International Civil Aviation Organization
Regional Aviation Safety Group - Pan America (RASG-PA)

WORKING PAPER

RASG-PA ESC/30 — WP/06
Rev.2
21/03/18

Thirtieth Regional Aviation Safety Group — Pan America Executive Steering Committee Meeting (RASG-PA ESC/30)

Baltimore, United States, 22 to 23 March 2018

Agenda Item 3: Items/Briefings of Interest to the RASG-PA ESC

SAFETY MODULE OF THE SAM PLAN

(Presented by the Secretariat)

EXECUTIVE SUMMARY

This working paper (WP) presents to the Thirtieth Regional Aviation Safety Group — Pan America Executive Steering Committee Meeting (RASG-PA ESC/30), the proposal of the safety module of the Regional plan for the sustainability of air transport in the SAM Region (SAM plan).

Action:	Please refer to Paragraph 3 below
Strategic Objectives:	• Safety
References:	• Resolution A39-12: ICAO global safety and air navigation planning • Report of the Fourth meeting of Air Navigation and Flight Safety Directors of the SAM Region (Lima, Peru, 2-4 October 2017) • ICAO Global aviation safety plan (GASP) (Doc 10004, 2017-2019)

1. Background

1.1 At the 39th Session of the ICAO Assembly, held in Montreal, Canada from 27 September to 7 October 2016, the Assembly endorsed the Second edition of the Global aviation safety plan (GASP) and the Fifth edition of the Global air navigation plan (GANP) for use as global strategic guidance for safety and air navigation, and agreed that ICAO should implement and maintain the GASP and the GANP up to date in support of the relevant strategic objectives of the Organization.

1.2 In this regard, the A39 agreed that the referred GASP and GANP should serve as a framework for the drafting and implementation of regional, sub-regional, and national implementation plans, thus ensuring the consistency, harmonisation and coordination of efforts towards improving the safety, capacity and efficiency of international civil aviation.

2. Development of the SAM plan´s safety module

2.1 Pursuant to Resolution A39-12 regarding the development and implementation of regional, sub-regional and national safety implementation plans, the South American Office developed a proposal of the SAM plan´s safety module, called the SAM safety plan (SAMSP), to address the safety aspects of the SAM Region.

2.2 Besides the safety module, the Plan SAM is comprised by the modules of air connectivity, institutional building and environmental protection and its purpose is to ensure the sustained growth of civil aviation in the Region.

2.3 The SAMSP was developed taking into account the strategic objectives of the last revision of the GASP, and falls within the context of a preventive strategy for improving safety performance in the South American (SAM) Region.

2.4 This preventive safety strategy is based on the following main priorities:

- ✓ improvement of effective implementation (EI) at State and regional level;
- ✓ implementation of the State safety programme (SSP);
- ✓ reduction of the rate of accidents in all aviation segments, regardless of aircraft weight and type of operation;
- ✓ collaboration at the regional level;
- ✓ use of the industry programmes; and
- ✓ availability of appropriate infrastructure in air navigation services and aerodromes to support safe operations.

2.5 The document contains the vision of the SAM Region regarding safety management, assigning high priority to safety, sustainability of operations, environmental protection, and training.

2.6 The end objective of the plan is to save as many human lives as possible, reducing the rate of accidents in all aviation segments to a minimum acceptable level.

2.7 Based on the current safety situation of the SAM Region, the SAMSP establishes the criteria and guidance required for the development of the States safety plans in terms of the safety policy and objectives and safety performance indicators, with their respective targets and alert levels.

2.8 The plan also provides planning and implementation criteria and guidance concerning:

- ✓ implementation tools;
- ✓ planning levels;
- ✓ stakeholders roles;

- ✓ coordination procedures between the RASG-PA and the SAM Office;
- ✓ work teams required to support safety implementation in each State;
- ✓ accountability of States;
- ✓ metrics to assess attainment of objectives and goals;
- ✓ action by stakeholders to support the implementation of State corrective action plans (CAPs);
- ✓ the requirement that States develop a business plan to support the implementation of States safety plans;
- ✓ the requirement that States submit a safety report once they have established and implemented their SSP and safety plans;
- ✓ sources of safety data and information; and;
- ✓ information about the system-wide information management (SWIM) as a future tool related to aviation data.

2.9 The SAMSP is presented in the **Appendix** of this WP.

3. **Required action**

3.1 RASG-PA ESC is requested to:

a) take note of the information presented in this working paper and in **Appendix** ; and

b) identify mechanisms to permit alignment of SAMSP objectives with RASG-PA objectives.

— — — — — — — — — — —

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SOUTH AMERICAN REGIONAL OFFICE

SAFETY MODULE

SOUTH AMERICAN SAFETY PLAN (SAMSP)

Original Version

March 2018

TABLE OF CONTENTS

Page

Page

ATTACHMENTS:

FOREWORD

The *SAM Safety Plan (SAMSP)* is published by the ICAO South American Regional Office on behalf of accredited States and International Organisations involved. It addresses the implementation of *safety management* with respect to three main priorities: effective implementation (EI) improvement within the ICAO Universal safety oversight audit programme (USOAP) continuous monitoring approach (CMA); the implementation of the State safety programme (SSP); and the reduction of the accident rate in high-risk categories identified in the South American (SAM) Region. This Plan corresponds to the safety axis of the *Regional Plan for the Sustainability of Air Transport in the SAM Region*. The SAMSP objectives have been developed in accordance with the objectives of the Global Aviation Safety Plan (GASP).

The instance for the approval of the SAMSP and its future reviews is the Meeting of the Civil Aviation Authorities (RAAC) of the SAM Region. The ICAO SAM Regional Office will publish, on behalf of the States and International Organisations involved, revised versions of the plan as may be required to reflect current implementation activities.

Copies of the Plan may be requested to:

ICAO SAM REGIONAL OFFICE

LIMA, PERU

E-mail	:	icaosam@icao.int
Website	:	www.lima.icao.int
Tel:	:	+511 6118686
Fax	:	+511 6118689
Address	:	P.O. Box 4127, Lima 100, Peru

The present edition (Original) includes guidance and recommendations of Doc 10004 – Global Aviation Safety Plan (GASP) - 2017-2019, as well as some aspects of the draft document for the period 2020-2022. Subsequent amendments and/or corrigenda will be indicated in the corresponding registration table, as per the procedure established in Page 5.

The publication of amendments and corrigenda is announced regularly through correspondence with States and International Organisations, as well as in the ICAO website, which should be consulted by those using this publication. The blank boxes facilitate annotations.

REGISTRATION 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 Within the framework of the *Regional Plan for the Sustainability of Air Transport in the SAM Region*, the Safety Plan for the South American Region (SAMSP) has been developed taking into account the latest revision to the Global Aviation Safety Plan (GASP), and falls within a preventive strategy that will allow for improving safety performance in the South American Region (SAM). This safety-related preventive strategy is based on the implementation of a State safety programme (SSP) that systematically addresses risks, and the effective implementation and continuous improvement of the eight (8) critical elements (CE) of the safety oversight system.

1.1.2 Through the SSP preventive approach, States will have the opportunity of managing a decrease in the accident and incident rates in all segments of their domestic aviation system, including aircraft of all weights and remotely piloted aircraft (RPAs).

1.1.3 The plan is aimed at establishing a safety management implementation strategy in the SAM Region, mainly based on the guidelines of the GASP, the provisions of Annex 19 and of other safety-related Annexes, as well as the guidelines of Doc 9859 – Safety Management Manual (SMM).

1.1.4 The document contains the vision of the SAM Region regarding safety management, assigning high priority to safety, sustainability of operations, environmental protection, and training.

1.1.5 **The final objective of this plan is to save as many human lives as possible, reducing accidents in all aviation segments to an acceptable minimum.**

1.2 Scope

1.2.1 The scope of this plan covers the flight information regions (FIR) of the SAM Region and addresses safety management implementation in accordance with the objectives established in the GASP for years 2022, 2025, 2028 and 2030.

1.3 Background

1.3.1 The International Civil Aviation Organization (ICAO) introduced the first version of the GASP in 1997, formalising a series of conclusions and recommendations issued during an informal meeting between the ICAO Air Navigation Commission (ANC) and the industry. The GASP was used to guide and prioritise the technical work programme of the Organization and is updated regularly to ensure its continuing relevance.

1.3.2 In May 2005, another meeting with the industry identified the need to extend the GASP to provide a common frame of reference for all stakeholders. Such a plan would provide a more proactive approach to aviation safety and would help to coordinate and guide safety policies and initiatives worldwide to reduce the risk of accidents in commercial aviation. It was then decided that, on behalf of the industry, the Industry Safety Strategy Group (ISSG) would work together with ICAO to develop a common approach to aviation safety. The global aviation safety roadmap that was developed by the ISSG provided the foundation for the GASP 2007 edition. In March 2006, ICAO held the

Directors General of Civil Aviation Conference on a global strategy for aviation safety (DGCA/06), which welcomed the roadmap and recommended that ICAO develop an integrated approach to safety initiatives based on the aforementioned roadmap, which would provide a global framework for the coordination of safety policies and initiatives.

1.3.3 In 2013, during its 38th Session, the Assembly urged ICAO to complete the development of a global aviation safety roadmap in support of the GASP. The second High-level Safety Conference held in 2015 (HLSC 2015) agreed on the need for ICAO to develop a global aviation safety roadmap in support of the GASP, in collaboration with States, regional aviation safety groups (RASGs), aviation safety partners, and the industry.

1.3.4 In 2015, ICAO established the Global Aviation Safety Plan Roadmap Group (GASPRG) to take the necessary action to assist the Organization in updating the GASP, particularly in relation to the development of a new global aviation safety roadmap supporting the implementation of the GASP. The GASPRG was composed of subject matter experts from States, the industry, and regional and international organisations. It included participation by all the organisations previously involved in the ISSG.

1.3.5 The GASP has undergone significant changes since its introduction in 1997, and has evolved through continuous consultation and review. The 2014-2016 edition was published in 2013 and included GASP objectives for States to achieve through the implementation of an effective safety oversight system, a State safety programme (SSP) and the safety capabilities required to support future aviation systems. The 2017-2019 edition updates the GASP to include a global aviation safety roadmap developed to support an integrated approach to implementation. The 2020-2022 edition is currently under preparation, and will include new safety management objectives, which have been taken under consideration, where applicable, in the formulation of this plan.

1.4 Role and responsibilities of stakeholders

1.4.1 The stakeholders, including regional safety groups, air operators, service providers, regulatory bodies, and manufacturers, will be facing greater levels of interaction when implementing safety management. Interaction between the SSP and the service providers' SMS, as well as the sharing and exchange of safety data and information are highly integrated and, therefore, require a significant level of coordination and cooperation among all stakeholders.

1.4.2 States, air operators and the industry will benefit from this plan and from the availability of international standards and recommended practices (SARPs) related with safety management, since they will permit the implementation of a more efficient, economical and safe aviation system in our Region.

2. Chapter 2: Air traffic in the SAM Region

2.1 Traffic forecasts for the SAM Region

2.1.1 Aircraft and passenger movement forecasts are important for safety management planning, since they provide future projections to determine capacity expansions. In order to calculate the rate of accidents, serious incidents, and incidents, it is necessary to know aircraft movements and their projection. These forecasts play an important role in SSP implementation by States and SMS implementation by service providers.

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. It is interesting to analyse the percentage of growth expected for that period, as shown in the tables contained in **Attachment A, Part 1** and **Part 2** of this document. The following paragraphs summarise the expected passenger and aircraft movement growth estimates.

2.1.3 According to 2007-2027 forecasts developed by the Seventh meeting of the CAR/SAM Forecasting Working Group (Doc 9917), passenger traffic in the South American Region is expected to grow at an annual rate of 8.8% during the 2007-2027 period, reaching 73 million passengers in 2027. Aircraft movements for the same period are expected to grow 7.9% per year, 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 the number of passengers between South American and Central America and the Caribbean will increase by 8.9%, reaching 27 million passengers in 2027. Aircraft movements for that period may reach a figure of 8.2%, with close to 282,000 movements in 2027. See Attachment A – Tables 2a – 2b.

2.1.5 An increase of 5.7% per year is expected between South America and North America for the period 2007 – 2027, reaching a figure of about 173 million passengers for 2027. Aircraft movements may reach 5%, close to 1,625,700 movements in 2027. See Attachment A – Tables 3a – 3b.

2.1.6 Finally, with respect to the South Atlantic, mainly in the Europe-South America corridor, a growth of 5.4% per year is expected, reaching an approximate figure of 21.5 million passengers for 2027, and a growth of 5.5% in aircraft movements, reaching more than 90,000 movements in 2027. See Attachment A – Tables 4a – 4b.

3. Chapter 3: General safety management principles

3.1 Introduction

3.1.1 The Convention on International Civil Aviation, hereinafter the *Convention*, stipulates that every State has complete and exclusive sovereignty over the airspace above its territory. Nevertheless, upon adhering to the Convention, States accept certain principles and arrangements so that international civil aviation may develop in a safe and orderly manner.

3.1.2 The safe and orderly development of international civil aviation requires that all civil aviation operations be carried out in accordance with internationally accepted standards, procedures and minimum operational practices. Therefore, the Convention requires that States collaborate as much as possible for the standardisation and harmonisation of regulations, rules, requirements, procedures and practices (see Articles 12 and 37). Accordingly, it follows that contracting States must establish and implement systems that will enable them to fulfil their international obligations and responsibilities in a satisfactory manner, in order to develop and manage civil aviation with as much efficiency and safety as possible.

3.1.3 The purpose of the standards and recommended practices (SARPs) contained in Annex 19 – Safety management, is to assist States in managing aviation safety risks. Given the increasing complexity of the global air transport system and the interaction among its aviation activities required for ensuring the safe operation of aircraft, Annex 19 supports the continued evolution of a preventive strategy to improve safety performance.

3.1.4 Effective SSP implementation is a gradual process, since it requires time to mature fully. Factors that affect the time required to establish an SSP include the complexity of the air transportation system and the maturity of the aviation safety oversight capabilities of the State.

3.1.5 Annex 19 consolidates texts from existing Annexes regarding SSP and safety management systems (SMS), as well as related elements dealing with the collection and use of data on safety and State safety oversight activities. The advantage of assembling this material in a single Annex is that States' attention is drawn to the importance of integrating their safety management activities, and margin is given to the evolution of safety management provisions.

3.1.6 Certain State safety management functions stipulated in Annex 19 may be delegated to a regional safety oversight organisation (RSOO), such as the Regional Safety Oversight Cooperation System (SRVSOP), or a regional accident and incident investigation organisation (RAIO), such as the South American AIG Regional Cooperation Mechanism (ARCM), on behalf of the State.

3.1.7 In accordance with the provisions of Article 37 of the Convention (Chicago, 1944), the ICAO Council first adopted Annex 19 on 25 February 2013, which contains SARPs related to the functional responsibilities and processes underlying safety management by States. The SARPs were based on safety management provisions initially adopted by the Council in Annexes 1; 6, Parts I, II and III; 8; 11; 13 and 14, Volume I, and on recommendations of the first special meeting of the Safety Management Panel (SMP) held in Montreal, on 13-17 February 2012.

3.1.8 In its report to the ICAO Council on the HLSC/2010 outcomes, the Air Navigation Commission had recommended that the drafting of Annex 19 follow a two-phased process. The first phase focused on creating an Annex on safety management, consolidating and reorganising the existing SARPs.

3.1.9 In the second phase, Amendment 1 to Annex 19 was introduced, which contains substantial changes to the safety management provisions, as described below.

3.1.10 Recognising the need to clarify the relationship between the eight critical elements (CEs) of a State safety oversight (SSO) system found in Appendix 1 and the detailed SSP framework elements previously found in Attachment A, Amendment 1 to Annex 19 consolidates, in Chapter 3, the provisions concerning State functional responsibilities regarding safety management. This chapter states that the CEs of a State safety oversight (SSO) system constitute the foundation of an SSP. Chapter 3 also integrates the eight CEs of the SSO system with the SSP framework elements into a harmonised set of SARPs to facilitate implementation. The CEs are shown in detail in Appendix 1 to Annex 19.

3.1.11 Furthermore, Amendment 1 provides new and amended SARPs on the SMS to facilitate implementation, including the addition of several explanatory notes. Amendment 1 also extends the applicability of an SMS to organisations responsible for the type design and manufacture of engines and propellers, which is facilitated by the recognition of these organisations in Annex 8.

3.1.12 Finally, Amendment 1 provides enhanced protection to safety data and information as well as their sources. One of the key elements of the amendment is that guidelines contained in the former Attachment B to Annex 19 has been upgraded to the status of SARPs, grouped within the new Appendix 3. The amendment enhances legal safeguards intended to ensure the appropriate use and protection of safety information, thereby facilitating its continued availability to support preventive safety improvement strategies. Definitions for safety data and information have also been developed to clarify the scope of provisions, thereby facilitating consistent application.

3.1.13 As a result of the adoption of Amendment 1, the second edition of Annex 19 was published. This edition reflects the extensive nature of the amendment, which completes the second phase of the development of the Annex. Amendment 1 was adopted by the Council on 2 March 2016, became effective on 11 July 2016 and will be applicable on 7 November 2019.

3.2 State functional responsibilities with regard to safety management

3.2.1 In the first edition of Annex 19, State responsibilities concerning safety management had been separate, corresponding to safety oversight (eight CEs) and the SSP.

3.2.2 The responsibility for safety oversight reflects the traditional role of the State, which is to assure the effective implementation of prescriptive SARPs by the aviation industry, while the SSP represents the inclusion of safety management principles and provisions.

3.2.3 In the second edition of Annex 19, these responsibilities have been integrated in Chapter 3 and are collectively referred to as *State safety management responsibilities*. The SARPs related to State safety management responsibilities, which include both safety oversight and safety management, are interdependent and constitute an integrated approach to safety management.

3.2.4 Ultimately, each State has the responsibility of managing the safety performance of its civil aviation system, and the integrated SSP provides a simplified approach to achieve this.

3.2.5 It is broadly recognised that States must first ensure that they have a mature safety oversight system in place to guarantee an effective SSP implementation. Annex 19, Chapter 3, Note 1, emphasises this, reminding States that the critical elements (CEs) of the State safety oversight (SSO) system constitute the foundation of a State's SSP.

3.2.6 SSP implementation requires coordination among multiple authorities responsible for the aeronautical functions of the State. SSP implementation does not modify the respective tasks of the State aeronautical bodies, nor their normal interaction. On the contrary, an SSP must take advantage of their collective safety functions and capabilities to further improve safety in the State. When starting to implement an SSP, most States find they already have processes and activities that address some aspects of an SSP. SSP implementation can help consolidate and improve the existing processes with additional performance elements based on safety risks. An SSP also facilitates SMS effective implementation by the aviation industry in the State.

3.2.7 Safety management implementation requires a change of paradigm by the State. It is expected that States fulfil their compliance-based oversight activities based on their capability to manage safety performance. Safety inspectors should be trained to operate in a performance-based environment. Some safety management activities require new competencies (for example, the performance of safety risk assessments).

3.2.8 Some States may have difficulties in adopting a safety management approach on their own, due to lack of resources or the necessary competencies. These States may find it useful to pool resources with other States, in order to effectively and efficiently implement their SSP. Some can obtain assistance from other States. States could also consider delegating specific safety management functions to a regional safety oversight organisation (RSOO) such as the SRVSOP, or to a regional accident and incident investigation organisation (RAIO) such as the ARCM, or to another State. Delegating is a means for States with limited resources to have access to the appropriate experience. Delegating can also permit States with a relatively low aviation activity to collectively gather safety data to identify trends and coordinate mitigation strategies.

3.2.9 Notwithstanding the above, States must take into account that, although some safety management duties and activities can be delegated, the ultimate responsibility for the SSP remains in the State.

Chapter 4: Safety status of the SAM Region

4.1 Introduction

4.1.1 This chapter presents an analysis of the status in the SAM Region from November 2011 to November 2017 with regard to safety performance in the following areas:

- ✓ USOAP CMA;
- ✓ accidents during scheduled commercial air transport operations with aircraft over 5 700 kg;
- ✓ runway excursion (RE) accidents during scheduled commercial air transport operations with aircraft over 5 700 kg
- ✓ runway excursion (RE) accidents occurred in the SAM Region during 2016 in all operation segments and with aircraft of all weights;
- ✓ SSP implementation; and
- ✓ goals achieved with regard to the Declaration of Bogota

4.1.2 The information contained in this chapter will facilitate the identification of indicators and the planning and implementation of the performance goals that States shall establish in their national safety plans.

4.2 Results in the SAM Region within the framework of the Universal Safety Audit Programme (USOAP) continuous monitoring approach (CMA)

4.2.1 USOAP CMA activities in the SAM Region started in November 2011. Up until February 2018, 4 CMA audits had been conducted, as well as 14 ICAO coordinated validation missions (ICVMs), 4 off-site monitoring activities and 2 integrated validation activity (IVAs). The current effective implementation (EI) average in the SAM Region is **78.85**%, while the overall improvement average in the seven (7) years of analysis (November 2011-February 2018) is **+12.57**, which indicates that the SAM Region has improved its EI by an average **1.79**% per year. It should be noted that the results of the Panama ICVM are preliminary.

4.2.2 The performance of the SAM Region during the USOAP CMA shows that CEs 8, 7 and 4, and audit areas AIG, AGA and ANS have the lowest percentage of EI. Accordingly, priority should be given to these CEs and audit areas when drafting corrective action plans (CAPs) that States must include in their national safety plans.

4.2.3 **Attachment B** to this plan contains a more detailed analysis of the results of the USOAP CMA in the SAM Region.

4.3 Analysis of accidents occurred in the SAM Region during the period 2009-2017 in scheduled commercial air transport operations with aircraft over 5 700 kg

4.3.1 The accident rate in South America for scheduled commercial air transport operations with aircraft over 5 700 Kg has progressively decreased since 2009, achieving in 2015 an accident rate of **1.03** per every **1,000,000** departures, far below the global rate of **2.78**. In 2016, the rate for the SAM Region was **1.09** versus a world rate of **2.16**. In 2017, the SAM Region rate increased slightly to **1.65** versus a world rate of **1.93**. In the last 3 years (2015, 2016 and 2017), the SAM Region has maintained an accident rate below the world rate, thus giving compliance to the Declaration of Bogota.

4.3.2 **Attachment C** to this plan presents a more detailed analysis of the accidents occurred between 2009-2017 in the SAM Region during scheduled air transport operations with aircraft over 5 700 kg.

4.4 Analysis of runway excursion (RE) accidents occurred in the SAM Region during the period 2007-2016 in scheduled air transport operations with aircraft over 5 700 kg

4.4.1 As of 2007, the accident rate due to REs has gradually decreased, with the exception of 2011 and 2013. In 2016, the rate increased slightly but remained stable in 2017. Accordingly, the goal set forth in the Declaration of Bogota continues to be met.

4.4.2 **Attachment C** to this plan provides a more detailed analysis of RE accidents occurred in the SAM Region in scheduled air transport operations with aircraft over 5 700 Kg during the 2007 – 2017 period.

4.5 Analysis of runway excursion (RE) accidents occurred in the SAM Region in 2016 in all operation segments and with aircraft of all weights

4.5.1 In order to analyse the increase in RE accidents in the SAM Region during 2016, the South American AIG Regional Cooperation Mechanism (ARCM) conducted a study of this accident category, using information from its safety data collection and processing system (SDCPS).

4.5.2 In 2016, **74** RE accidents occurred in SAM States, excluding Suriname and Uruguay, since no information was available from these States. Of total accidents, **53** occurred with aircraft of 2 250 kg or less.

4.5.3 During the analysis of events, which were classified into accidents, serious incidents and incidents, it became evident that the largest number of reports pertained to **accidents**. As to the type of operation, the largest number of events corresponded to **general aviation**, while by aircraft weight, the largest number of events occurred in aircraft between **1** and **2 250** kg. Therefore, the greatest area of concern and attention for the SAM Region should be general aviation, minor commercial aviation and aircraft between **1** and **2 250** kg. Another aspect that becomes evident is the **lack of incident reporting**, which should be higher than the number of serious incident or accident reports.

4.5.4 Regarding the flight phase in which the REs occurred, the analysis shows that the largest number of REs occurred in the landing phase, and that most were veer-offs.

4.5.5 In accordance with the study conducted, the main contributing factors for runway excursions were: meteorological (MET), infrastructure (INFRA), technical (TEC) and human factors (HF), being HF what most contributed to RE accidents.

4.5.6 Regarding harm to people and damage to aircraft, there was one (1) fatality and forty-two (42) cases of significant damage to aircraft.

4.5.7 Based on the study carried out, the working group arrived at the following conclusions:

a) The following general factors contributed to the observed occurrences: **Human factors**, including all those related to, and affecting, the correct performance of the crew; **technical factors**, including all mechanical failures that restrict the defensive technological barriers available in the aircraft; **meteorological factors**, that condition the environment in which REs occur; and **infrastructure factors**, which contribute directly to the cause of REs or condition the severity of the damage caused by REs.

b) In those study cases in which the RE occurred during the landing phase, a recurrent factor was the fact that the pilot did not identify being in an unstable approach, and that the decision to execute a missed approach could have been made. This situation was reached due to lack of experience, lack of training or inadequate CRM, possibly due to deficiencies in these concepts.

c) In those cases in which a technical failure triggered the event, it is presented as a conditioning factor of pilot behaviour.

d) The same applies to those case studies in which meteorological conditions have previously affected the runway surface or are present at the time of the event, adversely affecting landing conditions, and preventing the crew from manoeuvring to execute normal landing procedures.

4.5.8 To conclude the analysis, the working group proposed the following mitigation actions:

a) Provide appropriate initial and periodical instruction and training, to enable flight crews to identify and act upon the variables that constitute triggering factors of an RE, highlighting that training should take into account the specific analyses of the locations where flights take place, the types of aircraft and their power-units.

b) For good training planning, it is necessary to know and weigh the variables that constitute contributing factors to an RE, and assess the preparedness of crews for their identification and proper handling. Based on these concepts, it is recommended that the implementation of the safety management system (SMS) be required from aircraft operators, in order to generate guidelines on the objectives and competencies to be achieved by crews.

4.5.9 **Attachment C** presents a more detailed analysis of runway excursion (RE) accidents occurred in the SAM Region in 2016 in all operation segments and with aircraft of all weights.

4.6 SSP implementation results

4.6.1 Starting in 2013, the SAM Regional Office established the SSP implementation meeting. At its fifth meeting, held in Lima, Peru, on 7-11 November 2016, an analysis was made of the status of SSP implementation in SAM States.

4.6.2 At this meeting, some States showed more progress than others, and thus it was agreed to look for a mechanism in order that all could make progress at the same pace. In this sense, Bolivia, Chile, Colombia, Ecuador, Panama, Peru and Venezuela expressed their intention to participate in a pilot project for SSP implementation, until the end of 2018. Colombia joined the pilot project upon completion of the USOAP CMA audit conducted by ICAO from 5 to 15 June 2017.

4.6.3 The SAM SSP implementation pilot project was launched on 16 March 2017, with the participation of the aforementioned seven (7) States. Subsequently, Guyana requested its inclusion, thus becoming the eighth member of the pilot project.

4.6.4 The objective of the pilot project is to develop model legislation, regulations, guidance material, processes, mechanisms and systems concerning safety management in order to support SAM States with SSP implementation for a period of two years.

4.6.5 The pilot project consists of fifteen (15) projects and one (1) general project, which will be developed up to the end of 2018 to ensure SSP implementation in the eight (8) aforementioned States and in the remaining SAM States who wish to participate therein.

4.6.6 To date, 16 working groups are developing their programme of activities in support of SSP implementation in South America.

4.6.7 In order to comply with the first strategic objective of this plan and in line with the provisions of Annex 19, the ICAO South American Regional Office will request the remaining SAM States to submit their SSP implementation plans by December 2020. However, it should be noted that the second edition of Annex 19 would become effective on 7 November 2019.

SAM performance with regard to the Declaration of Bogota

4.6.8 The thirteenth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/13), held in Bogota, Colombia, on 4-6 December 2013, pledged to achieve by December 2016, among other things, the goals in the following safety areas: safety oversight, accidents, runway excursion accidents, aerodrome certification and SSP implementation, the performance of which is analysed below:

a) **Safety oversight:** The goal was to achieve **80%** effective implementation (EI) by December 2016 in the SAM Region.

   The current EI average in the SAM Region is **78.85%**. This percentage already includes the preliminary results of the Panama ICVM. Therefore, this goal was not achieved in 2016.

b) **Accidents:** The goal was to reduce the gap between the SAM Region accident rate and the global accident rate by 50%.

   The SAM accident rate for scheduled commercial air transport operations with aircraft over 5 700 kg has been gradually decreasing between 2009 and 2015. Nevertheless, in 2016 the rate increased to **2.71**, but kept below the global rate of **3.74**. Based on this performance, the goal that was to be achieved by December 2016 as set forth in the Declaration of Bogota was exceeded in 2014 and, for the first time, the rates of **1.03** in 2015 and of **2.71** in 2016 were lower than the average global rates of **2.78** in 2015, and **3.74** in 2016. As of November 2017,

both the global accident rate and the SAM accident rate have decreased with regard to that of 2016, being the SAM accident rate of **1.54** slightly lower than the global rate of **1.56**, thus giving compliance to the goal set forth in the Declaration of Bogota.

c) **Runway excursion accidents:** The goal was to reduce the RE accident rate by 20% with regard to the SAM average rate (2007-2012).

The average RE accident rate between 2007 and 2012 in the SAM Region was **2.24** accidents per one million departures. The 20% reduction pledged in the Declaration of Bogota was equivalent to **1.8** accidents per one million departures. Starting in 2012, the indicator remained below the regional average, and thus the goal set in the Declaration of Bogota for this accident category, was met until November 2017.

d) **Aerodrome certification:** The goal was to get **20%** of aerodromes certified.

As of December 2016, **24%** of the international aerodromes were certified, thus exceeding the established goal.

e) **SSP implementation and service providers' SMS oversight capacity:** The goals pledged were 76% for SSP implementation, and 100% for service providers' SMS oversight capacity.

The Fifth SSP Implementation meeting (Lima, 7-11 November 2016), after qualitatively assessing the progress made in the SSP, agreed to start SSP implementation with the first element of the first phase of SSP implementation. Therefore, the goals agreed upon were not achieved by December 2016.

5. Chapter 5: Planning and implementation considerations

5.1 Introduction

5.1.1 As air traffic volumes increase in the SAM Region and worldwide, so do the demands over air service operators and the related services supporting the operations of these operators and, thus, the number of ground and flight operations increase, representing a risk to air operations.

5.1.2 Improved effective implementation (EI) in the eight critical elements (CEs) of a safety oversight system, and in the eight audit areas, is a barrier against latent safety hazards. Therefore, it is necessary to start planning to allow for a gradual and sustainable improvement of EI in each of the SAM States.

5.1.3 It is foreseen that SSP implementation will permit proper safety risk management and mitigation of hazards, resulting in safer, and more efficient and sustainable operations.

5.1.4 Taking into account the benefits to be derived from safety management implementation in SAM States and in the SAM Region, it is necessary to start developing strategic and tactical plans to meet the objectives of the latest revision of the GASP for years 2022, 2025, 2028 and 2030.

5.2 ICAO strategic objective concerning safety

5.2.1 ICAO has established five general strategic objectives that are reviewed every three years. One of them is to *reinforce global civil aviation safety* and is mainly focused on the regulatory oversight capacity of States. The objective is set within the context of a greater volume of passengers and cargo movements, and the need to respond to changes regarding efficiency and the environment. Based on this objective, the GASP describes the key activities for the triennium. The ICAO website www.icao.int/abouticao/Pages/Strategic-Objectives.aspx contains additional information on the ICAO strategic objectives.

5.3 Global Aviation Safety Plan (GASP)

5.3.1 The GASP is a high-level strategic document on policies related to aviation safety planning and implementation. The GASP follows an approach and a philosophy similar to those of the Global Air Navigation Plan (Doc 9750), also referred to as the GANP. Both documents promote coordination and collaboration among international, regional and national initiatives aimed at achieving a harmonised, safe and efficient international civil aviation system.

5.4 The GASP outlines a continuous improvement strategy that covers the objectives to be achieved by States through the implementation of effective safety oversight systems and State safety programmes (SSP), developing advanced safety management systems that include predictive risk management. The GASP also contains deadlines for collective achievement of these objectives worldwide, in accordance with the procedure established for updating the GASP and the GANP, which are revised every three years.

Alignment of SAM objectives with the GASP strategic objectives

5.4.1 The objectives established in the SAMSP are aligned with the GASP strategic objectives, wherever applicable. To the extent ICAO amends GASP objectives, so will be the SAMSP objectives.

5.5 Effective implementation of the State safety oversight (SSO) system

5.5.1 In order to implement safety management, States must first establish and implement an effective State safety oversight (SSO) system. When implementing this system, the eight (8) safety oversight critical elements (CEs) will be taken under consideration. In practice, the critical elements are defence mechanisms that the system has available to avoid an accident or incident.

5.5.2 The States are expected to implement the eight (8) safety oversight CEs so that the State and the aeronautical community will share the responsibility. The CEs of a safety oversight system cover all the spectrum of civil aviation activities, including aerodromes, air traffic control, communications, licensing, flight operations, airworthiness, accident and incident investigation, and transport of dangerous goods by air, among others. Effective CE implementation is a *measure of the State's safety oversight capacity*.

5.5.3 Currently, the functional responsibilities of the State with regard to safety management are reflected in the State safety programme (SSP), together with the eight (8) critical elements (CEs) of the State safety oversight (SSO) system. The aforementioned 8 CEs are the basis for the SSP.

5.5.4 In order to implement an effective safety oversight system, States must conduct a gap analysis of structures and processes, not only of the 8 CEs, but also of the audit areas, in order to improve EI. In the gap analysis, States shall identify the existing structures and processes, as well as those identified as missing or deficient in each CE and audit area.

5.6 Transition to a comprehensive performance-based approach

5.6.1 Depending on the degree of maturity of the safety oversight system, the transition to a comprehensive performance-based approach can involve changes in the way in which the State conducts and organises its activities. Therefore, the gap analysis is a key aspect to determine the changes that States must introduce to implement a comprehensive performance-based approach through the SSP.

5.7 SSP implementation

5.7.1 Before implementing SSP through a plan, States must conduct a gap analysis of their current structures and processes, as compared with the ICAO SSP framework and the USOAP CMA protocol questions (PQs). This will enable States to assess the existence and maturity of SSP elements. After finalising and documenting the gap analysis, the components/elements/processes identified as missing or deficient, together with the existing ones, will serve as a basis for the State SSP implementation plan. The gap analysis shall also take under consideration the 311 PQs serving as a basis for the establishment of the SSP, and the 122 PQs directly related with the SSP/SMS.

5.7.2 SSP implementation should be based on the eight (8) safety oversight critical elements, taking into consideration that these constitute the basis of the SSP.

5.7.3 Within an SSP environment, the GASP requires that a risk-based approach be applied in order to achieve an acceptable level of safety performance (ALoSP). In this context, the function of the State should evolve to include the establishment and achievement of safety performance goals, as well as an effective oversight of the service providers' SMS.

5.7.4 SSP implementation requires a greater collaboration between operational sectors for the identification of hazards and management of risk. In this context, various safety data categories must be analysed in order to develop effective mitigation strategies specific to each State or for the Region. This

requires that ICAO, States and international organisations cooperate in the management of safety risks. In addition, collaboration among key stakeholders, including service providers and regulatory authorities, is essential in order to achieve the safety performance goals established in the SSP or in the service providers' SMS. In partnership with such key stakeholders at national and regional level, safety data should be analysed in order to maintain risk-related performance indicators and the main components of the aviation system. Key stakeholders should reach agreements to determine the appropriate indicators and establish common classification plans and analysis methodologies that will facilitate communication and the exchange of safety information.

5.7.5 SSP and SMS implementation could entail changes in regulations, policies, procedures and the organisation, requiring additional resources, staff retention, or different sets of skills, according to the degree of implementation of each SSP element and the SMS. Additional resources may also be needed for the collection, analysis and management of the information required for the development and maintenance of a risk-based decision-making mechanism. Furthermore, technical skills should be developed to gather and analyse data, identify safety trends, and communicate the results to the relevant stakeholders. An SSP may require investment in information technology for conducting analyses, as well as professionals with the necessary knowledge and skills for the operation of such systems.

5.8 Planning methodology

5.8.1 Planning will be organised based on project management techniques and clearly-defined performance objectives to support the strategic objectives of this plan.

5.8.2 All activities required for achieving the performance objectives will be designed using strategies and action plan models that can be shared in order to align the work at a regional level and within each State, with the main objective of achieving the maximum degree of interoperability and transparency.

5.8.3 When planning all these activities, measures shall be taken to ensure that resources are used efficiently, avoiding the planning of duplicate or unnecessary activities or tasks, in such a manner that said tasks/activities can be easily adapted to the SAM Region. Planning must encourage the optimisation of human resources, financial savings, and the use of electronic means of communications such as Internet, videoconferences, telephone conferences, e-mail, telephone, etc.

5.8.4 The new processes and work methods must ensure that performance objectives are associated to metrics reflected in timetables and status reports of the progress made at regional level, submitted to the civil aviation authorities of the Region, the SAM Regional Office, the Regional Aviation Safety Group – Pan America (RASG-PA), the CAR/SAM regional planning and implementation group (GREPECAS), the Air Navigation Commission (ANC) and the International Civil Aviation Organization (ICAO) Council.

5.8.5 Based on the SAMSP, States shall draft their own national plan, reflecting the work programme, timetable, individual responsible parties, and status of implementation, in order to monitor and report on the progress made in these activities. Likewise, States should consider the detailed information on the activities required for the implementation, the means to provide feedback on the progress made through an annual reporting process, which will help civil aviation administrations to prioritise the actions and support required, and to identify the assistance requirements of the Region.

5.8.6 The development of work programmes will be based on the experience and lessons learned during the USOAP CMA and SSP implementation cycle. Therefore, this plan is aimed at maintaining uniform harmonisation at regional level, and improving implementation efficiency, taking

advantage of existing infrastructure and applications in the Region.

5.8.7 For planning EI improvements and SSP implementation, the following methodology will be followed:

Effective implementation (EI) improvement

5.8.8 Based on the analysis of EI performance in SAM States conducted under the USOAP CMA in the period between November 2011 and November 2017, as shown in **Attachment B**, a continuous improvement process has been planned to cover up to 2030. This improvement will be gradual and will depend on the capacity of each State to establish and apply a mature, effective and sustainable safety oversight system. Continuous improvement planning will be based on each State's performance during the aforementioned period, and on the potential safety oversight capacity that the State could offer within the timeline set for achieving the strategic objectives established in this plan, and also considering the difficulties it might have for improving its EI.

State safety programme (SSP) implementation

5.8.9 Using as a reference the implementation phases set forth in Doc 9859 – Safety Management Manual, third edition, SAM States will plan and implement their SSP by phases.

Reduction of the accident rate in the SAM Region

5.8.10 When determining the accident categories defined by RASG-PA and that shall be addressed by the SAM Region, consideration will be given to accident categories with the most critical and higher risk trends, as well as to emerging categories that might have an impact on the States' and Region's safety.

Acceptable level of safety performance (ALoSP)

5.8.11 In accordance with Annex 19, second edition, States will determine the acceptable level of safety performance (ALoSP) through their SSP.

5.8.12 The ALoSP is the minimum level of safety performance, as defined in the SSP, expressed in terms of safety performance goals and indicators.

5.8.13 The establishment and, more importantly, the achievement of the AloSP is the end result the State pursues through its SSP. Therefore, the role of the State in the management of its safety performance must be clearly understood.

5.8.14 The State ALoSP must be agreed upon by a group of high-ranking officials representing the various aeronautical and administrative authorities involved in the SSP.

5.8.15 States will establish safety performance indicators (SPIs) for monitoring and assessing safety performance in their national civil aviation systems.

5.8.16 During the third phase of SSP implementation, States should be able to carry out data and trend analyses in support of a safety management approach. The safety indicators should be consistent with State policies and objectives on this matter and should also be appropriate and relevant to the scope and complexity of the aeronautical activities of the State.

5.8.17 Within this context, the State should first define its safety management policy and objectives, so it can identify its indicators, with their goals and alert levels. Furthermore, the State should identify safety indicators in order to determine whether there are any undesirable trends, to alert on breaches to the acceptable level, and to monitor the attainment of the goals.

5.8.18 The integration of the eight critical elements (CE) of an effective safety oversight with the elements of a sound SSP, as well as a sound safety reporting culture are necessary aspects for the collection and use of data for predictive risk management.

5.8.19 The exchange of safety information and the participation of regulatory (CAA) and administrative (AIG and others) bodies are key elements for the establishment of safety indicators.

Establishment of safety management implementation policies, objectives, indicators, goals and alerts through the State safety plan

5.8.20 Each SAM State will include in its safety plan, the policy, objectives, indicators, goals and alert levels for its implementation of safety management.

Safety management implementation policy

5.8.21 For purposes of the State safety plan, the policy will be presented through a formal document describing the intentions and direction of the State regarding safety management implementation. The policy will establish the commitment of the State top officials to the accomplishment of safety management implementation. This policy will be endorsed by the aeronautical authorities and will promote compliance with the objectives set in the national safety plan.

Safety management implementation objectives

5.8.22 Just like the policy, the objectives are short and high-level statements that provide guidance to all relevant aviation authorities of the State. The objectives represent the safety results that the State expects to achieve with the available resources and within a given period of time. The objectives must be specific and measurable. They will serve as a basis to assess the performance of the State within a given period of time.

5.8.23 For the purpose of this plan and the safety plans of the States, the objectives of the SAM Region will be based on the following priorities:

- ✓ EI improvement of the eight CEs contained in the SSP;
- ✓ SSP implementation;
- ✓ reduction of accident rates in all aviation segments with aircraft of all weights;
- ✓ regional collaboration;
- ✓ use of industry programmes; and
- ✓ availability of the appropriate infrastructure in air navigation services and aerodromes to support safe operations.

SAM strategic objectives

5.8.24 Table 5-1 below presents the strategic objectives that States will take into account when planning and implementing safety management. These objectives are set forth taking into consideration the significant efforts being made by the SAM Region to improve EI in its States, and also based on the results obtained with the new USOAP CMA.

Table 5-1 – SAM strategic objectives

Timeline	Strategic Objectives
By 2020	✓ All States will implement a **sustainable SSP**. ✓ All States will contribute to the **reduction by 10% of accident rates and numbers in the SAM Region**, based on the annual calculated slope and the number of accidents for those operations for which departure information is not available. ✓ Enhanced effective implementation to enable States to achieve 95% by 2028. ✓ Regional collaboration. ✓ Use of industry programmes. ✓ Availability of the appropriate infrastructure in air navigation services and aerodromes to support safe operations.
By 2025	✓ All States will implement an **effective SSP**, as appropriate to the complexity of their civil aviation systems. ✓ All SAM States will contribute to the **reduction by 10% of accident rates and numbers in the SAM Region**, based on the calculated annual slope and the number of accidents for those operations for which departure information is not available. ✓ Enhanced effective implementation to enable States to achieve 95% by 2028. ✓ Regional collaboration. ✓ Use of industry programmes. ✓ Availability of the appropriate infrastructure in air navigation services and aerodromes to support safe operations.
By 2028	✓ All States will obtain **95% EI** in the eight (8) critical elements (CEs) of the State safety oversight system, as appropriate to the complexity of their civil aviation systems. ✓ All States will contribute to the **reduction by 10% of accident rates and numbers in the SAM Region**, based on the calculated annual slope and the number of accidents for those operations for which departure information is not available. ✓ Regional collaboration. ✓ Use of industry programmes. ✓ Availability of the appropriate infrastructure in air navigation services and aerodromes to support safe operations.
By 2030	✓ A consecutive three-year period **without aviation accident fatalities** will be achieved and maintained starting in 2030. ✓ All States will contribute to the **reduction by 10% of accident rates and numbers in the SAM Region**, based on the calculated annual slope and number of accidents for those operations for which departure information is not available.

Timeline	Strategic Objectives
	✓ Regional collaboration. ✓ Use of industry programmes. ✓ Availability of the appropriate infrastructure in air navigation services and aerodromes to support safe operations.

Safety performance indicators

5.8.25 The safety performance indicator is defined as a data-based parameter used for monitoring and assessing safety performance.

5.8.26 For the purpose of this plan and the State safety plans, the following indicators will be considered:

- ✓ EI improvement percentage;
- ✓ SSP implementation percentage, with reference to the number of elements of the four implementation phases;
- ✓ Rate of accidents in scheduled commercial air transport operations with aircraft over 5 700 kg;
- ✓ Number of accidents for all types of operations with aircraft over 2250 kg, and with aircraft of 2 250 kg or less;
- ✓ Safety oversight margins;
- ✓ Globally harmonised SPIs and level of participation in industry assessment programmes; and
- ✓ Percentage of improvement in air navigation and aerodrome infrastructure essential to support safe operations.

Safety performance targets

5.8.27 The safety performance target is defined as the State's or service provider's projected or intended target with respect to a safety performance indicator, within a given period of time that coincides with the safety objectives.

5.8.28 The safety performance criteria and goals for the SAM Region are established below, based on statistical data compiled in the last few years.

Effective implementation (EI) improvement and SSP implementation

5.8.29 In order to meet the objectives and deadlines established in **Table 5-1** – SAM strategic objectives, States will take into account in their national safety plans, the EI and SSP implementation goals shown in **Table 5-2**. These goals have been established for the years 2020, 2022, 2024, 2025, 2026 and 2028, and for each of the four groups of States indicated in the left column of the aforementioned table. The percentages for the groups have been selected in a gradual manner and based

on the current EI status of States.

5.8.30 Considering that the SAM Region has improved its effective implementation (EI) by **12.57%** during the past seven (7) years, corresponding to the USOAP CMA cycle, and that the average annual increase is 1.79% (see **Table 2** in **Attachment B**), the planning of goals for each State has taken into account a gradual annual improvement of **2.5**%, or **5%** every two years. This annual improvement proposal stems from the fact that several States have received, are receiving, or will receive, technical assistance from the SAM Regional Office and the SRVSOP for the completion of their corrective action plans (CAPs) and all the protocol questions (PQs).

Table 5-2 – EI improvement and SSP implementation indicators and goals

States with EI	**2020** % SSP Implementation % EI Improvement	**2022** % EI Improvement	**2024** % EI Improvement	**2025** % SSP Implementation % EI Improvement	**2026** % EI Improvement	**2028** % EI Improvement
less than 65% **Group 1**	Sustainable SSP (100%) 75 %	80 %	85 %	Effective SSP (100%) 87.5%	90 %	95-100 %
between 65 and 74.99% **Group 2**	Sustainable SSP (100%) 80 %	85 %	90 %	Effective SSP (100%) 92.5%	95 %	95-100 %
between 75 and 84.99 % **Group 3**	Sustainable SSP (100%) 85 %	90 %	95 %	Effective SSP (100%) 95%	95 %	95-100 %
between 85 and 95 % **Group 4**	Sustainable SSP (100%) 95 %	95 %	95 %	Effective SSP (100%) 95%	95 %	95-100 %

Accident rate reduction

In order to manage the accident rate reduction through the indicators and goals shown in Table 5-3, a 10% reduction in SAM performance curve slope values has been planned for both scheduled commercial air transport accidents and runway excursion (RE) accidents with aircraft over 5 700 kg. In order to determine the slopes, the algorithmic method was applied to the 2010-2016 historical rates. In the case of accidents, the 2009 and 2015 rates were eliminated because they were too high and too low, respectively, instead of which the rate was interpolated between the 2014 and 2016 rates so that the slope would present a uniform value and trend for that year. **Attachment D** describes the methods used to calculate indicators, slopes, goals and alert levels for air accidents and RE accidents during scheduled commercial air transport operations with aircraft over 5 700 kg.

5.8.31 For RE accidents occurred with aircraft over 2 500 kg or aircraft of 2500 kg or less in all aviation segments, consideration was only given to the number of accidents, given the lack of information regarding aircraft movement.

Table 5-3 – Accident rate reduction indicators and goals

Indicators per category and per type of operation	2020 Goals	2022 Goals	2024 Goals	2026 Goals	2028 Goals	2030 Goals
Accident rate Scheduled commercial air transport with aircraft over 5 700 kg	Reduce **10%** below **2.34**, which corresponds to the value of the SAM slope estimated for **2020** **Goal: 2.10**	Reduce **10%** below **2.11**, which corresponds to the value of the SAM slope estimated for **2022** **Goal: 1.90**	Reduce **10%** below **1.91**, which corresponds to the value of the SAM slope estimated for **2024** **Goal: 1.72**	Reduce **10%** below **1.74**, which corresponds to the value of the SAM slope estimated for **2026** **Goal: 1.57** Zero fatalities	Reduce **10%** below **1.59**, which corresponds to the value of the SAM slope estimated for **2028** **Goal: 1.43** Zero fatalities	Reduce **10%** below **1.45**, which corresponds to the value of the SAM slope estimated for **2030** **Goal: 1.30** Zero fatalities
RE accident rate Scheduled commercial air transport with aircraft over 5 700 kg	Reduce **10%** below **0.54**, which corresponds to the value of the SAM slope estimated for **2020** **Goal: 0.48**	Reduce **10%** below **0.42**, which corresponds to the value of the SAM slope estimated for **2022** **Goal: 0.38**	Reduce **10%** below **0.32**, which corresponds to the value of the SAM slope estimated for **2024** **Goal: 0.29**	Reduce **10%** below **0.24**, which corresponds to the value of the SAM slope estimated for **2026** **Goal: 0.21** Zero fatalities	Reduce **10%** below **0.16**, which corresponds to the value of the SAM slope estimated for **2028** **Goal: 0.14** Zero fatalities	Reduce **10%** below **0.09**, which corresponds to the value of the SAM slope estimated for **2030** **Goal: 0.08** Zero fatalities
Number of RE accidents Aircraft over 2 250 kg # ACCD. SAM 2016: **21**	Reduce by **20%** total SAM accidents in 2016: **17**	Reduce by **30%** total SAM accidents in 2016: **15**	Reduce by **40%** total SAM accidents in 2016: **13**	Reduce by **50%** total SAM accidents by 2016: **10**	Reduce by **60%** total SAM accidents by 2016: **8**	Reduce by **70%** total SAM accidents by 2016: **6**
Number of RE accidents Aircraft of 2 250 kg or less # ACCD. SAM 2016: **53**	Reduce by **20%** total SAM accidents in 2016: **42**	Reduce by **30%** total SAM accidents in 2016: **37**	Reduce by **40%** total SAM accidents in 2016: **32**	Reduce by **50%** total SAM accidents in 2016: **26**	Reduce by **60%** total SAM accidents in 2016: **21**	Reduce by **70%** total SAM accidents in 2016: **16**

Accident and incident rate control and monitoring alert levels

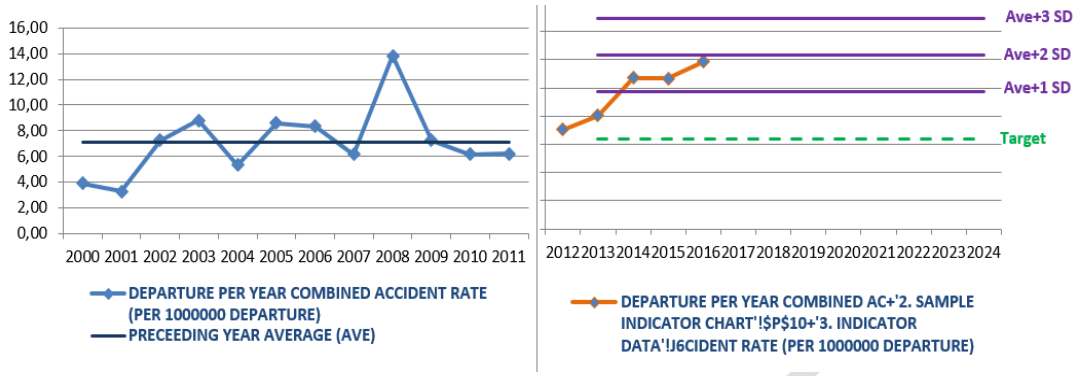
5.8.32 The determination of **alert levels** is associated with the trend behaviour of the historical data of an indicator. The reason is to ensure that the actual alert setting of an indicator has taken into consideration its own recent historical behaviour. Historical data performance is specifically measured using two characteristics of the historical data group:

a) the average value; and

b) the standard deviation (SD) value

5.8.33 The alert levels for a new follow-up period (current year) are based on the performance of the previous period (preceding year) and are derived from these two values (average and standard deviation). Alert levels are illustrated in the safety indicator chart through three alert lines as follows:

- ✓ average + 1 SD;
- ✓ average + 2 SD; and
- ✓ average + 3 SD.



For manual calculation purposes, the standard deviation (SD) (population) formula is:

$$STDEVP = \sqrt{\frac{\Sigma(x-\mu)^2}{N}}$$

where:

∑: is the summation symbol

x: is the value of each data point

μ: is the average value of all data points

N: is the value of the data points

5.8.34 The standard deviation is equal to the square root of the sum of the squares (RSS) of the standard deviations of the average rates of each year in a known period.

5.8.35 For indicator control and monitoring purposes, States will calculate the alert levels associated to each indicator.

5.9 Implementation tools

5.9.1 In order to meet the goals defined in **Tables 5-2** and **5.3**, which correspond to EI improvement, SSP implementation and accident rate reduction, the following implementation tools will be considered:

State safety plan

5.9.2 Each State will develop a safety plan. In this plan, the State will define the policy, directives, objectives, indicators, goals and alert levels, in accordance with the directives, objectives, indicators and goals established in this plan. Its development will depend on the level of maturity of the State with respect to the implementation of a safety management system that contemplates the integration of the eight critical elements (CE) of the safety oversight system, with SSP provisions.

5.9.3 The State safety plan will include:

- ✓ The CAP, which will describe the activities to be undertaken by the State in order to meet the objectives and goals of its safety plan with regard to EI improvement, or the plan for updating the PQs, in accordance with the EI percentage obtained by each State in the USOAP CMA;

- ✓ The SSP implementation plan, which will describe implementation phases and

elements; and

- ✓ The mitigation plans for managing risks and preventing accidents.

5.9.4 The State safety plan, with its corresponding parts, will be submitted to the ICAO South American Regional Office for control and monitoring purposes.

5.9.5 **Attachment E** shows a State safety plan model (TBD).

Corrective action plan (CAP)

5.9.6 In order to meet the goals established in Table 5-2 regarding EI, the States will develop and implement a corrective action plan (CAP). Before developing this CAP, States will conduct a gap analysis of the USOAP CMA protocol questions (PQs). Based on the gaps and deficiencies identified, States will develop the CAP on the USOAP CMA on-line framework (OLF). To develop and implement the CAP, States will submit a Gantt chart to the ICAO South American Office, showing the deadlines established for the goals defined in Table 5-2, and defining an improvement every two years that is proportional to the 95% objective set for 2028.

5.9.7 In order to facilitate CAP management, States may develop an Excel template for each audit area, similar to the CAP template shown in the OLF. Once the individual CAPs are completed, they can be published in the indicated OLF. **Attachment F** shows a CAP model in Excel.

SSP implementation plan

5.9.8 For SSP implementation, States will develop a phased SSP implementation plan, in accordance with Doc 9859, third edition, Table 4-1.

5.9.9 **Attachment G** shows a Gantt chart containing an SSP implementation plan model.

Mitigation plans to manage risks and prevent accidents

5.9.10 Based on high-risk trends identified, States will develop their mitigation plans in order to manage risks and prevent accidents.

5.10 Planning and implementation levels and role of stakeholders

Regional Aviation Safety Group – Pan America (RASG-PA)

5.10.1 RASG-PA planning will be at the strategic level, in support of ICAO strategic objectives set forth in the GASP. This regional group will actively participate in the coordination and harmonisation of all activities carried out for the resolution of regional aviation safety problems.

5.10.2 The RASG-PA will facilitate the exchange of best practices, cooperation, and collaboration by applying a top-down approach to supplement the bottom-up planning and implementation approach of the SAM Region and States. RASG-PA activities will be fully aligned with GASP objectives, while ensuring that the safety priorities of the SAM Region are taken into consideration. Likewise, the RASG-PA will monitor compliance with the SAMSP and will facilitate the publication of the safety reports of the Region.

5.10.3 The RASG-PA will also facilitate the sharing and exchange of information with SAM

States, for the benefit of their SSPs.

5.10.4 The RASG-PA will annually inform the ICAO Air Navigation Commission (ANC) on the progress made in the GASP. Likewise, the RASG-PA has tasked the SAM Regional Office with the development of the Pan American Safety Report, which is presented every year at the plenary meeting of this Regional Group and is subsequently shared with the ANC.

ICAO South American Regional Office

5.10.5 The South American Regional Office will conduct its planning and implementation at a tactical level, in compliance with the strategic objectives of this plan, as defined by ICAO HQ through the GASP.

5.10.6 The SAM Office will provide support to the States in the planning and implementation of this plan. To provide this support, the Regional Office will coordinate with the corresponding States the necessary virtual and on-site technical assistance by its officers and SRVSOP Technical Committee (TC) and ARCM experts.

Regional Safety Oversight Cooperation System (SRVSOP)

5.10.7 Planning and implementation by the SRVSOP will be accomplished at a tactical level. The Regional System will support its States in the resolution of the safety problems identified during USOAP CMA activities.

AIG Regional Cooperation Mechanism (ARCM)

5.10.8 Planning and implementation by the ARCM will be at a tactical level. This mechanism will assist member States in improving their EI in the area of aviation accident and incident investigation (AIG), and will participate in the coordination of AIG cooperation between ARCM member States. It will also provide reactive information to the regional groups and to State SSPs for safety management purposes.

5.11 Coordination procedures between the RASG-PA – SAM Office; SAM Office – accredited member States; SAM Office - SRVSOP and ARCM

RASG-PA – SAM Office

5.11.1 Two-way coordination between the RASG-PA and the SAM Office regarding compliance with SAMSP strategic objectives will take place between the RASG-PA Executive Steering Committee (ESC) and the Regional Director of the ICAO South American Office or his delegate.

SAM Office – Accredited member States

5.11.2 Coordination between the SAM Office and its accredited member States, and *vice versa* regarding compliance with the SAMSP and State national safety plans, will take place between the Flight Safety Officer and the focal point designated by each State for the implementation of its national safety plan.

SAM Office, SRVSOP and ARCM

5.11.3 Two-way coordination between the SAM Office, SRVSOP and ARCM, with regard to

the support to be provided by these bodies, will take place between the regional officers responsible for each audit area and the focal points of each State.

5.12 Working groups to support the implementation of the State safety plan

5.12.1 To achieve the objectives and goals set in their safety plans, States will establish the following working groups:

- ✓ **Working group for EI improvement and maintenance.-** States will designate working groups for the following audit areas: LEG, ORG, PEL, OPS, AIR, AIG, ANS and AGA. These groups will be led by the USOAP CMA National Continuous Monitoring Coordinator (NCMC) designated by each State.

- ✓ **Working group for SSP implementation.-** States will designate an SSP implementation team that will be led by the SSP coordinator designated by the State.

- ✓ **SSP coordination committee.-** This committee will consist of the senior executives of the State regulatory and administrative bodies that are part of the SSP, with the SSP accountable executive acting as coordinator.

- ✓ **Working group for managing prevention in support of accident rate reduction in the SAM Region**.- Civil aviation and accident investigation authorities will designate working groups to manage prevention in support of accident rate reduction in the SAM Region.

5.13 Accountability

5.13.1 For accountability purposes, the following meetings organised by the ICAO South American Regional Office will be used:

- ✓ **For EI improvement and maintenance.-** National Continuous Monitoring Coordinator (NCMC) and Flight Safety Directors (DSO) annual meetings.

- ✓ **For SSP implementation.-** SAM SSP implementation and Flight Safety Directors (DSO) annual meetings.

- ✓ **For the assessment of performance indicators and accident rate goals established by the SAM Region in this plan**.- Flight Safety Directors and ARCM Executive Committee annual meetings.

5.14 Metrics

- ✓ **EI improvement and maintenance.-** In order to know the percentage of State compliance, the following formula will be applied:

$$EI\ (\%) = \frac{\text{number of satisfactory PQs}}{\text{total number of applicable PQs}} \times 100$$

- ✓ **SSP implementation.-** The metric will be based on the number of elements presented to the SSP Secretariat (SAM Office), out of the total elements in the four SSP implementation phases.

- ✓ **Accident rate indicators and goals established by the SAM Region in the SAMSP**.- The calculation will be based on the accident rate, using the ICAO formula. For the number of accidents, the corresponding percentage will be applied by rule of three.

5.15 Action taken by stakeholders to support the implementation of State CAPs

5.15.1 Paragraphs 6.9, 6.10, 6.11, 7.9, 7.10 and 7.11 in **Attachment B** describe the actions recommended for the planning and implementation of State CAPs, taking into account the situation of each with respect to EI achieved in each CE and audit area.

5.16 Development of a business plan to support the implementation of States´ national safety plans

5.16.1 Each State will develop a business plan to support the implementation of national safety plans.

5.16.2 Business plans will be developed in order to know what financial resources the States require for the following purposes:

- ✓ completion of CAPs (*e.g.*, personnel hiring, training, assistance missions, drafting of documentation, hiring of assistance, etc.)

- ✓ updating of PQs;

- ✓ implementation of the SSP, including the budget for the implementation of a safety data collection and processing system (database systems); and

- ✓ implementation of plans containing mitigation measures to prevent accidents and incidents in high-risk categories.

5.16.3 These plans will also help the SAM Office obtain funding from global support programmes for States with limited resources.

5.17 State safety report (SSR)

5.17.1 Once States have implemented their SSP, they will publish their safety reports on a yearly basis, describing the performance achieved during the year with regard to their safety performance indicators and goals.

5.17.2 The reports will be published during the first three months of the following year, on the SAM Office website, in a section devoted to this end.

5.17.3 **Attachment H** shows a model of said report (TBD).

5.18 Safety data and information sources

5.18.1 The safety data and information sources that States could consult during the planning and implementation of their national safety plans include: ICAO iSTARS-3, RASG-PA data sources, IATA data sources, ARCM data sources, and their own data sources (SSP and ADREP/ECCAIRS platforms).

5.19 Aviation data tool of the future: System-wide information management (SWIM)

5.19.1 SWIM is defined as an advanced technological programme designed to facilitate a better exchange of information within the air traffic management (ATM) system, such as the operational status of an aerodrome, meteorological information, flight data, or special use of the airspace. SWIM is also known as the aviation intranet of the future.

5.19.2 SWIM will be used in both civil (SESAR/NextGen) and military (*Network Centric Warfare*) environments. These concepts allow users to randomly use that part of the information that is relevant for their operations, which can only be done through interoperable technical network feeder sources.

5.19.3 In view of the foregoing, SWIM will be of great use for the SSP, in view of the diversity of information it will deliver in the future.

ATTACHMENT A

TRAFFIC FORECASTS FOR 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

Table 1 a

- 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

Table 1 b

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

Table 2 a

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

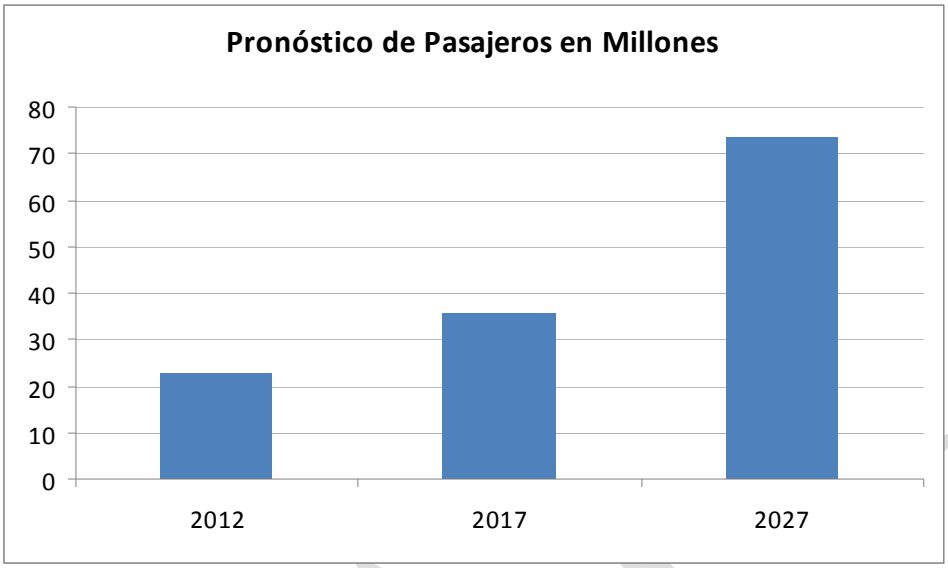
Rank	City Pair	Total Aircraft Movements 2007[2/]	Total Aircraft Movements 2027	Average Annual Growth(Per cent) 2007-2027
1	Sao Paulo - Johannesburg	878	3094	6.5
2	Buenos Aires - Cape Town	208	406	3.4
	Total	1086	3500	6.0

- 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

Table 1a: South America – Movement of passengers

	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


Pronóstico de Pasajeros en Millones
80
70
60
50
40
30
20
10
0
2012
2017
2027

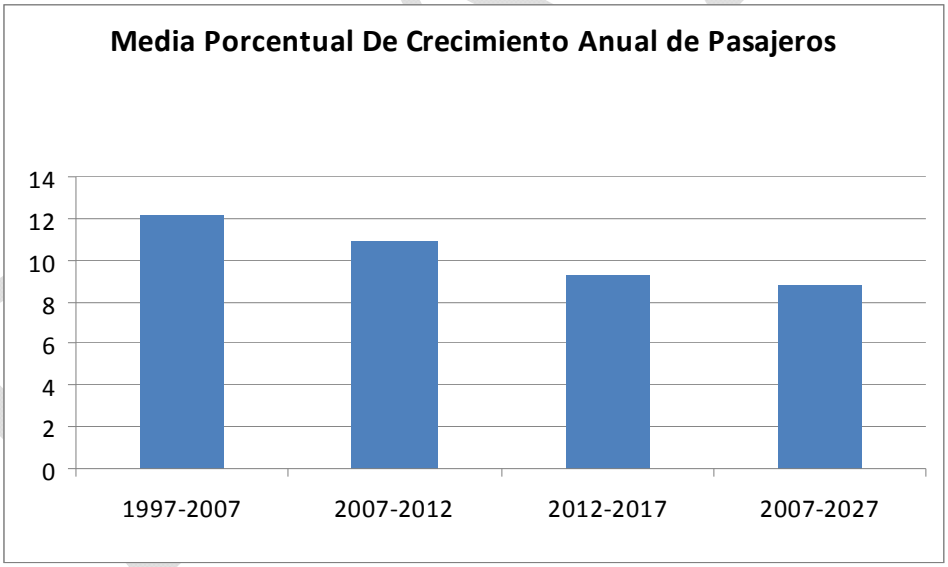
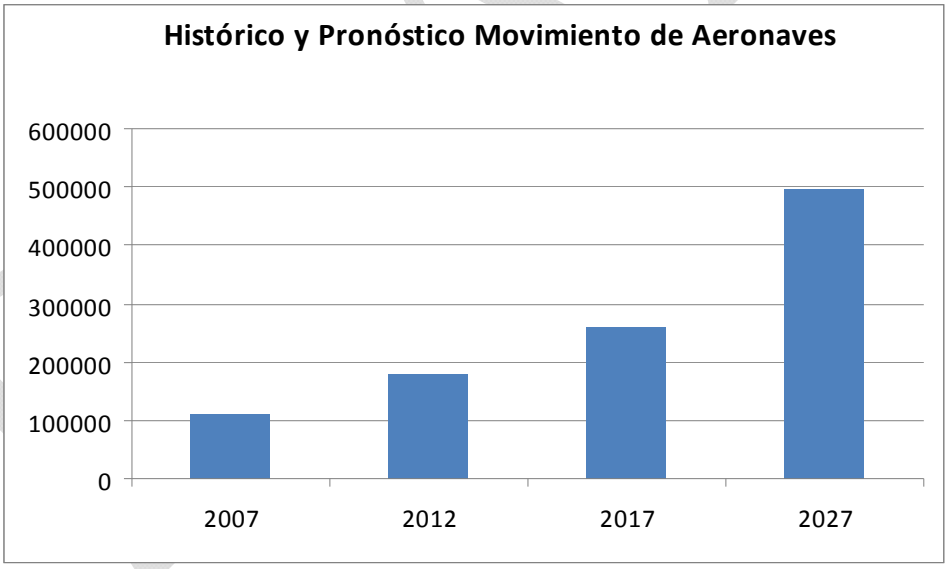

Media Porcentual De Crecimiento Anual de Pasajeros
14
12
10
8
6
4
2
0
1997-2007
2007-2012
2012-2017
2007-2027

Table 1b: South America – Aircraft movements

	Year	Aircraft Movements
Historical	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



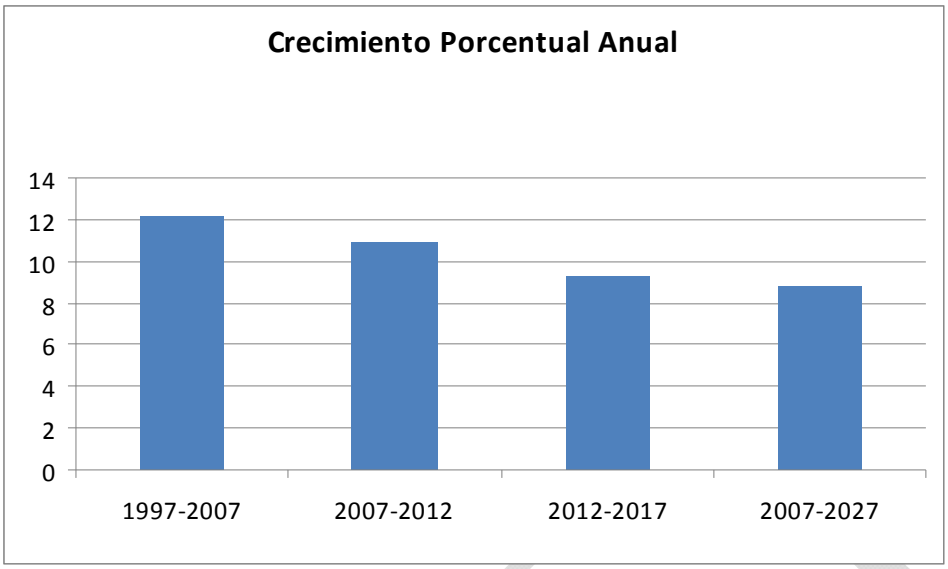
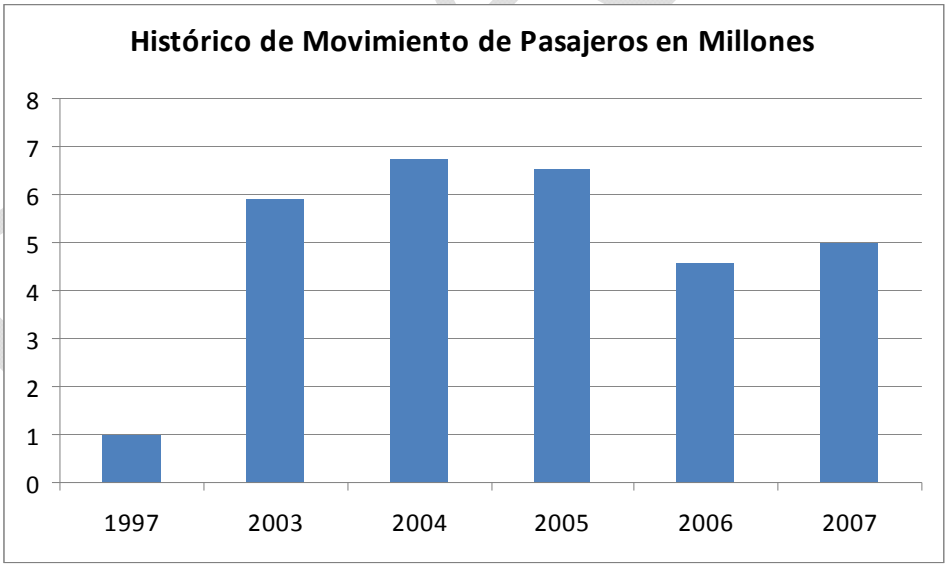

Crecimiento Porcentual Anual
14
12
10
8
6
4
2
0
1997-2007
2007-2012
2012-2017
2007-2027

Table 2a: South America – Central America – Movement of passengers

	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




Pronóstico de Pasajeros en Millones
30
25
20
15
10
5
0
2012
2017
2027

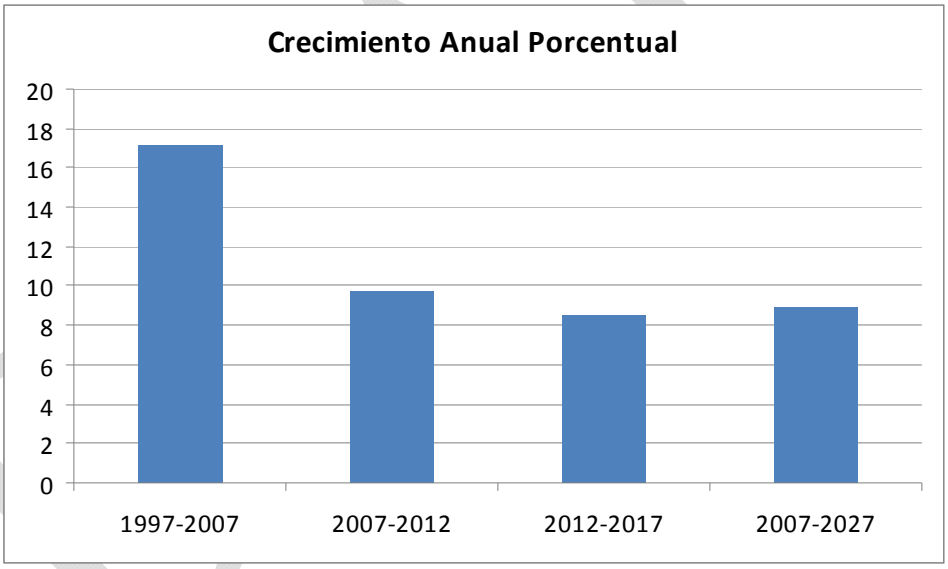

Crecimiento Anual Porcentual
20
18
16
14
12
10
8
6
4
2
0
1997-2007
2007-2012
2012-2017
2007-2027

Table 2b: South America – Central America – Aircraft movements

	Year	Aircraft Movements
Historical	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

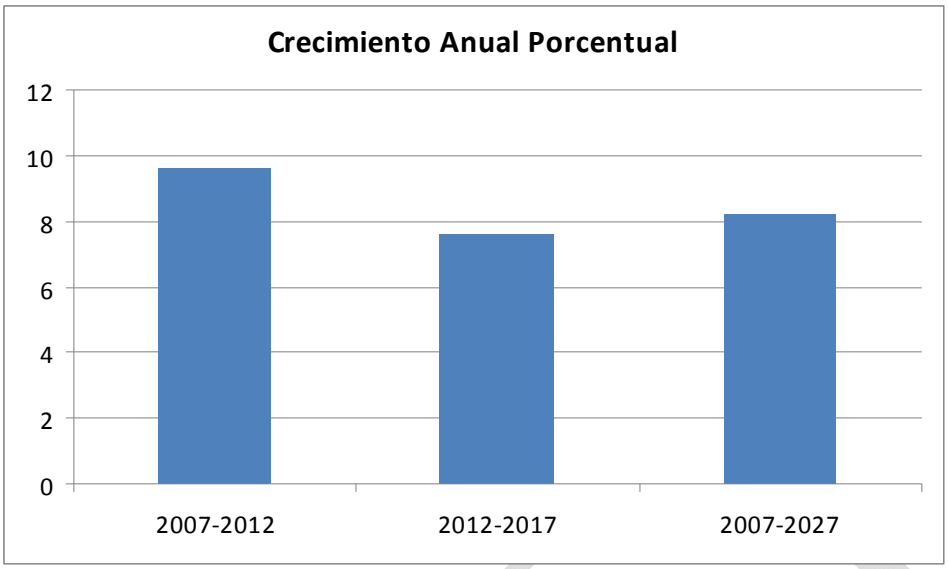
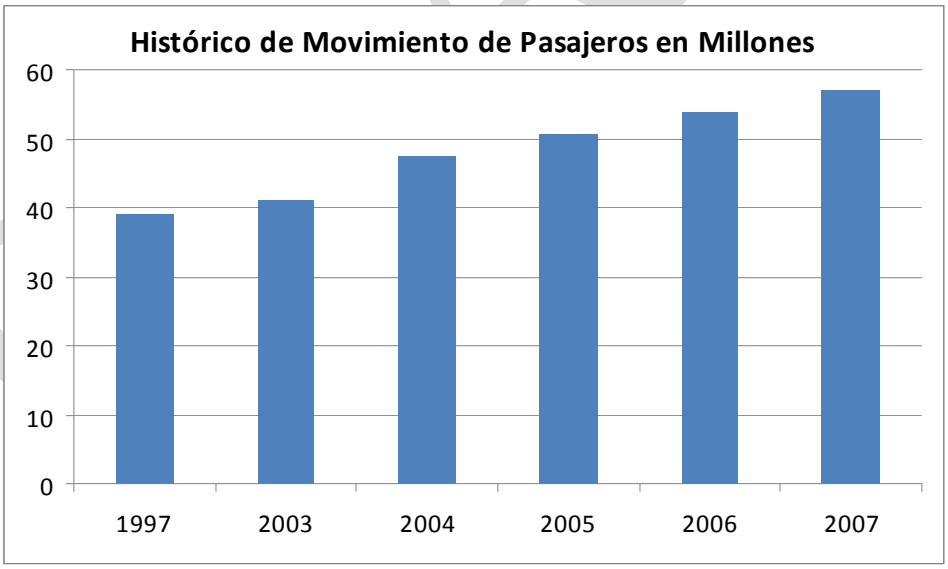
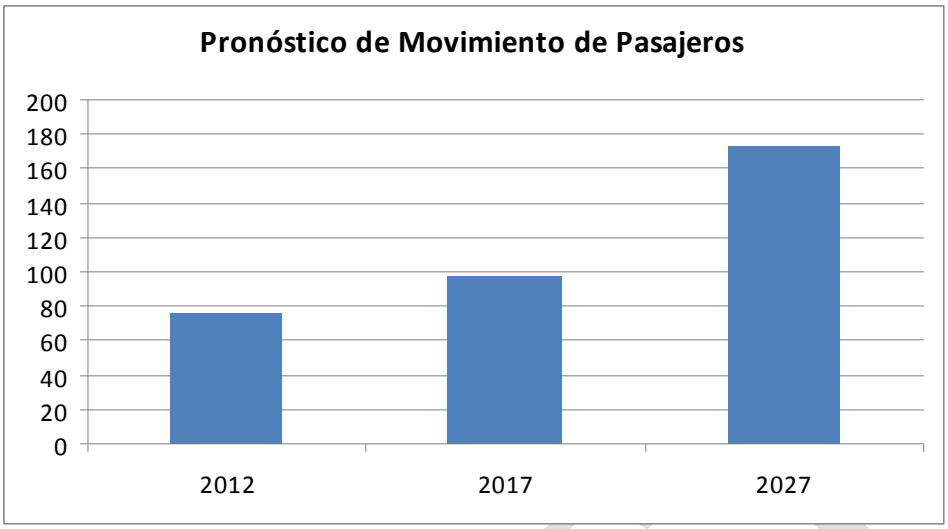

Crecimiento Anual Porcentual
12
10
8
6
4
2
0
2007-2012
2012-2017
2007-2027

Table 3a: South America – North America – Movement of Passengers

	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 growth (per cent)	1997-2007	3.8	2.1	-1.3
	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

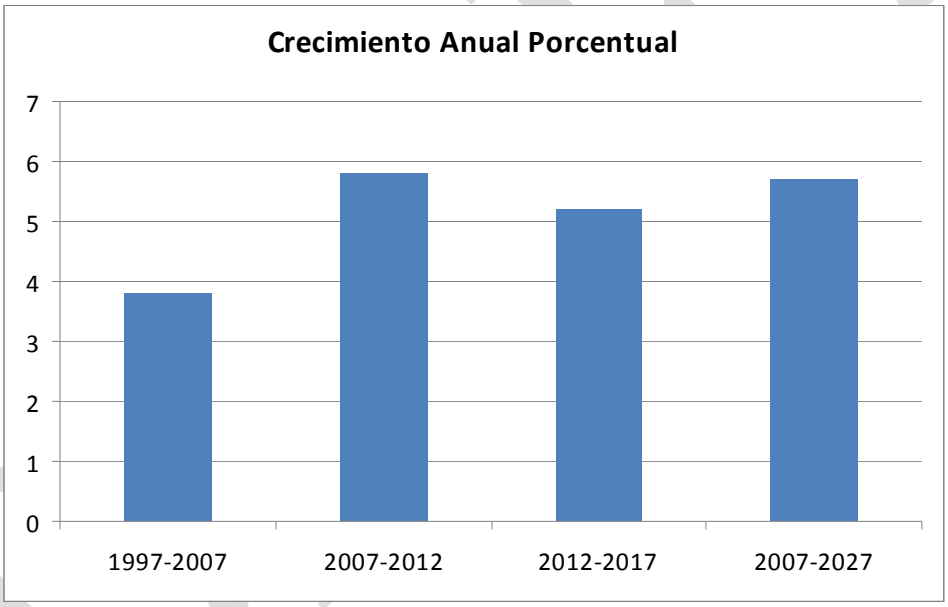

Crecimiento Anual Porcentual
7
6
5
4
3
2
1
0
1997-2007
2007-2012
2012-2017
2007-2027

Table 3b: South America – North America – Aircraft movements

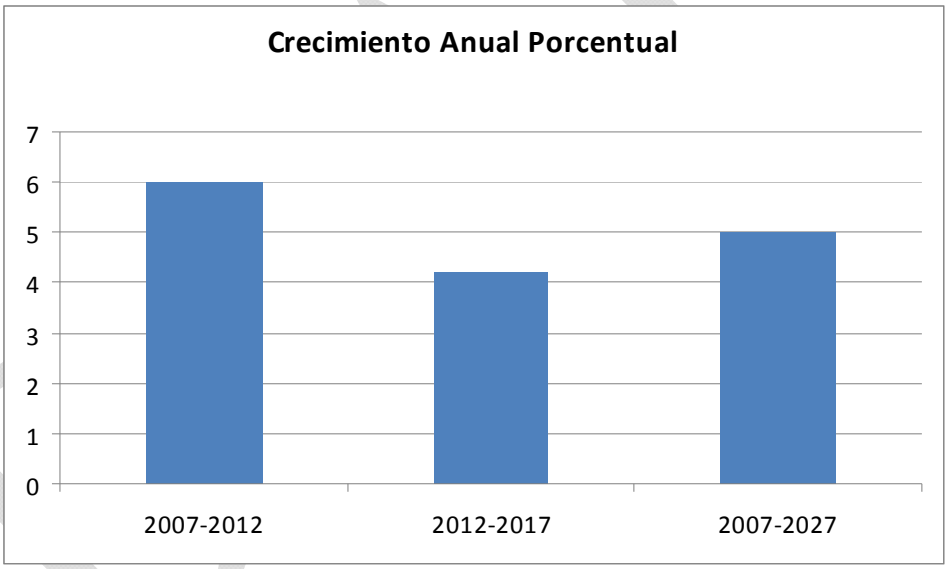
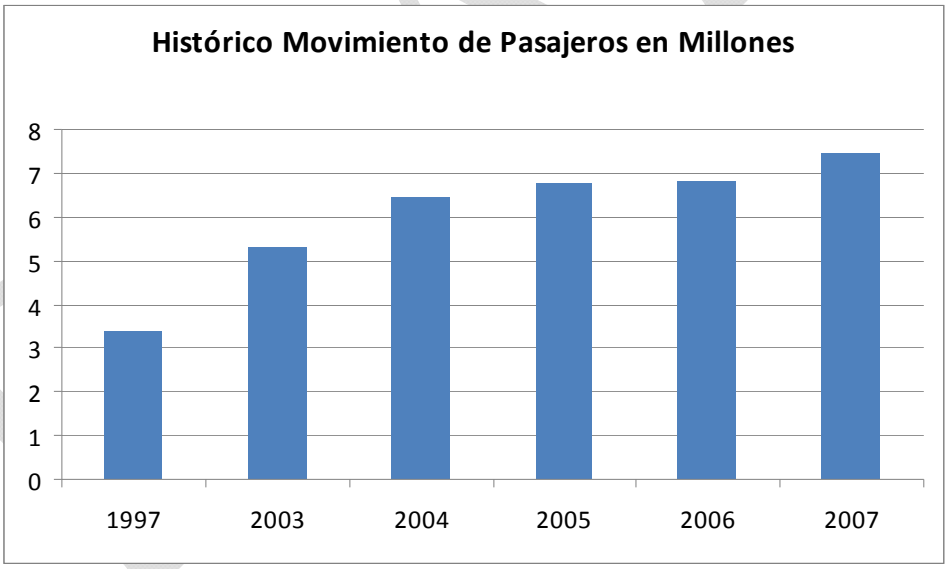


Table 4a: South Atlantic – Europe/South America Corridor - Passengers

	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




Pronóstico de Pasajeros en Millones
25
20
15
10
5
0
2012
2017
2027

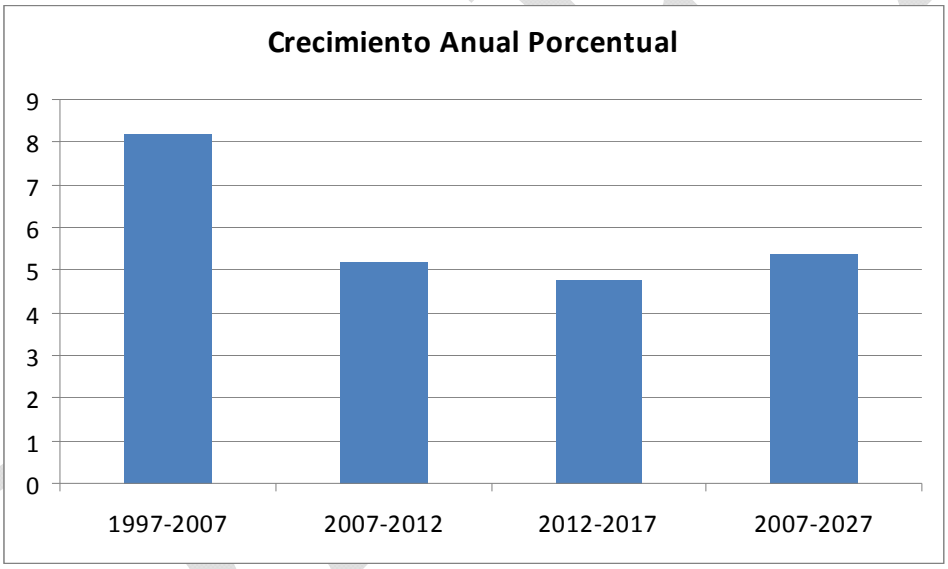
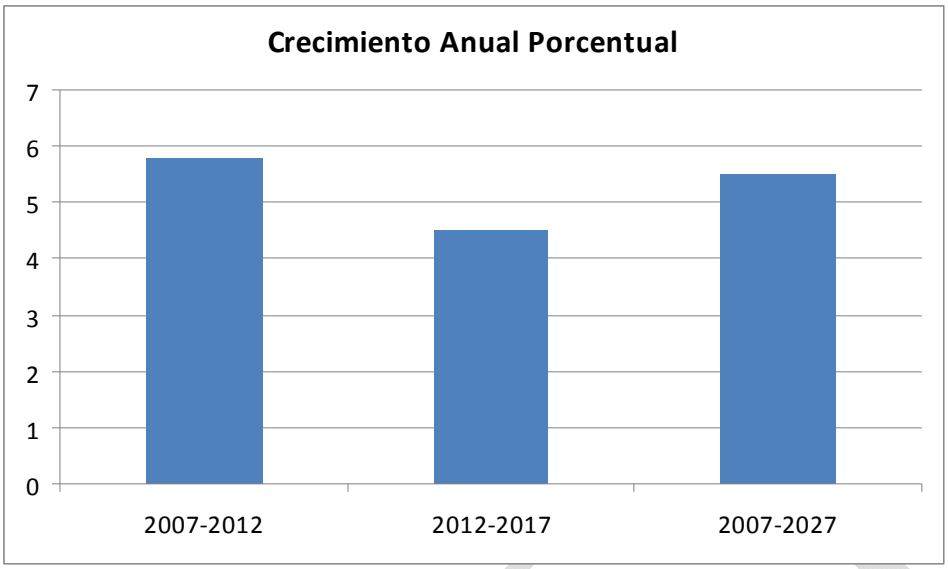

Crecimiento Anual Porcentual
9
8
7
6
5
4
3
2
1
0
1997-2007
2007-2012
2012-2017
2007-2027

Table 4b: South Atlantic – Europe/South America Corridor - Aircraft

	Year	Aircraft Movements
Historical	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


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

ATTACHMENT B

Analysis of SAM performance between November 2011 and February 2018 within the framework of the USOAP CMA

1. Transition to the continuous monitoring approach (CMA) of the Universal safety oversight audit programme (USOAP)

1.1 The two-year transition to the USOAP CMA took place between 2011 and 2012, and the complete programme was launched on 1 January 2013, as scheduled and approved by the ICAO Council at its 197th Session in November 2012. The USOAP CMA transition plan included several activities related to communication with the States and stakeholders, the development and launching of an on-line framework (OLF) and its multiple instruments and modules, the development of documentation and supporting guidelines, the enhancement of the USOAP CMA quality management system (QMS), documentation related to processes and procedures, training of auditors and experts, the conduction of on-site CMA activities in the States, and the establishment and extension of agreements with the relevant partners to promote coordination and cooperation.

1.2 During the transition, ICAO changed its approach to generate PQ-based findings instead of findings and recommendations (F&R). ICAO also modified the formulae for calculating effective implementation (EI) and obtaining a more accurate EI percentage.

2. USOAP CMA activities in the SAM Region between November 2011 and February 2018

2.1 USOAP CMA activities in the SAM Region started in 2011. By February 2018, 4 CMA audits, 14 ICVMs, two (2) integrated validation activities (IVAs), and 4 off-site monitoring activities had been carried out as shown in Table 1 below.

Table 1 – USOAP CMA activities – November 2011 - February 2018

Year	CMA audits	ICVMs	Integrated validation activity (IVA)	Off-site monitoring activities
2011		Colombia		
2012		Ecuador: ICVM 1 Suriname		
2013	Bolivia	Argentina Venezuela		
2014	Peru	Uruguay: ICVM 1		Ecuador Uruguay
2015	Panama	Ecuador: ICVM 2 Brazil		Brazil
2016		Uruguay: ICVM 2 Paraguay Bolivia Guyana		Paraguay
2017	Colombia	Chile Panama	Uruguay (AGA) Chile (AIG)	
Total	04	14	2	4

2.2 *Table 2 – Results of USOAP/CMA activities carried out in the SAM Region between November 2011 and February 2018*, describes the activities carried out in each State, the percentage of effective implementation (EI) achieved in each activity, and the final percentages of each of them, with general averages.

Table 2 – Results of USOAP/CMA activities carried out in the SAM Region (November 2011 – February 2018)

State	Last CSA audit	CMA audit	ICVMs Original EI	IVA	Off-site validation activity	Total improvement achieved	% EI Current / *Partial
01. Argentina	2008: 77.5		2013: **86.3** (+8.8)			+ 9.07	**86.57**
02. Bolivia	2008: 72.26	2013: 67.73 (-4.53)	2016: **86.22** (+18.49)			+ 13.63	**85.89**
03. Brazil	2009: 85.75		2015: **95.07** (+7.47)		2015: 87.60 (+1.85)	+ 9.21	**94.96**
04. Chile	2008: **84.29**		2017: **94.1** (+11.05)	2017: **94.65 (AIG)**		+ 10.36	**94.65**
05. Colombia	2007: 63	2017: **74.38** (+11.38)	2011: **78.23** (+15.23)			+ 11.38	**74.38**
06. Ecuador	2009: 55.40		2012: 67.80 (+12.40) 2015: **89.32** (+21.20)		2014: 68.12 (00.32) (report not available)	+ 34.85	**90.25**
07. Guyana	2007: 44.21		2016: **64.4** (+20.19)			+ 21.01	**65.22**
08. Panama	2005: 85.79	2015: **36.58** (-49.21)	2017:**61.79** (+25.21)			- 24	***61.79**
09. Paraguay	2009: 51.04		2016: **71.82** (+18.19)		2016: 53.63 (+2.59)	+ 19.8	**70.84**
10. Peru	2007: 68.22	2014: **74.34** (+6.12)				+ 6.05	**74.27**
11. Suriname	2009: 50.7		2012: **60.3** (7.71)			+ 9.33	**60.03**
12. Uruguay	2008: 41.49		2014: **57.88** (+16.39) 2016: **71.45** (+13.57)	2017: **71.37**	2014 (report not available)	+ 29.88	**71.37**
13. Venezuela	2009: 82.1		2013: **93.00** (11.03)			+ 10.83	**92.93**
Average	**66.28**	**- 9.06 per audit**	**14.78 per ICVM**		**1.58 per activity**	**+ 12.57 (1.79)**	**78.85** (12.57)

* The table above includes the preliminary results of the audit conducted in Panama.

2.3 The table above shows that the general average for the 7 years of analysis (November 2011 – February 2018) is **+ 12.57 %**, which indicates that the EI of the SAM Region improved at an average of **1.79** % per year.

2.4 Peru is the only State that has not received an ICVM. The ICVM to Peru is scheduled for 7-14 August 2018.

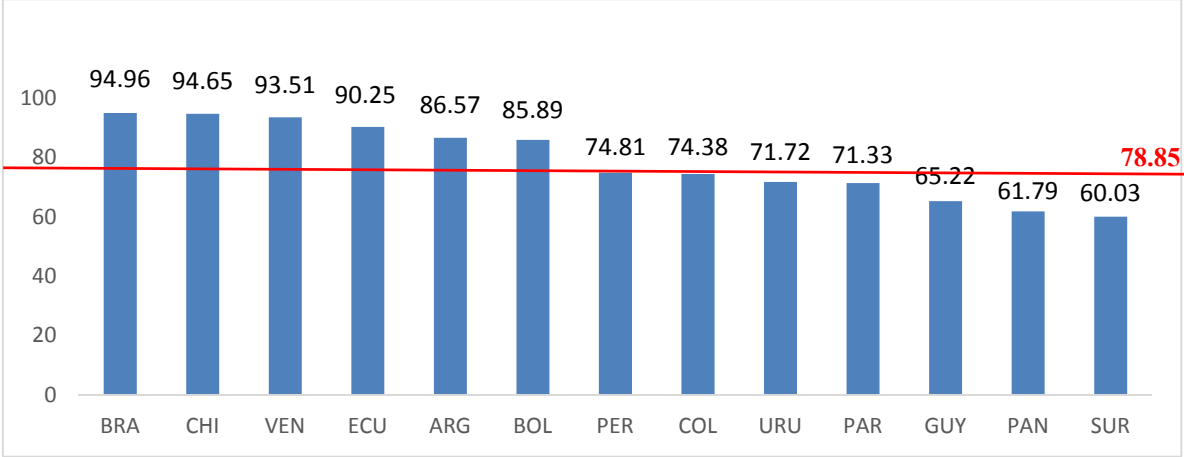
2.5 Likewise, a CMA audit has been scheduled for March 2018 in Brazil, only for the accident and incident investigation (AIG) area.

3. Status of SAM States in relation to the USOAP CMA as of February 2018

3.1 The status and general average of SAM States regarding effective implementation (EI) by audit area are shown in *Table 3 – Status of SAM States in relation to the USOAP CMA (November 2011 – February 2018)*.

3.2 According to Table 3, the average EI of the SAM Region is **78.85**%. This percentage includes the preliminary results of the ICVM to Panama.

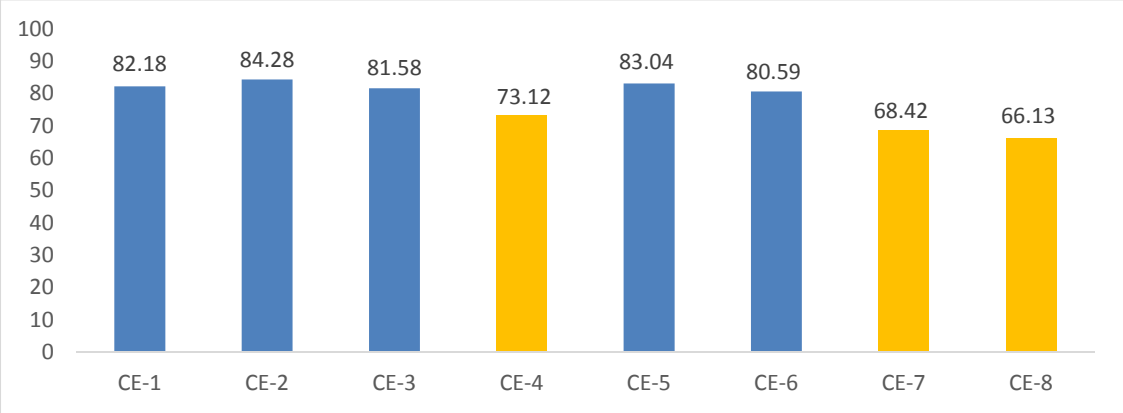
Table 3 – Status of SAM States in relation to the USOAP CMA (November 2011 – February 2018)



4. Average effective implementation (EI) of the SAM Region, per critical element (CE)

4.1 Table 4-1 – Average effective implementation (EI) of the SAM Region per CE shows the average EI of the SAM Region with respect to the eight (8) critical elements (CEs) of a State safety oversight system. CEs 8, 7 and 4 have the lowest percentage of EI. Accordingly, States shall assign priority to these CEs in their national safety plans.

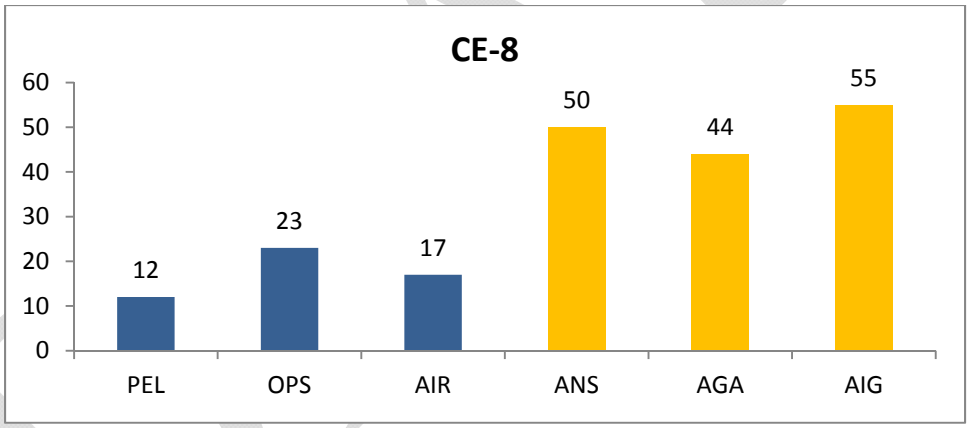
Table 4-1 – Average effective implementation (EI) of the SAM Region per CE



4.2 Critical element 8 (CE-8) – Resolution of safety concerns

4.2.1 Table 4-2 shows that the AIG, AGA and ANS areas have the largest number of unsatisfactory protocol questions (PQs) in CE-8 – Resolution of safety concerns.

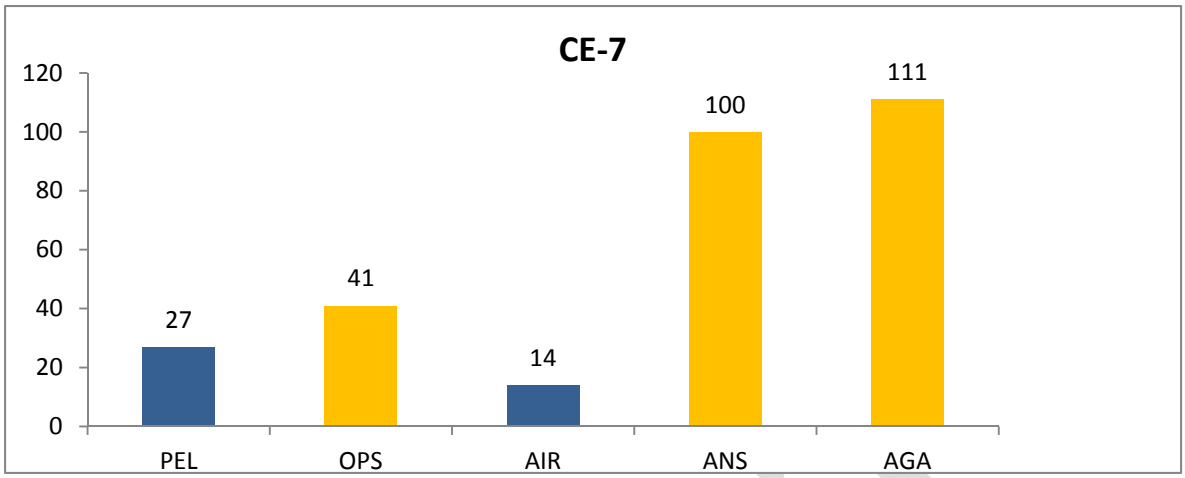
Table 4-2 – Audit areas with the largest number of unsatisfactory PQs in CE-8



4.3 Critical element 7 (CE-7) – Surveillance obligations

4.3.1 Table 4-3 shows that the ANS, AGA and OPS areas have the largest number of unsatisfactory protocol questions (PQs) in CE-7 – Surveillance obligations.

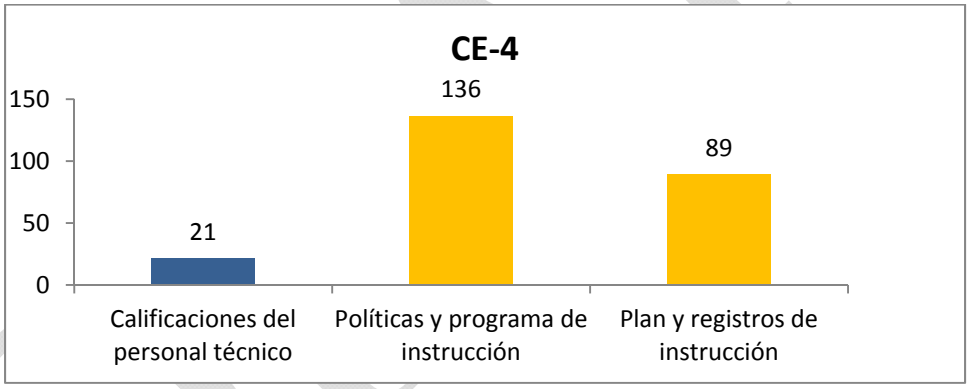
Table 4-3 – Audit areas with the largest number of unsatisfactory PQs in CE-7



4.4 **Critical element 4 (CE-4) – Qualified technical personnel**

4.4.1 Table 4-4 shows that the sub-groups related to training policy and programme and with training plans and records have the largest number of unsatisfactory protocol questions (PQs) in CE-4 – Qualified technical personnel.

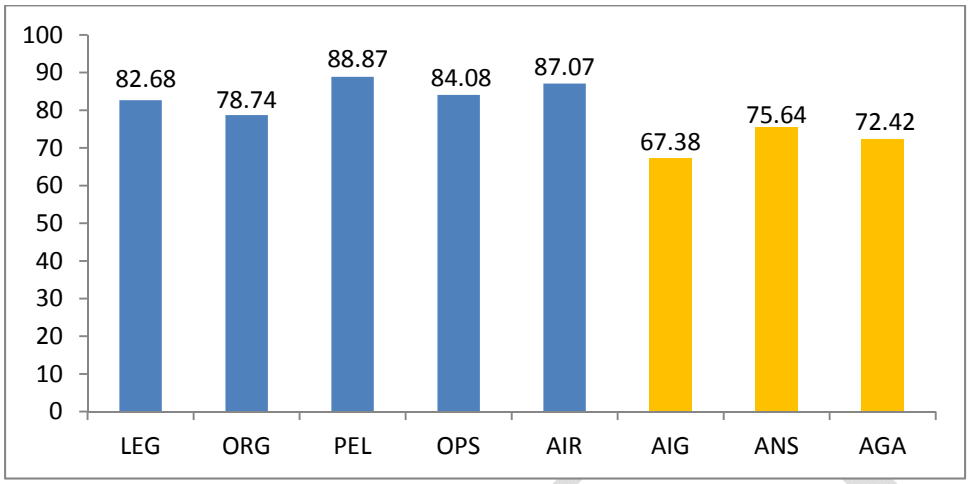
Table 4-4 – Sub-groups with the largest number of unsatisfactory PQs in CE-4



5. Average effective implementation (EI) of the SAM Region by audit area

5.1 Table 5-1 – Average effective implementation (EI) of the SAM Region by audit area, shows the average EI of the SAM Region with respect to each USOAP CMA audit area. The AIG, AGA and ANS audit areas have the lowest percentage of EI. Accordingly, States shall assign priority to these areas in their national safety plans, if applicable.

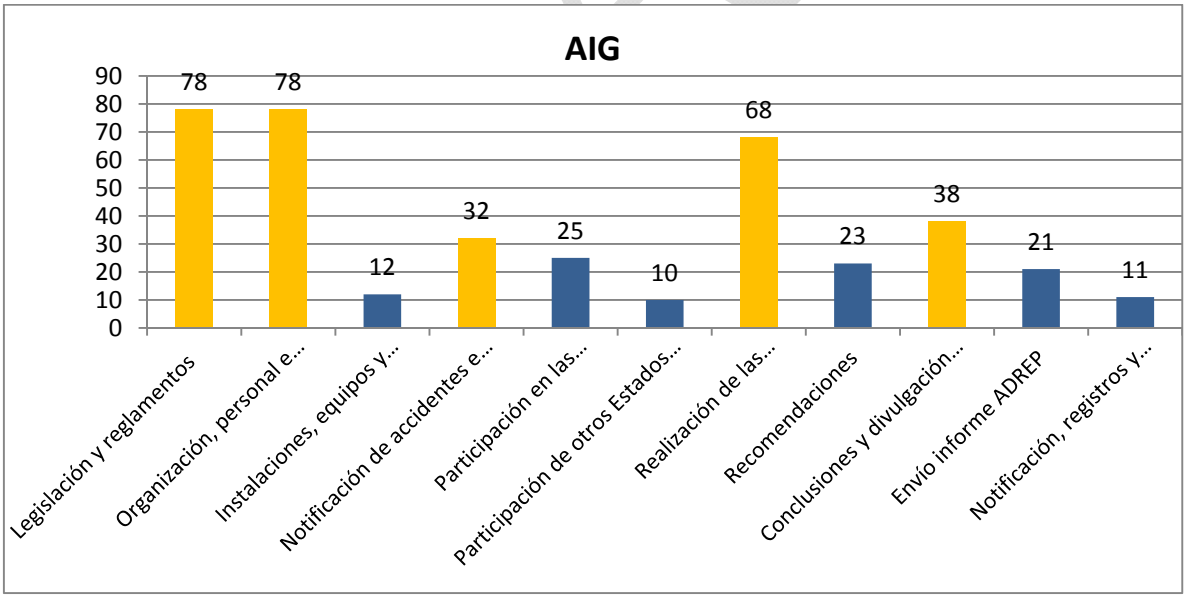
Table 5-1 – Average effective implementation (EI) of the SAM Region, by audit area



5.2 AIG audit area

5.2.1 Table 5-2 shows that the sub-groups related to legislation and regulations; organisation, staffing and training; investigation of accidents and serious incidents; completion and dissemination of the final report; and reporting of accidents and serious incidents, have the largest number of unsatisfactory protocol questions (PQs) in the AIG audit area.

Table 5-2 – Sub-groups with the largest number of unsatisactory PQs in AIG

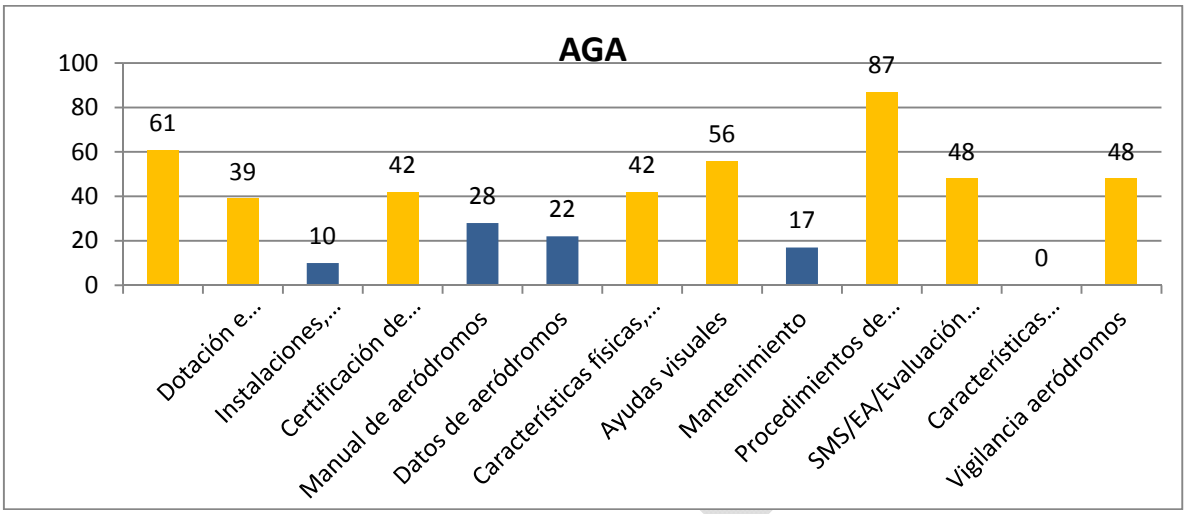


5.3 AGA audit area

5.3.1 Table 5-4 shows that the sub-groups on safety procedures, SMS, aeronautical studies, and risk assessment; legislation and regulations; visual aids; aerodrome certification;

staffing and personnel training; and physical characteristics, facilities and equipment have the largest number of unsatisfactory protocol questions (PQs) in the AGA audit area.

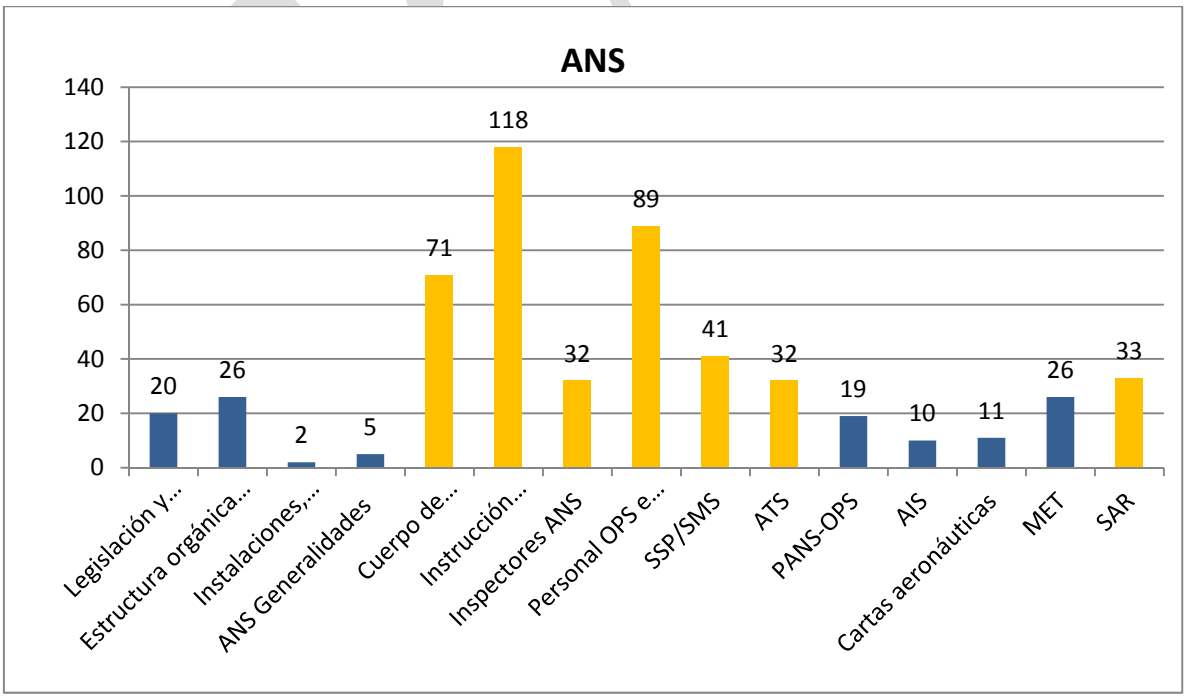
Table 5-4 – Sub-groups with the largest number of unsatisfactory PQs in the AGA area



5.4 ANS audit area

5.4.1 Table 5-3 shows that the sub-groups on ANS inspector training; OPS personnel and ANSP training; ANS inspectors; SSP/SMS; organisational structure of the ANS and ATS, have the largest number of unsatisfactory protocol questions (PQs) in the ANS audit area.

Table 5-3 – Sub-groups with the largest number of unsatisfactory PQs in the ANS area



6. Effective implementation by SAM States of the critical elements of the State safety oversight system

The critical elements (CEs) of a safety oversight system cover all the spectrum of civil aviation activities. The level of effective implementation (EI) of CEs is an indication of the safety oversight capacity of the State. Within the framework of safety management, CEs are the basis of the State safety programme (SSP). The current EI status in SAM States with respect to CEs is analysed below for planning purposes.

6.1 Critical element 1 (CE-1) – Primary aviation legislation

6.2 Introduction

6.1.1.1 The States will enact comprehensive and effective aviation legislation that is consistent with the size and complexity of their aeronautical activity and aligned with the requirements of the Convention on International Civil Aviation, to enable civil aviation safety oversight and management and compliance with regulations through the responsible authorities or organisations established to that end.

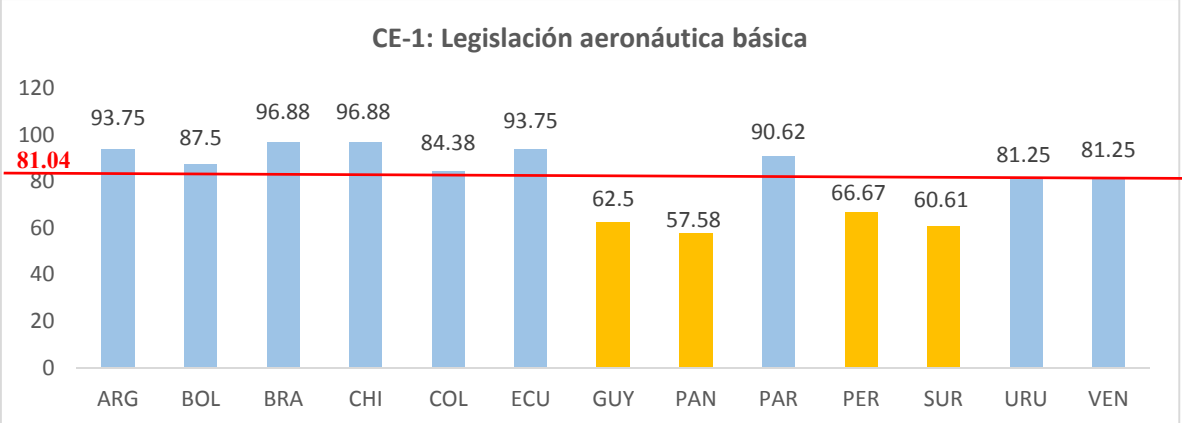
6.1.1.2 Aviation legislation will contain provisions to allow personnel conducting safety oversight functions to gain access to aircraft, operations, facilities, personnel and related records, as applicable, of individuals and organisations that perform aeronautical activities.

6.1.1. Current status

6.1.2.1 *Table 5-1 – Effective implementation of CE-1 in SAM States*, shows the performance of each SAM State regarding CE-1 – Primary aviation legislation.

6.1.2.2 Table 5-1 shows that four (4) States are below the 81.04% average EI of the SAM Region.

Table 6-1 – Effective implementation of CE-1 in SAM States (December 2017)



6.3 Critical element 2 (CE-2) – Specific operating regulations

6.2.1 **Introduction**

6.3.1.1 States will enact regulations that will at least include the national requirements emanating from the primary aviation legislation, in relation to standard operating procedures, products, services, equipment and infrastructure, in accordance with the Annexes to the Convention on International Civil Aviation.

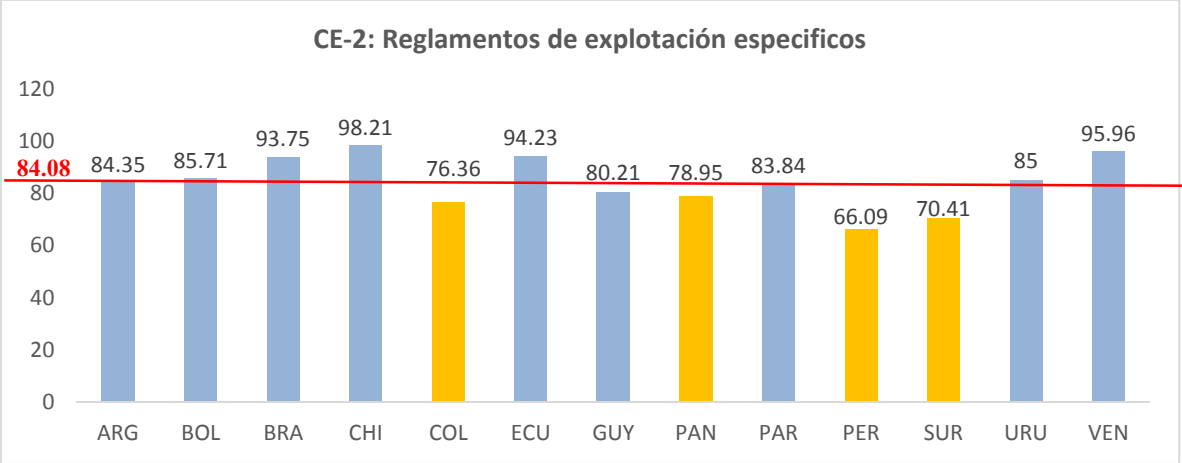
Note.- The concept of "regulations" is used in a generic sense and covers, inter alia, instructions, rules, decrees, directives, sets of laws, requirements, policies and orders.

6.2.2 **Current status**

6.2.2.1 *Table 6-2 – Effective implementation of CE-2 in SAM States* shows performance in relation to CE-2 – Specific operating regulations, in each SAM State.

6.2.2.2 Table 6-2 shows that five (5) States are below the 84.08% average EI of the SAM Region.

Table 6-2 – Effective implementation of CE-2 in SAM States (December 2017)



6.4 Critical element 3 (CE-3) – State system and functions

6.3.1 Introduction

6.4.1.1 States will establish responsible authorities or bodies, as appropriate, which have the support of sufficient qualified personnel, and adequate financial resources for safety management.

6.4.1.2 Safety functions and objectives will be established for State authorities or bodies so that they can fulfil their safety management responsibilities.

6.4.1.3 *States should take the necessary measures regarding, inter alia, work compensation and conditions in order to ensure the hiring and retention of qualified personnel to perform safety oversight functions.*

6.4.1.4 States will make sure that the personnel performing safety oversight duties receive training in ethics and personal behaviour to enable them to avoid real or perceived conflicts of

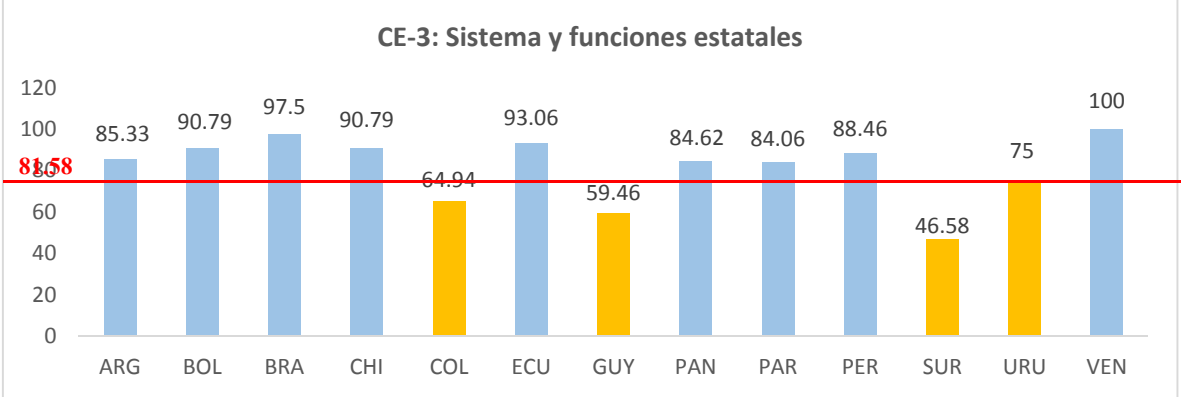
interest in the discharge of their official obligations.

6.4.1.5 *States should apply a methodology to determine the number of staff required to perform safety oversight functions, taking into account the size and complexity of aeronautical activities in their State.*

6.3.2 Current status

6.3.2.1 *Table 6-3 – Effective implementation of CE-3 in SAM States* shows the performance of each SAM State with respect to CE-3 – State system and functions. This table shows that five (5) States are below the 81.58% average EI of the SAM Region.

Table 6-3 – Effective implementation of CE-3 in SAM States (December 2017)



6.5 Critical element 4 (CE-4) – Qualified technical personnel

6.3.3 Introduction

6.3.3.1 States will establish the minimum requirements with respect to the qualifications of the technical personnel performing safety-related functions and will take the necessary measures to offer the required initial and recurrent training to maintain and improve the competencies of said personnel to the desired level.

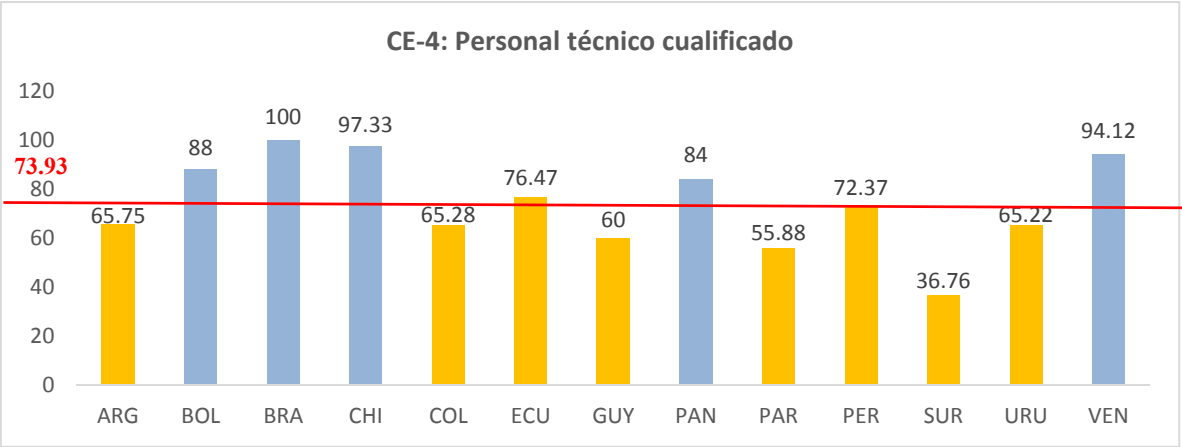
6.3.3.2 States will implement a system to keep technical personnel training records.

6.3.4 Current status

6.3.4.1 *Table 6-4 – Effective implementation of CE-4 in SAM States* shows the performance of each SAM States with respect to CE-4 – Qualified technical personnel.

6.3.4.2 Table 6-4 shows that seven (7) States are below the 69.26% average EI of the SAM Region.

Table 6-4 – Effective implementation of CE-4 in SAM States (December 2017)



6.6 Critical element 5 (CE-5) – Technical guidance, tools and provision of critical safety information

6.3.5 Introduction

6.3.5.1 States will provide suitable facilities, updated and comprehensive technical guidelines and procedures, safety-critical information, tools and equipment, and means of transportation, as appropriate, to the technical personnel so that they may perform their safety oversight functions efficiently and in a standardised manner, in accordance with the established procedures.

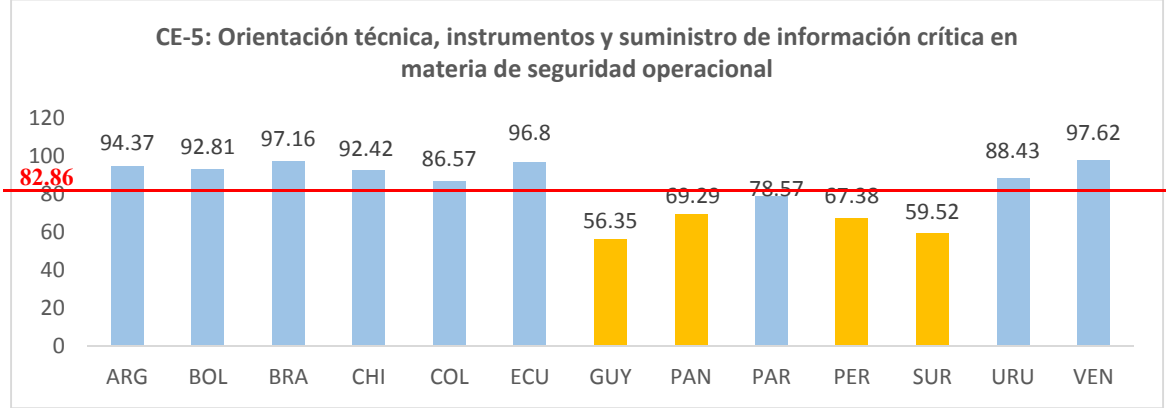
6.3.5.2 States will provide technical guidance to the aviation industry on the implementation of the relevant regulations.

6.3.6 Current status

6.3.6.1 *Table 6-5 – Effective implementation of CE-5 in SAM States* shows the performance of each SAM State with respect to CE-5 – Technical guidance, tools and provision of critical safety information.

6.3.6.2 Table 6-5 shows that five (5) States are below the 82.86% average EI of the SAM Region.

Table 6-5 – Effective implementation of CE-5 in SAM States (December 2017)



6.7 Critical element 6 (CE-6) – Licensing, certification, authorisation and approval obligations

6.3.7 Introduction

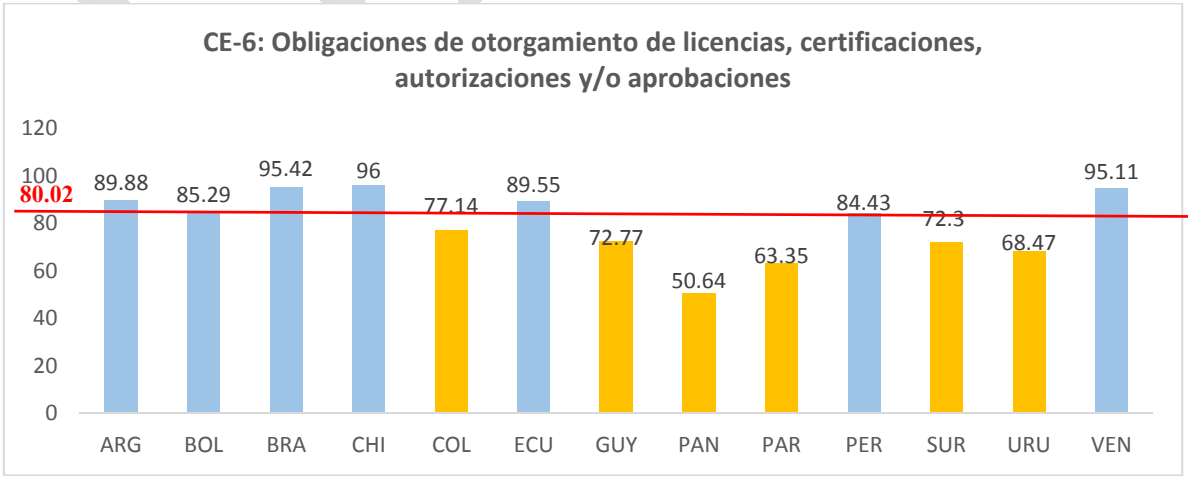
6.3.7.1 States will implement documented processes and procedures to ensure that the individuals and organisations that conduct an aeronautical activity meet the established requirements before they are allowed to exercise the privileges granted by a licence, certificate, authorisation or approval for conducting the relevant aeronautical activity.

6.3.8 Current status

6.3.8.1 *Table 6-6 – Effective implementation of CE-6 in SAM States* shows the performance of each SAM State to CE-6 – Licensing, certification, authorisation and approval obligations.

6.3.8.2 Table 6-6 shows that five (5) States are below the 80.02% average EI of the SAM Region.

Table 6-6 – Effective implementation of CE-6 in SAM States (December 2017)



6.8 Critical element 7 (CE-7) – Surveillance obligations

6.3.9 Introduction

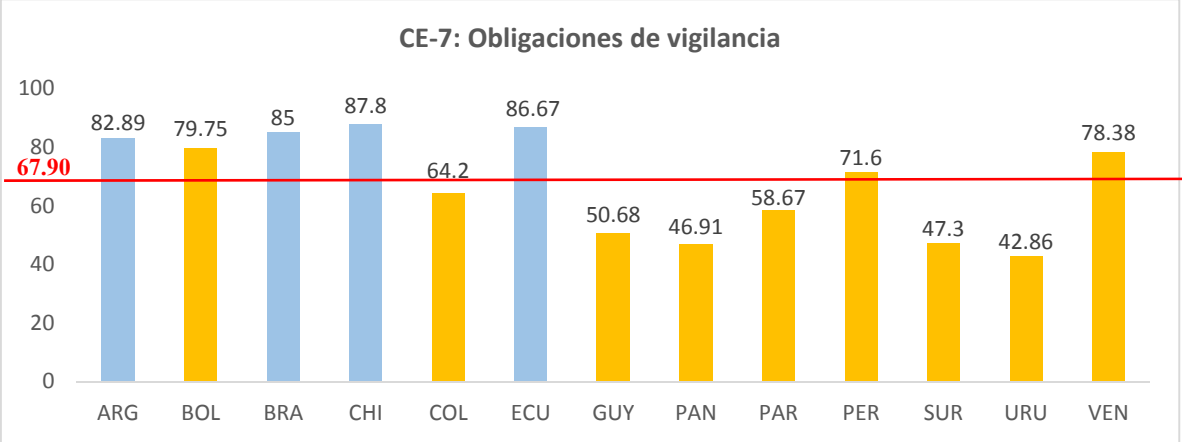
6.3.9.1 States will implement documented surveillance processes, defining and planning inspections, audits and continuous monitoring activities to ensure, as a preventive measure, that holders of a licence, certificate, authorisation and/or approval within the scope of aviation continue to meet the established requirements. This includes oversight of the personnel designated by the authority to perform, on its behalf, safety oversight functions.

6.3.10 Current status

6.3.10.1 *Table 6-7 – Effective implementation of CE-7 in SAM States* shows the performance of each SAM State with respect to CE-7 – Surveillance obligations.

6.3.10.2 Table 6-7 shows that six (6) States are below the 67.90% average EI of the SAM Region.

Table 6-7 – Effective implementation of CE-7 in SAM States (December 2017)



6.9 Critical element 8 (CE-8) – Resolution of safety concerns

6.3.11 Introduction

6.3.11.1 States will apply a documented procedure for the adoption of appropriate measures, including enforcement actions, to resolve identified safety concerns.

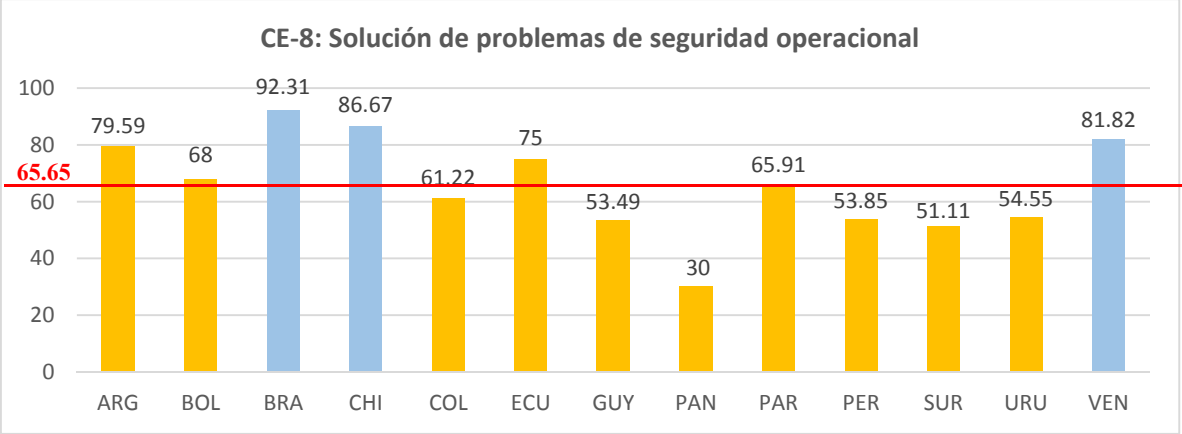
6.3.11.2 States will make sure that identified safety concerns are resolved on a timely manner through a system for monitoring and recording progress and measures adopted by individuals and organisations conducting aeronautical activities for their resolution.

6.3.12 Current status

6.3.12.1 *Table 6-8 – Effective implementation of CE-8 in SAM States* shows the performance of each SAM State with respect to CE-8 – Resolution of safety concerns.

6.3.12.2 Table 6-8 shows that six (6) States are below the 64.49% average EI of the SAM Region.

Table 6-8 – Effective implementation of CE-8 in SAM States (December 2017)



6.10 Action taken by each State to reach or maintain EI and the level of maturity of the SSP established in the strategic objectives of this plan

6.3.13 Based on the EI obtained in the CEs, SAM States will develop their national safety plans, in which they will include the activities required to reach or maintain the strategic objectives of the SAM Region established in Table 4-1 – Strategic objectives of the SAM Region, contained in Chapter 4 of this plan. The corrective action plans (CAPs) developed by the States for each CE will be consistent with the level of EI obtained and the level of maturity reached in the implementation of the SSP. The lower the level of EI and maturity in the implementation of the SSP, the greater the effort to be made by the State to achieve the strategic objectives established in the Region**.**

6.11 Action by the SAM Office to support SAM States in achieving or maintaining EI and the level of SSP maturity established in the strategic objectives of this plan

6.3.14 The SAM Office, through its regular programme, will plan and execute missions to support its member States in the planning and execution of their national safety plans. These missions may be virtual or face-to-face, and will be reflected in the programme of activities of the Regional Officers responsible for the CEs.

6.12 Action by the SRVSOP to support SAM States in achieving or maintaining EI and the level of SSP maturity established in the strategic objectives of this plan

6.3.15 The SRVSOP, through its annual programme of activities, will plan and execute missions to support its member States in the planning and implementation of their national safety plans. These activities will be reflected in the programmes of activities of the SRVSOP Technical Committee experts responsible for the CEs. Technical assistance missions may be virtual or face-to-

face, depending on the established assistance programme.

7. E ffective implementation by SAM States with respect to the USOAP CMA audit areas

Within the framework of the USOAP CMA, ICAO has established the following audit areas: primary aviation legislation and civil aviation regulations (LEG), civil aviation organisation (ORG); personnel licensing and training (PEL); aircraft operations (OPS); airworthiness (AIR); aircraft accident and incident investigation (AIG); air navigation services (ANS); and aerodromes and ground aids (AGA).

7.1 Primary aviation legislation and specific operating regulations (LEG)

7.1.1. Introduction

7.1.1.1 The *primary aviation legislation and specific operating regulations (LEG)* audit area comprises 27 protocol questions (PQs) that address the required legislative and regulatory aspects required for a State to meet its obligations and responsibilities under the Convention on International Civil Aviation and its Annexes.

7.1.1.2 The term "legislation" is used in the PQs as a generic term that includes primary aviation legislation and specific operating regulations.

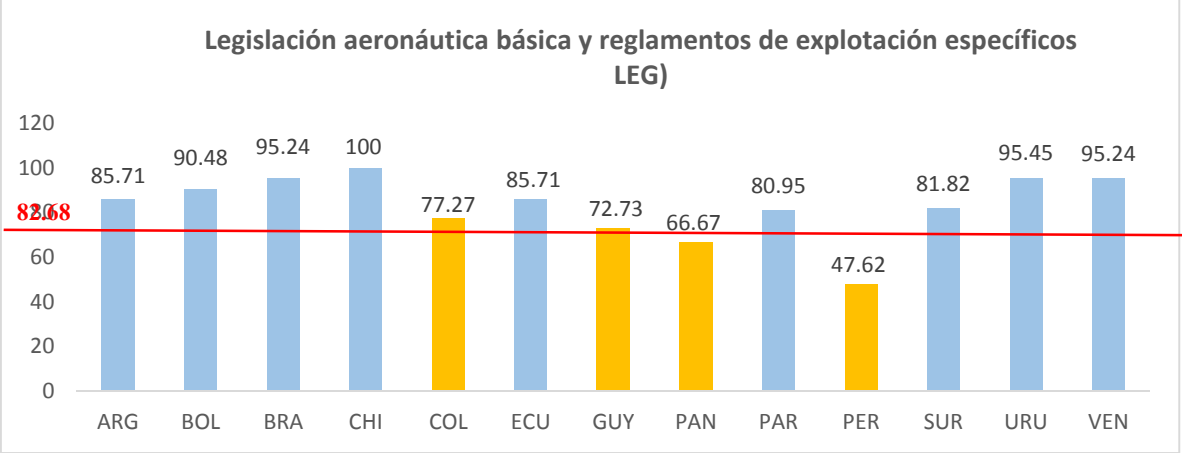
7.1.1.3 The term "primary aviation legislation" used in the USOAP CMA PQs includes all types of provisions and/or instruments that have been enacted and are applicable in the State (*e.g.*, laws, acts, codes, and international treaties).

7.1.2 Current status

7.1.2.1 *Table 7-1 – Effective implementation of LEG in SAM States* shows the performance of each SAM State with respect to the primary aviation legislation and specific operating regulations (LEG) audit area.

7.1.2.2 Table 7-1 shows that four States are below the 82.68% average EI of the SAM Region in the LEG audit area.

Table 7-1 – Effective implementation of LEG in SAM States (December 2017)



7.2 Civil aviation organisation (ORG)

7.1.3 Introduction

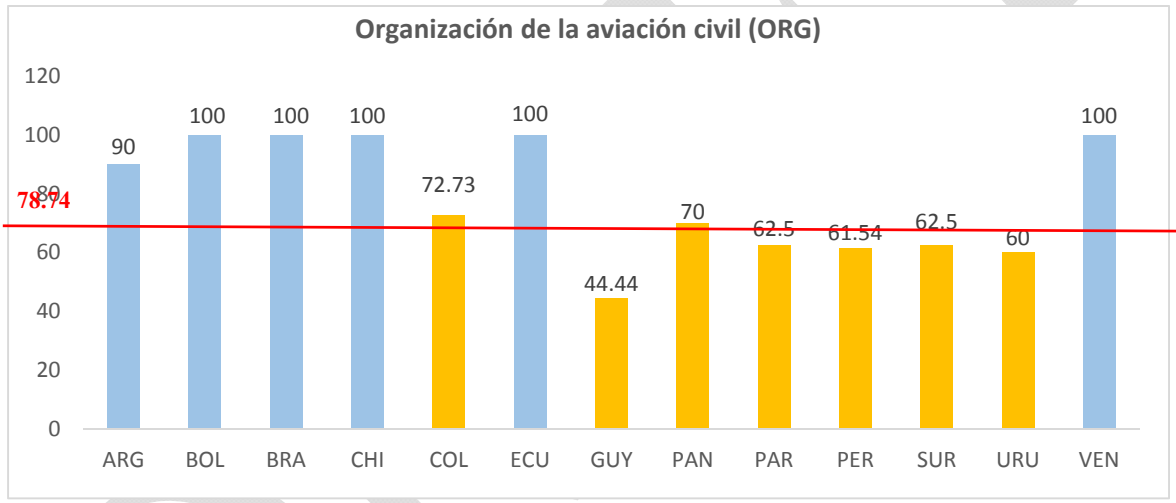
7.1.3.1 The *civil aviation organisation (ORG)* audit area comprises 27 protocol questions (PQs) that address aspects related to the State civil aviation system and safety oversight functions; technical personnel qualification and training; and facilities, equipment and documentation.

7.1.4 Current status

7.1.4.1 *Table 7-2 – Effective implementation of ORG in SAM States* shows the performance of each SAM State with respect to the civil aviation organisation (ORG) area.

7.1.4.2 Table 7-2 shows that seven (7) States are below the 75.22% average EI of the SAM Region.

Table 7-2 – Effective implementation of ORG in SAM States (December 2017)



7.3 Personnel licensing and training (PEL)

7.1.5 Introduction

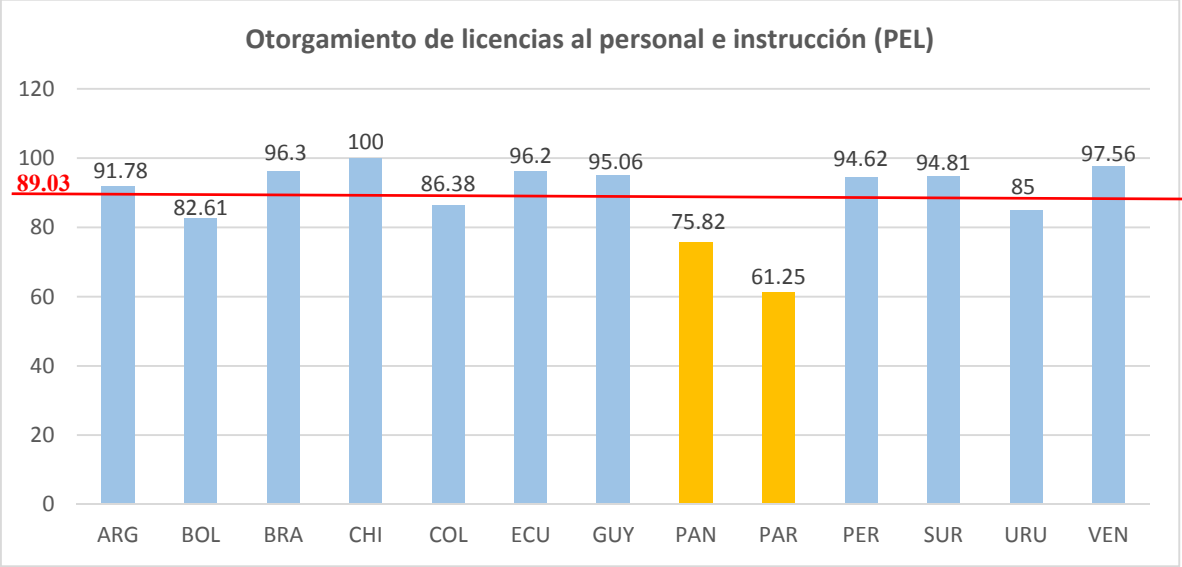
7.1.5.1 The personnel licensing and training (PEL) audit area comprises 111 protocol questions (PQs) that address aspects related to legislation and regulations; organisation, staffing and training; facilities, equipment and documentation; granting of licences and ratings; conversion and validation of foreign licences; exams; medical evaluation; language proficiency; record-keeping; and approval and oversight of training organisations.

7.1.6 Current status

7.1.6.1 *Table 7-3 – Effective implementation of PEL in SAM States* shows the performance of each SAM States in the area of personnel licensing and training (PEL).

7.1.6.2 Table 7-3 shows that five (5) States are below the 89.03% average EI of the SAM Region.

Table 7-3 – Effective implementation of PEL in SAM States (December 2017)



7.4 Aircraft operations (OPS)

7.4.1 Introduction

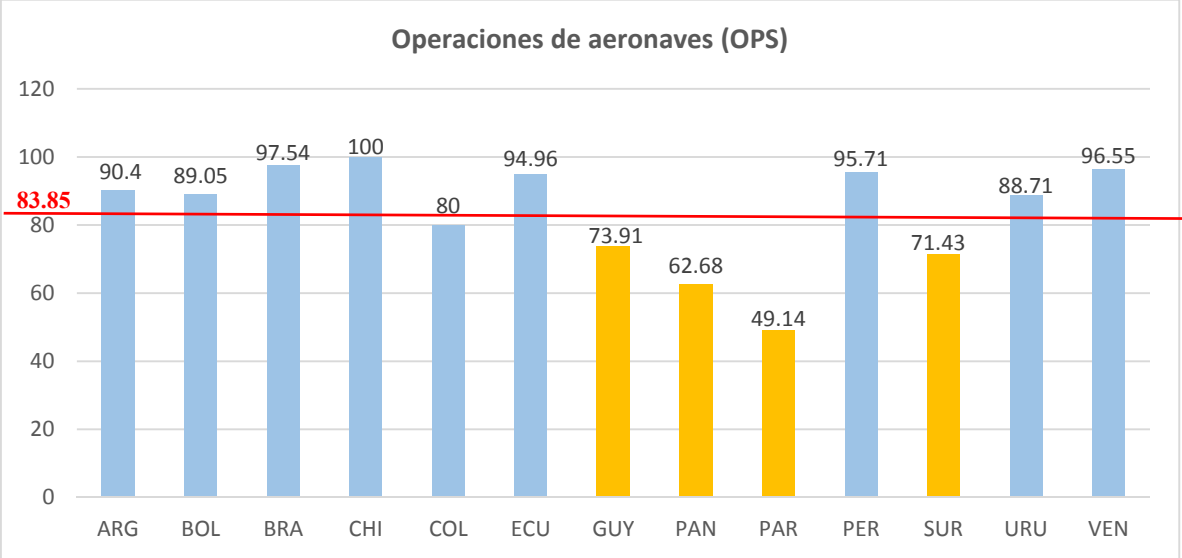
7.4.1.1 The *aircraft operations (OPS)* audit area comprises 158 protocol questions (PQs) that address aspects related to legislation and regulations; organisation, staffing and training; facilities, equipment and documentation; delegation and transfer of responsibilities; AOC requests; review of the documentation of aircraft operators; training of aircraft operators; crew schedules and control of operations; fatigue risk management system (FRMS); security measures; ground handling; SMS of aircraft operators; dangerous goods; oversight of aircraft operators; and resolution of safety concerns.

7.4.2 Current status

7.4.2.1 *Table 7-4 – Effective implementation of OPS by SAM States* shows the performance of each SAM State with respect to the area of aircraft operations (OPS).

7.4.2.2 Table 7-4 shows that five (5) States are below the 83.85% average EI of the SAM Region.

Table 7-4 – Effective implementation of OPS in SAM States (December 2017)



7.5 Airworthiness (AIR)

7.5.1 Introduction

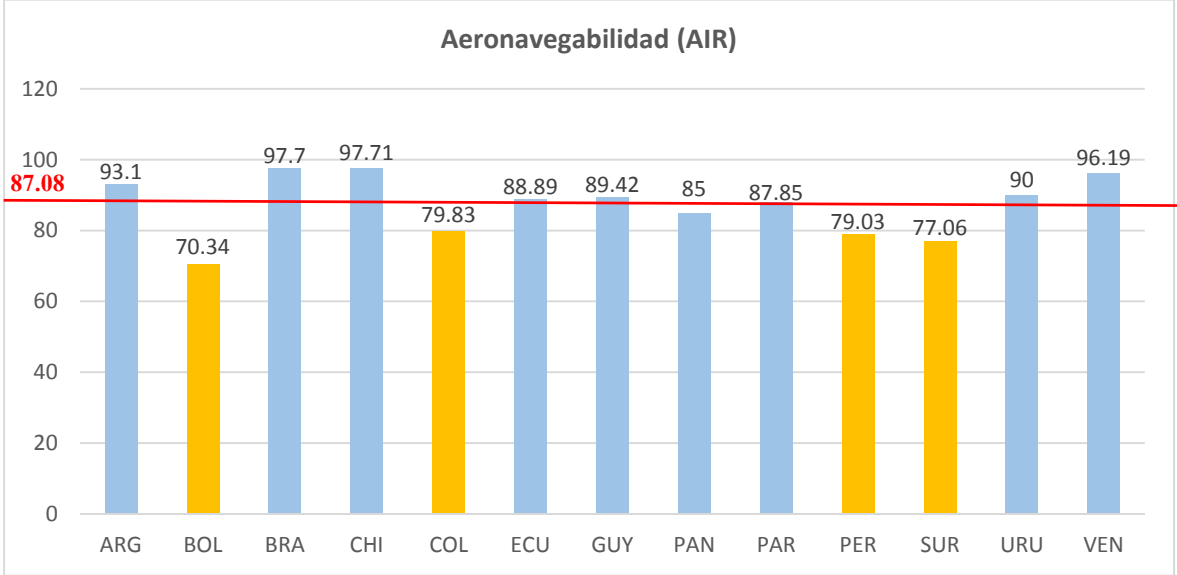
7.5.1.1 The *airworthiness (AIR)* audit area comprises 242 protocol questions (PQs) that address aspects related to legislation and regulations of the airworthiness inspection division (DIA); organisation, staffing and training (DIA); aircraft registration; airworthiness certification and other authorisations; responsibilities of the State of registry / operator with respect to continuing airworthiness; certification of airworthiness of aircraft operators; approved maintenance organisations (AMO); airworthiness oversight (DIA); resolution of safety concerns – AIR (DIA); legislation and regulations of the airworthiness technical division (DTA); organisation, staffing and training (DTA); DTA facilities and equipment; type certificate; additional responsibilities of the State of design concerning continuing airworthiness; design organisations; production activities; delegation and transfer of responsibilities (DTA); airworthiness oversight (DTA) and resolution of safety concerns – AIR (DTA).

7.5.2 Current status

7.5.2.1 *Table 7-5 – Effective implementation of AIR in SAM States* shows the performance of each SAM State in the primary aviation legislation and specific operating regulations (LEG) area.

7.5.2.2 Table 7-5 shows that five (5) States are below the 87.08% average EI of the SAM Region.

Table 7-5 – Effective implementation of AIR in SAM States (December 2017)



7.6 Aircraft accident and incident investigation (AIG)

7.6.1 Introduction

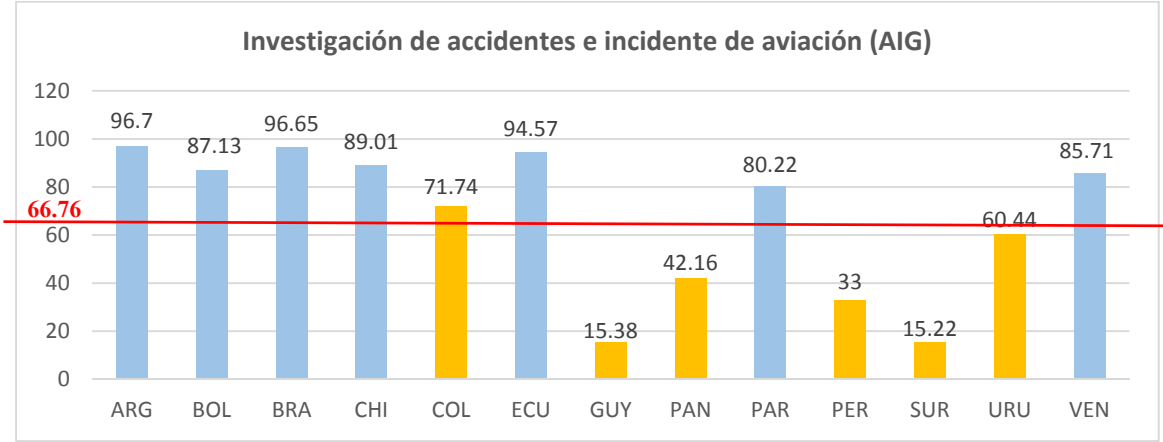
7.6.1.1 The *aircraft accident and incident investigation (AIG)* audit area comprises 109 protocol questions (PQs) that address aspects related to legislation and regulations; organisation, staffing and training; facilities, equipment and documentation; reporting of accidents and serious incidents; participation in investigations conducted by other States; participation of other States in accident and incident investigations; conduction of aircraft accident and serious incident investigations; safety recommendations; completion and dissemination of the final report; delivery of ADREP reports; and reporting, recording and analysis of accidents and incidents.

7.6.2 Current status

7.6.2.1 *Table 7-6 – Effective implementation of AIG in SAM States* shows the performance of each SAM State in the area of aircraft accident and incident investigation (AIG).

7.6.2.2 Table 7-6 shows that five (5) States are below the 66.76% average EI of the SAM Region.

Table 7-6 – Effective implementation of AIG in SAM States (December 2017)



7.7 Air navigation services (ANS)

7.7.1 Introductionj

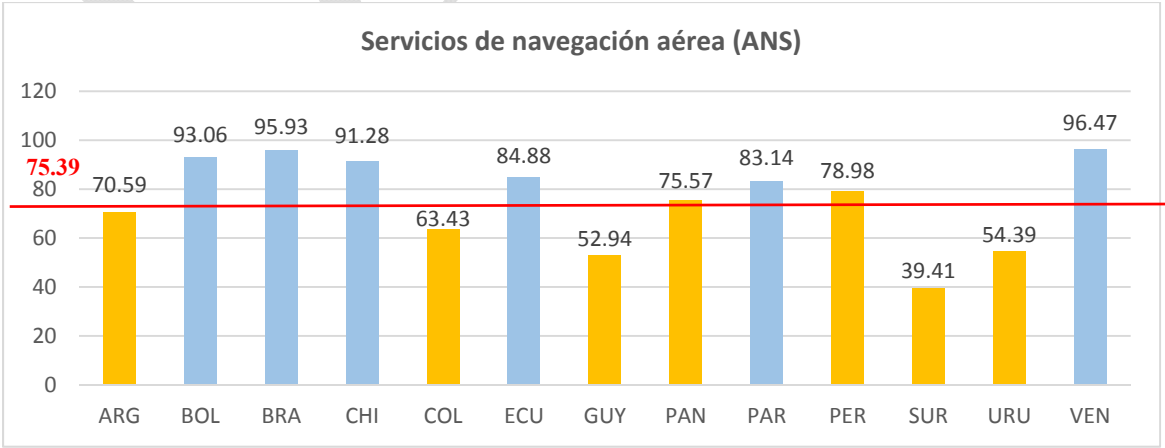
7.7.1.1 The *air navigation services (ANS)* audit area comprises 191 protocol questions (PQs) that address aspects related to legislation and regulations; ANS organisational structure; facilities, equipment and documentation; ANS – general; ANS inspectors; training of ANS inspectors; ANS inspector staffing; ANS operational and training personnel; SSP/SMS; ATS; PANS-OPS; AIS; aeronautical charts; MET and SAR.

7.7.2 Current status

7.7.2.1 *Table 7-7 – Effective implementation of ANS in SAM States* shows the performance of each SAM State in the area of air navigation services (ANS).

7.7.2.2 Table 7-7 shows that six (6) States are below the 75.39% average EI of the SAM Region.

Table 7-7 – Effective implementation of ANS in SAM States (December 2017)



7.8 Aerodromes and ground aids (AGA)

7.8.1 **Introduction**

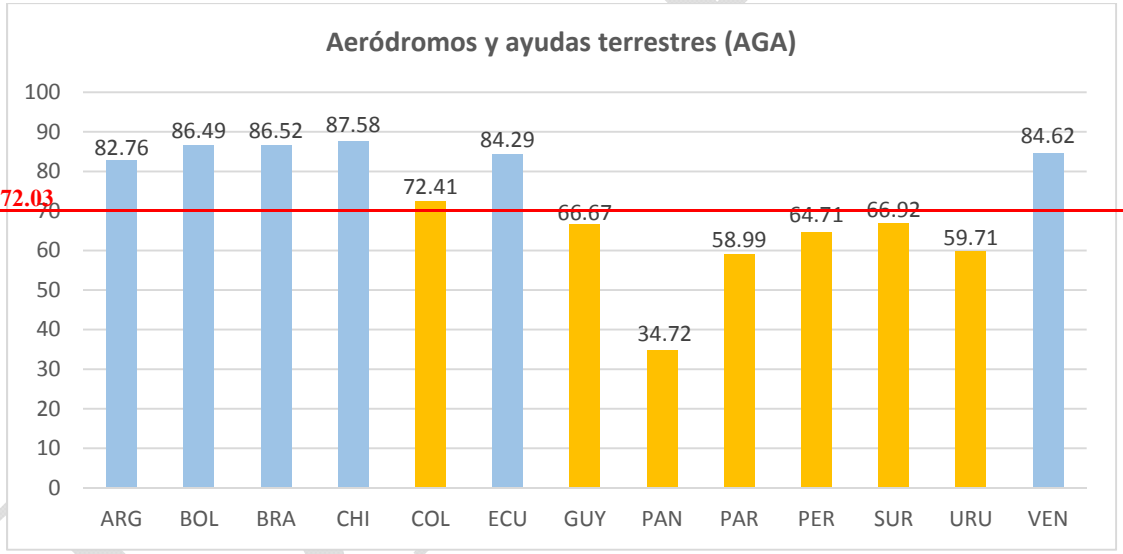
7.8.1.1 The *aerodromes and ground aids (AGA)* audit area comprises 182 protocol questions (PQs) that address aspects related to legislation and regulations; organisation, staffing and training; facilities, equipment and documentation; aerodrome certification – general; aerodrome manual; provision of aerodrome data and coordination; physical characteristics, facilities and equipment; aerodrome visual aids; aerodrome maintenance; safety procedures for aerodrome operations; SMS / aeronautical studies / risk assessments; heliport characteristics and aerodrome surveillance.

7.8.2 **Current status**

7.8.2.1 *Table 7-8 – Effective implementation of AGA in SAM States* shows the performance of each SAM State with respect to the aerodromes (AGA) area.

7.8.2.2 Table 7-8 shows that six (6) States are below the 72.03% average EI of the SAM Region.

Table 7-8 – Effective implementation of AGA in SAM States (December 2017)



7.9 Action taken by each State to achieve or maintain EI and the level of SSP maturity established in the strategic objectives of this plan

7.9.1 Based on the EI obtained in each audit areas, SAM States will include in their national safety plans the activities required to attain or maintain the strategic objectives of the SAM Region established in Table 4-1 – Strategic objectives of the SAM Region, shown in Chapter 4 of this plan. The corrective action plans developed by the States for the audit areas will be consistent with the level of EI obtained and the level of maturity achieved in SSP implementation. The lower the level of EI and maturity of SSP implementation, the greater the effort to be made by the State to reach the strategic objectives established in the Region.

7.10 Action taken by the SAM Office to support SAM States in achieving or maintaining EI and the level of SSP maturity established in the strategic objectives of this plan

7.10.1 The SAM Office, through its regular programme, will plan and conduct missions to support its member States in the planning and implementation of their national safety plans. These activities will be reflected in the programme of activities of the Regional Officer in charge of each audit area.

7.11 Action taken by the SRVSOP to support SAM States in achieving or maintaining EI in the LEG, ORG, PEL, OPS, AIR, ANS and AGA areas and the level of SSP maturity established in the strategic objectives of this plan

7.11.1 The SRVSOP, through its annual programme of activities, will plan and conduct missions to support its member States in the planning and implementation of their national safety plans. These activities will be reflected in the programme of activities of the SRVSOP Technical Committee expert in charge of the audit area.

7.12 Action by the ARCM to support SAM States in achieving or maintaining EI in the AIG area and the level of SSP maturity established in the strategic objectives of the plan

7.12.1 The ARCM, through its annual programme of activities, will plan and conduct missions to support its member States in the planning and implementation of their national safety plans with respect to the AIG area. These activities will be reflected in the programme of activities of the ARCM Technical Committee expert in charge of AIG.

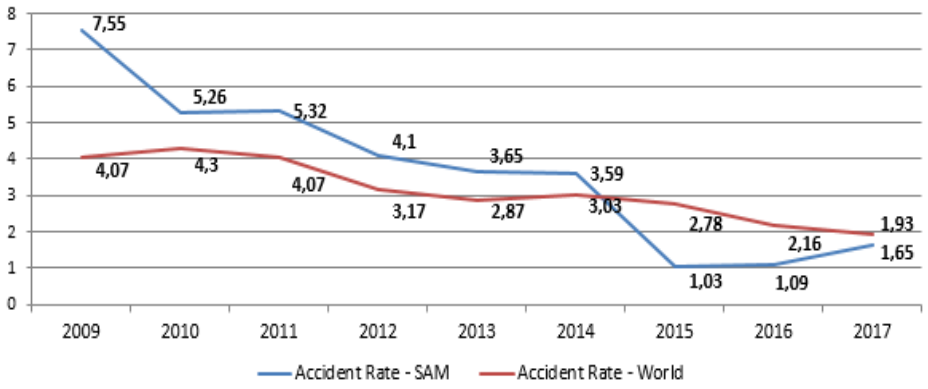
ATTACHMENT C

Analysis of aircraft accidents in the SAM Region

1. Analysis of accidents occurred in the SAM Region in scheduled air transport operations with aircraft over 5 700 kg during the period 2009-2016

1.1 According to the information contained in ICAO iSTARS-3, the accident rate in South America in scheduled commercial air transport operations with aircraft over 5 700 kg has been gradually decreasing since 2009 until reaching in 2015 a rate of **1.03** accidents per 1,000,000 departures, far below the global rate of **2.78**. In 2016, the rate for the SAM Region was **1.09** versus a world rate of **2.16**. In 2017, the SAM Region rate increased slightly to **1.65** versus a world rate of **1.93**. In the last 3 years (2015, 2016 and 2017), the SAM Region has maintained an accident rate below the world rate, thus giving compliance to the Declaration of Bogota.

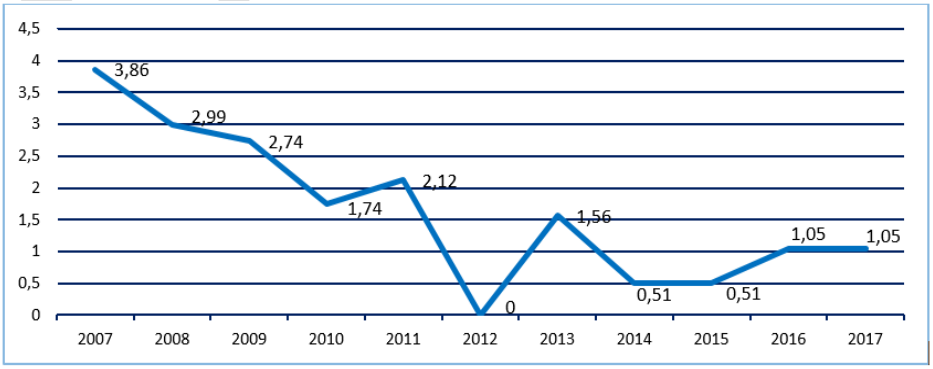
Table 1 – Accident rate in scheduled commercial air transport operations with aircraft over 5 700 kg



2. Analysis of accidents due to runway excursions (REs) occurred in the SAM Region in scheduled air transport operations with aircraft over 5 700 kg during the period 2007-2016

2.1. Based on the information contained in the ICAO iSTARS-3, the rate of accidents due to REs has been gradually decreasing since 2007, except in 2011 and 2013, when rates increased before dropping significantly. In 2016, the rate increased slightly and remained stable in 2017.

Table 2 – Rate of accidents due to REs in the SAM Region 2007-2016

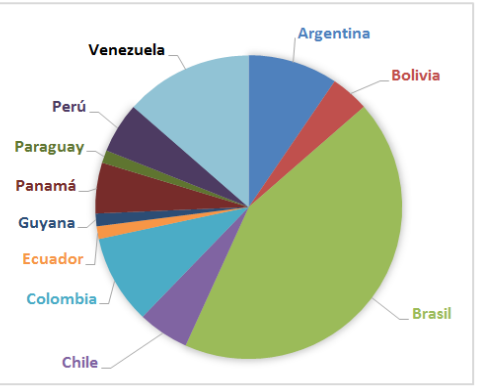


3. Analysis of accidents due to runway excursions (REs) occurred in the SAM Region in all operational segments and with aircraft of all weights

3.1. In order to analyse the increase in the number of accidents due to REs in the SAM Region during 2016, the South American AIG Regional Cooperation Mechanism (ARCM) conducted a study in this accident category using its safety data collection and processing system (SDCPS). The following charts show the number of occurrences, by State, for aircraft of all weights, aircraft over 2250 kg, and aircraft of 2250 kg or less.

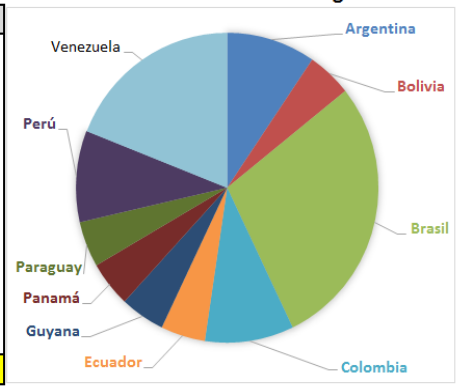
Cantidad de sucesos por Estado

Estados	Sucesos
Argentina	7
Bolivia	3
Brasil	32
Chile	4
Colombia	7
Ecuador	1
Guyana	1
Panamá	4
Paraguay	1
Perú	4
Venezuela	10
Total:	74



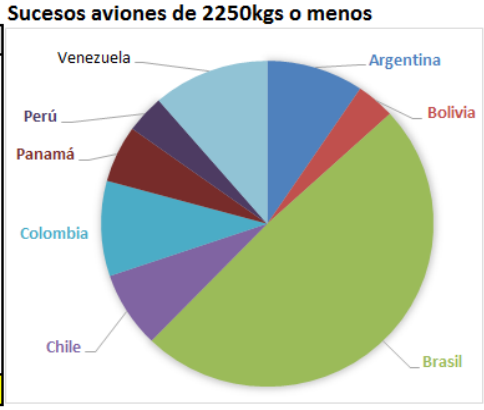
Sucesos aviones de más de 2.250kgs

País	Sucesos
Argentina	2
Bolivia	1
Brasil	6
Chile	
Colombia	2
Ecuador	1
Guyana	1
Panamá	1
Paraguay	1
Perú	2
Venezuela	4
Total:	21



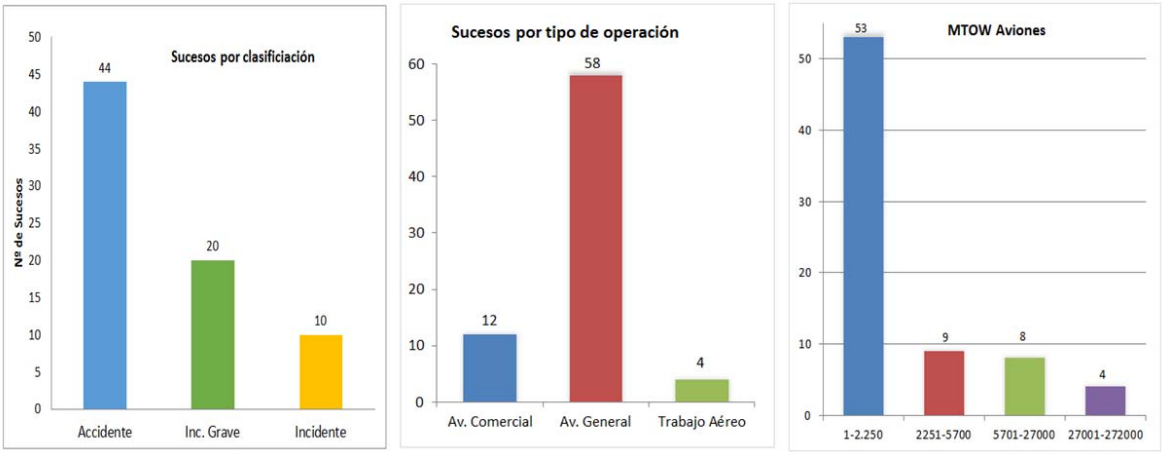
Sucesos aviones de 2250kgs o menos

Estado	Sucesos
Argentina	5
Bolivia	2
Brasil	26
Chile	4
Colombia	5
Ecuador	
Guyana	
Panamá	3
Paraguay	
Perú	2
Venezuela	6
Total:	53



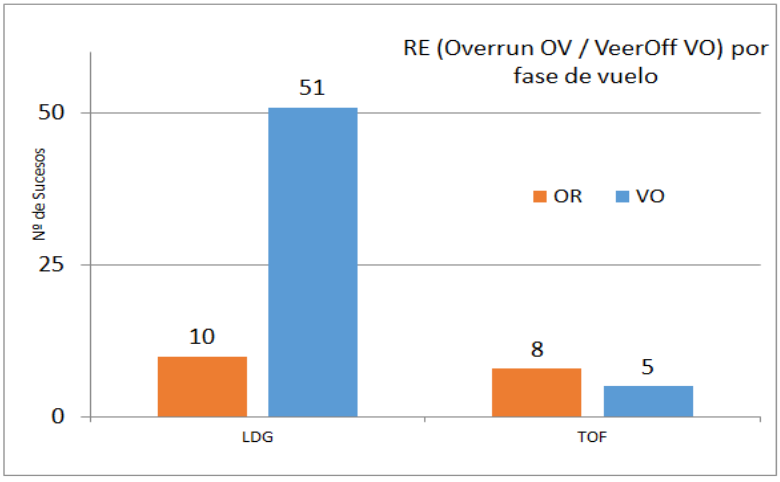
3.2. The charts show that the segment with more occurrences is that of aircraft of less than 2 250 kg, with **53 accidents** out of a total of **74 accidents** due to runway excursions that occurred in 2016. It may also be noted that States with more traffic volume have more occurrences.

3.3. The following charts show the classification of occurrences as accidents, serious incidents, and incidents; by type of operation, and by maximum certificated take-off weight:

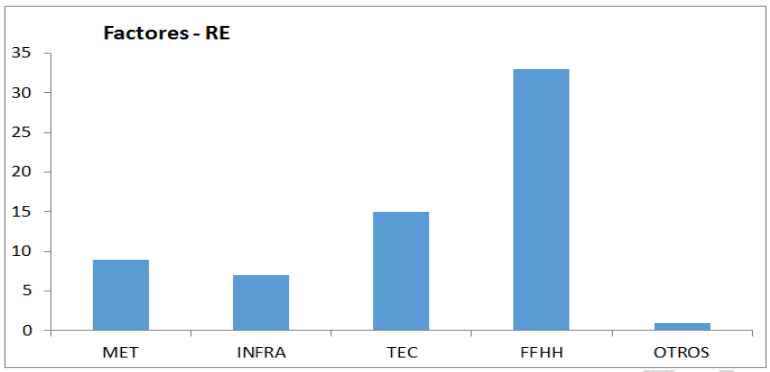


3.4. The chart of occurrences classified as accidents, serious incidents and incidents, shows that most events correspond to accidents. The chart by type of operation shows that most occurrences correspond to general aviation, while in the chart by aircraft weight, most occurrences are in the 1 to 2250 kg category. Based on the above, the area of greatest concern for the SAM Region should be general aviation, minor commercial aviation, and aircraft between 1 and 2250 kg. Another obvious aspect is the lack of incident reporting, which should exceed the number of serious incident and accident reports.

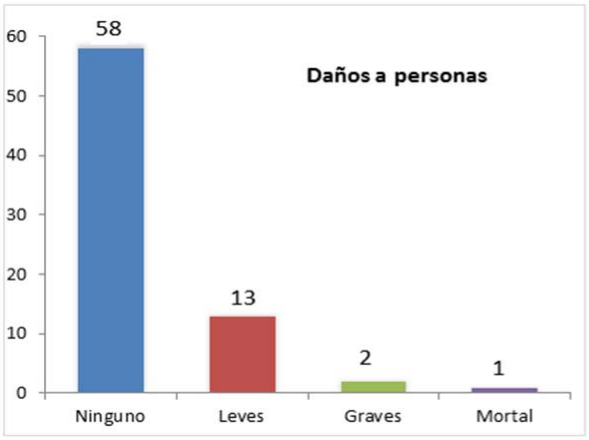
3.5. Taking into account the flight phase in which REs occurred, it may be noted that the largest number of occurrences corresponds to the landing phase and veer-offs.

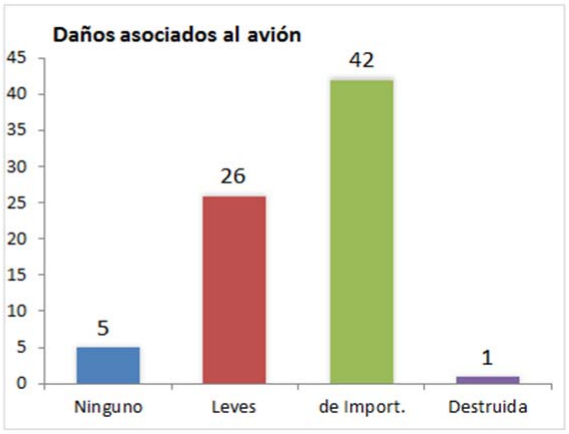


3.6. Based on the analysis performed, the main contributing factors to runway excursions were: meteorology (MET), infrastructure (INFRA), technical factors (TEC) and human factors (FFHH), where human factors contributed the most to RE accidents. The distribution of these factors is as follows:



3.7. Regarding the distribution of harm to individuals and damage to aircraft, it may be noted that there was one fatality and forty-two (42) cases of major damage associated to aircraft.





4. Conclusions

4.1 Based on the analysis performed, the work team concluded that the following general contributing factors were present in the occurrences observed: **Human factors,** including all those related to, and affecting, the proper performance of crews; **Technical factors**, including all mechanical failures that restrict the defensive technological barriers available in the aircraft; **Meteorological factors**, that condition the environment in which REs occur; and **Infrastructure factors**, which contribute directly to the cause of REs or condition the severity of the damage caused in REs.

4.2 In those study cases in which the RE occurred during the landing phase, a recurrent factor was the fact that the pilot did not identify being in an unstable approach, and that a decision to execute a missed approach could have been made. This situation was reached due to lack of experience, lack of training or inadequate CRM, possibly due to deficiencies in these concepts.

4.3 In those cases in which a technical failure triggered the event, it is presented as a conditioning factor of pilot behaviour.

4.4 The same applies to those case studies in which meteorological conditions had previously affected the runway surface or were present at the time of the event, adversely affecting landing conditions, and preventing the crew from manoeuvring to execute normal landing procedures.

5. Proposed mitigation action

5.1 The working group proposed the following mitigation action:

5.2 Generate proper training activities during the initial and recurrent training stages to enable crews to identify and act upon the variables that constitute triggering factors of an RE, highlighting that training should take into account the places where flights take place, the types of aircraft, and their type of power-unit.

5.3 For good training planning, it is necessary to know and weigh the variables that constitute contributing factors to an RE, and assess the preparedness of crews for their identification and proper handling. Based on these concepts, it is recommended that aircraft operators be required to implement a safety management system, from which guidelines can be generated on the objectives and competencies to be achieved by crews.

5.4 The Fourth Meeting of AIG Authorities of South America (AIG-SAM/4), held in Brasilia, Brazil, on 23-25 May 2017, took note of the results of the analysis conducted by the ARCM runway excursions (RE) working group regarding the contributing factors or system deficiencies present in accidents or incidents related to runway excursions (REs), as well as the preventive measures that should be implemented promptly to improve safety in the Region, based on the preliminary reports of RE accidents and incidents occurred in the SAM Region in 2016 with aircraft of all weights. In this regard, the Meeting adopted the following recommendation and conclusion:

RECOMMENDATION AIG-SAM/04-01 Generate and/or strengthen proper training activities

That States foster mitigation measures to generate and/or strengthen proper training activities by their air service operators during the initial or recurrent training stage, so that the crews may identify and act upon the variables that make up the factors that trigger REs, highlighting that training should take into account the places where flights take place, the types of aircraft and their power-units.

CONCLUSION AIG-SAM/04-07 Deepen the analysis of runway excursions (REs) in order to propose further mitigation measures to the States

That the ARCM RE task force deepen its RE analysis so that it may propose mitigation measures to the States, such as programmes for raising awareness on REs and how to avoid them. The proposed mitigation measures will be sent to the States using the *fast-track* communication mechanism.

5.5 Based on the aforementioned recommendation and conclusion, the task force has initiated the corresponding work to deepen its analysis of REs in order to propose mitigation measures to SAM States, such as programmes for raising awareness on REs and how to avoid them. The proposed mitigation measures will be sent to the States using the *fast-track* communication mechanism.

ATTACHMENT D

Methods used for calculating indicators, slopes, goals and alert levels for aircraft accidents and RE accidents in scheduled commercial air transport operations with aircraft over 5 700 kg

1. Introduction

1.1 Within the context of the SSP, the collective safety performance indicators (SPIs) of the State and its criteria for setting the corresponding objectives and alerts will facilitate the control and measurement of the collective performance of its aviation industry. Accordingly, a tool is required to allow the State to select the appropriate indicator package from a safety indicator bank for the purpose of controlling and measuring its SSP. The established safety indicators and their respective goals and alert settings will serve as a mechanism to measure and control safety and achieve the acceptable level of safety performance (ALoSP).

2. Need to establish standard calculation methods to compare indicators, slopes, goals, and alert levels

2.1 In order to monitor, control and measure collective and individual performance of the Region, the States, and the service providers, it is necessary to develop standard calculation methods that will make it possible to compare the established indicators, slopes, goals, and alert levels. These calculation methods will also permit the identification of trends based on indicator measurements, and thus the establishment of the respective goals and alerts for future periods.

3. Calculation of indicators

3.1 The calculation of safety performance indicators will be expressed in accident rates for a given number of departures and harmonised at State, regional and global level. The calculation factor for the number of departures will be less than the number of total departures of the State.

4. Calculation of slopes and goals

4.1 In accordance with Appendix 4 to Chapter 4 of Doc 9859, Third edition, this plan uses a methodology based on the determination of the mean value (arithmetic average) of measurements obtained from the indicators in each period under study (sampled). With these values, the standard deviation is obtained. In order to define the goals, the proposal is to use the mean obtained and apply an imposed improvement percentage, so as to obtain an expected value for future exercises, taking into account alert values obtained by adding one, two or three standard deviations. Upon completion of the new period, the measured value is compared with the expected value. If they do not match, they are checked to see if alert levels have been exceeded and if these have exceeded the criteria established for each of them.

4.2 The application of this methodology to accident rates in the SAM Region results in the following:

Figure D-1 – Rate of accidents worldwide and in the SAM Region

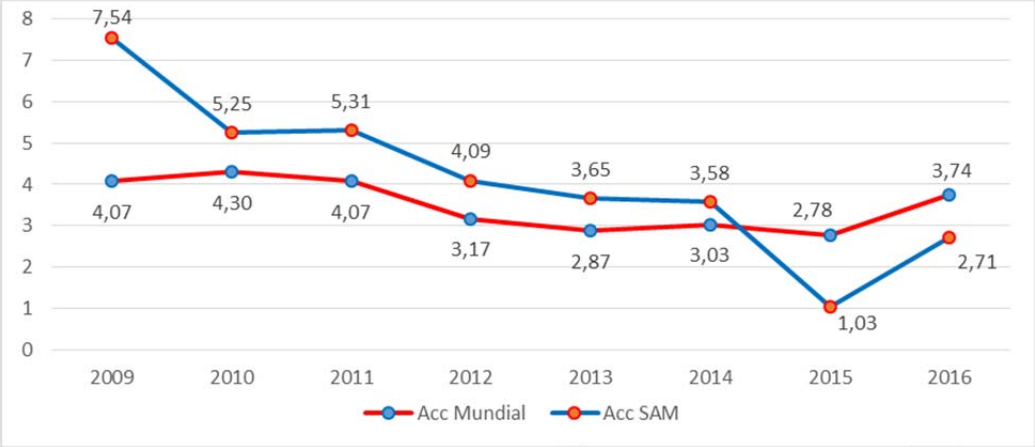
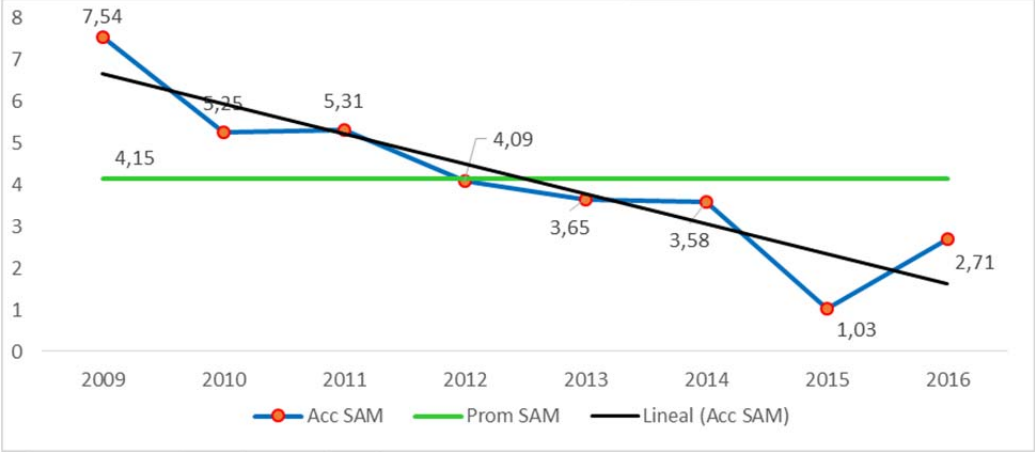


Figure D-2 – Average of accidents (4.15) and trend line in the SAM Region



4.3 Based on the above figures, the following analysis and proposal is made:

a) The average rate of accidents in the SAM Region between 2009 and 2016 was 4.15 accidents per million departures, depicted in Figure D-2 with a green line parallel to the abscissae. If we apply the aforementioned concept to the establishment of goals, *e.g.* reducing the current average accident rate by 10%, we obtain an expected value of 3.74 accidents per million departures for future periods. However, it may be noted that, for the last five years under study (2012, 2013, 2014, 2015 and 2016), the measured value was much less than the mentioned average.

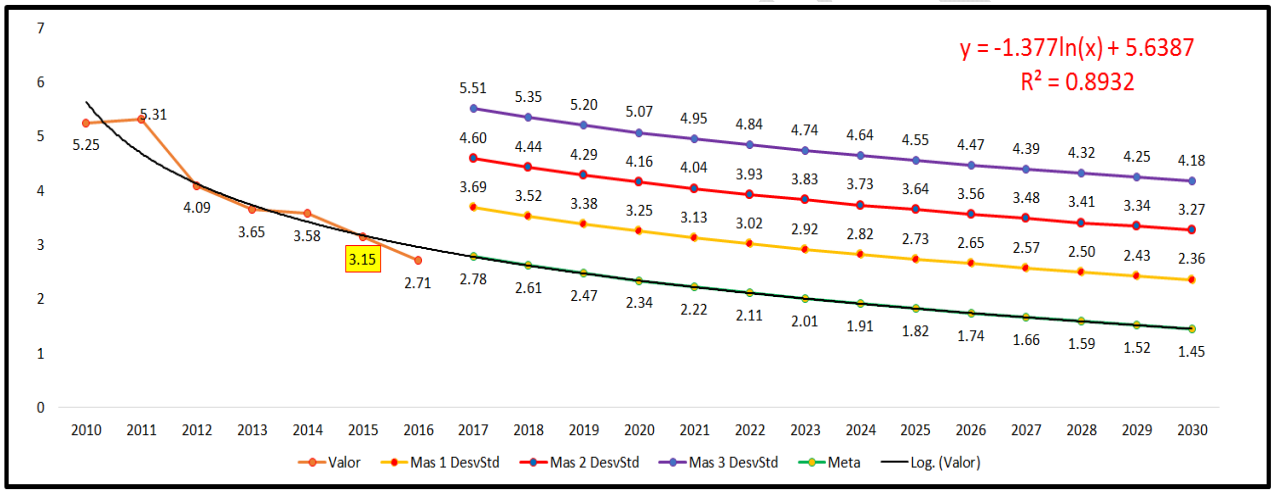
b) Therefore, it is proposed to consider a line that represents the trend of the measured values, the slope of which would be used to outline any increases and decreases. This is shown in Figure D-2 through the downward straight black line. If this line is used to define the function that represents it, it will be equal to "y" and "y" is = - 0.67 x + 7.25; accordingly, there is a negative slope whose reference value is -0.67. This is a value to be monitored when making the calculations in future periods, to see if it improves or gets worse.

c) If the objective is to infer the expected values in future periods, the use of the trend line based on a linear function would not be the most appropriate, since, as shown in Figure D-2, the slope obtained, if extrapolated, would lead to negative values in future periods, which would be unacceptable.

d) In view of this, the proposal is to disregard the value measured in 2009, and use the sample for years 2010 to 2016, and obtain a compromise value that softens the effect of the value measured in 2015. This latter value could be calculated by adding the value measured for 2014 and the value for 2016, and divide it by 2, that is (3.58 + 2.71) / 2 = 3.15.

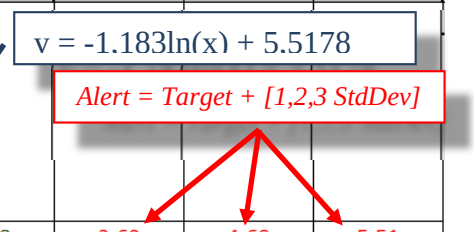
e) After obtaining these values, an analysis should be made of the best function leading to a statistical "regression analysis" for obtaining an optimum "correlation". In the case under study, the logarithmic function was considered, as shown below:

Figure D-3 – Logarithmic trend line, goals equivalent to the trend line values, and alert levels



The values represented and expressed in the graph are those obtained from the table below. It may be noted that the values obtained from 2017 onwards are calculated for the "value" column based on the equation of the trend line function, the independent variable (x) is the number of order of the period under study, and one, two or three standard deviations are added to each alert value obtained.

Indice ACC SAM		Meta	Alertas		
Año	Valor	0%	Mas 1 DesvStd	Mas 2 DesvStd	Mas 3 DesvStd
2010	5.25				
2011	5.31				
2012	4.09				
2013	3.65				
2014	3.58				
2015	3.15				
2016	2.71				
2017	2.78	2.78	3.69	4.60	5.51
2018	2.61	2.61	3.52	4.44	5.35
2019	2.47	2.47	3.38	4.29	5.20
2020	2.34	2.34	3.25	4.16	5.07
2021	2.22	2.22	3.13	4.04	4.95
2022	2.11	2.11	3.02	3.93	4.84
2023	2.01	2.01	2.92	3.83	4.74
2024	1.91	1.91	2.82	3.73	4.64
2025	1.82	1.82	2.73	3.64	4.55
2026	1.74	1.74	2.65	3.56	4.47
2027	1.66	1.66	2.57	3.48	4.39
2028	1.59	1.59	2.50	3.41	4.32
2029	1.52	1.52	2.43	3.34	4.25
2030	1.45	1.45	2.36	3.27	4.18



4.4 Based on Figure D-3, the following analysis is conducted:

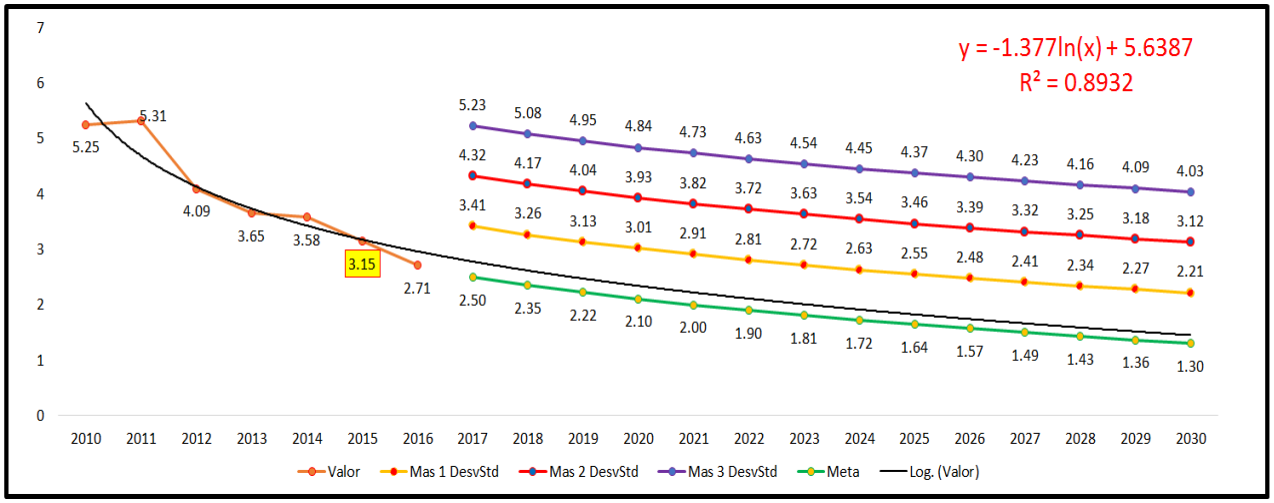
a) For the function under consideration, it may be noted that the slope line is the closest to the representation of the reference values (from 2010 to 2016), since the correlation coefficient (R2) is equal to 0.8932, *i.e.*, close to 1, which indicates a close correlation.

b) Using the obtained function and since there is a need to define the expected values for several periods (up to 2030), the periods were extrapolated until obtaining the expected value up to 2030 and intermediate values. This is shown in Figure D-3 with a green line.

c) Likewise, having obtained a standard deviation of the values under consideration equal to 0.862, the values of alert levels (lines) for one, two and three standard deviations can be derived, as shown in Figure D-3: yellow line for one standard deviation, red line for two standard deviations, and burgundy for three standard deviations.

d) After defining the methodology for determining the trend using a non-linear (logarithmic) function, and deducting the expected values for future periods, an improvement can be projected with the same tool, reducing the calculated value by 10% (-10%), as shown in Figure D-4.

Figure D-4 – Goals established with a 10% improvement (- 10%) based on the values calculated on the accident slope line



For the representation and expression of values in Figure D-4, the procedure used is the same as for Figure D-3. The goal is obtained from multiplying the values by 1-Meta (10%), based on which alerts are obtained for one, two and three standard deviations.

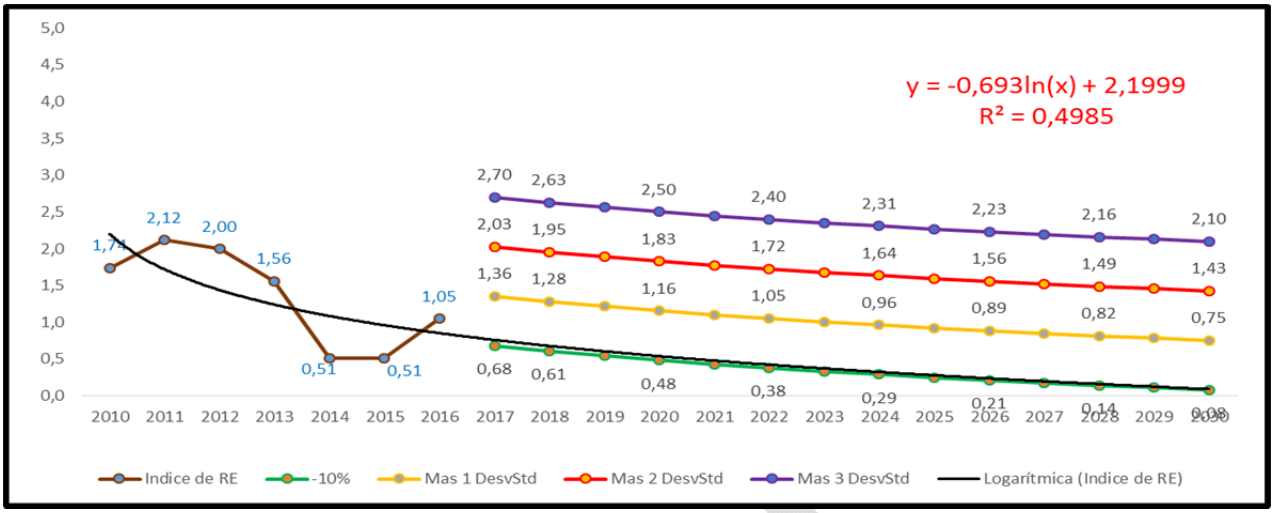
	Indice ACC SAM		Meta	Alertas		
	Año	Valor	-10%	Mas 1 DesvStd	Mas 2 DesvStd	Mas 3 DesvStd
1	2010	5,25				
2	2011	5,31				
3	2012	4,09				
4	2013	3,65				
5	2014	3,58				
6	2015	3,15				
7	2016	2,71				
8	2017	2,78	2,50	3,41	4,32	5,23
9	2018	2,61	2,35	3,26	4,17	5,08
10	2019	2,47	2,22	3,13	4,04	4,95
11	2020	2,34	2,10	3,01	3,93	4,84
12	2021	2,22	2,00	2,91	3,82	4,73
13	2022	2,11	1,90	2,81	3,72	4,63
14	2023	2,01	1,81	2,72	3,63	4,54
15	2024	1,91	1,72	2,63	3,54	4,45
16	2025	1,82	1,64	2,55	3,46	4,37
17	2026	1,74	1,57	2,48	3,39	4,30
18	2027	1,66	1,49	2,41	3,32	4,23
19	2028	1,59	1,43	2,34	3,25	4,16
20	2029	1,52	1,36	2,27	3,18	4,09
21	2030	1,45	1,30	2,21	3,12	4,03

Target = Value x (1 – Target)

Alert = Target + [1,2,3 StdDev]

4.5 This same methodology was used for runway excursion (RE) accident rates, based on the measurements and rates for years 2010 to 2016, as shown in the graph below:

Figure D-5 – Goals established with a 10% (- 10%) improvement, based on values calculated in the runway excursion (RE) accident slope line



	Indice de RE		Meta	Alertas		
	Año	Valor Estima	-10%	Mas 1 DesvStd	Mas 2 DesvStd	Mas 3 DesvStd
1	2010	1,74				
2	2011	2,12				
3	2012	2,00				
4	2013	1,56				
5	2014	0,51				
6	2015	0,51				
7	2016	1,05				
8	2017	0,76	0,68	1,36	2,03	2,70
9	2018	0,68	0,61	1,28	1,95	2,63
10	2019	0,60	0,54	1,22	1,89	2,56
11	2020	0,54	0,48	1,16	1,83	2,50
12	2021	0,48	0,43	1,10	1,77	2,45
13	2022	0,42	0,38	1,05	1,72	2,40
14	2023	0,37	0,33	1,01	1,68	2,35
15	2024	0,32	0,29	0,96	1,64	2,31
16	2025	0,28	0,25	0,92	1,60	2,27
17	2026	0,24	0,21	0,89	1,56	2,23
18	2027	0,20	0,18	0,85	1,52	2,19
19	2028	0,16	0,14	0,82	1,49	2,16
20	2029	0,12	0,11	0,78	1,46	2,13
21	2030	0,09	0,08	0,75	1,43	2,10

y = -0,693ln(x) + 2,1999

Target = Value x (1 – Target)

Alert = Target + [1,2,3 StdDev]

4.6 Upon using this methodology for available data on runway excursion (RE) accidents, it is important to clarify that other possibilities of using trend lines were analysed. However, it was noted that,

although confidence is not high, the trend line is the closest and offers the highest correlation value (R2= 0.4985).

5. Concepts used for the method

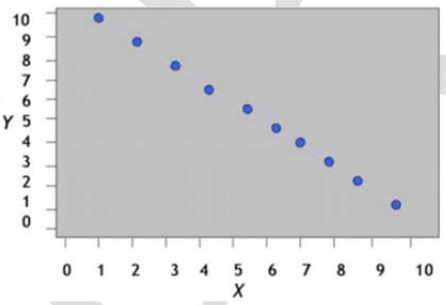
5.1 This analytical study is based on some statistical mathematical concepts related to:

a) **Regression analysis**: This is a statistical procedure that studies the functional relationship between variables, with the purpose of predicting one as a function of the other(s). This can be used to generate a dispersion diagram, which is a graph that shows the intensity and direction of the relationship between two variables of interest. These regressions can be:

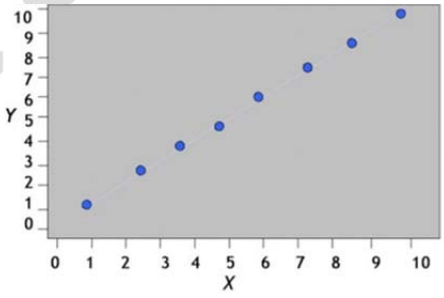
- Simple regression: only one independent variable intervenes.
- Multiple regression: two or more independent variables intervene.
- Linear regression: the function is a linear combination of the parameters.
- Non-linear regression: the function that links parameters is not a linear combination.

b) **Correlation analysis**: A set of statistical techniques used for measuring the intensity of the relationship between two variables. The correlation coefficient (R2) requires variables measured in scale of intervals or proportions.

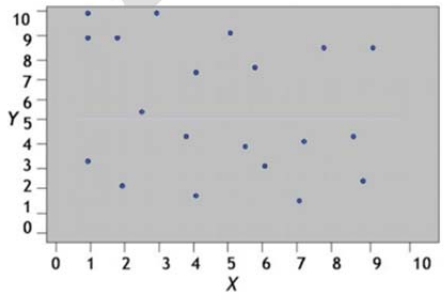
- It varies between -1 and 1.
- Values of -1 or 1 indicate a perfect correlation.
- A value equal to 0 indicates absence of correlation.
- Negative values indicate a reverse linear relationship and positive values indicate a direct linear relationship.



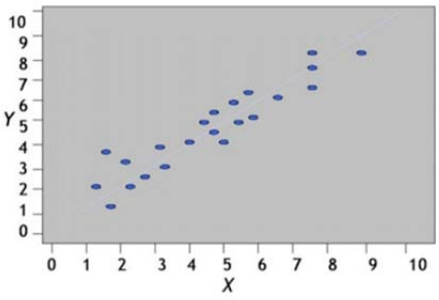
Correlación Negativa Perfecta



Correlación Positiva Perfecta



Sin Correlación



Correlación Fuerte y Positiva

5.2 MS EXCEL tools were used to determine:

a) **Slopes**: To determine these, a graph (Excel) was generated with the values obtained from the measurements in each period (accident rates). Based on the graph, the "linear" trend line was inserted in the graph to obtain a "y = m x + b" type equation to determine the slope of the "straight line", *i.e.*, the value expressed by parameter "m". This equation is expressed in the graph (the corresponding option in Excel is selected).

b) **Determination of the best trend line**: As in the previous paragraph, the "trend line" was inserted, using the one expressing the best correlation (R2) for the set of represented points (in this case, the logarithmic function was selected). Both the equation "y = -1.377ln(x) + 5.6383", as well as the correlation coefficient (R2), are expressed in the graph (to this end, the corresponding option in Excel must be selected).

c) **Determination of expected future values (extrapolation):** In order to determine these values, a column was created in the table of values to express the calculation thereof for the periods under study (future values from 2020 to 2030). This calculation is accomplished by entering in each cell the equation of the trend line "y = -1.377ln(x) + 5.6383", considering the period (year or order of same in the total data) as an independent variable (x).

6. Considerations

6.1 The methodology used showed that the best approach to this sample of values is to use the trend line as the basis for the logarithmic function. However, special attention should be paid to the function to be used, since consideration should be given to an analysis of the correlation (R2) between the value sample data and the trend line or function used.

7. Conclusions

7.1 This work permits the identification of a method to be used for calculating indicators, slopes, goals and alert levels for air accidents and RE accidents in scheduled commercial air transport operations with aircraft over 5 700 kg. It is up to the person executing the regional and State safety plan to generate a dynamic of action control and oversight, and measure the results aimed at achieving the proposed goals.

ATTACHMENT E

MODEL CONTENTS OF THE STATE SAFETY PLAN

CONTENTS

6.2 Effective safety management system that includes the eight (8) critical elements (CEs) and SSP provisions
6.3 Implementation of the safety management system (SMS) by service providers

7. Chapter 7: Work team to support safety implementation

7.1 USOAP CMA work team
7.2 SSP implementation team and SSP coordination mechanism (Committee/Board)
7.3 Teams for the implementation of mitigation measures to reduce accidents

ATTACHMENTS

As applicable

ATTACHMENT F

MODEL CORRECTIVE ACTION PLAN (CAP)

USOAP CMA PROTOCOL QUESTIONS – LEGISLATION (LEG)

PQ No.	Protocol question	Guidance for review of evidence	ICAO reference	CE	Steps	Proposed action	Office in charge	Evidence reference	Est. impl. date	Revised impl. date	Completion date	Status
1.001	Has the State promulgated primary aviation legislation to enable it to address its obligations as a signatory to the Chicago Convention?	1) Confirm title, date of promulgation, and latest amendment of all primary aviation legislation	CC Part I GM Doc 9734 Part A 3.2	CE-1	1							
		2) Verify that primary aviation legislation has been amended as required, based on the amendments to the Chicago Convention			2							
		3) Verify that the content of the legislation is consistent, sufficient (addressing all the required areas) and properly organised			3							

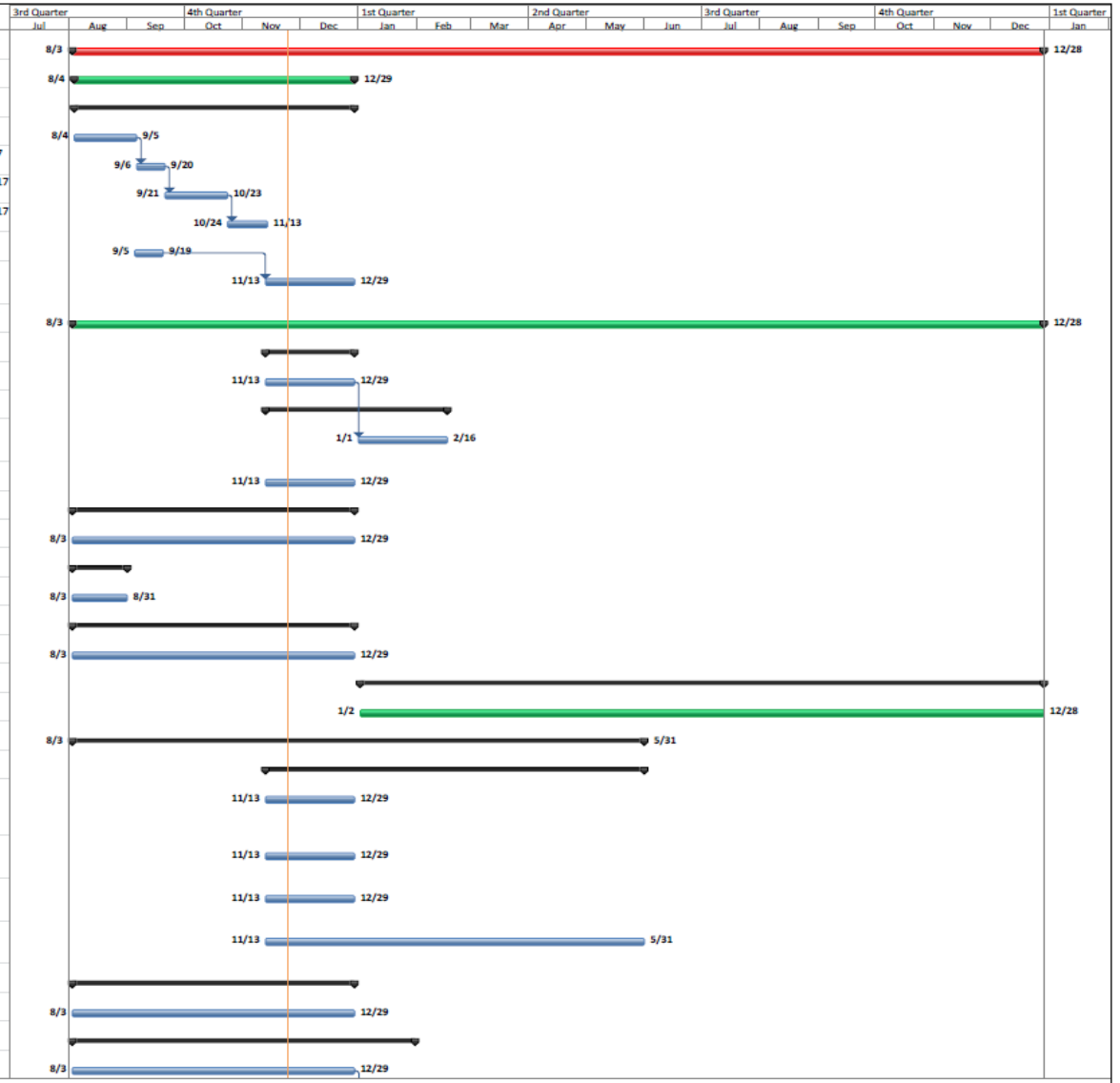
USOAP CMA PROTOCOL QUESTIONS – LEGISLATION (LEG)

PQ No.	Protocol question	Guidance for review of evidence	ICAO referen	CE	Steps	Proposed action	Office in charge	Evidence reference	Est. impl. date	Revised impl. date	Completion date	Status
1.005	Does primary aviation legislation provide for the introduction or adoption of civil aviation regulations and their subsequent promulgation?	Verify that provisions allow for the introduction/adoption of regulations that cover at least all Annexes related to the PEL; OPS (including DG); AIR; AIG; ANS; and AGA areas.	CC Part I GM Doc 9734 Part A 3.3	CE-1	1							

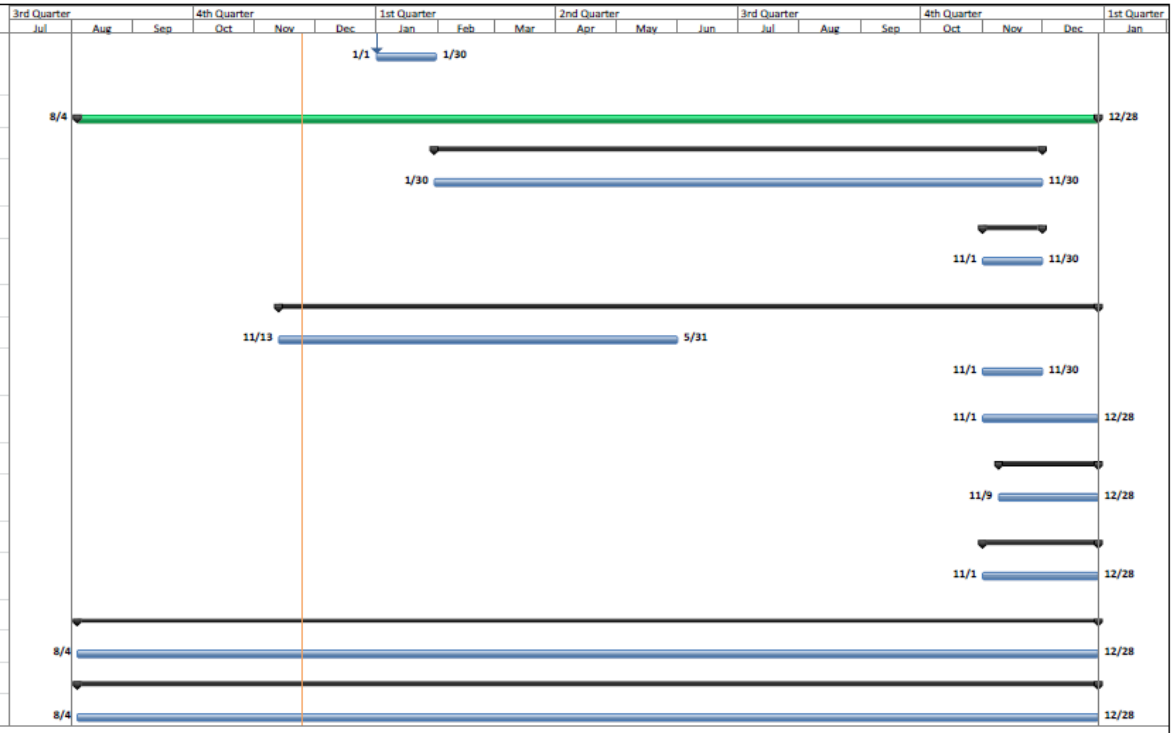
ATTACHMENT G

SSP IMPLEMENTATION PLAN

ID	Task Mod	Task Name	Duration	Start	Finish
1		**PLAN DE IMPLEMENTACIÓN DEL SSP**	**367 days**	**Thu 8/3/17**	**Fri 12/28/18**
2		**ETAPA 1**	**106 days**	**Fri 8/4/17**	**Fri 12/29/17**
3		**Elemento 1.2 del SSP (i)**	**106 days**	**Fri 8/4/17**	**Fri 12/29/17**
4		Identificar la organización apoderada del SSP y al ejecutivo responsable	23 days	Fri 8/4/17	Tue 9/5/17
5		Establecer el equipo de implementación del SSP	11 days	Wed 9/6/17	Wed 9/20/17
6		Realizar un análisis de brechas del SSP	23 days	Thu 9/21/17	Mon 10/23/17
7		Desarrollar un plan de implementación del SSP	15 days	Tue 10/24/17	Mon 11/13/17
8		Establecer un mecanismo de coordinación del SSP	11 days	Tue 9/5/17	Tue 9/19/17
9		Desarrollar la documentación del SSP necesaria, incluido el marco de trabajo del SSP del Estado, sus componentes y elementos	35 days	Mon 11/13/17	Fri 12/29/17
10		**ETAPA 2**	**367 days**	**Thu 8/3/17**	**Fri 12/28/18**
11		**Elemento 1.1 del SSP**	**35 days**	**Mon 11/13/17**	**Fri 12/29/17**
12		Establecer un marco de trabajo de seguridad operacional legislativo	35 days	Mon 11/13/17	Fri 12/29/17
13		**Elemento 1.2 del SSP (ii)**	**70 days**	**Mon 11/13/17**	**Fri 2/16/18**
14		Identificar, definir y documentar las responsabilidades de la gestión de seguridad operacional	35 days	Mon 1/1/18	Fri 2/16/18
15		Definir y documentar la política y los objetivos de la seguridad operacional del Estado	35 days	Mon 11/13/17	Fri 12/29/17
16		**Elemento 1.3 del SSP**	**107 days**	**Thu 8/3/17**	**Fri 12/29/17**
17		Establecer un proceso de investigación de accidentes e incidentes graves	107 days	Thu 8/3/17	Fri 12/29/17
18		**Elemento 1.4 del SSP (i)**	**21 days**	**Thu 8/3/17**	**Thu 8/31/17**
19		Establecer una legislación de cumplimiento (sanciones) básica (revisar)	21 days	Thu 8/3/17	Thu 8/31/17
20		**Elemento 3.1 del SSP (i)**	**107 days**	**Thu 8/3/17**	**Fri 12/29/17**
21		Supervisión estatal de la seguridad operacional y vigilancia de sus proveedores de servicios	107 days	Thu 8/3/17	Fri 12/29/17
22		**Elemento 2.1 del SSP (i)**	**259 days**	**Tue 1/2/18**	**Fri 12/28/18**
23		Facilitar y promover la educación del SMS para los proveedores de servicios	259 days	Tue 1/2/18	Fri 12/28/18
24		**ETAPA 3**	**216 days**	**Thu 8/3/17**	**Thu 5/31/18**
25		**Elemento 1.4 del SSP (ii) - Promulgar la política/ legislación de cumplimiento que incluya:**	**144 days**	**Mon 11/13/17**	**Thu 5/31/18**
26		Disposiciones para los proveedores de servicios que operan bajo un SMS a fin de que aborden y resuelvan desviaciones de seguridad operacional y calidad de forma interna	35 days	Mon 11/13/17	Fri 12/29/17
27		Condiciones y circunstancias en las cuales un Estado puede intervenir las desviaciones de seguridad operacional	35 days	Mon 11/13/17	Fri 12/29/17
28		Disposiciones para evitar el uso o la divulgación de datos de seguridad operacional para propósitos que no sean la mejora de la	35 days	Mon 11/13/17	Fri 12/29/17
29		Disposiciones para proteger las fuentes de información obtenidas desde los sistemas de notificación voluntaria/confidencial	144 days	Mon 11/13/17	Thu 5/31/18
30		**Elemento 2.1 del SSP (ii)**	**107 days**	**Thu 8/3/17**	**Fri 12/29/17**
31		Desarrollar reglamentos armonizados que requieran de la implementación de SMS	107 days	Thu 8/3/17	Fri 12/29/17
32		**Elemento 3.2 del SSP (i)**	**129 days**	**Thu 8/3/17**	**Tue 1/30/18**
33		Establecer sistemas de recopilación e intercambio de datos	107 days	Thu 8/3/17	Fri 12/29/17



ID	Task Mod	Task Name	Duratio	Start	Finish
34		Establecer indicadores de rendimiento en materia de seguridad operacional del Estado de alto impacto y niveles de objetivos/ alertas	22 days	Mon 1/1/18	Tue 1/30/18
35		**ETAPA 4**	**366 days**	**Fri 8/4/17**	**Fri 12/28/18**
36		**Elemento 2.2 del SSP**	**219 days**	**Tue 1/30/18**	**Fri 11/30/18**
37		Revisar y acordar los indicadores de rendimiento en materia de seguridad operacional del proveedor de servicios	219 days	Tue 1/30/18	Fri 11/30/18
38		**Elemento 3.1 del SSP (ii)**	**22 days**	**Thu 11/1/18**	**Fri 11/30/18**
39		Incorporar el SMS y los indicadores de rendimiento en materia de seguridad operacional del proveedor de servicios en el	22 days	Thu 11/1/18	Fri 11/30/18
40		**Elemento 3.2 del SSP (ii)**	**295 days**	**Mon 11/13/17**	**Fri 12/28/18**
41		Implementar sistemas de notificación de seguridad operacional voluntaria/confidencial	144 days	Mon 11/13/17	Thu 5/31/18
42		Establecer indicadores de seguridad operacional/calidad de bajo impacto con control del nivel de objetivos/alertas, según	22 days	Thu 11/1/18	Fri 11/30/18
43		Promover el intercambio de información de seguridad operacional con los proveedores de servicios y otros Estados, y entre ellos	42 days	Thu 11/1/18	Fri 12/28/18
44		**Elemento 3.3 del SSP**	**36 days**	**Fri 11/9/18**	**Fri 12/28/18**
45		Priorizar inspecciones y auditorías basadas en el análisis de riesgos de seguridad operacional o datos de calidad, donde corresponda	36 days	Fri 11/9/18	Fri 12/28/18
46		**Elemento 3.1 del SSP (iii)**	**42 days**	**Thu 11/1/18**	**Fri 12/28/18**
47		Establecer un mecanismo de revisión interna que aborde el SSP para garantizar la eficacia y mejora continuas	42 days	Thu 11/1/18	Fri 12/28/18
48		**Elemento 4.1**	**366 days**	**Fri 8/4/17**	**Fri 12/28/18**
49		Capacitación interna, comunicación y distribución de información de seguridad	366 days	Fri 8/4/17	Fri 12/28/18
50		**Elemento 4.2**	**366 days**	**Fri 8/4/17**	**Fri 12/28/18**
51		Capacitación externa, comunicación y distribución de información de seguridad	366 days	Fri 8/4/17	Fri 12/28/18



ATTACHMENT H

STATE SAFETY REPORT MODEL

CONTENTS

8. Chapter 8: Progress made in mitigation plans to reduce accident rates

    8.1 Commercial aviation
    8.2 Non-commercial aviation

ATTACHMENTS

Where applicable

ATTACHMENT I

REFERENCE DOCUMENTS

- Annex 19 to the Convention on International Civil Aviation, Second edition – Safety management
- Doc 9859, Third edition – Safety management manual (SMM)
- Doc 9917 – Seventh meeting of the CAR/SAM forecasting working group
- Current Global aviation safety plan (GASP)
- ARCM document: Analysis of runway excursion (RE) accidents occurred in the SAM Region in 2016 in all operational segment and with aircraft of all weights.
- Monks Joseph G. *Administración de operaciones, serie Schaum*, 1st edition, Mexico D.F., Mc. Graw Hill, pages 170–174.
- USOAP CMA on-line framework
- ICAO iSTARS-3
- ARCM SDCPS

ATTACHMENT J

GLOSSARY OF TERMS

ADREP	Accident/incident data reporting
AGA	Aerodromes and ground aids
AIG	Aviation accident and incident investigation
AIR	Airworthiness
ALoSP	Acceptable level of safety performance
ANC	Air Navigation Commission
ANS	Air navigation services
AOC	Air operator certificate
ARCM	AIG Regional cooperation mechanism (South America)
ATM	Air traffic management
CAA	Civil aviation authority
CAP	Corrective action plan
CAR	Central America and the Caribbean
CE	Critical elements
CE-1	Primary aviation legislation
CE-2	Specific operating regulations
CE-3	State systems and functions
CE-4	Qualified technical personnel
CE-5	Technical guidance, instruments and provision of critical safety information
CE-6	Licensing, certification, authorisation and/or approval obligations
CE-7	Oversight obligations
CE-8	Resolution of safety concerns
CMA	Continuous monitoring approach
CRM	Crew resource management
DGAC	Directors general of civil aviation
DSO	Safety director
ECCAIRS	European Coordination Centre for Accident and Incident Reporting Systems
EI	Effective implementation
ESC	Executive Steering Committee
F&R	Findings and recommendations
FFHH	Human factors
FIR	Flight information regions
GANP	Global air navigation plan
GAP	Gap
GASP	Global Aviation Safety Plan
GASPRG	Global aviation safety plan roadmap group
GREPECAS	CAR/SAM Regional Planning and Implementation Group
HLSC	High-level safety conference
IATA	International Air Transport Association
ICVM	ICAO coordinated validation mission
INFRA	Infrastructure factors
ISSG	Industry safety strategy group
iSTARS	Integrated Safety Trend Analysis and Reporting System
LEG	Primary aviation legislation and civil aviation regulations
MET	Meteorological factors
NCMC	National continuous monitoring coordinator

OLF	On-line framework
OPS	Aircraft operations
ORG	Civil aviation organisation
PEL	Licensing and training
PQ	Protocol question
QMS	Quality management system
RAAC	Meeting of the civil aviation authorities
RAIO	Regional accident and incident investigation organisation
RASG	Regional aviation safety group
RASG-PA	Regional aviation safety group – Pan-America
RE	Runway excursion
RPA	Remotely piloted aircraft
RSOO	Regional safety oversight organisation
SAM	South American Region
SAMSP	South American safety plan
SARP	Standards and recommended practices
SD	Standard deviation
SDCPS	Safety data collection and processing system
SMM	Safety management manual
SMP	Safety management panel
SMS	Safety management system
SPI	Safety performance indicators
SRVSOP	Regional safety oversight cooperation system
SSO	State safety oversight system
SSP	State safety programme
SSR	State safety report
SWIM	System-wide information management
TBD	To be defined
TEC	Technical factors
USOAP	Universal safety oversight audit programme