specific certification requirements vary according to the type of work location (ship, aircraft or RCC). The applicant to the title or certification may be assigned to a SAR specialist, who will observe how he/she carries out each of the tasks, and who will attest to his/her competence. A detailed knowledge of the geographical area of operation shall also be demonstrated. Certain tasks may require a periodic certification renewal.

7.3.15 Those responsible for managing the SAR service in general perform administrative functions; consequently, it is advisable that they participate in training courses on the following topics:

a) Planning;
b) Organisation;
c) Personnel;
d) Budget; and
e) Performance assessment

7.3.16 The use of means and personnel in search and rescue operations under severe weather or in rough terrain will require a special ability that is not generally learned through normal courses. Consequently, consideration should be given to the conduction of specialised courses for personnel training.

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8. Chapter 8: Aeronautical Information Services

8.1 Introduction

8.1.1 SAM States must consider the operational requirements of this Plan when implementing aeronautical information services.

8.1.2 In view of the new requirements derived from the implementation of the ATM Operational Concept, SAM States shall consider planning for improvements to, and the strengthening of, Aeronautical Information Services, taking into account the initiatives of the Global Air Navigation Plan, as well as new provisions and requirements for short and medium-term implementation, and the related components of the aforementioned concept (Attachment B).

8.2 Analysis of the current situation (2011)

8.2.1 The AIS system currently available in the SAM Region presents deficiencies in some States, *inter alia:*

a) Lack of information with assurance of quality, integrity, and timely distribution of AIS products,

b) Activities are not data-oriented, and electronic information is not provided with quality assurance, in real time and with the capability of combining statistical and dynamic information in the same presentation,

c) Standard models are not used for the creation of integrated aeronautical, terrain and obstacle information data bases,

d) WGS-84 implementation has not been completed,

e) The English language is not used in AIS publications,

f) Topographic and land relief information is missing from instrument approach charts,

g) The geoid undulation is mission from aerodrome and heliport charts,

h) Quality control systems have not been implemented,

i) Automated systems have not been implemented,

j) The pre-flight information bulletin (PIB) is not provided,

k) Area minimum altitudes (AMA) are not included in route navigation charts,

l) English is not used in plain-language NOTAMs,

m) Post-flight information services are not facilitated,

n) Lack of training for AIS personnel,

o) Lack of aerodrome obstacle charts,

p) Lack of 1:500,000 aeronautical charts and 1:1,000,000 global chart

q) Non-compliance with the AIRAC system,

r) Lack of coordination between AIS/MET units for consistency between the NOTAM/ASHTAM and the volcanic ash SIGMET and for updating MET information in the AIP.

8.3 Strategy for the implementation of performance objectives

8.3.1 Planning has been based on two main axes, which are shown in Attachment C, and listed below:

a) Improving the quality, integrity and availability of aeronautical information (SAM/AIM 01 PFF).
b) Transition to the provision of electronic aeronautical information (SAM/AIM 02 PFF).

Improving the quality, integrity and availability of aeronautical information

8.3.2 Full compliance with SARPs on quality assurance, integrity and timely availability of aeronautical information is a prerequisite for the transition to AIM.

8.3.3 In this sense, an action plan must be drafted and carried out to resolve current deficiencies as a prerequisite for the migration to AIM.

Aeronautical information regulation and control (AIRAC)

8.3.4 According to the AIS-AIM Transition Roadmap, the States must comply with the aeronautical information regulation and control (AIRAC) process. The quality of Aeronautical Information Services depends on the efficacy of the mechanisms for distribution, synchronisation and timing of said information.

Quality management system (QMS)

8.3.5 Quality management systems covering all the functions of aeronautical information services will be implemented and maintained.

8.3.6 The use of data sets on airborne equipment (FMS), automated systems for ATC, ground proximity warning systems (GPWS) and other systems related to an improved situational awareness make it absolutely necessary to implement processes to ensure the quality and integrity of the aforementioned data. These processes should be organised in a quality management system (QMS) applicable to all activities performed by the AIS.

8.3.7 The quality management system should be consistent with the ISO 9000 series and be certified by an accredited certification body. This certification is sufficient measure of compliance.

Monitoring of integrity in the data supply chain

8.3.8 Quality management systems should evolve until they are applied to all the data supply chain, starting at their origin.

8.3.9 In order to guarantee raw data integrity, service level agreements (SLA) must be established with the originators.

8.3.10 These SLAs will serve as a regulatory framework for the provision of data by the originators, and will contain details, *inter alia*, on: services to be provided, related indicators, acceptable and unacceptable levels of service, commitments and responsibilities of the parties, action to be taken in face of given events or circumstances, agreed data transmission formats, etc.

8.3.11 The SLAs are also a tool for measuring service performance, through the use of key performance indicators (KPIs).

Use of WGS-84

8.3.12 GNSS implementation requires the use of a common geodetic reference system. The SARPs determine that this common reference system must be WGS-84.

8.3.13 Consequently, the objective should be to express all coordinates in the WGS-84 reference system in an effective and verifiable manner. This requirement will also apply to future data products.

Transition to the Provision of Electronic Aeronautical Information

8.3.14 The transition to aeronautical information management (AIM) implies--as already stated--a data-oriented product. This transition to a digital format must be based on standard models and products that permit the exchange at a global level.

8.3.15 Based on this standardisation, the implementation of products and models will be done in a coordinated manner, at a global level, and in keeping with SARP updates resulting from new specifications.

Integrated Aeronautical Information Database

8.3.16 For the design of the aeronautical information database, it is necessary to establish a conceptual model that defines the semantics of aeronautical information in terms of common data structures and takes into consideration the new requirements derived from the ATM Operational Concept.

8.3.17 The implementation of a conceptual model fosters interoperability and should serve as a reference in the design of the specified database.

8.3.18 Use will be made of an integrated aeronautical information database that integrates the digital aeronautical data of a State or Region and will serve to generate AIM products or services.

8.3.19 Use of database engines with spatial characteristics (geo-database) is highly advisable, since it enables data processing in geographical information systems (GIS).

8.3.20 Although it is not necessary for the design of these databases to be identical in all States or Regions, their modelling according to a common conceptual model would facilitate the subsequent exchange of data.

8.3.21 Database management may be carried out by a State or through regional initiatives.

Aeronautical Information Exchange Model (AIXM)

8.3.22 An exchange model is essential for interoperability, since it establishes aeronautical data syntax for names and characteristics.

8.3.23 It will be established based on open standards (XML, GML), facilitating their incorporation into pre-existing or future systems.

8.3.24 It shall contemplate the exchange of dynamic information (NOTAM), enabling the extension of the traditional NOTAM format to give way to the digital NOTAM digital.

Terrain and obstacle database (e-TOD)

8.3.25 Ground proximity warning systems (GPWS), like the GIS-based procedure design and optimisation tools, require the electronic availability of high-quality terrain and obstacle data products.

8.3.26 To respond to this need, terrain and obstacle databases will be established according to common definitions that will be incorporated into the SARPs.

Electronic Aeronautical Information Publication (eAIP)

8.3.27 The eAIP must be considered as the evolution from the traditional paper-based AIP to the digital medium. The electronic version will have two formats: one will be suited for printing and the other will be accessible only through web browsers.

8.3.28 The eAIP must maintain a standard format, just like its predecessor, facilitating the exchange and preventing the proliferation of different presentations.

Electronic mapping and aerodrome mapping

8.3.29 Taking into account the technology available on board and in order to improve situational awareness, new digital mapping products suited to these devices will be established.

8.3.30 The use of the exchange model will allow these products to incorporate dynamic information in real time.

AIS-MET interoperability

8.3.31 Once an exchange model has been established for AIM and a similar one for MET, it will be necessary to implement processes that promote AIS-MET interoperability and thus permit information integration.

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9. Chapter 9: Aerodromes and Ground Aids / Aerodrome Operational Planning (AGA/AOP)

9.1 Introduction

9.1.1 SAM States must take into account the operational requirements of this Plan, including Ground Aids.

9.1.2 In view of the new requirements derived from the implementation of the ATM Operational Concept, SAM States shall consider the planning of improvements and strengthening of aerodrome services, pointing out that the ATM community includes as members the aerodromes, aerodromes exploiters and other parties contributing to the supply and operation of the physical infrastructure necessary for take-offs, landings and aircrafts flight stop services, taking into account the Global Air Navigation Plan initiatives as well as new provisions and requirements that require implementation in the short and medium term, and the related components of the cited concept (Attachment B).

9.2 Analysis of the current situation (2011)

9.2.1 Though aerodromes certification is a standard included in Annex 14 since 2003, only 5% of international airports were certified in the SAM region. Normally States do not update the information contained in the Air Navigation Plan, nor inform ICAO Regional Office about the correction of deficiencies registered in the GANDD database. Therefore, States in the Region commonly show difficulties to achieve their obligations regarding aerodromes surveillance, generating preoccupation regarding safety levels in such States, added to continuous increment of air transport demand, particularly when infrastructure is used up to capacity limits.

9.2.2 Recent introduction of new air navigation technologies contrasts with the lack of compliance of airport standards, including difficulties in the adoption of new safety management tools now widely used in other human activities.

9.2.3 Most of existing installations were settled many years ago, when design requirements were not as demanding as in the present days. Therefore, there exist difficulties for the certification of aerodromes constructed under less strict requirements than those being required for actual designs.

9.2.4 In the AGA area, gaps that contribute to these scenery and that can affect efficiency of new air navigation technologies, such as absence or inadequacy of national regulation and orientation guidelines, lack of trained personnel to perform safety surveillance functions of exploited airports, difficulty for ensuring the supply, timely update and expedite dissemination of critical safety information, as well as information regarding terrain and emplacements that could constitute an obstruction or hazard to air navigation.

9.3 Strategy for the implementation of performance objectives

9.3.1 SAM States should make all possible efforts to warranty that aerodromes required physical characteristics and operational procedures followed by aerodrome exploiters correspond to ICAO standards and recommended methods (SARPS) and harmonise with Latin American regulations developed by the Regional Safety Oversight System (SRVSOP).

9.3.2 In the SAM Region, States should ensure that air navigation support services of aerodromes and airlines fulfil national regulations, harmonised with LAR AGA, and adopting the appropriate juridical frame for formalizing responsibilities of exploiters, public or private.

9.3.3 The aerodrome should negotiate the increase of TMA operations in a safety environment, which requires identifying and optimising the critical elements at the inside and outside of the aerodrome that can influence this condition.

9.3.4 The optimization of TMA air space structure with the PBN implementation makes necessary measures that ensure an effective control with respect to emplacements in aerodromes proximity areas, taking into account the minima separation applicable between aircrafts and obstacles.

9.3.5 As first reference to these critical elements, the identification of aerodromes located near to operational saturation, followed by actions required to improve this capacity in terms of differentiation of these limits through the application of the best practices in the existing infrastructure, and, if necessary, in modified infrastructure, are interpreted as a necessary requirement.

9.3.6 Other external conditions to aerodrome operation that should be coordinated with responsible Regional Committees are the limitation of operations due to noise level, to the use of ground and to bird hazard, as well as the cancelation of operations due to adverse climatic conditions, that affect or limit the required optimization.

9.3.7 Planning has been based on main axes, which are shown in Attachment D, as listed below:

a) Quality and availability of aeronautical data (SAM PFF/AGA 01)
b) Aerodrome certification (SAM PFF/AGA 02)
c) Safe aerodrome operations that to not meet ICAO SARPs. (SAM PFF/AGA 03)
d) Improvement of physical and operational characteristics of the aerodrome (SAM PFF/AGA 04)
e) Runway safety (SAM PFF/AGA 05)

9.3.8 As a result of the assessment of aerodrome capacity factors directly affected by the increase in the flow of operations within the framework of safety management, strategies for achieving AGA/AOP objectives are identified, as summarised in five Performance Framework Formats (PFFs): Aerodrome information quality requirements, aerodrome certification, safe operations at aerodromes that do not meet ICAO SARPs (certificates with limitations), aerodrome capacity optimisation, and runway incursions and excursions.

Quality and availability of aeronautical Data

9.3.9 In order to achieve more efficient aerodrome operations and reduce the risk of aviation accidents, the quality and availability of aeronautical data must be assured through updates.

9.3.10 The tasks required to attain this performance objective includes the development of a regional action plan that identifies the need to update the information contained in Document 8733, CAR/SAM Navigation Plan, Vol. II FASID, Table AOP1. The updating of information will contribute to a reduction of air navigation deficiencies in the States, taking into account that many of them result from non-compliance with the information contained in Table AOP1 originally provided by the States. Likewise, it will be necessary to establish a juridical frame, as for example letters of agreement with AIM, not only to ensure the quality of aerodrome information, but also to update aerodrome obstacle data in the WGS-84 system through e-TOD.

9.3.11 Other task of special importance for the implementation of PBN is the adoption of systems by the States to ensure the control of emplacements near the aerodromes and the permanent monitoring to prevent irregular constructions and installations that affect negatively air navigation.

Aerodrome Certification

9.3.12 Certification process of aerodromes is an indispensable requirement to improve safety in aerodromes and to establish in States an effective oversight by exploiters.

9.3.13 In cases where the State cannot overcome in the short term the difficulties for the certification of airports, it is necessary to conform a multinational teams of experts of the region under the coordination of the SRVSOP that will carry out evaluations using the regulations and guides of the Regional System. The activities of the team, the obligations of the exploiter and the granting of the certificate would be issues to be convened.

9.3.14 It is important to guarantee the quality of the installations and services of the Aerodrome through a process of continuous training of the personnel involved in airport operations.

9.3.15 The adequate provision of AGA installations and services would depend of the management and competence of technical-operative personnel. Likewise, availability should be proportional to the amount of different services being supplies, based in a model that would ensure the quality of the airport system.

Safe Operations at Aerodromes non-compliant with ICAO SARPs

9.3.16 Conditions of certain part of the aerodromes infrastructure in the SAM region lead to believe that some aerodromes are susceptible of a certification with deviations regarding ICAO SARPS, however this do not exclude these aerodromes nor others of the Region to count with guidelines for the treatment of deficiencies and the implementation of operations in the aerodromes within a safety environment, which will stimulate risk management, auto audits from aerodromes and States (Document 9859) as well as ICAO audits.

9.3.17 The above requires of a regional plan to identify these aerodromes in the SAM Region, to develop guidelines by ICAO f or the implementation of aerodromes certification with deviation of ICAO SARPS, including in this guidelines the orientation towards cost efficient aeronautical studies development/SMS, to encourage States to the certification of their aerodromes. The implementation of certification of these aerodromes is also a safety objective in the SAM Region.

Improvement of physical and operational characteristics of the aerodrome

9.3.18 In term of Air Traffic Flow Management ATFM, conceptual changes of the aerodrome physical and operational characteristics should be introduced, taking into account ATFM in the strategy phase, airport exploiters should be conscious about airport capacity and its impact in the ATFM.

9.3.19 Some issues that should be considered in the structure are:

a) the design should contemplate the reduction of runway occupancy time,
b) safe manoeuvring under every meteorological conditions without capacity decrease,
c) precise guide of surface movements to and from a runway under every condition, and
d) position should be known (under an adequate level of precision) and the intention of all vehicles and aircrafts that carry out operations in the movement area, and these data should be available to the ATM community members.

9.3.20 The aerodrome exploiter should provide the necessary infrastructure, included, among others, visual aids, taxiways, runways and exits, as well as a precise guide of surface movements to improve safety and elevate to maximum the capacity of the aerodrome under every meteorological condition.

9.3.21 In order to establish a balance between demand and capacity, aerodrome exploiters should evaluate aerodrome capacities in order that air space users be able to determine when, where and how to perform operations, at the same time that conflict needs with respect to air space and aerodrome capacity are mitigated.

9.3.22 The capacity obtained through the aforementioned strategies relates to the installed infrastructure and its utilisation, understood as capacity with respect to the required demand. Accordingly, aerodrome capacity must be assessed based on saturation or near saturation under current and expected traffic conditions. Therefore, it is very important for the Region to identify airports that are close to this saturation condition in order to propose the development of manuals that contemplate, as a first objective, capacity improvements in runways, turning apron, taxiways and apron, based on the existing infrastructure and, as a second objective, the implementation of new infrastructure.

9.3.23 Accordingly, it is necessary to assess the aerodromes of the Region that are close to the point of saturation, develop a guide containing, as first measure, runway capacity optimisation procedures that use operational tools such as runway segregation, reference fields segmented runways, optimisation of surface movement and, as second measure, plan the new infrastructure that, in both cases, should be in harmony with the environment. It is necessary to include letters of operational agreement in this new operational condition, as well as the monitoring of the optimisation of runways and their supplementary systems.

Runway safety

9.3.24 The safety of aircraft operations with respect to conditions that cause runway excursions, may largely depend on pavement surface conditions, their behaviour under different weather conditions, and their use. Consequently, the identification and management of such conditions to keep them within acceptable levels favour this operational requirement. These characteristics are: friction on paved surfaces covered by snow or ice or water, surface drainage capacity, and rubber contamination.

9.3.25 The foregoing requires the development of a regional action plan for the identification of these runway surface safety requirements and the assurance of an acceptable SMS risk.

9.3.26 Likewise, aerodrome operators must report these operating conditions to users, authorities and providers, as a requirement for ensuring proper dissemination.

9.3.27 The States must monitor the progress of the programme, and this information shall be provided to ICAO in order to contribute to safety measurements.

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Chapter 10: Development of Human Resources and Competence Management

10.1 Introduction

10.1.1 In view of the new requirements derived from the implementation of the ATM Operational Concept, SAM States shall consider planning the Development of Human Resources and Competence Management, taking into account the Global Air Navigation Plan Initiatives, new provisions and requirements in the short and medium term, as well as the related components of the cited concept (Attachment B).

10.1.2 The Air Navigation system allows for the collaborative integration of human resources, information, technology, facilities and services with the support of communications, navigation and surveillance. The provision of ATM services in the SAM Region will depend on the performance of individuals and the development of new competencies, making possible their interrelationship with the operational and technical environment. Each system is developed, maintained and operated by human beings that continue to be the most flexible and critical element to manage threats and errors in ATM operations. A seamless navigation scope will be required in the future. An international team prepared to perform its functions in that new operational scenario. To achieve this, the members of this team must receive a uniform and high quality level of training.

10.1.3 The role of the individual and his contribution to the Air Navigation System will mutate according to the changes presented in the Operational Concepts and the structure of the system. The proper provision of air navigation services will depend on the management of the competencies of technical and operational personnel, as well as on their availability in sufficient numbers to cover the different services. It will also demand a redefinition of the profile of the personnel required for the system.

10.1.4 In the past, the evolution of aeronautical technologies has been gradual and, to a large extent, Civil Aviation Training Centres (CATCs) and instructors have been able to face the challenges of change, even though they did not always have refined training methodologies and instruments available. However, the new ATM systems are based on many new concepts, and their implementation represents an even bigger challenge.

10.1.5 The introduction of these new concepts within the ATM system will make planning a critical element and its efficient development will have a big impact on all aeronautical personnel, including the managerial levels. That is why competence management is one of the key issues for a successful transition.

10.1.6 As a result of the introduction of the components of the ATM Operational Concept, new aeronautical disciplines will emerge. From the point of view of human resource planning, it will be necessary to redistribute and train personnel. The need for a seamless integration of human resources to the management of safety in the design and implementation of new ATM systems and in operational training has been clearly identified.

10.1.7 The planning of personnel competence management for the implementation of the components of the ATM Operational Concept shall take into account the specific requirements of all the implementation activity of the different areas that make up this Document. The development and implementation of the expertise of human resources, the guidelines, standards, methods and the tools for human error management, the friendly use of the new technology and operational training will be the basis for ATM success in the region.

10.1.8 The planning of training in the SAM Region shall be done in standardised manner and coordinated with CATCs where the required courses would be given.

10.1.9 ICAO has adopted a new training policy that includes a process to support training organisations and courses. This new training policy covers all safety and security aspects and supplements the work of the special team on the new generation of aviation professionals (NGAP). The civil aviation training policy of ICAO permits the implementation of an integral framework that ensures that all training provided by ICAO or third parties is subject to assessment to make sure it complies with the stringent standards concerning the design and development of training courses (EB2010/40).

10.2 **Analysis of the current situation - 2011**

10.2.1 The CAR/SAM ANP, within its planning parameters takes into account human resources and their training. The high level of automation and interdependence of the current system gives rise to several problems related to human resources and human factors and the interaction with their environment and other persons. The experience gained in this are indicates that the human element should be considered as the critical part of any plan for the implementation of new technologies. Achievement of the ATM operational concept will be dependent on the competence of the human resources.

10.2.2 The challenges and the development of human resources will multiply during the transition period to the ATM Operational Concept. Since the existing and emerging air navigation technologies will work in parallel for some time, civil aviation personnel will have to develop new skills while maintaining those necessary for the operation and maintenance of the existing systems, using a collaborative approach for civil aviation training.

10.2.3 The analysis of the current situation reveals existing weaknesses and emerging threats.

10.2.4 Weaknesses **include*, inter alia*:**

a) Lack of sufficient personnel
b) Lack of and duly trained personnel.
c) Legal and budgetary limitations of the States
d) High cost of training (initial, specialised, recurrent, remedial,
e) Personnel that do not comply with English Language Proficiency Requirements
f) Personnel with inadequate knowledge to manage operate and maintain the systems.
g) Inadequate and Insufficient amount of simulators for training.
h) Instructors with insufficient knowledge and qualifications to meet current needs
i) lack of suitable profile for the selection of candidates
j) Evaluation of the training centres in order to meet the established requirements in EB/2010/40.

10.2.5 Emerging threats **include *inter alia,***

a) The need to implement new training methods
b) The need to develop new competencies to address new technologies.
c) Increased traffic volume
d) Change of mindset to embrace a collaborative approach.
e) Change in mindset to accept technological and operational developments.

10.2.6 Currently, the South American Region has a regional mechanism made up by the Directors of Civil Aviation Training Centres, which meets on an annual basis. These events are aimed at analysing human resource planning and training, cooperation amongst training centres, the creation of introductory courses to the new systems, the need to professionalise training centres in order to face the new demands of the new systems, promote the TRAINAIR programme through the incorporation of new centres into the programme, and the development of courses under this methodology. This mechanism should reflect the new requirements, and establish a programme in keeping with current requirements.

10.3 Strategies for the implementation of performance objectives

10.3.1 All the areas involved in ATM have participated in the planning of the development of human resources and training requirements, including operations and airworthiness personnel of the aeronautical authority of each State. The starting point was the absence of a full integration and the need to become aware of the role of each individual within the ATM Operational Concept, taking into account the guidelines of Document 9750 – Global Air Navigation Plan, the Global ATM Operational Concept and other related ICAO documents.

10.3.2 In a first phase, the ICAO SAM Regional office, in cooperation with the States, should develop a roadmap that includes concrete activities to face the challenges of the new concepts, with duly trained and updated personnel.

10.3.3 The Air Navigation system should be designed to reduce potential errors optimizing their detection and mitigation. To this end we need the application of a fair culture that includes a voluntary incident reporting system enabling organisational learning.

10.3.4 ICAO programmes concerning the formation of the new generation of aviation professionals (NGAP) must be taken into account, using the results of this panel for planning the courses.

10.3.5 To facilitate international cooperation for r the development of training programmes and materials the region may use the following strategies:

a) **Early identification of training needs and priorities for Air Navigation Systems personnel:** Given the diverse and specific training that will be needed for the new systems, as well as the need for standardization, it is essential to establish a collaborative plan of supplies required. However, an effective plan will only be formulated once the training needs and priorities have been clearly identified.

b) **Coordination and planning of training for Air Navigation Systems personnel at regional level:** Effective planning and coordination for the preparation of the appropriate materials should be done at a regional level to achieve standardisation. The SAM Region has structures that could be used to fulfil this task.

10.3.6 Through Regional projects, consideration shall be given, in a first phase, to the development of a Guide on the ATM Operational Concept and its supporting systems, in order to train instructors in the new concepts to be implemented.

10.3.7 When planning specialized training, provisions should be made for inclusion of basic training in other areas, so that there will be acknowledgement of the work carried out in other units, and awareness of the impact of the task in the consideration of the global ATM. Personnel will be aware of the work done in other units and of the impact their tasks have on the overall ATM. As a strategy, the planning of personnel competence management shall consider three stages:

a) Basic training: This stage shall include the new Operational ATM concepts

b) Training for those who plan and implement: Training is required at the top management level in order to provide decision makers the necessary basic information for planning the implementation of ATM systems. This type of training is required for executive staff responsible for planning ATM systems, as well as for those responsible for planning supporting systems.

c) Task-specific training: if training is required for ongoing management, operation and maintenance of systems. This category accounts for most of the training needs and is the most difficult to plan, develop and implement.

10.3.8 Planning has been based on a main axis, which is shown in **Attachment D**, and listed below:

a) Planning training to develop air navigation systems personnel skills (SAM/HR/01 PFF).

10.3.9 CATCs shall actively accompany the planning and development of update and training courses on the ATM Operational Concept to comply with the roadmap developed by ICAO and the States.

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11. Chapter 11: Safety Management

11.1 Introduction

The Global Aviation Safety Plan

11.1.1 The objective of the Global Aviation Safety Plan (GASP) is to reduce the risk of incidents for civil aviation by providing a common frame of reference for all stakeholders to as to have a more dynamic approach to aviation safety and contribute to the coordination and guidance of global safety policies and initiatives. The first version of the ICAO GASP was prepared in 1997 and was regularly updated until 2005. The 36th Assembly Session, held in October 2007, was presented with an amended GASP, which was subsequently acknowledged in Resolution A36-7.

11.1.2 The cited Resolution A 36-7 urges contracting States and the industry to adopt the principles and objectives contained in the Global Aviation Safety Plan and the Global Aviation Safety Roadmap, and to apply their methodologies in partnership with all stakeholders with a view to reducing the number and rate of aircraft accidents.

Regional Aviation Safety Groups

11.1.3 The Regions are currently resolving safety issues through different mechanisms established by the States themselves and the industry. The Pan-American States created the Regional Aviation Safety Group— Pan-America (RASG-PA) in 2008 in response to Resolution A 36-7. This Group was established as a focal point to ensure harmonisation and coordination of safety efforts aimed at reducing aviation risks in the North American, Central American and Caribbean (NACC) and South American (SAM) Regions, and the promotion, by all the stakeholders, of the implementation of the resulting safety initiatives.

State Safety Programme (SSP)

11.1.4 The introduction in the SARPs of requirements related to the State safety programme (SSP) resulted from the growing recognition that safety management principles impact most of the civil aviation management activities, including regulation, policy-making and safety oversight.

Safety Management System (SMS)

11.1.5 The States will require, as part of the State safety programme, that the air traffic service provider and aerodrome operators implement a safety management system acceptable to the State and that, at least:

a) Identifies safety hazards;

b) Ensures the implementation of the necessary corrective measures to maintain the agreed level of safety efficacy;

c) Provides for ongoing monitoring and periodic assessment of safety efficacy; and

d) Seeks to improve the general status of the safety management system on a continuous basis.

11.1.6 The SMS will clearly define the lines of responsibility for safety within the organisation of the air traffic service provider or aerodrome operator, including the direct safety responsibility of high managerial staff.

11.1.7 When AIS, CNS, MET and/or SAR services are provided under the authority of an ATS provider, the provision of these services will be subject to the requirements established in 11.1.5 and 11.1.6 above.

11.1.8 When AIS, CNS, MET and/or SAR services are fully or partially provided by an entity other than an ATS provider, the requirements established in 11.1.5 and 11.1.6 will apply to those aspects of these services that a have direct operational impact.

11.1.9 In order to maintain acceptable safety levels, AIS and MET services must implement Quality Management Systems.

11.1.10 Likewise, the State administration must establish mechanisms to ensure the effective supervision of the critical elements of the safety oversight function. Furthermore, it must create mechanisms to ensure that hazard identification and safety risk management by service providers is consistent with the established regulatory controls (requirements, specific operating regulations and implementation policies). These mechanisms include inspections, audits and surveys to ensure that safety risk regulatory controls are properly integrated in the SMS of service providers, that they are implemented as designed, and that they have the expected effect on safety risks.

11.1.11 According to ICAO Annex 11, any significant change in the ATS system related to safety, including the implementation of reduced separation minima or a new procedure, will only become effective after a safety assessment has shown that they will meet an acceptable level of safety and that users have been consulted. When applicable, the responsible authority will make sure that the appropriate measures are taken for post-implementation monitoring to verify that the established level of safety is being met. When the acceptable level of safety cannot be expressed in quantitative terms due to the nature of the change, the safety assessment may rely on operational judgment.

11.2 **Current situation (2011)**

11.2.1 Since 2007, courses on safety management systems (SMS) have been dictated at a regional level and in all South American States. Also, since 2009, regional courses were dictated and in some States of the Region on State Safety Programmes (SSP) and in different forums SAM States have been encouraged to implement their SSP demanding implementation of the corresponding SMS to service providers.

11.2.2 During the process of safety assessment, it could be noted that a few States have implemented in an effective manner both their SSP as well as their SMS at a level of service providers; therefore a high commitment is required by States and service providers in order to reach this performance objective.

11.3 **Strategy for the Implementation of Performance Objectives**

11.3.1 Planning has been based on a main axis, as shown in Attachment C, called ‘Safety” (SM/01 PFF), as follows:

a) Safety Management (PFF SAM/SM 01).

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ATTACHMENT A

AIR TRAFFIC FORECASTS IN THE SAM REGION

TRAFFIC FLOW 1

- Buenos Aires – Santiago de Chile
- Buenos Aires – Sao Paulo/Rio de Janeiro
- Santiago de Chile – Sao Paulo/Rio de Janeiro
-

Rank	City Pair	Total Aircraft Movements/ 2007/	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Santiago(Intl) - Buenos Aires(Pistarini)	12185	39079	6.0
2	Sao Paulo(Intl) - Buenos Aires(Pistarini)	11843	37982	6.0
3	Rio De Janeiro(Intl) - Buenos Aires(Pistarini)	5484	33681	9.5
4	Santiago(Intl) - Rio de Janeiro	4979	25453	8.5
5	Santiago(Intl) - Sao Paulo	846	4741	9.0
	TOTAL	35337	140936	7.2

- Sao Paulo/Rio de Janeiro – Europe

Rank	City Pair	Total Aircraft Movements 2007	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Sao Paulo-Paris	2921	8523	5.5
2	Sao Paulo-London	1665	5867	6.5
3	Rio De Janeiro-Paris	1559	6033	7.0
4	Sao Paulo-Madrid	1543	3721	4.5
5	Sao Paulo-Frankfurt	1521	3668	4.5
6	Sao Paulo-Milan	1284	4969	7.0
7	Rio De Janeiro-Madrid	1112	2213	3.5
8	Sao Paulo-Lisbon	992	2894	5.5
9	Rio De Janeiro-Lisbon	943	3323	6.5
10	Sao Paulo-Johannesburg	878	3094	6.5
11	Santiago-Rio De Janeiro	846	4741	9.0
12	Sao Paulo-Amsterdam	730	1761	4.5
13	Sao Paulo-Munich	726	2118	5.5
14	Zurich-Sao Paulo	676	1221	3.0
15	Rio De Janeiro-Porto	304	593	3.4
16	Sao Paulo-Porto	302	589	3.4
17	Rio De Janeiro-Frankfurt	190	371	3.4
18	Rio De Janeiro-Milan	16	31	3.4
19	Sao Paulo-Rome	2	4	3.4
	Total	18210	55734	5.8

TRAFFIC FLOW 2

- Sao Paulo/Rio de Janeiro – Miami
- Sao Paulo/Rio de Janeiro – New York

Rank	City Pair	Total Aircraft Movement 2007	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Rio de Janeiro-Miami	1082	1954	3.0
2	Sao Paulo- new York (Newark)	362	979	5.1
3	Sao Paulo-Miami	3482	6289	3.0
3	Sao Paulo-New York(JFK)	3233	5839	3.0
5	Sao Paulo-new York(Newark)	362	979	5.1
	Total	8521	16040	3.2

TRAFFIC FLOW 3

- Sao Paulo/Rio de Janeiro – Lima
- Sao Paulo/Rio de Janeiro – Los Angeles

Rank	City Pair	Total Aircraft Movements 2007	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Sao Paulo-Lima	2596	15944	9.5
2	Sao Paulo-Los Angeles	182	492	5.1
	Total	2778	16436	9.3

TRAFFIC FLOW 4

- Santiago – Lima – Miami
- Buenos Aires – New York
- Buenos Aires – Miami

Rank	City Pair	Total Aircraft Movements 2007	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Buenos Aires - New York	835	2258	5.1
2	Buenos Aires - Miami	2652	7172	5.1
3	Santiago - Lima	4208	21511	8.5
4	Lima - Miami	2220	6004	5.1
5	Santiago - Miami	1781	4816	5.1
	Total	11696	41761	6.6

TRAFFIC FLOW 5

- North of South America – Europe

Rank	City Pair	Total Aircraft Movements 2007	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Madrid - Bogota	1830	7774	7.5
2	Madrid - Caracas	1639	6342	7.0
3	Madrid - Lima	1323	3934	5.6
4	Madrid - Guayaquil	1099	3268	5.6
5	Paramaribo - Amsterdam	754	2242	5.6
6	Paris - Bogota	730	1318	3.0
7	Paris - Caracas	724	2322	6.0
8	Paris(Orly) - Cayenne	719	2782	7.0
9	Frankfurt - Caracas	676	2872	7.5
10	Milan - Caracas	520	1230	4.4
11	Quito - Madrid	519	1228	4.4
12	Lima - Amsterdam	493	1166	4.4
13	Lisbon - Caracas	434	1027	4.4
14	Santa Cruz - Madrid	433	1024	4.4
15	Funchal - Caracas	242	573	4.4
16	Madrid - Cali	227	537	4.4
17	Rome - Caracas	210	497	4.4
18	Porlamar - Frankfurt	209	494	4.4
19	Bogota - Barcelona	157	371	4.4
20	Tenerife - Caracas	110	260	4.4
21	Porto - Caracas	104	246	4.4
22	Porlamar - London	94	222	4.4
23	Bogota - Alicante	52	123	4.4
24	Porlamar - Manchester	48	114	4.4
25	Porlamar - Amsterdam	47	111	4.4
	Total above routes	13393	42079	5.9
	All other routes	58	137	4.4
	TOTAL	13451	42216	5.9

TRAFFIC FLOW 6

Santiago – Lima – Los Angeles

Rank	City Pair	Total Aircraft Movements 2007	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Santiago - Lima	4208	21511	8.5
2	Los Angeles - Lima	1155	3123	5.1
3	Santiago - Los Angeles	304	822	5.1
	Total	5667	25457	7.8

TRAFFIC FLOW 7

- South America – South Africa

Rank	City Pair	Total Aircraft Movements 2007[2/]	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Sao Paulo - Johannesburg	878	3094	6.5
2	Buenos Aires - Cape Town	208	406	3.4
	Total	1086	3500	6.0

- Santiago de Chile – Easter Island – Papeete (PAC)

Rank	City Pair	Total Aircraft Movements 2007	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Santiago - Easter Island	499	1456	5.5
2	Easter Island - Papeete	209	504	4.5
	Total	708	1960	5.2

Tabla 1a: Sudamérica – Movimiento de Pasajeros

	Year	Passengers (Million)	Load Factor	Average Seats
Historical	1997	4.3	64.7	170
	2003	7.11	60.9	160
	2004	8.03	64.6	160
	2005	9.78	73.5	168
	2006	10.81	70.9	167
	2007	13.55	74.1	164
Forecast	2012	22.74	74.1	168
	2017	35.5	77	172
	2027	73.65	80	180
Average Annual	1997-2007	12.2	1.4	-0.4
Growth (Per cent)	2007-2012	10.9	0	0.5
	2012-2017	9.3	0.8	0.5
	2007-2027	8.8	0.4	0.5

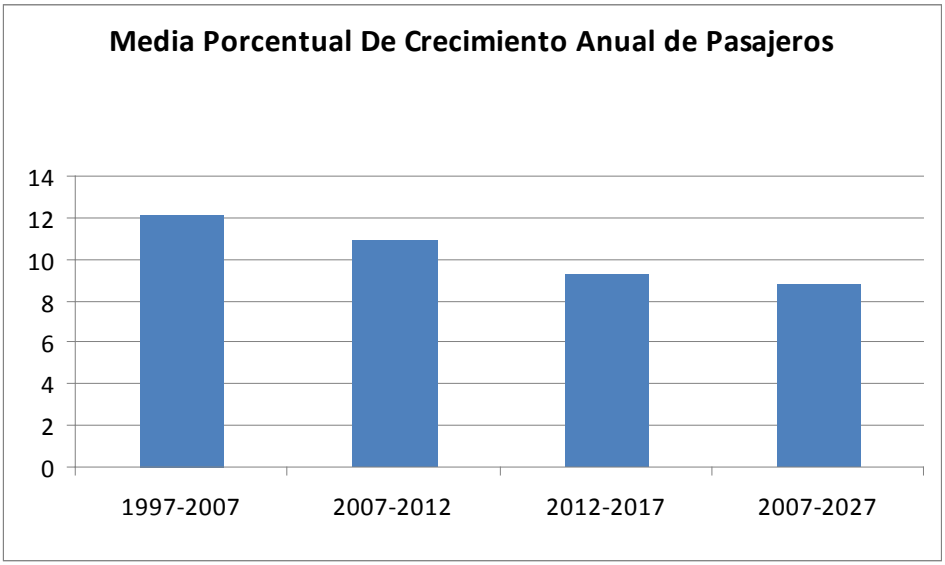
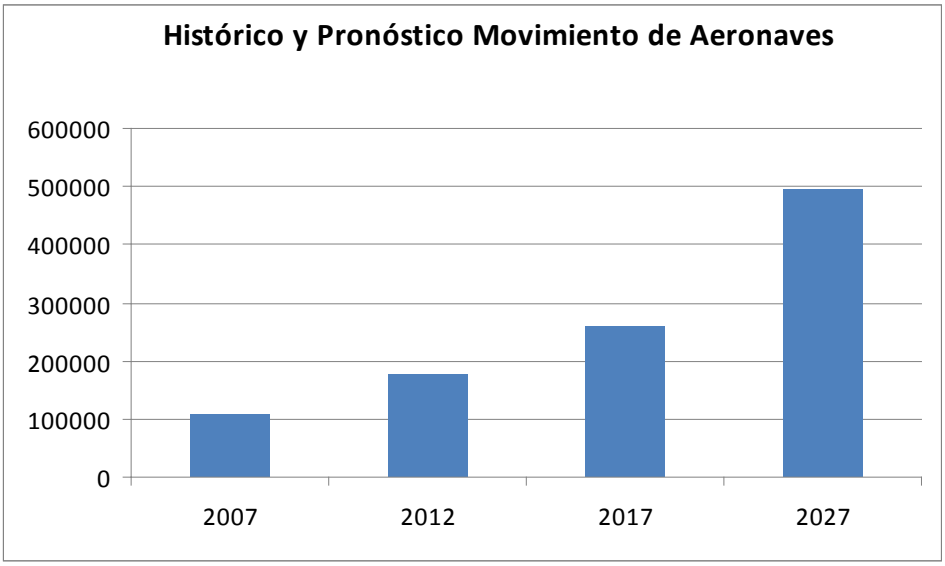


Tabla 1b: Sudamérica – Movimiento de Aeronaves

	Year	**Aircraft Movements**
Historic	2007	108523
Forecast	2012	177515
	2017	260507
	2027	497008
Average Annual Growth (Per cent)	2007-2012	10.3
	2012-2017	8
	2007-2027	7.9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400000
300000
200000
100000
0
2007
2012
2017
2027

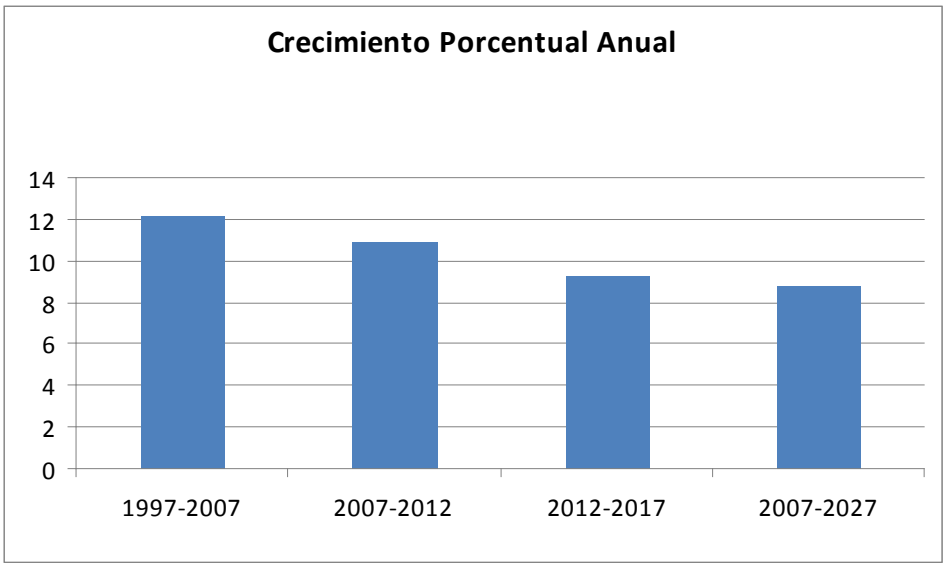
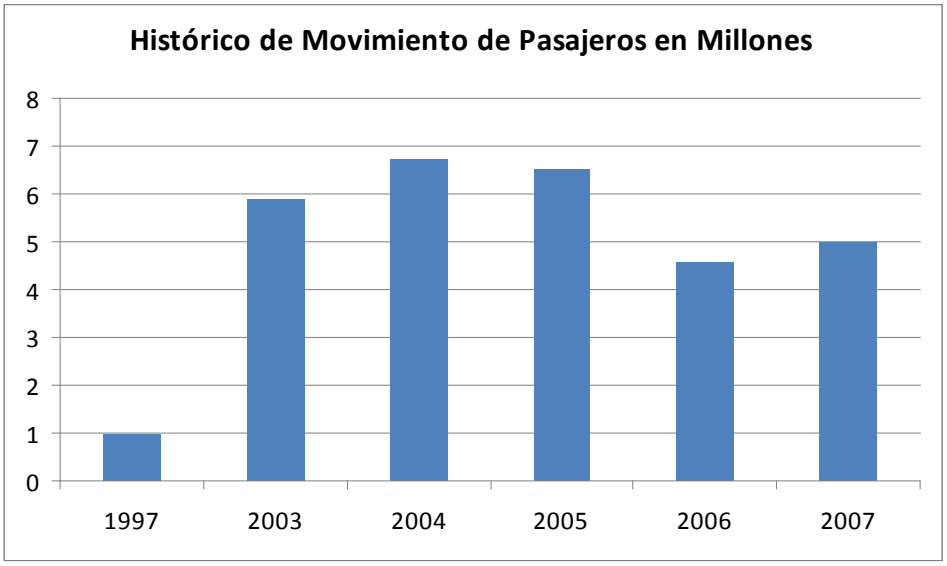

Crecimiento Porcentual Anual
14
12
10
8
6
4
2
0
1997-2007
2007-2012
2012-2017
2007-2027

Tabla 2a: Sudamérica – Centro América – Movimiento de Pasajeros

	Year	Passengers (Million)	Load Factor	Average Seats
Historical	1997	1.02	54	165
	2003	5.93	4.1	162
	2004	6.77	4.81	161
	2005	6.56	4.59	157
	2006	4.59	70	157
	2007	4.98	72.4	156
Forecast	2012	7.93	72.4	157
	2017	11.91	74.8	158
	2027	27.32	80	160
Average Annual Growth (Per cent)	1997-2007	17.2	3	-0.5
	2007-2012	9.7	0	0.1
	2012-2017	8.5	0.7	0.1
	2007-2027	8.9	0.5	0.1



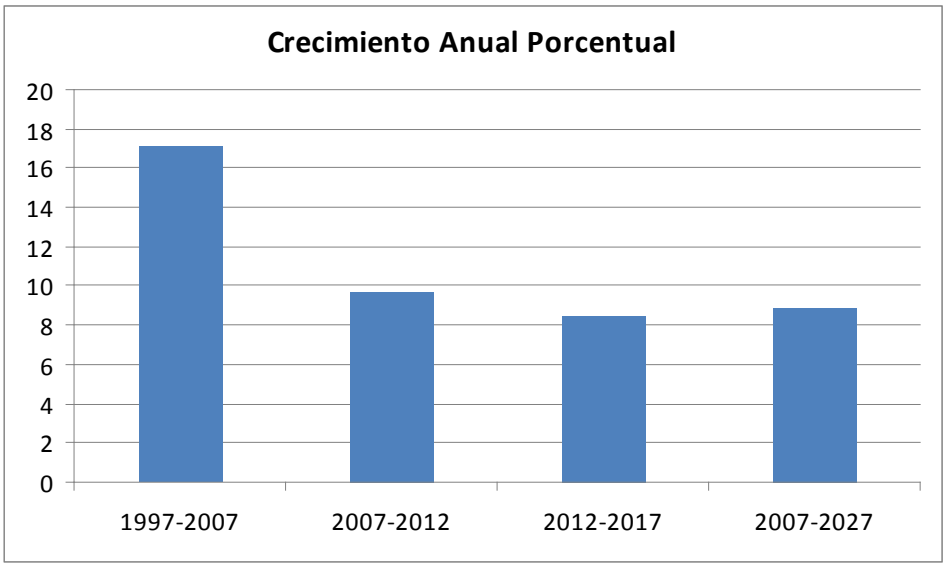
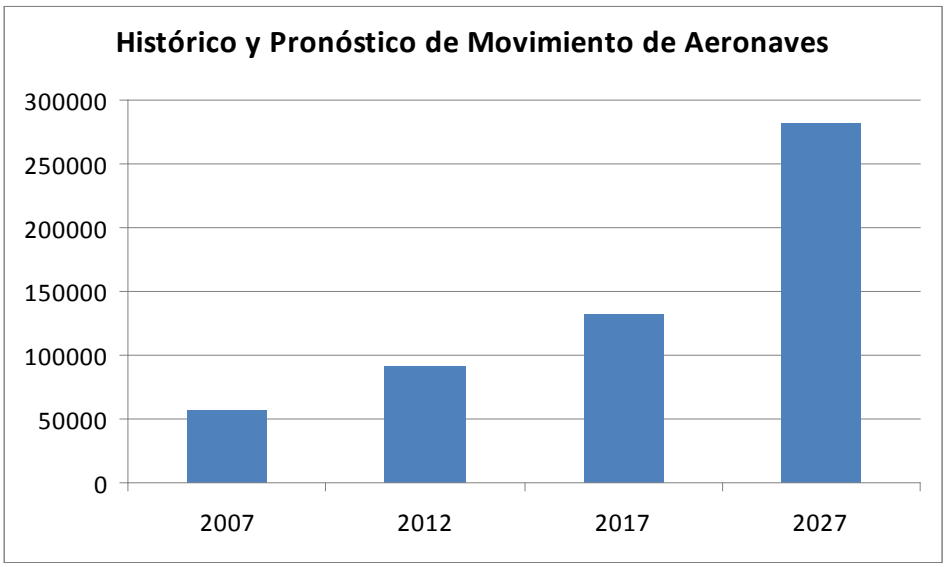


Tabla 2b: Sudamérica – Centro América -Movimiento de Aeronaves

	Year	Aircraft Movements
Historic	2007	58378
Forecast	2012	92446
	2017	133450
	2027	282354
Average Annual Growth (per cent)	2007-2012	9.6
	2012-2017	7.6
	2007-2027	8.2


Histórico y Pronóstico de Movimiento de Aeronaves
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250000
200000
150000
100000
50000
0
2007
2012
2017
2027

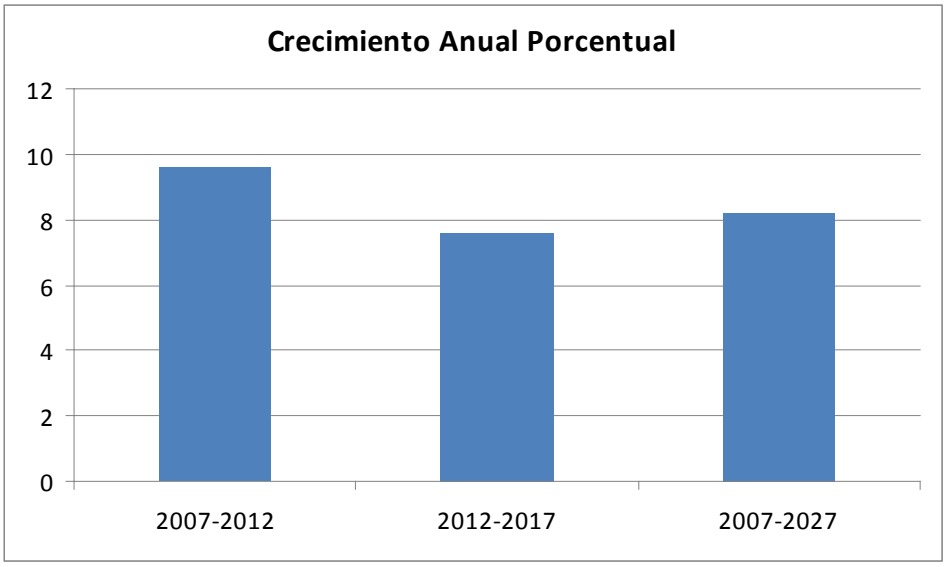
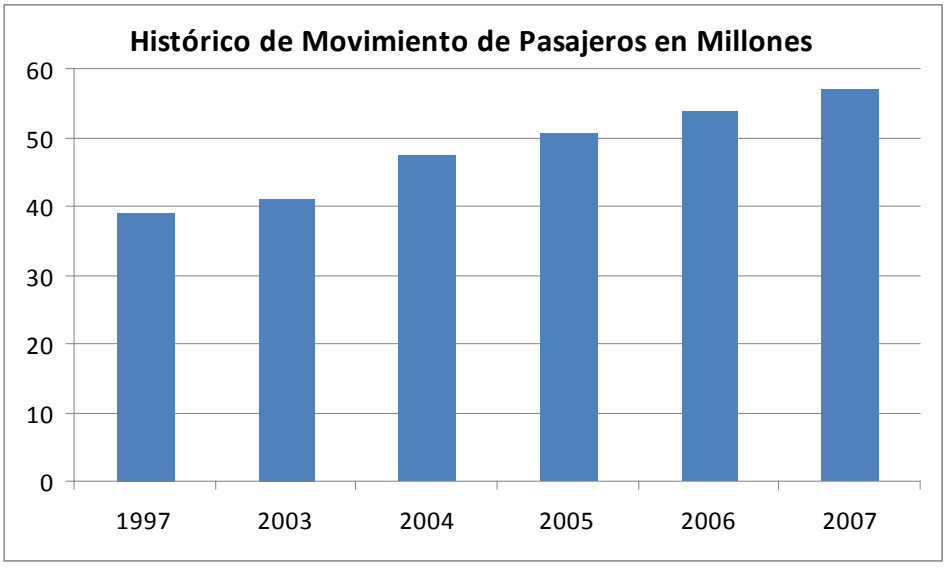
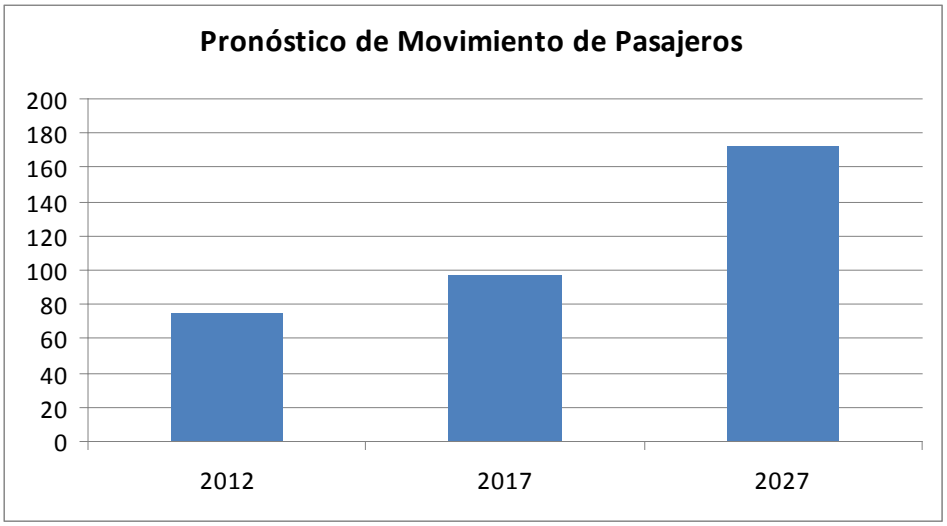

Crecimiento Anual Porcentual
12
10
8
6
4
2
0
2007-2012
2012-2017
2007-2027

Tabla 3a: Sudamérica – Norteamérica Movimiento de Pasajeros

	Year	Passengers (Million)	Load Factor	Average Seats
Historical	1997	39.2	62	189
	2003	41.23	68	168
	2004	47.42	70	166
	2005	50.83	73	166
	2006	53.88	74.4	166
	2007	56.96	76.6	166
Forecast	2012	75.66	76.6	165
	2017	97.58	79.3	167
	2027	172.97	85	170
Average Annual	1997-2007	3.8	2.1	-1.3
Growth (Per cent)	2007-2012	5.8	0	-0.1
	2012-2017	5.2	0.7	0.2
	2007-2027	5.7	0.5	0.1




Pronóstico de Movimiento de Pasajeros
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160
140
120
100
80
60
40
20
0
2012
2017
2027

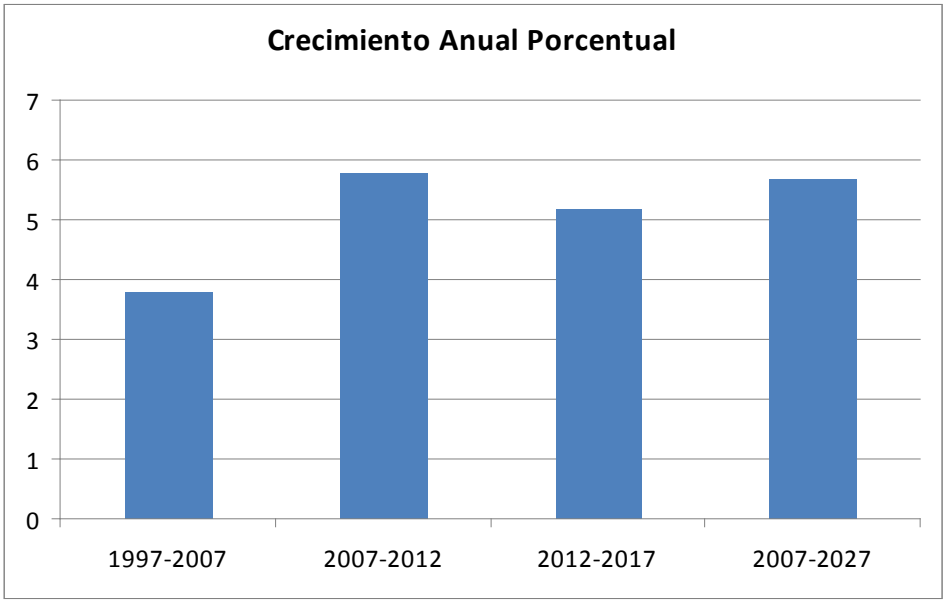
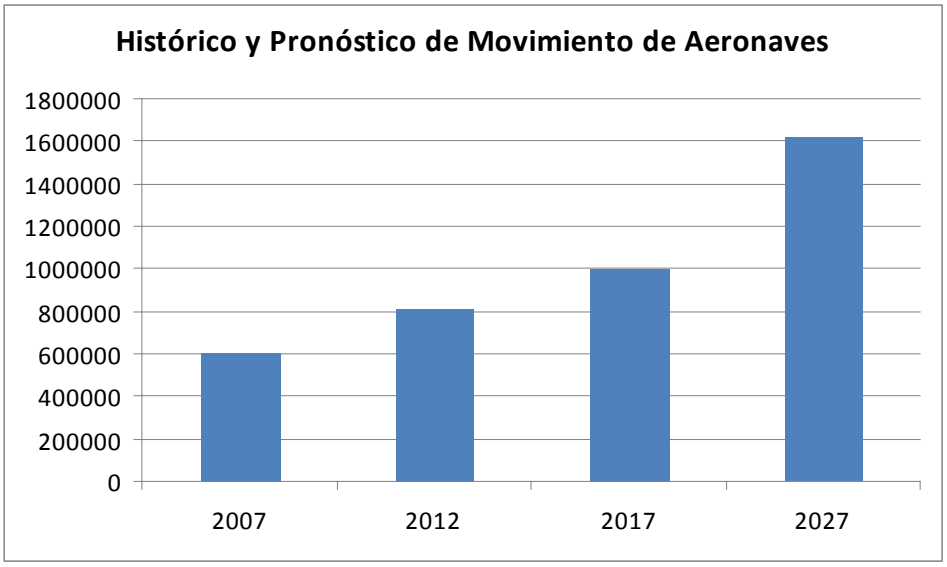

Crecimiento Anual Porcentual
7
6
5
4
3
2
1
0
1997-2007
2007-2012
2012-2017
2007-2027

Tabla 3b: Sudamérica – Norteamérica Movimiento de Aeronaves



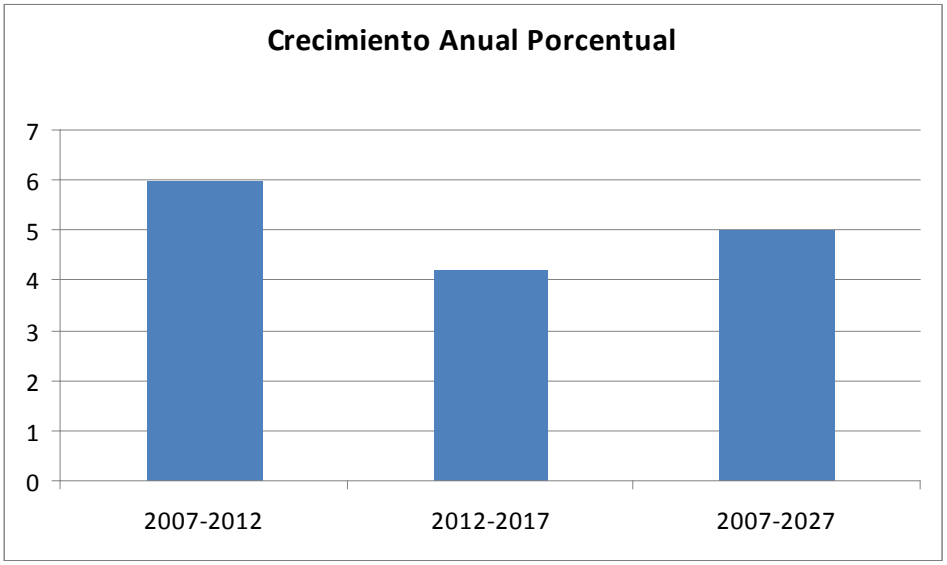
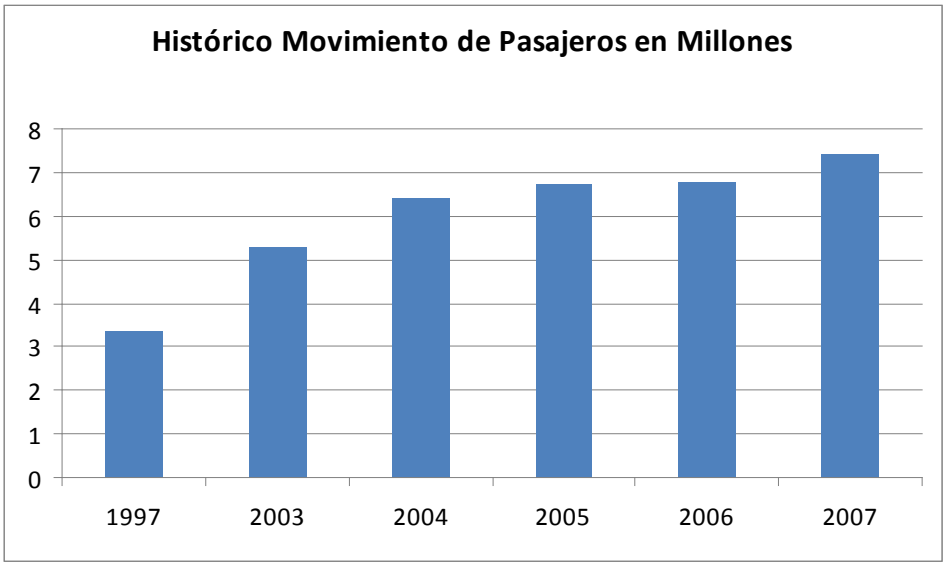
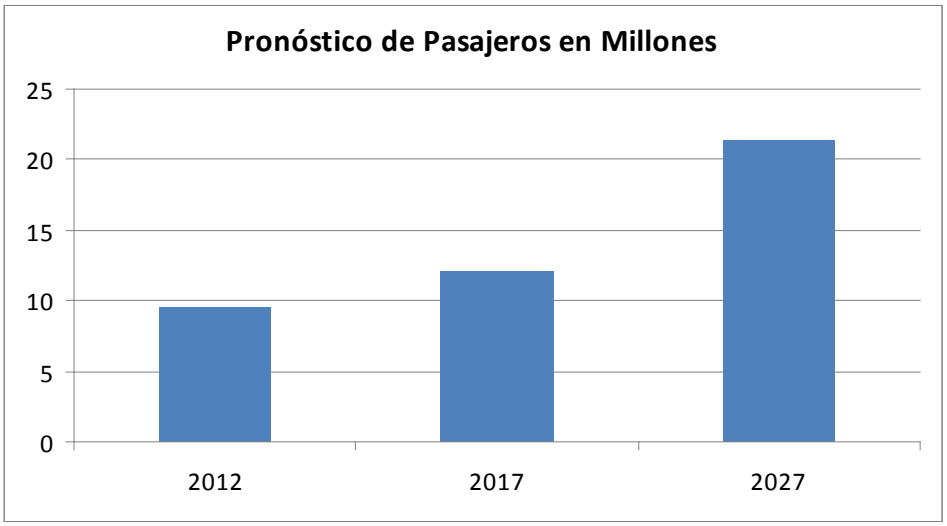


Tabla 4a: Atlántico Sur Corredor Europeo Sudamérica – Pasajeros

	Year	Passengers (Million)	Load Factor	Average Seats
Historical	1997	3.4	74.4	287
	2003	5.3	77	309
	2004	6.43	76	339
	2005	6.77	79.6	325
	2006	6.79	84.3	286
	2007	7.46	83.7	281
Forecast	2012	9.6	83.7	281
	2017	12.12	85	281
	2027	21.48	85	280
Average Annual Growth (Per cent)	1997-2007	8.2	1.2	0.3
	2007-2012	5.2	0	-0.6
	2012-2017	4.8	0.3	0
	2007-2027	5.4	0.1	-0.2





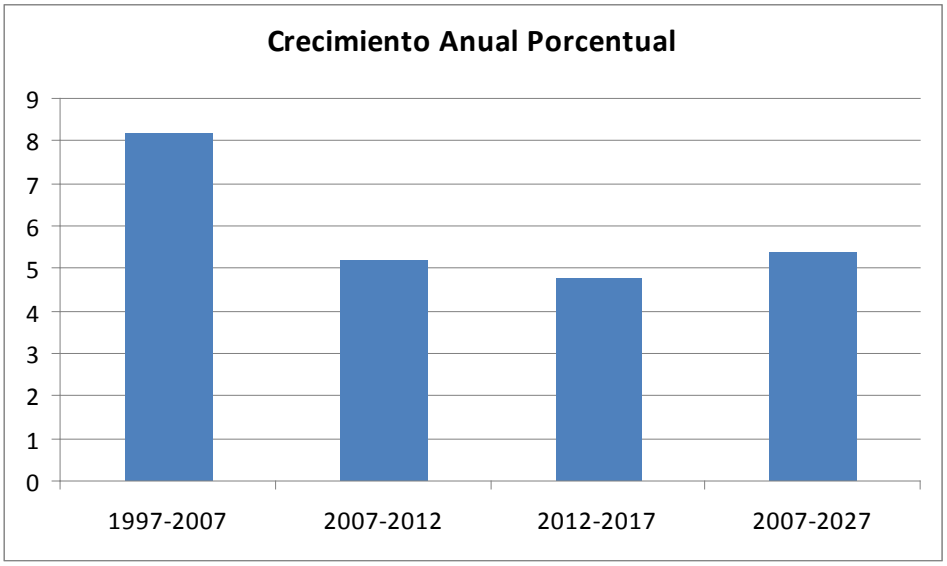
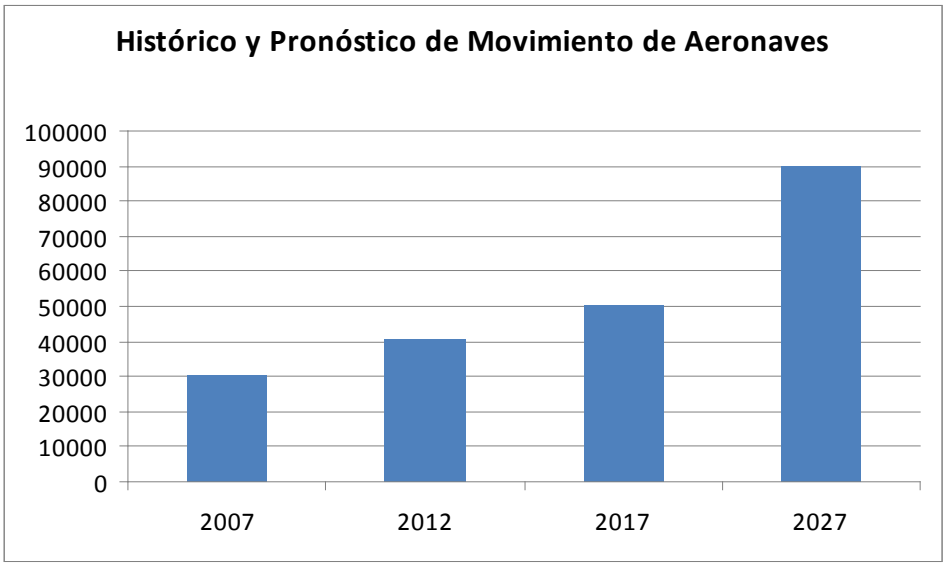


Tabla 4b: Atlántico Sur Corredor Europeo Sudamérica -Aeronaves

	Year	Aircraft Movements
Historic	2007	30749
Forecast	2012	40805
	2017	50732
	2027	90252
Average Annual Growth (Per cent)	2007-2012	5.8
	2012-2017	4.5
	2007-2027	5.5


Histórico y Pronóstico de Movimiento de Aeronaves
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80000
70000
60000
50000
40000
30000
20000
10000
0
2007
2012
2017
2027

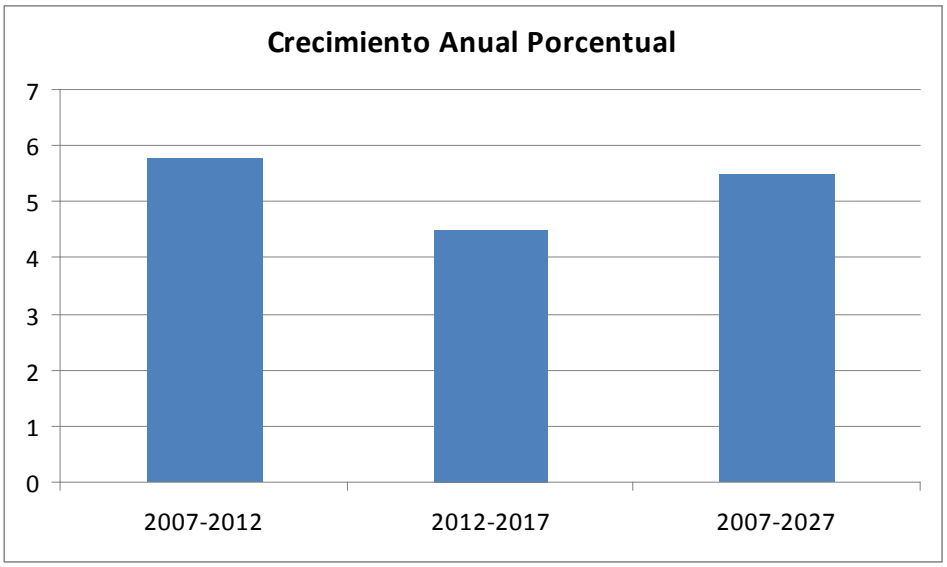
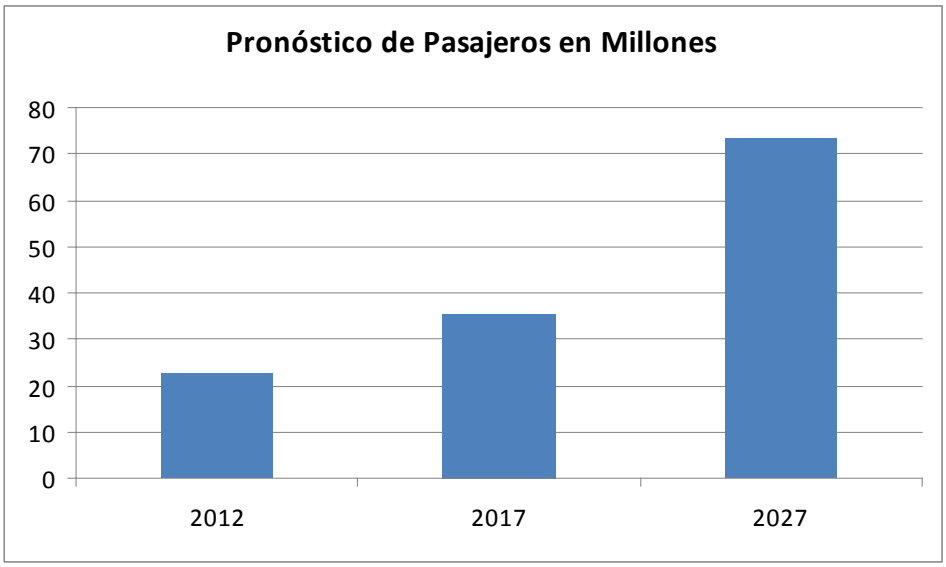

Crecimiento Anual Porcentual
7
6
5
4
3
2
1
0
2007-2012
2012-2017
2007-2027

Tabla 1a: Sudamérica – Movimiento de Pasajeros

	Year	Passengers (Million)	Load Factor	Average Seats
Historical	1997	4.3	64.7	170
	2003	7.11	60.9	160
	2004	8.03	64.6	160
	2005	9.78	73.5	168
	2006	10.81	70.9	167
	2007	13.55	74.1	164
Forecast	2012	22.74	74.1	168
	2017	35.5	77	172
	2027	73.65	80	180
Average Annual	1997-2007	12.2	1.4	-0.4
Growth (Per cent)	2007-2012	10.9	0	0.5
	2012-2017	9.3	0.8	0.5
	2007-2027	8.8	0.4	0.5



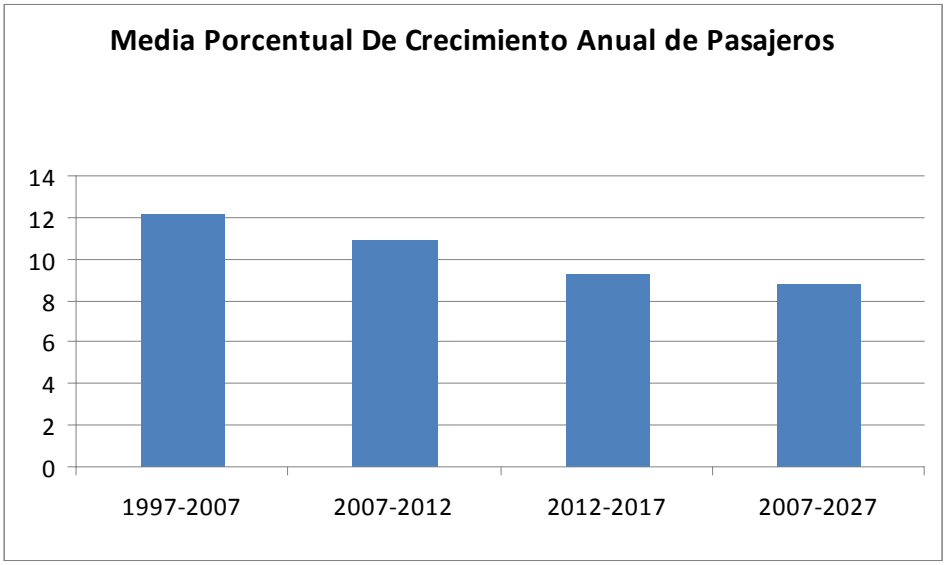
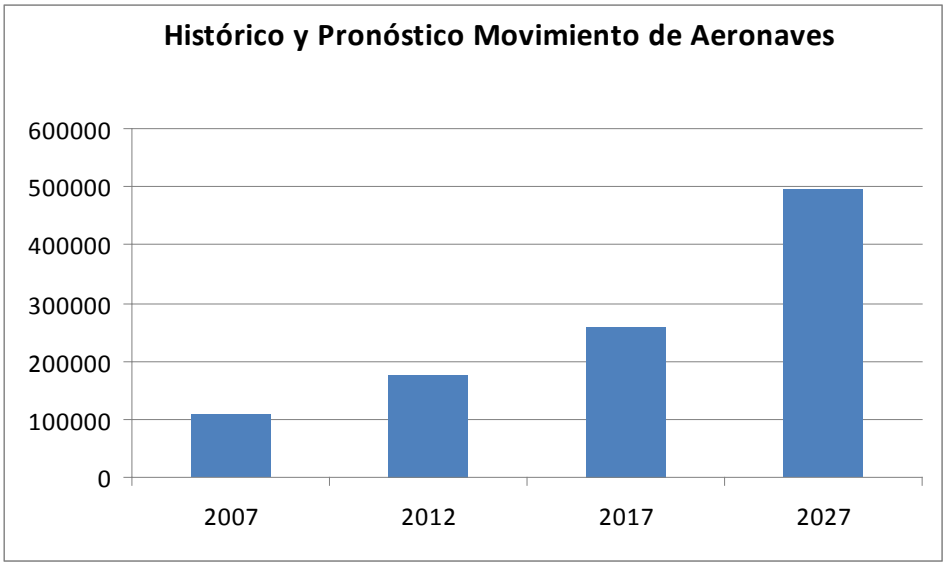


Tabla 1b: Sudamérica – Movimiento de Aeronaves

	Year	**Aircraft Movements**
Historic	2007	108523
Forecast	2012	177515
	2017	260507
	2027	497008
Average Annual Growth (Per cent)	2007-2012	10.3
	2012-2017	8
	2007-2027	7.9


Histórico y Pronóstico Movimiento de Aeronaves
600000
500000
400000
300000
200000
100000
0
2007
2012
2017
2027

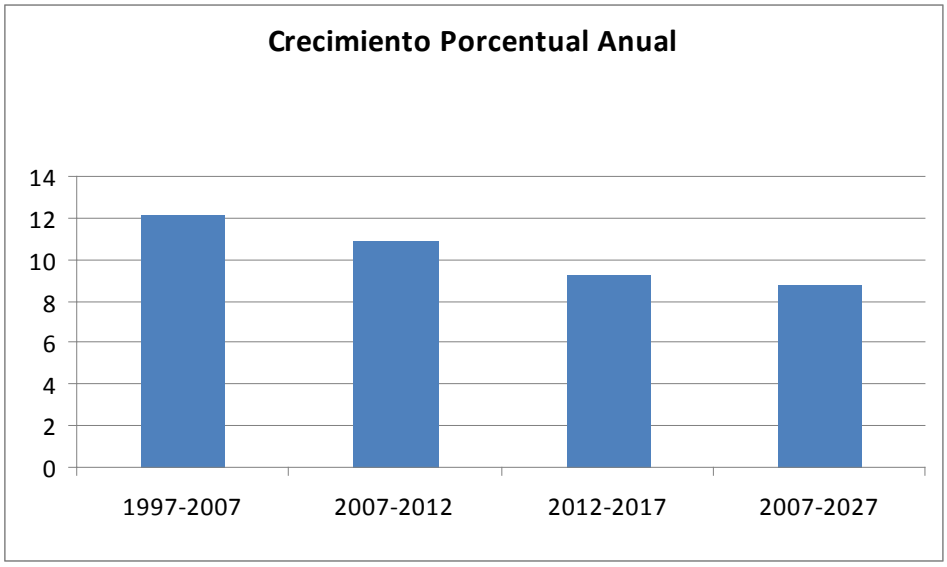
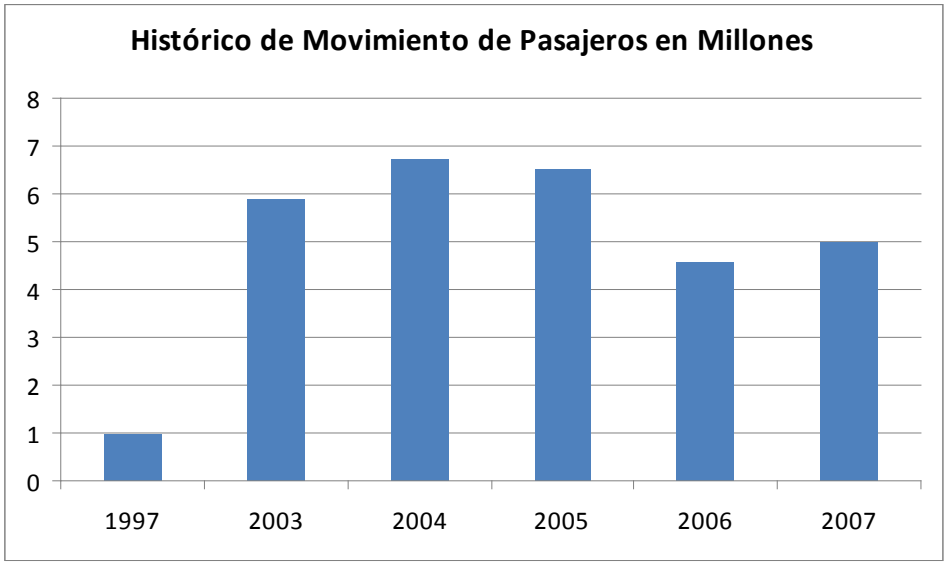

Crecimiento Porcentual Anual
14
12
10
8
6
4
2
0
1997-2007
2007-2012
2012-2017
2007-2027

Tabla 2a: Sudamérica – Centro América – Movimiento de Pasajeros

	Year	Passengers (Million)	Load Factor	Average Seats
Historical	1997	1.02	54	165
	2003	5.93	4.1	162
	2004	6.77	4.81	161
	2005	6.56	4.59	157
	2006	4.59	70	157
	2007	4.98	72.4	156
Forecast	2012	7.93	72.4	157
	2017	11.91	74.8	158
	2027	27.32	80	160
Average Annual Growth (Per cent)	1997-2007	17.2	3	-0.5
	2007-2012	9.7	0	0.1
	2012-2017	8.5	0.7	0.1
	2007-2027	8.9	0.5	0.1



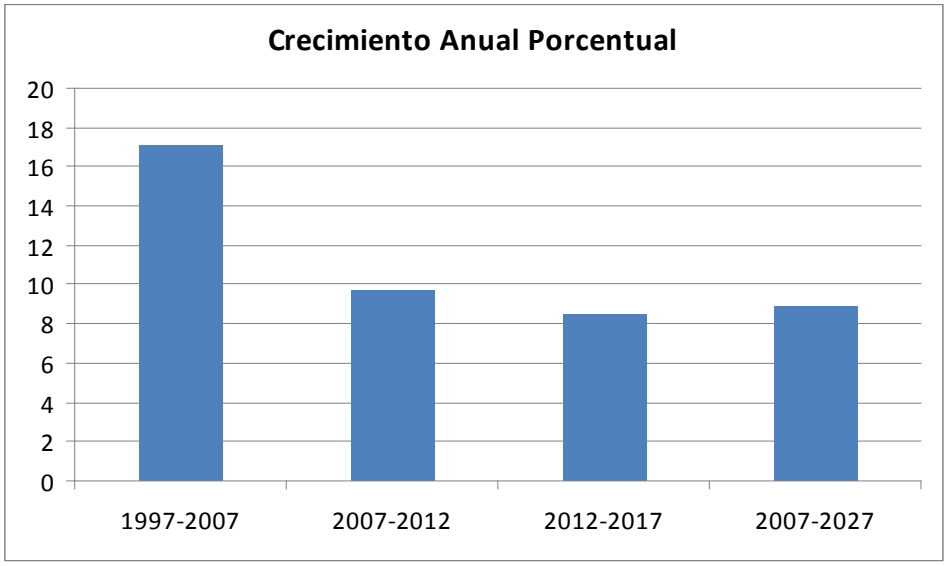


Tabla 2b: Sudamérica – Centro América -Movimiento de Aeronaves

	Year	**Aircraft Movements**
Historic	2007	58378
Forecast	2012	92446
	2017	133450
	2027	282354
Average Annual Growth (per cent)	2007-2012	9.6
	2012-2017	7.6
	2007-2027	8.2


Histórico y Pronóstico de Movimiento de Aeronaves
300000
250000
200000
150000
100000
50000
0
2007
2012
2017
2027

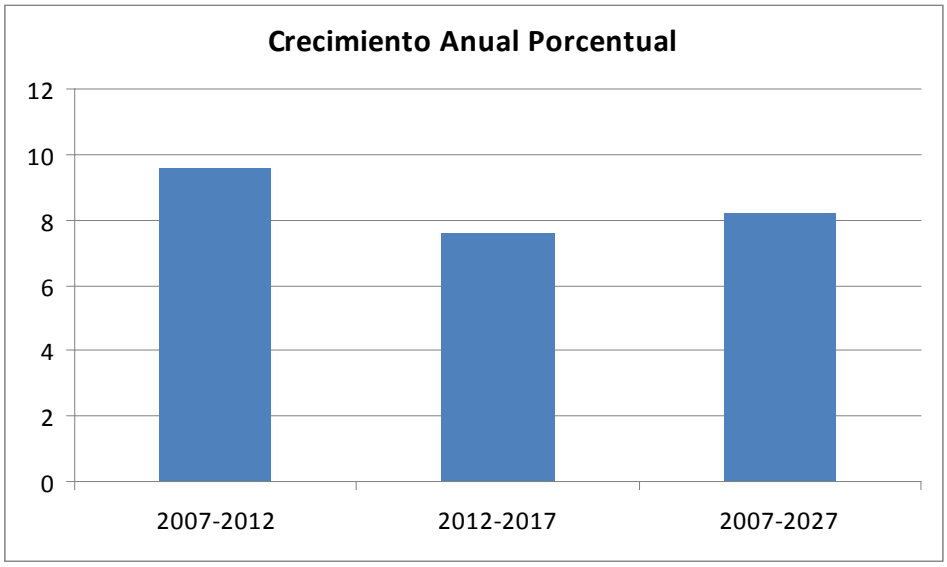
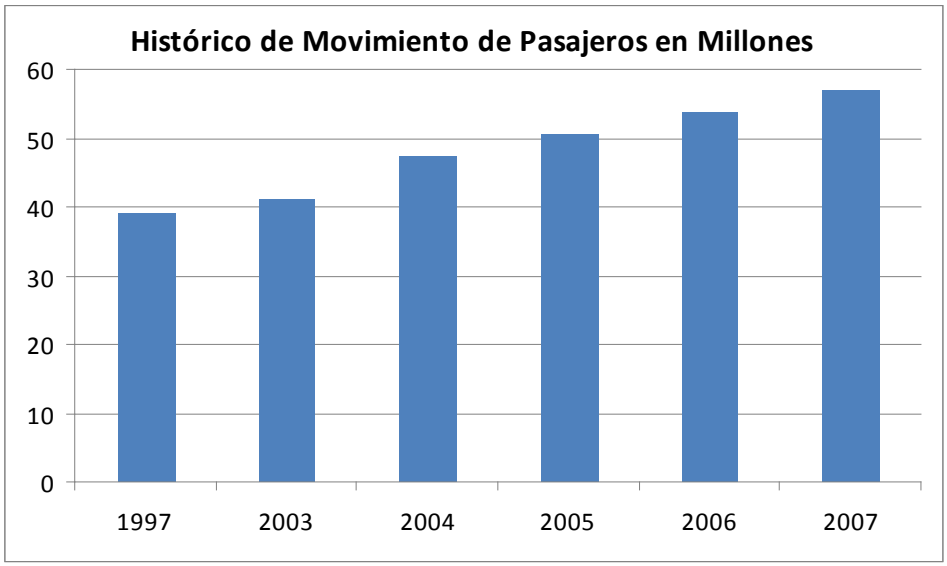
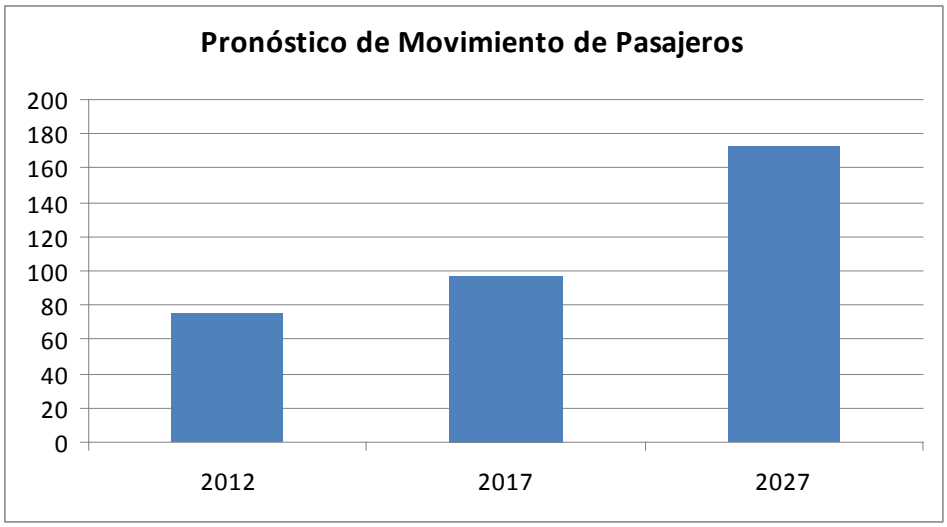

Crecimiento Anual Porcentual
12
10
8
6
4
2
0
2007-2012
2012-2017
2007-2027

Tabla 3a: Sudamérica – Norteamérica Movimiento de Pasajeros

	Year	Passengers (Million)	Load Factor	Average Seats
Historical	1997	39.2	62	189
	2003	41.23	68	168
	2004	47.42	70	166
	2005	50.83	73	166
	2006	53.88	74.4	166
	2007	56.96	76.6	166
Forecast	2012	75.66	76.6	165
	2017	97.58	79.3	167
	2027	172.97	85	170
Average Annual	1997-2007	3.8	2.1	-1.3
Growth (Per cent)	2007-2012	5.8	0	-0.1
	2012-2017	5.2	0.7	0.2
	2007-2027	5.7	0.5	0.1




Pronóstico de Movimiento de Pasajeros
200
180
160
140
120
100
80
60
40
20
0
2012
2017
2027

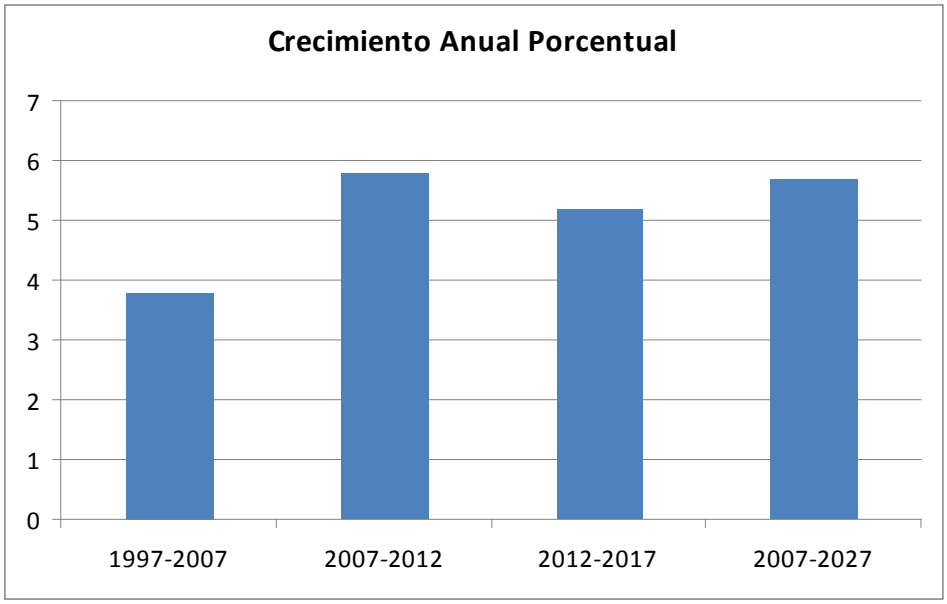
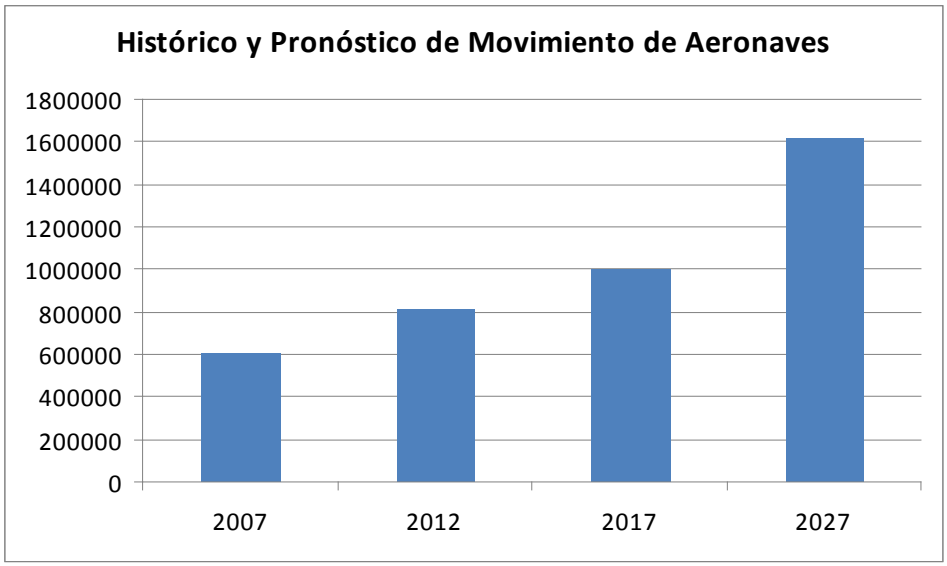

Crecimiento Anual Porcentual
7
6
5
4
3
2
1
0
1997-2007
2007-2012
2012-2017
2007-2027

Tabla 3b: Sudamérica – Norteamérica Movimiento de Aeronaves



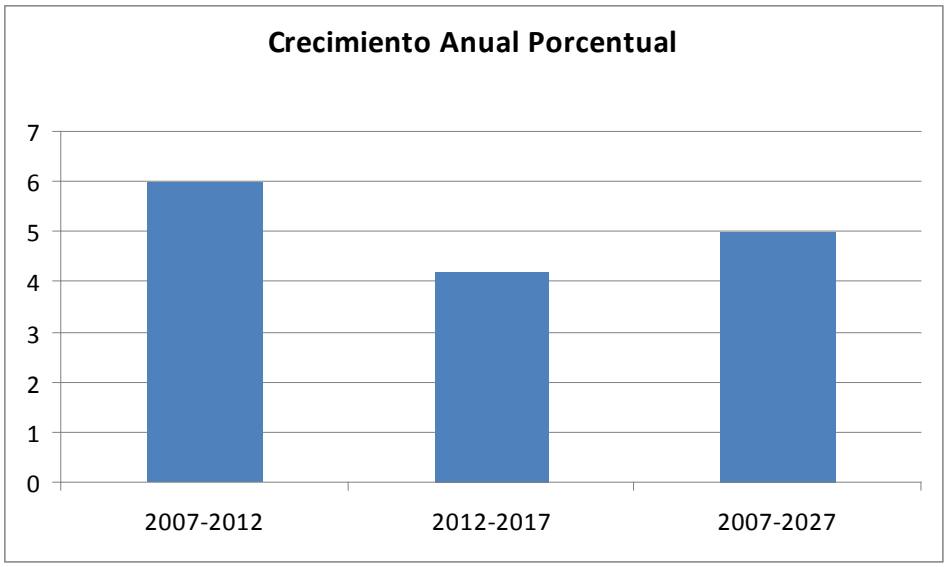
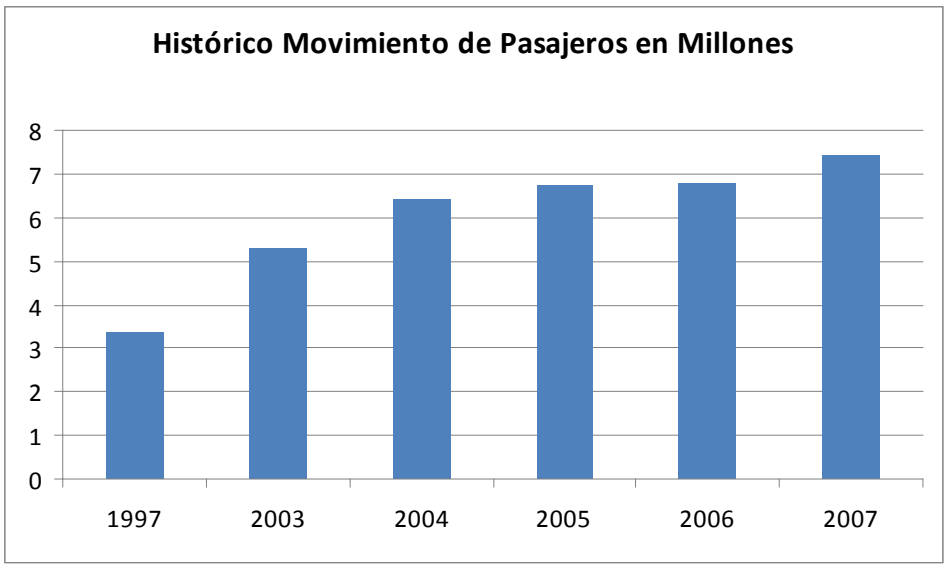
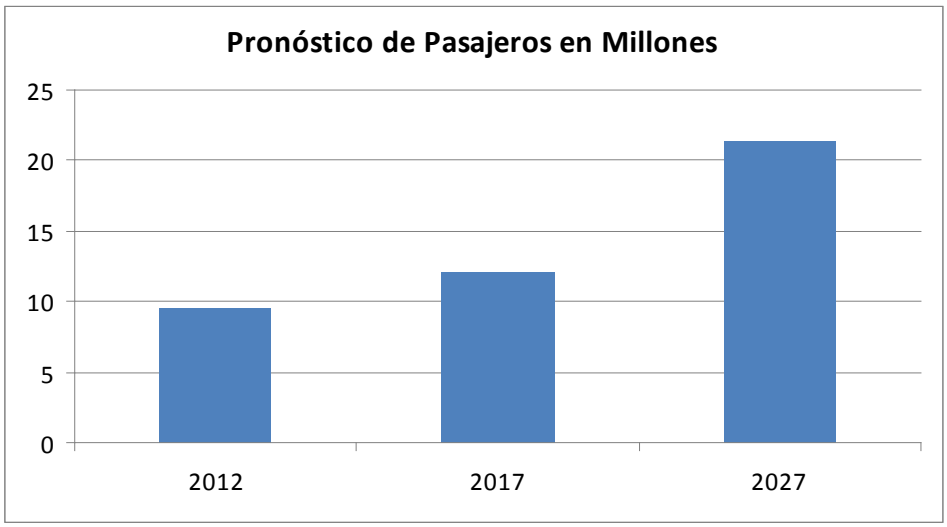


Tabla 4a: Atlántico Sur Corredor Europeo Sudamérica – Pasajeros

	Year	Passengers (Million)	Load Factor	Average Seats
Historical	1997	3.4	74.4	287
	2003	5.3	77	309
	2004	6.43	76	339
	2005	6.77	79.6	325
	2006	6.79	84.3	286
	2007	7.46	83.7	281
Forecast	2012	9.6	83.7	281
	2017	12.12	85	281
	2027	21.48	85	280
Average Annual Growth (Per cent)	1997-2007	8.2	1.2	0.3
	2007-2012	5.2	0	-0.6
	2012-2017	4.8	0.3	0
	2007-2027	5.4	0.1	-0.2





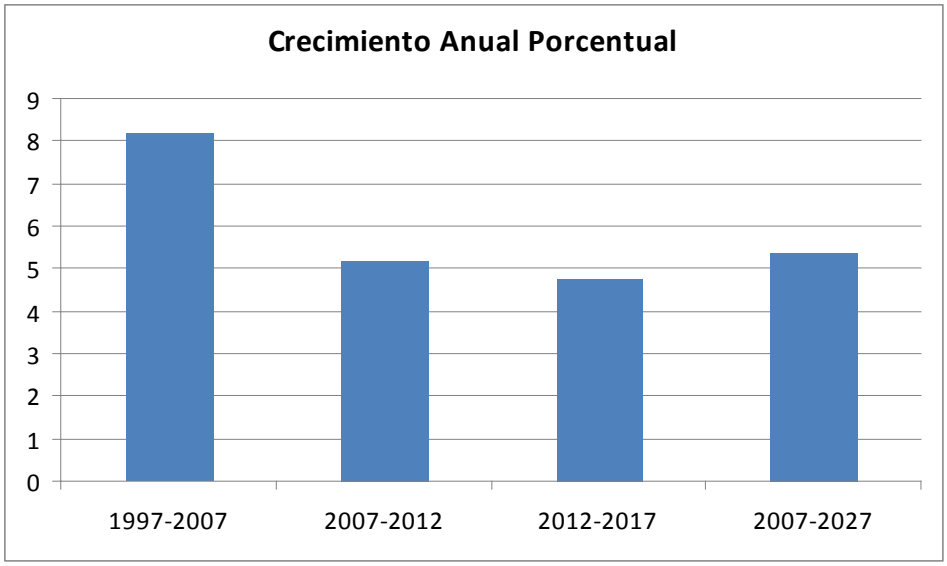
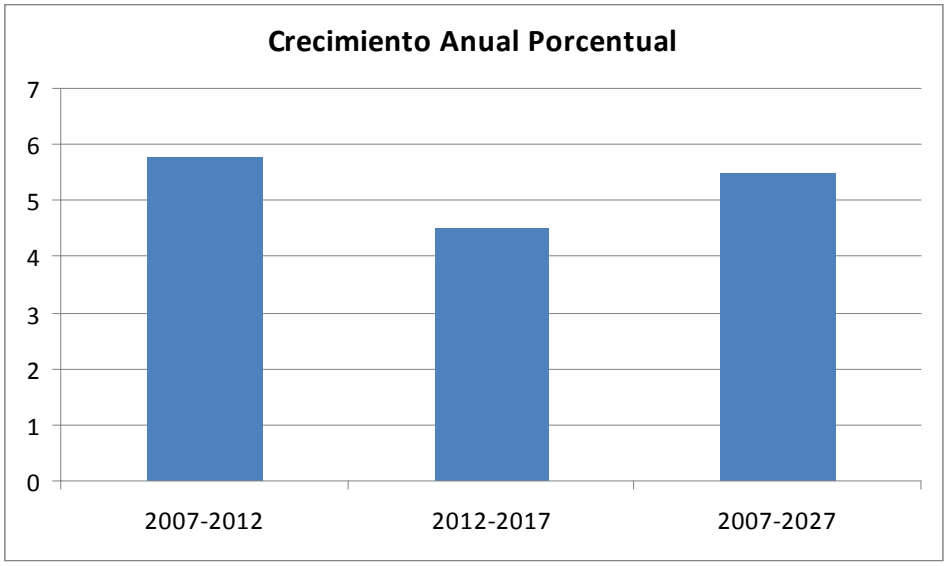


Tabla 4b: Atlántico Sur Corredor Europeo Sudamérica -Aeronaves

	Year	Aircraft Movements
Historic	2007	30749
Forecast	2012	40805
	2017	50732
	2027	90252
Average Annual Growth (Per cent)	2007-2012	5.8
	2012-2017	4.5
	2007-2027	5.5


Histórico y Pronóstico de Movimiento de Aeronaves
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
2007
2012
2017
2027


Crecimiento Anual Porcentual
7
6
5
4
3
2
1
0
2007-2012
2012-2017
2007-2027

ATTACHMENT B

GLOBAL PLAN INITIATIVES AND THEIR RELATIONSHIP WITH THE MAIN GROUPS

GPI		En-route	Terminal Area	Aerodrome	Ancillary Infrastructure	Associated component of the Operational Concept
GPI-1	Flexible use of airspace	X	X			AOM, AUO
GPI-2	Reduced vertical separation minima	X				AOM, CM
GPI-3	Harmonisation of level systems	X				AOM, CM, AUO
GPI-4	Alignment of upper airspace classifications	X				AOM, CM, AUO
GPI-5	RNAV and RNP (Performance-based navigation)	X	X	X		AOM, AO, TS, CM, AUO
GPI-6	Air traffic flow management	X	X	X		AOM, AO, DCB, TS, CM, AUO
GPI-7	Dynamic and flexible ATS route management	X	X			AOM, AUO
GPI-8	Collaborative airspace design and management	X	X			AOM, AUO
GPI-9	Situational awareness	X	X	X	X	AO, TS, CM, AUO
GPI-10	Terminal area design and management		X			AOM, AO, TS, CM, AUO
GPI-11	RNP and RNAV SIDs and STARs		X			AOM, AO, TS, CM, AUO
GPI-12	Functional integration of ground and airborne systems		X		X	AOM, AO, TS, CM, AUO
GPI-13	Aerodrome design and management			X		AO, CM, AUO
GPI-14	Runway operations			X		AO, TS, CM, AUO
GPI-15	Match IMC and VMC operating capacity		X	X	X	AO, CM, AUO
GPI-16	Decision support and alerting systems	X	X	X	X	DCB, TS, CM, AUO

GPI		En-route	Terminal Area	Aerodrome	Ancillary Infrastructure	Associated component of the Operational Concept
GPI-17	Implementation of data Relationship applications	X	X	X		DCB, AO, TS, CM, AUO, ATMSDM
GPI-18	Aeronautical information	X	X	X	X	AOM, DCB, AO, TS, CM, AUO, ATMSDM
GPI-19	Meteorological systems	X	X	X	X	AOM, DCB, AO, AUO
GPI-20	WGS-84	X	X	X	X	AO, CM, AUO
GPI-21	Navigation systems	X	X	X	X	AO, TS, CM, AUO
GPI-22	Communication infrastructure	X	X	X	X	AO, TS, CM, AUO
GPI-23	Aeronautical radio spectrum	X	X	X	X	AO, TS, CM, AUO, ATMSDM

ATTACHMENT C

PERFORMANCE FRAMEWORK FORM (PFF)

1. This outcome and management form is applicable to both regional and national planning, and includes references to the Global Plan. Other formats may be appropriate, but they must contain, at least, the elements described below.

1.1 Performance objective: Regional/national performance objectives should be defined, using the performance-based approach that best reflects the activities required to support ATM systems at regional/national level. Along their life cycle, performance objectives may change, depending on the evolution of the ATM system; therefore, during the implementation process, they should be coordinated with all the stakeholders in the ATM community and be at their disposal. The establishment of joint decision-making processes ensures that all stakeholders are involved and agree on the requirements, tasks and timetables.

1.2 Regional performance objectives: Regional performance objectives are the improvements required by the air navigation system to support global performance objectives, and are related to the operational environments and the priorities applicable at regional level.

1.3 National performance objectives: National performance objectives are the improvements required by the air navigation system in support of regional performance objectives, and are related to the operational environments and priorities applicable at State level.

1.4 Benefits: Regional/national performance objectives should meet the expectations of the ATM community, as described in the operational concept; they should generate benefits for the parties involved; and should be attained through operational activities and techniques aligned with each performance objective.

1.5 Metrics: Metrics permit to measure the objectives achieved. The monitoring and measurement of the performance of ATM systems may require metrics in areas such as access, capacity, cost-effectiveness, efficiency, environment, flexibility, prediction capacity, and safety.

1.6 **Strategy:** ATM evolution requires a clearly-defined gradual strategy that includes the tasks and activities that best represent the national and regional planning processes, in keeping with the global planning framework. The goal is to achieve a harmonised implementation process that evolves towards a global and seamless ATM system. Accordingly, it is necessary to develop short- and medium-term work programmes focused on system improvements that reflect a clear work commitment of the parties involved.

1.7 **Components of the ATM operational concept:** Each strategy or set of tasks should be associated to components of the ATM operational concept. The designators of the ATM components are as follows:

- AOM – Airspace organisation and management
- DCB – Demand/capacity balancing
- AO – Aerodrome operations

- TS – Traffic synchronisation
- CM – Conflict management
- AUO – Airspace user operations
- ATM SDM – ATM service delivery management

1.8 **Tasks:** The regional/national work programmes, based on these PFF templates, should define the tasks required to attain said performance objective while maintaining a direct relationship with the components of the ATM system. The following principles should be taken into account when developing a work programme:

- Work should be organised using project management techniques and performance-based objectives, in line with ICAO strategic objectives.
- All tasks related to the compliance with the performance objectives should be carried out based on strategies, concepts, action plans and roadmaps that may be shared amongst the parties, with the main objective of attaining transparency through interoperability and harmonisation.
- Task planning should include the optimisation of human resources, as well as the promotion of the dynamic use of electronic communication amongst the parties (for example, Internet, video-conferences, tele-conferences, e-mail, telephone and fax). Likewise, resources should be used efficiently, avoiding duplication of work or unnecessary tasks.
- The process and work methods should ensure the possibility of measuring the performance objectives, comparing them with timetables, and easy reporting of the progress made at national and regional level to the PIRGs and ICAO Headquarters, respectively.

1.9 **Period:** Indicates the start and end of that task in particular.

1.10 **Responsibility:** Indicates the organisation/entity/individual responsible for the fulfilment or management of the associated tasks.

1.11 **Status:** The status basically monitors progress in the fulfilment of said task as it proceeds to the date of completion. For the classification of the status of implementation, the words VALID, COMPLETED, REPLACED and CONTINUOUS will be used.

1.12 **Link with the global plan initiatives (GPIs)*:*** The 23 GPIs, as described in the Global Plan, provide a global strategic framework for the planning of air navigation systems, and are designed to contribute to the achievement of regional/national performance objectives. Each performance objective should be related with the corresponding GPIs. The goal is to make sure that the evolutionary work process at State and regional level is integrated within the global planning framework.

2. The PFFs prepared for the performance objectives concerning ATM, CNS, MET, SAR, AIS, AGA/AOP, personnel competence management and SMS are presented below. In addition, a matrix with the inter-relationship amongst the PFFs in included.

REGIONAL PERFORMANCE OBJECTIVE: SAM/ATM 01 OPTIMISATION OF THE EN-ROUTE AIRSPACE STRUCTURE	
Benefits	
Safety	• Reduces the complexity of the airspace structure, by reinforcing safety
Environmental protection and sustainable development of air transport	• Reduces fuel consumption and, consequently, CO^2 emissions into the atmosphere, due to reduction of miles flown and to continuous descent and ascent operations • Increases airspace capacity. • Takes advantage of aircraft RNAV capacity
Metrics	
• Reduction of air traffic incidents each 100,00 operations per year • Increase ATC sector capacity • Reduction of CO^2 emissions each 100,00 operations per year	

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
	a) Carry out implementation and assessment of Version 02 of the SAM ATS route network, and the implementation of RNAV 5 exclusionary space.	(*) - 2013	States	Valid
	b) Optimise oceanic routes and complete implementation of RNAV10 (RNP10) routes.	(*) - 2012	States	Valid
	c) Review and update the SAM PBN Roadmap and the ATS route network optimisation programme.	2012 - 2013	Regional Project States	Valid
	d) Assess the status of implementation of the en-route PBN action plan.	2012	States	Valid
	e) Implement a regional tool for RAI availability forecast in order to support en-route, TMA and non-precision approach operations.	2012 - 2015	States	Valid
	f) Prepare Version 03 of the ATS route network, including RNP4 application for oceanic routes and RNP2 in continental airspace.	2015	Regional Project States	Valid
	g) Implement random routes in defined continental airspaces.	2018+	States	Valid
	h) Monitor implementation progress.	(*) - 2018 +	GREPECAS	Valid
Relation-ship with GPIs	GPI/5: performance-based navigation, GPI/7: management of dynamic and flexible ATS routes, GPI/8: collaborative airspace design and management.			

(*) Indicates that the task has started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/ATM 02 TMA AIRSPACE STRUCTURE OPTIMISATION	
Benefits	
Safety	• Implementation of continuous descent (CDO) operations • Increased safety during landing and reduced CFIT incidence • Reduction of airspace complexity, by reinforcing safety
Environmental protection and sustainable development of air transport	• Reduces fuel consumption and, consequently, CO^2 emissions into the atmosphere, due to reduction of miles flown and continuous descent and ascent operations; • Reduces aeronautical noise, through continuous descent operations (CDO); • Increases airspace capacity, since it permits the establishment of separate arrival/departure flows, and even the segregation of IFR from VFR flights; • Takes advantage of aircraft RNAV capacity; • Airport arrival/departure under any meteorological condition.

Metrics

- Percentage of international aerodromes with SIDs/STARs, RNAV and/or RNP implemented, when required.
- Percentage of aerodromes that have implemented continuous descent and ascent operations.
- Reduction of air traffic incidents each 100,00 operations per year
- Reduction of tons of CO^2 emissions each 100,00 operations per year
- Reduction of aeronautical noise.

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM AUO CM	a) Assess the progress made in the terminal area PBN action plan.	2012	States	Valid
	b) Implement standard RNAV 1 arrival/departure routes in selected TMAs with ATS surveillance.	(*) - 2013	States	Valid
	c) Implement RNAV 1 and/or RNP 1 standard arrival/departure routes in all the TMAs of international airports.	2012 – 2016	States	Valid
	d) Implement CDO operations in all the TMAs of international airports.	2013 - 2018	States	Valid
	e) Implement RNAV1/RNP1 exclusionary airspace in high-density TMAs.	2015 – 2018 +	States	Valid
	f) Monitor progress during implementation.	(*) - 2018	GREPECAS	Valid
Relation-ship with GPIs	GPI/1: Flexible use of airspace, GPI/5: performance-based navigation, GPI/7: management of dynamic and flexible ATS routes, GPI/8: collaborative airspace design and management, GPI/10: terminal area design and management, GPI/11: RNP and RNAV SIDs and STARs, and GPI/12: functional integration of ground and airborne systems.			

(*) Indicates that the task has been started before the period contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/ATM 03 IMPLEMENTATION OF RNP APPROACHES	
Benefits	
Safety	• Increases safety during landing, reducing the incidence of CFIT • Permits the establishment of safe approach procedures at airports with limitations due to rough terrain.
Environmental protection and sustainable development of air transport	• Reduces miles flown and/or permits optimum descent flights, decreasing fuel consumption, and thus CO^2 emissions into the atmosphere; • Takes advantage of aircraft capacity for flying optimum paths; • Improved airport operational minima.
Metrics	
• Percentage of RNP APCH procedures that have been implemented, including APV Baro VNAV and LNAV implemented only at runway ends with instrument operations, according to the 37th Assembly Resolution 37/11.	

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM **AUO** **AO** **CM**	a) Assess progress of PBN action plan on approach procedures.	2012	SAMIG	Valid
	b) Implement RNP APCH procedures (or RNP AR APCH when operationally advantageous), including APV BARO VNAV, and LNAV only, in conformity with ICAO Assembly Resolution A37/11.	(*) – 2018+	States	Valid
	c) Start-up of the implementation of GLS procedures (GBAS) CAT I landing at selected airports.	2015 – 2018 +	States	Valid
	d) Monitor the progress made during implementation.	(*) - 2018+	GREPECAS	Valid
Relation-ship with GPIs	GPI/1: Flexible use of airspace, GPI/5: performance-based navigation, GPI/8: collaborative airspace design and management, GPI/12: functional integration of ground and airborne systems and GPI/14; runway operations.			

(*) Indicates that the task has been started before the period contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/ATM 04
FLEXIBLE USE OF AIRSPACE

Benefits

Safety	• Improvement of coordination and civil/military cooperation strengthens airspace safety.
Environmental protection and sustainable development of air transport	• Permits a more efficient ATS route structure, by reducing miles flown, fuel consumption and, consequently, CO^2 emissions into the atmosphere. • Increases airspace capacity. • Greater availability of reserved airspace aviation at times when there is no activity from those airspace users

Metrics

- Percentage of committees or similar civil/military coordination bodies implemented
- Number of civil/military coordination and cooperation agreements implemented
- Permanent reduction of reserved airspaces

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM **AUO** **CM**	a) Develop guidance material on civil/military coordination and cooperation, for the definition of policies, procedures and national standards;	(*) - 2012	Regional Project States	Valid
	b) Carry out an assessment of the amount and extension of reserved airspaces	(*) - 2012	States	Valid
	c) Establish committees or similar civil/military coordination bodies;	(*) - 2012	States	Valid
	d) Make arrangements to have a permanent relationship and close cooperation between ATS civil units and the appropriate military units, as well as other reserved airspace users;	(*) - 2012	States	Valid
	e) Establish procedures for coordination of temporary reservation of airspace (TRA) through issuance of NOTAMs or specific real time reserved airspace activation procedures, when so required for ANSPs.	(*) - 2013	States	Valid
	f) Develop a regional strategy and work programme for the implementation of the flexible use of airspace, through a phased approach, starting with a more dynamic sharing of reserved airspace, taking UAS into consideration.	2012 - 2018	Regional Project States	Valid
	g) Monitor progress during implementation.	(*) - 2013	GREPECAS	Valid
Relation-ship with GPIs	GPI/1: Flexible use of airspace; GPI/18: Aeronautical information.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/ATM 05 ATFM IMPLEMENTATION	
Benefits	
Safety	• Avoids ATC and airport system overload, by reinforcing safety
Environmental protection and sustainable development of air transport	• Less delays caused by meteorological and traffic conditions, leading to a reduced consumption of fuel and emission of pollutants • Improved prediction • Improved management of the demand that exceeds service in ATC sectors and aerodromes
Metrics	
• Percentage of flights delayed due to measures implemented by ATC	

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
DCB AO AOM CM	a) Assess the progress made in the ATFM implementation work programme	2012	States	Valid
	b) Assess meteorological information requirements for ATFM implementation purposes.	2012	States	Valid
	c) Develop a regional method for establishing demand/capacity forecasts	(*) - 2013	States	Valid
	d) Develop and implement regional procedures for an efficient and optimum use of aerodrome and runway capacity	(*) - 2014	States	Valid
	e) Develop and implement methods for improving efficiency, as required, through airspace management.	(*) - 2015	States	Valid
	f) Develop and implement operational coordination procedures between States ATFM units;	2012 – 2018+	States	Valid
	g) Monitor progress during implementation.	(*) – 2018+	GREPECAS	Valid
Relation-ship with GPIs	GPI/1: Flexible use of airspace; GPI/6: air traffic flow management; GPI/7: dynamic and flexible management of ATS routes; GPI/9: situational awareness; GPI/13 aerodrome design and management; GPI/14: runway operations; and GPI/16: decision support and alerting systems.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/ATM 06 IMPROVE ATM SITUATIONAL AWARENESS	
Benefits	
Safety	• The availability of terrain and obstacle electronic date in the pilot post permits a reduces number of CFIT accidents • Improved situational awareness provides data that facilitate operational decision-making, enhancing safety.
Environmental protection and sustainable development of air transport	• Improved air traffic demand provides a reduction in aircraft separation, enabling a best air traffic flow management and ATC capacity. • Contributes to collaboration between the flight crew and the ATM system • Contributes to collaborative decision-making (CDM) through the sharing of aeronautical data • Reduced workload for pilots and controllers
Metrics	
• Reduction of CFIT accidents • Reduction of operational errors including LHDs	

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
ATM-SDM AO CM	a) Develop an action plan for improving situational awareness of pilots and controllers.	(*) - 2012	Regional Project	Valid
	b) Implement flight plan data processing systems (new FPL format) and data communication tools between ACCs.	(*) – 2014	States	Valid
	c) Implement ATS surveillance technologies and their applications as required.	2012 – 2018+	States	Valid
	d) Implement air-ground communication systems through Data link (ADS-C/CPDLC in oceanic airspaces ADS-B, D-ATIS, DCL, D-VOLMET, etc.	(*) – 2018+	States	Valid
	e) Implement advanced automation support tools to contribute to aeronautical information sharing.	2015 – 2018+	States	Valid
	f) Monitor the implementation	(*) – 2018+	GREPECAS	Valid
Relation-ship with GPIs	GPI/1: Flexible use of airspace; GPI/6: air traffic flow management; and GPI/7: dynamic and flexible ATS route management; GPI/9: situational awareness; GPI/13: aerodrome design and management; GPI/14: runway operations; y GPI/16: decision support and alerting systems; GPI/17: implementation of Data link applications; GPI/18: aeronautical information; GPI/19: meteorological systems, GPI/22: communication infrastructure.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/ATM 07 FLIGHT PLAN IMPLEMENTATION	
Benefits	
Safety	• Incorporation of additional information in FPL reinforces safety.
Environmental protection and sustainable development of air transport	• Expanded airspace capacity; • Enhanced operational efficiency.
Metrics	
• Percentage of States that have implemented the new FPL.	

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
SDM ATM	a) Guides on the transition to the new format of the filed flight plan.	(*)	ICAO	Valid
	b) Develop a regional strategy for the transition to the new format of the filed flight plan.	(*)	ICAO	Valid
	c) Identification of stakeholders and possible impact of the implementation of the new format of the filed flight plan (FPL/RPL/CPL).	(*)	States	Valid
	d) Assessment of current/future flight plan processing capabilities with respect to the new flight plan format.	(*)	States	Valid
	e) Behaviour trials between systems capable of processing the NEW flight plan.	(*)	States	Valid
	f) Development of contingency procedures and determination of technical/operational considerations for the transition.	(*)	States	Valid
	g) Identification of the main parties involved in FP data flow and the definition of the transition steps based on: - Systems capable of processing both formats: current and NEW. - Systems to be modernised / implemented before 2012 and that will be capable of processing the new format of the filed flight plan.	(*)	States	Valid
	h) Publication of transition actions, trials and other publications for users and interested parties	(*)	GREPECAS	Valid
	i) Assess transition actions and make adjustments.	(*)	States	Valid
	j) Implement the transition plan.	(*)	States	Valid
	k) Monitor transition activities.	(*)	ICAO	Valid
Relation-ship with GPIs	GPI/4: alignment of upper airspace classifications; GPI/1: flexible use of airspace; GPI/6 air traffic flow management; GPI/7: dynamic and flexible ATS route management; GPI/9: situational awareness; GPI/13: aerodrome management and design; GPI/14: runway operations; GPI/16: decision support and alerting systems; GPI/17: implementation of Data link applications; GPI/18: aeronautical information; GPI/19: meteorological systems; GPI/21: navigation systems; GPI/22: communication infrastructure			

NOTE: This PFF is based on the format presented to the CNS/ATM/SG/1 in March 2010. This Subgroup is responsible for the development of tasks.

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/CNS 01 IMPROVEMENTS TO THE AERONAUTICAL FIXED SERVICE IN THE SAM REGION	
Benefits	
Safety	• Reduction of operational coordination errors between adjacent ACCs; • Increased ATM situational awareness; and • Reduced pilot and controller workload.
Environmental protection and sustainable development of air transport	• Increased capacity and availability of aeronautical fixed service in support of ATS, MET, AIS and SAR applications; and • Support to ATFM / CDM.
Metrics	
• Number of AMHS interconnection as per FASID Table 1Bb; • Number of AIDC interconnections as per FASID Table 1Bb; and • Percentage of phases completed for the implementation of the new regional network.	

2012 – 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM ATM-SDM DCB CM AUO	a) Complete the implementation of AMHS systems in those States that do not have such systems yet	(*) - 2013	States	Valid
	b) AMHS interconnection between adjacent States	(*) - 2014	States	Valid
	c) Implement communication services for the centralised ATFM	2015 - 2018+	States	Valid
	d) Implement AIDC in the automated centres of the SAM Region	(*) - 2013	States	Valid
	e) Operational implementation of AIDC between adjacent ACCs	(*) - 2014	States	Valid
	f) Implementation of new digital network (REDDIG II)	2012 -2015	States	Valid
	g) Monitor implementation progress	2012-2017	GREPECAS	Valid
Relation-ship with GPIs	GPI/6: ATFM, GPI/9: situational awareness, GPI/ 16: decision support and alerting systems, GPI/18: aeronautical information, GPI/17: data link applications, GPI/19: meteorological systems, GPI/22: communication infrastructure.			

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REGIONAL PERFORMANCE OBJECTIVE: SAM/CNS 02 IMPROVEMENTS TO THE AERONAUTICAL MOBILE SERVICES IN THE SAM REGION	
Benefits	
Safety	• Reduction of operational coordination errors between adjacent ACCs, making ATS coordination more efficient; and • Reduction of pilot and controller workload.
Environmental protection and sustainable development of air transport	• Assured coverage and quality of communications in ATS service; • Increased availability of communications for the ATS service; • Support to AIM/MET service; and • Assured radio frequency spectrum assigned to aviation for the communication service.
Metrics	
• Percentage of compliance with FASID Table 2-A; • Number of CPDLC systems implemented; • Number of DCL systems implemented; • Number of D-ATIS systems implemented, and • Number of VOLMET systems implemented.	

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM ATM-SDM DCB CM	a) Complete the implementation of the services required in Table CNS 2-A "Aeronautical Mobile Service - AMSS"	(*) - 2014	States	Valid
	b) Continental en-route: Complete coverage of VHF communications in the lower airspace, when operations so require	2012- 2015	States	Valid
	c) Implement oceanic area CPDLC, maintaining HF service as back-up	(*) - 2018	States	Valid
	d) Implement CPDLC in selected continental area	2012- 2018	States	Valid
	e) Terminal area: Implementation of different VHF channels for control tower and APP services at all airports where a single channel is used for APP and control tower services	(*) - 2015	States	Valid
	f) Implementation of DCL services at selected aerodromes	2016-2018	States	Valid
	g) Implementation of D-ATIS services at selected aerodromes.	2012-2017	States	Valid
	h) Implementation of VOLMET services (voice and data)	(*) - 2018	States	Valid
	i) Guarantee protection of the radio frequency spectrum used for current and foreseen communication services	(*) - 2018	States ICAO	Valid
	j) Monitor implementation progress	2012-2018	GREPECAS	Valid
Relation-ship with GPIs	GPI/6: ATFM, GPI/9: Situational awareness, GPI/17: Data link applications, GPI/19: Meteorological systems, GPI/22: Communication infrastructure, GPI 23: Aeronautical radio spectrum.			

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REGIONAL PERFORMANCE OBJECTIVE: SAM/CNS 03 IMPROVEMENTS TO NAVIGATION SYSTEMS IN THE SAM REGION				
Benefits				
Safety	• Support to aircraft spacing; • Reduced pilot and controller workload; and • Increased landing safety, avoiding CFIT			
Environmental protection and sustainable development of air transport	• Increased airspace capacity and structure; • Increased integrity of the GNSS system; • Support to PBN implementation; and • Reduced costs.			
Metrics				
• Number of deactivated NDBs in accordance with FASID Table 3-3; and • Number of GBAS implemented at airports with sufficient operational demand.				
2012 - 2018 ***Strategy***				
ATM OC COMPONENTS	**TASKS**	**PERIOD**	**RESPONSIBILITY**	**STATUS**
AOM ATM-SDM TS AUO	a) Continue with NDB phase-out	*- 2018+	States	Valid
	b) Implement new DME systems in support of en route operations where the PBN plan so considers it	2012-2018	States ICAO	Valid
	c) Implement GBAS at airports with sufficient operational demand	2015-2018+	States	Valid
	d) Modernisation of flight trial platforms for GNSS applications	2012-2017	States	Valid
	e) Guarantee the protection of the radio frequency spectrum used for current and future radio navigation services	(*)-2018	States ICAO	Valid
	f) Monitor implementation progress	2012-2018	GREPECAS	Valid
Relation-ship with GPIs	GPI/5: RNAV and RNP; GPI/6: ATFM; GPI/7: dynamic and flexible ATS route management; GPI/10: terminal area design and management; GPI/11: RNP and RNAV SIDs and STARs; GPI/12: functional integration of ground and airborne systems; GPI/13: aerodrome design and management; GPI/14: runway operations; GPI/21: navigation systems; GPI 23: aeronautical radio spectrum.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/CNS 04 IMPROVEMENTS TO THE ATS SURVEILLANCE SERVICE IN THE SAM REGION	
Benefits	
Safety	• Increased ATM situational awareness; • Improved ATS coordination, reducing coordination errors between adjacent ACCs; and • Reduction of pilot and controller workload.
Environmental protection and sustainable development of air transport	• Facilitates ATS planning; • Increased airspace capacity; • Supports the implementation of PBN and random routes; and • Optimisation of information sharing resources.
Metrics	
• Number of ADS-C systems implemented in oceanic FIRs; • Number of adjacent ACCs with exchange of ATS surveillance data, • Percentage of ensure airspace for upper levels with ADS-B coverage, and • Number of A-SMGS systems implemented.	

2012 – 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM AO TS CM ATM-SDM	a) implement ADS-B and/or MLAT systems in en-route areas	2012-2018+	States	Valid
	b) Implement surface movement guidance and control systems (A-SMGCS) at airports where previous study indicates its requirement	2013- 2018+	States	Valid
	c) Implement the ADS-C service in all States with responsibility over an oceanic FIR	(*) - 2018	States	Valid
	d) Implement the exchange of ATS surveillance data between adjacent ACCs	(*) - 2018+	States	Valid
	e) Guarantee the protection of the radio frequency spectrum used for current and future radio navigation services	(*) - 2018	States ICAO	Valid
	f) Monitor implementation progress	2012-2018	GREPECAS	Valid
Relation-ship with GPIs	GPI/5: RNAV and RNP; GPI/6: ATFM; GPI/9: situational awareness; GPI/10: terminal area design and management; GPI/11: RNP and RNAV SIDs and STARs with; GPI/12: functional integration of ground and on-board systems; GPI/13: aerodrome design and management; GPI/14: runway operations; GPI/17: data link applications, GPI/22: communication infrastructure, GPI 23: aeronautical radio spectrum.			

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REGIONAL PERFORMANCE OBJECTIVE: SAM/MET 01 IMPLEMENTATION OF THE MET INFORMATION QUALITY MANAGEMENT SYSTEM				
Benefits				
Safety	• Ensure the quality of meteorological data and products provided to all the users of the ATM community • Improve the trust of the user with respect to meteorological data used for flight planning and re-planning.			
Metrics				
• Number of international aerodromes with implemented QMS/MET. • Number of international aerodromes with certified QMS/MET.				
2012 – 2018 ***Strategy***				
ATM OC COMPONENTS	**TASKS**	**PERIOD**	**RESPONSIBILITY**	**STATUS**
	a) Ensure the implementation of the MET information quality management system QMS/MET)	(*) 2012-2015	Regional Project States	Valid
	b) Develop the LAR-MET	2013-2015	Regional Project States	Valid
	c) Certify and maintain the certification of the QMS/MET quality management system by an approved organisation in all AOP aerodromes.	(*) 2015	States	Valid
	d) Monitor the process of QMS/MET implementation	2012-2018	GREPECAS	Valid
Relationship with GPIs	GPI/18: Aeronautical information and GPI/19: Meteorological systems.			

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REGIONAL PERFORMANCE OBJECTIVE: SAM/MET 02
IMPROVEMENTS IN MET FACILITIES

Benefits

Safety	• Provide more reliable MET information to all the ATM community. • Assistance in decision-making for ATM. • Assurance of availability of MET information for the user • Contribute to situational awareness of aeronautical users for all weather operations (AWO).

Metrics

- Number of international aerodromes with operative AWOS.
- Number of MWOs with the required equipment and systems.
- Number of AOP aerodromes with updated summaries and climatological tables.

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM **DCB** **AO** **AUO** **ATM-SDM** **CM**	a) Establish a regional plan for the automation of meteorological data at all AOP aerodromes. b) Establish a regional plan to strengthen Meteorological Watch Offices (MWOs) with the infrastructure required for the effective watch in the FIRs.	2012-2018	Regional Project States	Valid
	c) Establish programmes for periodic inspection and calibration of meteorological instruments of EMA(s)	2012-2014	States	Valid
	d) Develop and implement a programme for the update of the summaries and climatological tables of AOP aerodromes.	2012-2014	States	Valid
	e) Monitor the implementation of the different programmes	2012-2014	GREPECAS States	Valid
Relationship with GPIs	GPI/9: Situational awareness, GPI/14: Runway operations, GPI/18: Aeronautical information and GPI/19: Meteorological systems.			

REGIONAL PERFORMANCE OBJECTIVE: SAM/MET 03 IMPROVEMENTS IN THE IMPLEMENTATION OF INTERNATIONAL AIRWAYS VOLCANO WATCH (IAVW), SURVILLANCE OF THE ACCIDENTAL RELEASE OF RADIOACTIVE MATERIAL AND THE ISSUANCE OF SIGMETs				
Benefits				
Safety	• Increased flight safety with the provision of information on volcanic ash and severe phenomena			
Environmental protection and sustainable	• Support pre-flight planning, optimising air routes with respect to volcanic ash and the accidental release of radioactive material. • Support the planning of new air routes in a safe and sustainable manner.			
Metrics				
• Number of States with IAVW and their implemented evolutions. • Number of States with contingency plan for volcanic ash and accidental release of radioactive material, approved.				
2012 – 2018 ***Strategy***				
ATM OC COMPONENTS	**TASKS**	**PERIOD**	**RESPONSIBILITY**	**STATUS**
AOM **AO** **AUO** **ATMSDM** **DCB** **CM**	a) Develop a plan to ensure the implementation of improvements in the international airways volcano watch	(*) 2012	Regional Project	Valid
	b) Develop a Guide for IAVW implementation in the Region, based on ICAO Document 9766.	2012-2013	Regional Project States	Valid
	c) Update the letters of agreement between CAAs/MET/State vulcanologic bodies, describing the responsibilities of each institution (including VONA format)	(*) 2012	States	Valid
	d) Where applicable, develop written agreements with national meteorological services (NMS) in case of accidental release of radioactive material.	(*) 2012	States	Valid
	e) Update the letters of operational agreement between ATS/MET units,	(*) 2012	States	Valid
	f) Develop a regional contingency planfor cases of volcanic activity	2012-2013	Regional Project	Valid
	g) Develop a regional contingency plan for cases of accidental release of radioactive material.	2012-2013	Regional Project	Valid
	h) Update the procedures in MWOs and VAACs according to Amendments 76 and 77 of Annex 3	2013-2018	States	Valid
Relation-ship with GPIs	GPI/9: Situational awareness, GPI/14: Runway operations, GPI/16: Decision support and alerting systems, GPI/18: Aeronautical information and GPI/19: Meteorological systems.			

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REGIONAL PERFORMANCE OBJECTIVE: SAM/MET 04 IMPROVEMENTS IN OPMET INFORMATION EXCHANGE AND FOLLOW-UP OF WAFS EVOLUTION	
Benefits	
Safety	• Timely provision of duly coded OPMET information to the ATM community • Increased regional use of meteorological forecasts (upper wind, turbulence, icing, convective clouds and others).
Environmental protection and development of air transport	• Increased efficiency of operations and reduced carbon emissions
Metrics	
• Increased availability of OPMET information (in percentage) at regional and international level. • Number of States that have implemented WAFS and its evolutions.	

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM **DCB** **AO** **AUO** **ATMSDM** **CM**	a) Establish a regional procedure to ensure timely availability of duly coded OPMET information	(*) 2018	States / Brasilia OPMET database	Valid
	b) Develop contingency procedures for the dissemination of OPMET information through the Internet in case of communication system failure.	2012 - 2013	States	Valid
	c) Implement the new turbulence, icing, and convective cloud forecasts	(*) 2013	States	Valid
	d) Develop and implement a transition plan for OPMET information coding in XML format	2013-2018	Regional Project States	Valid
	e) Establish plans for the migration from ISCS to WIFS.	(*) 2014	States	Valid
	f) Develop, together with COM units, a migration plan that permits WAFS products to be compatible with the future NextGEN/SESAR environment.	2013-2018+	Regional Project	Valid
	g) Develop and implement regional procedures in support of ATM.	(*) 2018+	ICAO States	Valid
Relation-ship with GPIs	GPI/9: Situational awareness, GPI/14: Runway operations, GPI/18: Aeronautical information and GPI/19: Meteorological systems.			

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REGIONAL PERFORMANCE OBJECTIVE: SAM/SAR 16 COOPERATION AND COORDINATION OF SAR SERVICES AT REGIONAL LEVEL	
Benefits	
Safety	• Favours the application of practical risk management principles
Environmental protection and development of air transport	• Ensure cooperation and coordination amongst the interested parties
Metrics	
• Number of letters of agreement established for SAR • Number of SAR exercises conducted	
2012 - 2018 **Strategy**	

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
N/A	a) Assess SAR requirements at regional level	2011	ICAO-States	Valid
	b) Adopt SAR requirements at regional level	2012 - 2014	States	Valid
	c) Comply with risk and quality management practical principles	(*) - 2017	States	Valid
	d) Develop, update, establish and ratify SAR agreements between States	(*) - 2017	States	Valid
	e) Harmonise SAR training plans	(*) - 2013	CATC	Valid
	f) Conduct annual SAR exercises at regional level	(*) - 2015	States	Valid
	g) Monitor implementation progress	2012 - 2018	GREPECAS	Valid
Relation-ship with GPIs	Not applicable			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/AIM 01 IMPROVEMENT OF QUALITY, INTEGRITY AND AVAILABILITY OF AERONAUTICAL INFORMATION	
Benefits	
Safety	• Assures data integrity and resolution • Favours information traceability
Environmental protection and development of air transport	• Assures timely awareness of significant changes in information

Metrics

- Number of States that meet the AIRAC calendar
- Number of States that have implemented QMS
- Number of corrected deficiencies
- Number of States establish SLA agreements
- Number of States that completed WGS84 implementation

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM **AO** **DCB** **AUO**	a) Action plan to resolve AIS deficiencies.	(*) 2012	States	Valid
	b) Assess the status of implementation and update of the AIM Action Plan	2012	Regional Project	Valid
	c) Effective compliance with the AIRAC system	(*) - 2012	States	Valid
	d) Establish a quality management system (QMS)	(*) - 2013	States	Valid
	e) Complete the use of WGS-84, taking into account the new data products	(*) - 2013	States	Valid
	f) Develop guidelines on service level agreements (SLAs) between data originators and AIM	* - 2012	Regional Project	Valid
	g) Establish agreements with data originators (SLAs)	2012 - 2013	States	Valid
	h) Monitor the implementation of the AIM Action Plan	2012 - 2018	GREPECAS	Valid
Relation-ship with GPIs	GPI/9: Situational awareness, GPI/16: Decision support and alerting systems, GPI/18: Aeronautical information, GPI/20: WGS-84, GPI/21: Navigation systems.			

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REGIONAL PERFORMANCE OBJECTIVE: SAM/AIM 02 TRANSITION TO THE PROVISION OF ELECTRONIC AERONAUTICAL INFORMATION	
Benefits	
Safety	• Support to ground proximity warning systems (GPWS) and procedure design and optimisation tools.
Environmental protection and development of air transport	• Integration of dynamic and static information into a single display to facilitate situational awareness. • Access to information during all flight phases.
Metrics	
• Number of States that have implemented the transition plan	

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM **AO** **CM** **DCB** **TS** **AUO** **ATM-SDM**	a) Prepare a transition plan for the provision of electronic aeronautical information	2012	Regional Project	Valid
	b) Implement the transition plan for the provision of electronic aeronautical information	2013 - 2018+	States	Valid
	c) Develop and establish a programme to facilitate AIS - MET interoperability	2016 - 2018	Regional Project	Valid
	d) Prepare an Action Plan for implementation of a GIS	(*) 2012	Regional Project	Valid
	e) Monitor the implementation of the transition plan for the provision of electronic aeronautical information	2012 - 2018+	GREPECAS	Valid
Relationship with GPIs	GPI/9: Situational awareness, GPI/16: Decision support and alerting systems, GPI/18: Aeronautical information, GPI/19: Meteorological systems, GPI/20: WGS-84.			

REGIONAL PERFORMANCE OBJECTIVE: SAM/AGA 01 QUALITY AND AVAILABILITY OF AERONAUTICAL DATA	
Benefits	
Safety	• Less aircraft accidents at the aerodrome; • Improved aircraft safety at the aerodrome;
Environmental protection and development of air transport	• Efficient aerodrome operations based on aeronautical data quality assurance.

Metrics

- Number of deficiencies related to non-compliance of the information contained in FASID Table AOP 1. Doc. 8733, Vol. II
- Number of aerodromes with processes defined and implemented with AIM

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AO CM AUO	a) Develop a regional action plan to update the information contained in Document 8733 CAR/SAM Navigation Plan, Vol. II FASID, Table AOP1	(*) - 2018	GREPECAS	Valid
	b) Establish and implement a process to assure the provision of aeronautical data to AIM by the airport operator with the corresponding quality requirements.	(*) - 2018	States	Valid
	c) Monitor the quality and availability of aeronautical data.	(*) – 2018+	GREPECAS	Valid
Relationship with GPIs	GPI/9: situational awareness, GPI/10: terminal area design and management, GPI/13: aerodrome design and management; GPI/14: runway operations, GPI/18: aeronautical information, GPI/20: WGS-84.			

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REGIONAL PERFORMANCE OBJECTIVE: SAM/AGA 02 AERODROME CERTIFICATION	
Benefits	
Safety	• Less aircraft accidents at the aerodrome;
Environmental protection and development of air transport	• Efficient aerodrome operations based on compliance with the SARPs;

Metrics

- Number of certified aerodromes
- Number of trained inspectors
- Number of aerodromes with a certification validated under LAR AGA.

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AO CM AUO DCB	a) Develop Latin American Aerodromes Regulations (LAR-AGA) and the Aerodromes Inspector Manual (MIAGA).	(*) -2011	Regional Project	Valid
	b) Harmonise national regulations of States with LAR-AGA.	2012 – 2015	States	Valid
	c) Train regional aerodrome inspectors with the MIAGA.	(*) – 2015	Regional Project	Valid
	d) Establish a process of internal audits at aerodromes by operators based in SMS.	(*) – 2015	States	Valid
	e) Validate aerodrome certificates granted before harmonization with LAR AGA	2015 – 2018+	States	Valid
	f) Surveillance of the certification process.	2012 – 2018+	GREPECAS	Valid
Relationship with GPIs	GPI/9: situational awareness, GPI/10: terminal area design and management, GPI/13: aerodrome design and management. GPI/14: Runway operations.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/AGA 03 SAFE OPERATIONS AT AERODROMES THAT DO NOT MEET ICAO SARPS				
Benefits				
Safety	• Dispose of tools for the evaluation of deviations • Reduce aircraft incidents in aerodrome			
Environmental protection and development of air transport	• Efficient aerodrome operations			
Metrics				
• Number of certified aerodromes				
2012 - 2018 ***Strategy***				
ATM OC COMPONENTS	**TASKS**	**PERIOD**	**RESPONSIBILITY**	**STATUS**
AO CM AUO	a) Identify the regional airports with physical and operational characteristics that do not comply with ICAO SARPs.	(*) – 2012	Regional Project	Valid
	b) Develop a procedure for certification with deviation, including orientations for the evaluation of the non-conformities.	(*) - 2013	Regional Project	Valid
	c) Implement the procedure for certification with deviations.	2013 - 2018	States	Valid
	d) Monitor the implementation of the procedure.	2012 - 2018	GREPECAS	Valid
Relationship with GPIs	GPI/9: situational awareness, GPI/13: aerodrome design and management. GPI/14: runway operations.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/AGA 04 IMPROVEMENT OF AERODROME PHYSICAL AND OPERATIONAL CHARACTERISTICS				
Benefits				
Safety	• Increases safe aircraft operations.			
Environmental protection and development of air transport	• Guides and operational criteria that increase capacity with efficiency; • Traffic fluidity in the movement areas.			
Metrics				
• Number of aerodromes in which capacity has been optimised. • Number of aerodromes with increased capacity due to infrastructure improvement				
2012 - 2018 ***Strategy***				
ATM OC COMPONENTS	**TASKS**	**PERIOD**	**RESPONSIBILITY**	**STATUS**
	a) Develop procedures for the calculation of aerodromes capacity	2011 - 2012	Regional Project	Valid
	b) Train instructors to replicate procedures for calculation of capacity	2011 - 2012	Regional Project	Valid
AO CM AUO	c) Implement procedures for calculation of capacity and assess the aerodromes whose installed capacity is near saturation.	2011 - 2012	States	Valid
	d) Develop procedures to optimise aerodrome runway and apron capacity	(*)-2013	Regional Project	Valid
	e) Develop environmental management procedures in coordination with the Regional Committees	2011 - 2018	Proyecto Regional	Valid
	f) Apply procedures for optimising aerodrome runway and apron capacity	2013-2018	States	Valid
	g) Establish, in coordination with CNS, requirements to be applied to aerodromes operations for the implementation of surface movement guide and control systems	2012-2013	Regional Project	Valid
	h) Monitor the optimisation of runway and apron capacity	(*)-2018	GREPECAS	Valid
Relationship with GPIs	GPI/9: situational awareness; GPI/13: aerodrome design and management; GPI/14: Runway operations.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/AGA 05 RUNWAY SAFETY	
Benefits	
Safety	• Reduces runway excursions • Reduce runway incursions • Improves aircraft safety on the runway;
Environmental protection and development of air transport	• Efficient aerodrome operations
Metrics	
• Number of aerodromes with action plans for runway excursion risk management • Number of runway excursions per year per each million of yearly operations of international civil aviation • Number of runway incursions per year per each million of yearly operations of international civil aviation	
2012 - 2018 ***Strategy***	

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AO CM AUO	a) Develop a plan for runway surface safety management.	(*) - 2012	Regional Project	Valid
	b) Assist States in the implementation of procedures for runway surface safety management.	(*) - 2012	States	Valid
	c) Surveillance of the implementation of the regional management plan.	(*) – 2018+	GREPECAS	Valid
Relationship with GPIs	GPI/9: situational awareness, GPI/13: aerodrome design and management. GPI/14: Runway operations, GPI/18: Aeronautical information, GPI/20: WGS-84.			

(*) Indicates that the task has been started before the date contemplated in this planning.

REGIONAL PERFORMANCE OBJECTIVE: SAM/HR 01
Planning of training for development of personnel competence in air navigation system

Benefits

Safety	• Reinforces safety
Environmental protection and sustainable development of air transport	• Information available with a level of quality that is appropriate to the requirements. • Personnel duly trained as instructors in the ATM operational concept. • Personnel duly trained to manage, operate and maintain the air navigation system.. • Increases situational awareness of the personnel. • Provides for quality air navigation services.

Metrics

- Number of States that meet the training requirements in the ATM Operational Concept.
- Number of CATCs certified by ICAO or by States

2012 - 2018
Strategy

ATM OC COMPONENTS	TASKS	PERIOD	RESPONSIBILITY	STATUS
AOM, AO AUO DCB ATM-SDM CM TS	a) Develop the training programme for air navigation service personnel to respond to the new challenges, taking into account ICAO documentation.	2012-2013	Regional Project	Valid
	b) Follow up the activities of the New Generation of Aviation Professionals (NGAP) Special Team and implement the results in the region.	201-12 - 2016	States	Valid
	c) Establish a group of trainers in the ATM Operational Concepts to train instructors in the SAM Region	2012-2013	Regional Project	Valid
	d) Prepare guides for training, planning and the ATM Operational Concept.	2013-2014	Regional Project	Valid
	e) Prepare a programme for instructors on training, planning and the ATM Operational Concept.	2013-2014	Regional Project	Valid
	f) Strengthen Civil Aviation Training Centres (CATCs) of the Region through certification, evaluation and follow up	2012 – 2014	Regional Project States	Valid
	g) Conduct courses on training, planning and the ATM Operational Concept	2013-2016	States	Valid
	h) Monitor the training and updating of air navigation personnel	2016-2018+	GREPECAS States	Valid
Relation-ship with GPIs	*The updating and training of aeronautical personnel is a cross-cutting issue for all ATM system areas.*			

REGIONAL PERFORMANCE OBJECTIVE: SAM SM/01 SAFETY MANAGEMENT				
Benefits				
Safety	• Strengthens safety			
Metrics				
• Number of States that have implemented SSPs • Number of international airports that have implemented SMS • Number of ATS services that have implemented SMS.				
2012 - 2018 ***Strategy***				
ATM OC COMPONENTS	**TASKS**	**PERIOD**	**RESPONSIBILITY**	**STATUS**
AOM **AUO**	a) Follow up of the RASG-PA work programme, as a reference for the activities of the region.	(*) – 2018+	States	Valid
	b) Prepare guidelines for the implementation of SMS in ATS services and international aerodromes.	(*) - 2012	Regional Project	Valid
	c) Assist in the implementation of State safety programmes (SSPs).	2012	Regional Office	Valid
	d) Develop regional safety databases	2012 - 2013	Regional Project	Valid
	e) Formulate guidelines for the protection of safety data	2012 - 2014	Regional Project	Valid
	f) Effective implementation of SMS in ATS and international airports.	(*) - 2014	States	Valid
	g) Develop and implement a training plan concerning the development and application of a safety case	(*) - 2012	States	Valid
	h) Assess and assist States in the effective implementation of actions, in order to improve safety.	(*) - 2018	GREPECAS	Valid
	i) Continuous monitoring and periodical assessment of safety efficacy and SMS and SSP implementation	2012 - 2018	GREPECAS	Valid
Relation-ship with GPIs	The systemic safety approach is holistic, applied to the whole ATM system.			

(*) Indicates that the task has been started before the date contemplated in this planning.

RELATIONSHIP OF THE ACTIVITIES BETWEEN PFF(s)

AREA	ATM	AGA/AOP		AIM		CNS		MET	
ATM		ATM/2-AGA/AOP/1	c – c d – c	ATM/2-AIM/1	b – d, e c – d, e d – d, e e – d, e	ATM/1-CNS/2	b – a, c e – c, d f – a, b, c, d	ATM/1-MET/3	a – e, g
		ATM/3-AGA/AOP/1	a – a, b b – c c - c	ATM/2-AIM/2	b – a, b, d, e c – a, b, d, e d – a, b, d, e e – a, b, d, e	ATM/1-CNS/3	a – b f - b	ATM/1-MET/4	a – g
		ATM/3-AGA/AOP/4	b – a, b, c, d, e, f					ATM/2-MET/3	b – e, f, g c – e, f, g d - e, f, g e - e, f, g
		ATM/3-AGA/AOP/5	b – a, b					ATM/3-MET/3	b – e, f, g c – e, f, g
		ATM/5-AGA/AOP/4	c – a, b, c, d, e, f d - a, b, c, d, e, f	ATM/3-AIM/1	b – d, e c – d, e	ATM/1-CNS/4	b – c e – c f – a, c, d g – a, c, d	ATM/5-MET/1	b – a, c
						ATM/2-CNS/3	b – b	ATM/5-MET/2	b – a, b, c, d

AREA	ATM	AGA/AOP		AIM		CNS		MET	
							c - b		
						ATM/3 CNS/3	c - c	ATM/5-MET/3	b – a, c, d, e, g, h
						ATM/5-CNS/1	f -c	ATM/5-MET/4	b – a, b, c, g
						ATM/6-CNS/1	b – a, b, c, d, e d – c, d, f, g, h	ATM/7-MET/1	c – a d - a
				ATM/3-AIM/2	e – b	ATM/6-CNS/4	c – a, b, c, d d – a, c	ATM/7-MET/4	c – d d - d
				ATM/4-AIM/1	e – c, d, e				
				ATM/6-AIM/2	b – a, b, d, e c – a, b, d, e				
AGA/AOP				AGA/AOP/1-AIM/1	b – d g - e	AGA/AOP/4-CNS/4	g - b	AGA/AOP/5-MET/2	a - a
				AGA/AOP/1-AIM/2	b – d, e				
CNS				CNS/1-AIM/2	a – a, b f – a, b				
								CNS/2-MET/4	h – a, c. g

AREA	ATM		AGA/AOP		AIM		CNS		MET	
MET					MET/1-AIM/1	a - g				
					MET/3-AIM/2	f – c g – c				
					MET/1-AIM/2	a-g				
SAR	SAR/1-ATM/4	f - d								
RRHH	All the tasks of PFF/1		All the tasks of PFF/1		All the tasks of PFF/1		All the tasks of PFF/1		All the tasks o fPFF/1	
SM	All the tasks of PFF/1		All the tasks of PFF/1		All the tasks of PFF/1		All the tasks of PFF/1		All the tasks of PFF/1	

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ATTACHMENT D

GLOSSARY OF ACRONYMS

ABAS	Aircraft-based augmentation system
ACC	Area control centre
ADS	Automatic dependence surveillance
ADS-B	ADS-broadcast
ADS-C	ADS-contract
AFTN	Aeronautical fixed telecommunication network
AGA	Aerodromes and ground aids
AIDC	ATS inter-facility data communication
AIM	Aeronautical information management
AIRAC	Aeronautical information regulation and control
AIS	Aeronautical information service
AIXM	Aeronautical information exchange model
AMHS	ATS message handling system
ANP	Regional air navigation plan
ANS	Air navigation services
ANSP	Air navigation service provider
AO	Aerodrome operations
AOM	Airspace organisation and management
AOP	Aerodrome operations
APP	Approach control office or service
A-SMGCS	Advanced surface movement guidance and control system
ATC	Air traffic control
ATFM	Air traffic flow management
ATM	Air traffic management
ATMCP	Air traffic management operational concept panel
ATM SDM	ATM service delivery management
ATN	Aeronautical telecommunication network
ATS	Air traffic services
AUO	Airspace user operations
AWOS	Automated Weather Observing Systems
CAR / SAM	Caribbean and South American Regions
CDO	Continuous descent operations
CFIT	Controlled flight into terrain
CATC	Civil aviation training centre
CM	Conflict management
CNS	Communications, navigation and surveillance
CNS/ATM	Communications, navigation and surveillance/air traffic management
CO2	Carbon dioxide
CPDLC	Controller-pilot Data link communications

D-ATIS	Data link-automatic terminal information service
DCB	Demand/capacity balancing
DCL	Digital flight plan clearances
DME	UHF distance-measuring equipment
eAIP	Aeronautical information publication
eTOD	Terrain and obstacle database
FANS	Future air navigation systems
FASID	Regional plan facilities and services implementation document (Document 8733)
FIR	Flight information region
FL	Flight level
FMS	Flight management system
FUA	Flexible use of airspace
GIS	Geographical information system
GLS	GPS-based *landing* system
GML	Geography markup language
GNSS	Global navigation satellite system
GPI	Global Plan initiatives
GPS	Global positioning system
GPWS	Ground proximity warning system
GREPECAS	CAR/SAM regional planning and implementation group
HF	High frequencies
HFDL	HF Data link
IAVW	International Airways Volcano Watch
IFR	Instrument flight rules
ILS	Instrument landing system
IMC	Instrument meteorological conditions
ISO	International Standards Organisation
IVATF	International Volcanic Ash Task Force
KPI	Key performance indicators
LAR	Latin American aeronautical regulations
MET	Meteorological services for air navigation
METAR	Aviation routine weather report, which provides the meteorological conditions prevailing at an aerodrome.
METWSG	Meteorological Warnings Study Group
MLAT	Multilateration – Surveillance system
MSAW	Minimum safe altitude warning
MWO	Meteorological Watch Office
NDB	Non-directional radio beacon
NGAP	New generation of aviation professionals
NM	Nautical miles
NPA	Non-precision approach
NOTAM	Notice to personnel concerned with flight operations
ICAO	International Civil Aviation Organization

OLDI	Direct data interchange
OMA	Automatic weather office
WMO	World Meteorological Organization
OPMET	Operational meteorological information
PDC	Predeparture clearance
PFF	Performance Framework Form
PIRG	Planning and implementation regional group
PSR	Primary surveillance radar
QMS	Quality management system
RASG-PA	Regional aviation safety group - Pan-American
REDDIG	South American digital communication network
RNAV	Area navigation
RNP	Required navigation performance
RVR	Runway visual range
RVSM	Reduced vertical separation minimum
SADIS	Satellite distribution system for information relating to air navigation
SAM	South American Region
SARPS	Standards and recommended practices
SID	Standard instrument departure
SIGMET	Significant weather
SLA	Service level agreement
AMSS	Aeronautical mobile-satellite service
SMGCS	Surface movement guidance and control system
SPECI	Special aviation weather report
SSR	Secondary surveillance radar
STAR	Standard instrument arrival
TMA	Terminal control area
TRA	Temporary reservation of airspace
TS	Traffic synchronisation
TWR	Aerodrome control tower or aerodrome control
UAS	Unmanned aircraft systems
VDL	VHF digital Relation-ship
VFR	Visual flight rules
VHF	Very high frequency
VOLMET	Meteorological information for aircraft in flight
VOR	VHF omnidirectional radio range
WAFS	World area forecast system
WATRS	Western Atlantic route system
WGS-84	World geodetic system — 1984
XML	Extensible markup language

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ATTACHMENT E

Aeronautical meteorological information (MET) provided band MET units

.0	*Distributor*	*Destiny*	*Frequency Hour (h)*	*Communication Means*	*Flight phase*
METAR and METREPORT with TR*in (FASID Table MET 1A)	AMS	TWR, APP, ACC, FIC, COM Station	Each hour	AFTN / Intranet / CCTV, etc.	F1,F2;F3,F4 and F5
SPECI and SPECIAL with TR*in (FASID Table MET 1A)	AMS	TWR, APP, ACC, FIC, COM Station	Each hour	AFTN / Intranet / CCTV, etc.	F1,F2;F3,F4 and F5
TAF	AMO	TWR, APP, ACC, FIC, COM Station	Each hour	AFTN / Intranet / CCTV, etc.	F1,F2;F3,F4 and F5
Aerodrome warnings	AMO	TWR, APP, COM Station, AGA Services	When justified	AFTN / Intranet / CCTV, etc.	F1,F2,F4 and F5
WINTEM (data obtained of WAFS)	AMO and/or MWO	ACC, FIC	Every 6h (if justified)	AFTN / Intranet / CCTV, etc.	F3
Significant weather forecast in (data obtained of WAFS)	AMO and/or MWO	ACC, FIC	Every 6h (if justified)	AFTN / Intranet / CCTV, etc.	F3
SIGMET	AMO and/or MWO	ACC, FIC	Every 6h (if justified)	AFTN / Intranet / CCTV, etc.	F3
Wind shear warnings and alerts	AMO	TWR and APP	When justified	AFTN / Intranet / CCTV, etc.	F1,F2,F4 and F5
Tropical cyclones advisories	AMO	TWR and APP	When justified	AFTN / Intranet / CCTV, etc.	F1,F2,F4 and F5
Volcanic ash advisories	TCA/MWO	ACC AND FIC	When justified	AFTN / Intranet / CCTV, etc.	F3
Information on accidental release of radioactive materials, that means the location of the accident and projected trajectories of the radioactive material.	MWO (normally the information is obtained from the RMSC of the MWO involved)	ACC AND FIC	When justified	AFTN / Intranet / CCTV, etc.	F3
Information on volcanic eruptions and volcanic ash on which no SIGMET has been issued yet	MWO/VAAC	ACC AND FIC	When justified	AFTN / Intranet / CCTV, etc.	F3

Phase 1: Take-Off
Phase 2: Departure
Phase 3: En route
Phase 4: Approach
Phase 5: Landing

* Prepared by the AMO

ATTACHMENT F

REFERENCE DOCUMENTS

- ICAO Document 7192 -AN/857: Training Manual
- ICAO Document 8126 “Aeronautical Information Services Manual”
- ICAO Document 8697 “Aeronautical Chart Manual”
- ICAO Document 8733: CAR/SAM Regional Air Navigation Plan
- ICAO Document 8896: Manual of aeronautical meteorological practice
- ICAO Document 9137. Airport Services Manual.
- ICAO Document 9157. Aerodrome Design Manual
- ICAO Document 9184. Airport Planning Manual.
- ICAO Document 9377: Manual on coordination between air traffic services, aeronautical information services and aeronautical meteorological services
- ICAO Document 9674 “World Geodetic System (WGS-84) Manual”.
- IMO/ICAO Doc 9731 – International Manual of Search and Rescue Aeronautical and Maritime Services
- ICAO Document 9750: Global Air Navigation Plan
- ICAO Document 9774: Aerodrome Certification Manual.
- ICAO Document 9828: Eleventh Air Navigation Conference
- ICAO Document 9830. Surface Movement Guidance and Control Systems (SMGCS) Manual
- ICAO Document 9854: Global ATM Operational Concept
- ICAO Document 9859. Safety Management Manual.
- ICAO Document 9868: Training (PANS)
- ICAO Document 9882: Manual on ATM Requirements
- ICAO Document 9883: Manual on global performance of the air navigation system
- ICAO Document 9931: Manual on Continuous Descent Operations
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- Circular 311
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- Air Traffic Flow Management Operational Concept for the Caribbean and South American Regions (CAR/SAM ATFM CONOPS)
- Roadmap SAM Roadmap for Air Traffic Flow Management

- Guidelines for the transition to satellite navigation systems in the CAR/SAM Regions (Appendix H to Document 8733)
- Strategies for the introduction and application of non-visual aids in approach, landing and departure in the CAR/SAM Regions (Appendix I to Document 8733)
- Caribbean/South American Air Traffic Flow Management Manual
- Manual on the Collaborative Decision-Making Process for the South American Region
- Guide for the application of a common methodology to estimate airport and ATC sector capacity for the SAM Region
- Programme for optimising the ATS route network in the South American Region
- CAR/SAM Roadmap for Performance-Based Navigation
- PBN implementation Project – En-route operations – Short term – SAM Region
- PBN Implementation Project – TMA and Approach Operations – Short Term – SAM Region.
- GNSS Manual, Doc 9849 AN/457
- GREPECAS /14 final report (April 2007)
- Strategy for the evolution of air navigation systems in the CAR/SAM Regions - First Edition Rev. 2.0 – CNS/ATM/SG/1
- GREPECAS/14 Final Report
- CAR/SAM regional unified surveillance strategy - CNS/ATM/SG/1
- Guidance for improving communication, navigation and surveillance systems to meet short- and medium-term operational requirements for en-route and terminal area operations – Regional Project RLA/06/901- October 2008
- Guideline for the implementation of national IP digital networks in support of current and future aeronautical applications (RLA/06/901 project)
- Guide for the operational interconnection of AMHS systems in the SAM Region (RLA/06/901 project)
- Model Memorandum of Understanding (MoU) for the interconnection of AMHS (RLA/06/901 project)
- Plan for the interconnection of automated ACC in the CAR/SAM Regions (RLA/06/901 project)
- Preliminary system interface control document for the interconnection of ACC centers of the CAR/SAM Regions (RLA/98/003 project)
- Preliminary reference system/subsystem specification for the air traffic control automation system (SSS) (Project RLA/06/901)
- Model Memorandum of Understanding (MoU) for the interconnection of automated systems (RLA/06/901 project)
- 37th Session of the Assembly, Working Paper A37-WP/ 64: Report on outcomes of initiatives regarding Next Generation of Aviation Professionals
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- *http://www2.icao.int/en/anb/met-aim/met/sadisopsg/Pages/default.aspx*
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