International Civil Aviation Organization
South American Regional Office
Fifth Meeting of Air Navigation and Flight Safety Directors of the SAM Region (ANFS/5)
(Lima, Peru, 20 to 22 August 2018)

Agenda Item 5: Regional plan for the sustainability of air transport in the SAM Region

STATUS OF DEVELOPMENT AND FUTURE ACTIONS CONCERNING THE REGIONAL PLAN FOR THE SUSTAINABILITY OF AIR TRANSPORT IN THE SAM REGION

(Presented by the Secretariat)

SUMMARY

This working paper presents updated information on the status of development of the Regional plan for the sustainability of air transport in the SAM Region and the high-level declaration to be presented at the Fourth World Aviation Forum of the International Civil Aviation Organization (ICAO) to be held on 17-19 September 2018, and of the activities scheduled for the review and approval of the work framework of the 2020-2035 agenda.

References:

- Final report of the RAAC/13 meeting - "Declaration of Bogota" (Bogota, Colombia, 4-6 December 2013).
- Final report of the ANFS/4 meeting (Lima, Peru, 2-4 October 2017).
- Final report of the RAAC/15 meeting (Lima, Peru, 4-6 December 2017)
- First and second virtual meeting on the SAM Plan

ICAO strategic objectives:	• *Safety* • *Air navigation capacity and efficiency* • *Security and facilitation* • *Economic development* • *Environmental protection*

1. Background

1.1 The Declaration of Bogota, approved at the RAAC/13 meeting by the Directors General of the SAM Region, with the endorsement of the following international organisations: IATA, ACI-LAC, CANSO and ALTA, was effective until 2016, and served as the starting point for the launching of a result-based management process with clearly defined indicators developed based on consultations with the States over a period of one year. The Region made significant progress and received clear guidance on ICAO priorities in line with global planning.

1.2 Taking into account this good practice, the ANFS/3 meeting received information on the drafting of a regional plan to support decision-making by States to ensure the sustainable development of air transport over the next 15 years (up to 2032) and thus contribute to the achievement of several of the sustainable development goals (SDGs) established by the United Nations to ensure human prosperity and environmental protection. This development seeks to help the Region assume a new managerial

commitment at the highest governmental level that will contribute to prioritise initiatives that contribute the most to a safe and orderly development of air transport in South America, including the implementation of outstanding goals of the Declaration of Bogota, applying an inspiring, charismatic while ambitious vision for the Region, fully aligned with ICAO global plans, the GASP, GANP and GASeP.

1.3 The ANFS/4 meeting formulated a draft conclusion to be submitted to the Fifteenth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/15) (Asunción, 4-6 December 2017), recognising the importance of the four axes of the plan, the establishment of working groups for the drafting of the regional plan and the declaration document based on work done so far, and the commitment to take action as needed to finalise such documents. It should be noted that the work done is just a proposal of the Secretariat that requires analysis, changes and improvements based on a regional consensus.

1.4 Based on the positive experience of the Declaration of Bogota, the RAAC/15 meeting agreed that the SAM Region was ready to assume a new managerial commitment at the highest governmental level that will contribute to prioritise those initiatives that contribute the most to the safe and orderly development of air transport in South America, including the implementation of the outstanding goals of the Declaration of Bogota, applying an inspiring, charismatic while ambitious vision for the Region. Accordingly, it deemed necessary to develop a regional plan for the sustainability of air transport in the SAM Region to serve as a management tool in support of decision-making by States to ensure the sustainable development of air transport until 2035, clearly aligned with the sustainable development goals (SDGs).

1.5 The meeting recognised the importance of the four axes that could make up the Regional plan for the sustainability of air transport in the SAM Region, in alignment with ICAO strategic objectives and with the sustainable development objectives of the United Nations, and considered that the documentation prepared by the ICAO SAM Office concerning the axes should be considered as an initial reference for the plan.

1.6 Furthermore, the RAAC/15 meeting gave its support to the vision of the Plan, and expressed reservations with respect to the challenges posed by some of the proposals of the draft presented by the Secretariat. It also agreed on the need for time to develop a feasible strategy for the implementation of the vision of the Plan, understanding the asymmetries existing in the States of the Region. Accordingly, the following conclusion was approved:

Conclusion RAAC/15-7 Action to be taken for the approval of the Regional plan for the sustainability of air transport in the SAM Region and the declaration of implementation

In order to develop a regional plan for the sustainability of air transport in the SAM Region and a declaration of implementation, the Directors General of Civil Aviation of the SAM Region:

a) support the four axes of the draft Regional plan for the sustainability of air transport in the SAM Region: connectivity, safety, institutional building, and environmental protection, which are aligned with ICAO strategic objectives and with the sustainable development goals of the United Nations;

b) undertake to designate during the first quarter of 2018 focal points to be part of a group that, together with the ICAO Secretariat, the LACAC Secretariat, and representatives of interested international organisations, would analyse the scope of the plan in each of its axes, identify the experts that would be required for the drafting of the plan in its different axes, and establish a timetable for conducting the activities of the plan;

c) undertake to carry out the activities defined by the group that may be required for the drafting of the aforementioned plan and its respective declaration; and

d) undertake to participate in the teleconferences and the required face-to-face meetings.

2 Discussion

2.1 The Regional plan for the sustainability of air transport in the SAM Region is aimed at ensuring the sustainable growth of civil aviation in the Region, with emphasis on the following four axes:

- Air connectivity
- Safety
- Institutional building
- Environmental protection

2.2 Pursuant to Conclusion RAAC/15 b), the Secretariat, through letter SA521 dated 18 December 2017, requested States to designate their focal points for the review of these documents. In May 2018, the working group was established as described in **Appendix A**, and so far has held two virtual meetings.

2.3 The first virtual meeting of focal points for the SAM Plan was conducted on 3 April 2018, with 18 participants from 9 States. The meeting discussed the action taken so far concerning the SAM PLAN, its objectives. States provided their feedback. **Appendix B** contains a detailed report of this meeting.

2.4 During the first virtual meeting, participants were informed of the holding of the ICAO World Aviation Forum (IWAF) (17 and 19 September 2018, Fortaleza, Brazil), and the opportunity it offered for endorsement of the SAM Plan Aspirational Declaration. Accordingly, the meeting expressed its support to reviewing the Declaration and making it available to the ministerial authorities of the States at the aforementioned event.

2.5 The second virtual meeting of focal points for the SAM PLAN was held on 8 June 2018, with the participation of 25 representatives of 11 SAM States and IATA as observer. The meeting was presented with the first draft of the Aspirational Declaration. In this regard, the participants requested to make it more succinct, and offered to send their comments on the axes of the regional vision. Likewise, working groups were established for each axis in order to start a detailed review thereof. **Appendix C** contains a more detailed report of the meeting.

2.6 The Secretariat also conducted a teleconference with Guyana to gather their opinion on the connectivity, institutional building, and environmental protection axes, particularly on those actions that would require an internal State policy, and their needs for assistance for their implementation. These opinions will be included in the discussions of the corresponding working group.

2.7 The Declaration document was reviewed at ICAO Headquarters in Montreal. Taking into account that Latin American countries would be attending the IWAF/4, the meeting agreed to extend said declaration to all of Latin America and was modified accordingly. A proposal was made to maintain the vision, but with a more generic text to accommodate both Regions.

2.8 This declaration was circulated to focal points for its review at the Third virtual meeting of

focal points, which was held on 6 August. During this meeting, concerned was expressed a bout the text of the declaration, and one State recalled that the initial proposal was to work with the working groups before having a high level declaration. In this regard, the Secretariat proposed to prepare a declaration for the IWAF without making reference to the SAM PLAN, and considering a more Latin American context, to attend expressed concerns, and to give the necessary time to the working group for discussions and definition of the specific actions plans of each axis. States requested additional time to analyse the IWAF/4 declaration, and committed to provide comments to the Secretariat before the next virtual meeting to be held on Monday, 27 August at 9:00 am. (Lima -5UTC time).

2.9 In accordance with the mandate of RAAC/15, the Secretariat will take the necessary actions in order to analyse each axis in more detail with a view to defining its work framework: scope, purposes, deliverables, objectives, goals, priorities and guiding principles. This proposal will include the connectivity, institutional building and environmental protection axes. Also, during the Third virtual meeting, the working modality of the groups formed for the analysis of the four axes of the SAM Plan has been defined. The groups would be provided with the material that had been developed by the consultants for each of the axes and written comments were requested to be sent by email before the virtual meetings convening. Each group will count with a Regional Officer from the Secretariat to accompany the works, and the face-to-face meetings will be programmed opportunely.

2.10 Regarding the safety axis, it had already been presented at several safety meetings, such as the Fourth meeting of air navigation and flight safety directors of the SAM Region (Lima, Peru, 2-4 October 2017**),** the Seventh SSP implementation meeting (Lima, Peru, 23-27 April 2018) and the Third meeting of national continuous monitoring coordinators (NCMC) (18-20 July 2018). This axis was also presented to the Safety Directors through a virtual meeting prior to the Fifth meeting of air navigation and safety directors (ANFS/5) of the SAM Region. The final safety axis proposal is shown in **Appendix D** to this working paper for analysis, comments and acceptance at the ANFS/5 meeting to be send the respective group.

2.11 Once the working groups have completed the revision, the final documents could be circulated to the authorities for their subsequent presentation, analysis and approval by Meeting of Civil Aviation Authorities of the SAM Region.

3 Suggested action

3.1 The Meeting is invited to:

a) take note of the information presented herein;
b) provide comments to the working groups; and
c) discuss other related issues it may deem appropriate.

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APPENDIX A

WORKING GROUPS FORMED FOR THE AXES OF THE SAM PLAN

Air connectivity axis:

- David Dueñas (Chile)
- Amira Padron (Venezuela)
- Carlos Von Siedlitz (Panama)
- Carlos Caballero (Bolivia)
- Jorque Yanqui (Peru)
- Sergio Pérez Lauro (Uruguay)
- Virginia Silvera (Uruguay)
- Alexandra Palomino Pineda (Colombia)
- Julio Pereira (IATA)
- Filipe Reis (IATA)
- Saheed Sulaman (Guyana)

Safety axis:

- João Souza Dias Garcia (Brazil)
- Neverton Alves de Novais (Brazil)
- Paulo Henrique Iengo Nakamura (Brazil)
- Sergio Roberto Rodrigues Silva (Brazil)
- Felipe Koeller Rodrigues Silva (Brazil)
- David Romero (Venezuela)
- Fernando Torres (Peru)
- Marcos Revetria (Uruguay)
- Julio Danzov (Uruguay)
- Luis Alberto Valencia (Colombia)
- Julio Pereira (IATA)

Institutional strengthening axis:

- Marcelo Rezende Bernardes (Brazil)
- Gustavo Machado de Freitas (Brazil)
- Marcelo Moraes de Oliveira (Brazil)
- Jorge Wilson de Avila Ferreira Penna (Brazil)
- Roberto Fernandez Alves (Brazil);
- Macarena Roa (Chile)
- Luis Nuñez (Peru)
- Marisela Estrada (Venezuela)
- Pablo Simone (Uruguay)
- José Palermo (Uruguay)
- Oracio Márquez (IATA)

Eje de Protección del Medio Ambiente:
- Marcela Braga Anselmi (Brazil)
- Rodrigo Ayres Padilha (Brazil)
- José Pereira (Venezuela)
- Pedro Cardeillac (Uruguay)
- Adriana Jackson (Uruguay)
- Arturo Luján (Peru)
- Oracio Márquez (IATA)
- Saheed Sulaman (Guyana)
- Dorsa Sabet-Rasekh (Panama)

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APPENDIX B

SAM/PLAN/1

INTERNATIONAL CIVIL AVIATION ORGANIZATION
SOUTH AMERICAN REGIONAL OFFICE

FIRST VIRTUAL MEETING OF FOCAL POINTS FOR THE REGIONAL PLAN FOR THE SUSTAINABILITY OF AIR TRANSPORT IN THE SAM REGION

(SAM/PLAN/1)

REPORT

3 May 2018

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

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HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The First Virtual Meeting of Focal Points for the Regional Plan for the sustainability of air transport in the SAM Region (SAM/PLAN/1) was held on 3 May 2018, from 09:00 to 10:30 hours, Lima, Peru time.

ii-2 WORKING METHOD

The Meeting was developed through teleconference with the focal points nominated by States.

ii-3 AGENDA

The following agenda was adopted:

Agenda Item 1: **Aerial connectivity axis**

Under this Agenda item, the first axis of the Plan was reviewed expecting to obtain feedback on the points outlined in the Plan and define strategies to increase aerial connectivity in SAM Region States, with a focus on socioeconomic development.

Agenda Item 2: **Safety axis**

Under this subject, safety axis of the Plan was analysed. In this regard, the improvement opportunities presented by States were collected, which will be analysed and included in the draft text of said axis, if pertinent.

Agenda Item 3: **Institutional strengthening axis of SAM Plan**

Under this part of the Agenda, improvement opportunities identified in the document prepared by the Secretariat concerning the third axis were analysed. Focal Points were requested to present specific matters to be considered for its inclusion in the Plan or possible focus changes recommended to be considered in same.

Agenda Item 4: **Environmental protection axis**

Under this subject, improvement opportunities concerning environmental protection axis were analysed, collecting proposals of strategies to implement same, taking into account the main elements considered in the Plan: noise management, terrain management, plan to reduce CO_2 emissions and CORSIA.

Agenda
Item 5: **Other business**

Under this Agenda item the Meeting was able to review other aspects which have not been considered in the previous subjects and are related with the matters under analysis.

ii-4 **ATTENDANCE**

The Virtual Meeting was attended by 18 participants from 9 SAM States (Argentina, Bolivia, Brazil, Chile, Colombia, Guyana, Panama, Paraguay and Venezuela) and 7 ICAO officers.

The list of participants is presented in page iii-1.

FIRST VIRTUAL MEETING OF FOCAL POINTS FOR THE REGIONAL PLAN FOR THE SUSTAINABILITY OF AIR TRANSPORT IN THE SAM REGION

(SAM/PLAN/1)

LIST OF PARTICIPANTS

ARGENTINA
1. Hernán Adrián Gómez
2. Horacio Ernesto Kuobel

BOLIVIA
3. Carlos Alberto Caballero Guzmán

BRAZIL
4. Daniel Longo
5. Gil Lessa Amaral de Carvalho
6. Claudio Fidalgo

CHILE
7. Germán A. Olave
8. Jaime Binder
9. Luis A. Rossi
10. David Dueñas

COLOMBIA
11. Jazmin Alexandra Palomino Pineda
12. Melva Castañeda

GUYANA
13. Sahed Sulaman

PANAMA
14. Carlos F. von Seidlitz W.

PARAGUAY
15. Roque Díaz Estigarribia

VENEZUELA
16. Daniela Caraballo
17. Héctor Acosta
18. Anira Padrón Barito

ICAO
19. Fabio Rabani
20. Oscar Quesada-Carboni
21. Verónica Chávez
22. Jorge Armoa
23. Fabio Salvatierra
24. Fernando Hermoza
25. Roberto Sosa

1. Introduction

1.1 Mr. Oscar Quesada-Carboni, Deputy Director of the ICAO South American Office, made a brief introduction on the content of the SAM Plan. His address included the background of the Plan, referring to the Declaration of Bogota and the Decisions adopted by the AN&FS/4 (Lima, Peru, October 2017) concerning the approval of the Vision of the Plan, as well as the feedback provided by Civil Aviation Directors during the RAAC/15 meeting held in Asuncion, Paraguay in November 2017.

1.2 The Deputy Director emphasized the need to formulate a high-level plan for the inclusion of aviation in the development plans of the States, as an engine that drives the economy through improvements in connectivity and institutional strengthening. He also indicated that the SAM Region has enormous opportunities to increase connectivity with other Regions besides the NACC Region and Europe. Studies have demonstrated that SAM is a region relatively disconnected from the world and with great opportunities for improvement in this regard.

1.3 He also mentioned that a high level of safety would help to increase operations in the SAM Region, considering that the compliance with ICAO standards would be observed by air operators as a guarantee of safe operations. Additionally, he indicated that the world trend is for industries to implement processes that guarantee respect for the environment. ICAO has taken this commitment including the environmental protection as a strategic objective, therefore calling on all States to promote measures that lead air operations to be environment friendly.

1.4 With these words, the Deputy Director made an introduction of the objectives and axes of the SAM Plan, in addition to the reasons that have encouraged the Regional Office to prepare the document and submit it to civil aviation authorities for consideration, feedback and strategy formulation to achieve the objectives indicated in said plan.

1.5 Additionally, he recalled that during the RAAC/15 meeting, the SAM Plan was endorsed by civil aviation authorities, asking the Secretariat to organize teleconferences and face-to-face meetings to identify improvement opportunities in the developed document.

2. Comments

2.1 Following the introduction made by the Deputy Director, the floor was given to delegates of States, who indicated the following:

a) **Guyana** supported the Plan in the development of the axes. However, expressed his concern regarding the release of taxes on some items in which the civil aviation authority has no jurisdiction.

b) **Colombia** stated that the axis of connectivity, in the way it was formulated, involves competition from other State institutions, such as tax charges, open skies policies and regulatory frameworks for foreign investment. He advised that all details should be thoroughly analysed and look for a regional agreement to increase connectivity. A starting point that could be analysed as part of the connectivity axis might be a regional strategy to increase tourism.

   He also mentioned that an "Aviation Forum with a vision to 2030" was held on 9 and 10 April this year, where it could be observed that the vision was aligned with the thematic axes of the SAM Plan. He indicated as well that the SAM Plan would be used to delineate the Government Plan for the next four years, where two main axes are included, namely "strengthening of the industry" and "strengthening of human talent", where the CEA will have a preponderant participation concerning training and qualification of aviation professionals.

c) **Brazil** expressed his enthusiasm with the initiative of the Plan. However, expressed his reservations about the percentages mentioned in the connectivity axis, mainly indicating that they would like to have more knowledge concerning the meaning of these percentages and their origins. The Secretariat explained that the proposal was born from a study on connectivity carried out by a consultant and that all metrics should be understood as an initial draft to be analysed and agreed upon.

d) **Paraguay** informed that they are working to increase connectivity and that they are currently developing a Master Plan for the development of aviation with the support of the Korea Technical Cooperation Agency (KOICA). He also mentioned that it is important to count as well with the users' vision and requested that delegates from IATA should be invited for the next session.

e) **Chile** indicated that the Plan to consolidate connectivity in the SAM Region was ambitious, but that part of the way was already being carried out. He mentioned that Chile had a plan which served to develop an encouraging scenario for the installation of Low Cost Companies (LLC). At this point, he expressed his discrepancy with the need to develop secondary airports for these LLCs, since with a reformulation of the operations and the adequate management of the infrastructure of the main airports, the operations of the Low Cost could also be supported. Moreover, he indicated that there is already a plan designed by LACAC for this point. The Secretariat will ask Chile for their suggestions in order to review the proposal. It was clarified that a plan of transformation like this one requires the efforts of all different institutions and that LACAC represents an important actor concerning air transport issues. The duplication of efforts should be avoided and the important thing is to add support in order to achieve the objectives of the Plan.

f) **Argentina** requested time to analyse the documents related to the SAM Plan in order to provide input and identify opportunities for improvement.

g) **Venezuela** indicated they are working on their implementation plans related to safety and AVSEC, which had given them high levels of compliance. This task allowed the Bolivarian State of Venezuela the possibility of providing technical assistance to other States. There was also reported that they are working on improving their airport infrastructure, in addition to planning an increment in connectivity. In this sense, they are promoting the use of the Maiquetia Airport as a HUB. In order to achieve this goal, they are exploring strategic alliances with national and foreign airlines.

2.2 The Secretariat made a summary of all comments received from delegates, highlighting the most important points mentioned. In addition, it informed that the World Aviation Forum (IWAF) organized by ICAO, will take place in Fortaleza, Brazil, from 17 to 19 September 2018. This Forum will gather the most important national authorities and has been observed as a brilliant opportunity to proceed to the endorsement of the *Aspirational Declaration of the SAM Plan* by the Ministers of Transports and Communications, as well as the other Ministers under whose umbrella the administrative functioning of the civil aviation authority of its States is located. Delegates of States agreed with this assessment and supported reviewing said Declaration to make it available to the ministerial authorities of States by the aforementioned event.

2.3 Subsequently, the delegate of Guyana invited States to participate in the ICAO Air Transport Conference, which will be held in Guyana on 19 to 23 November 2018.

2.4 Finally, the Secretariat requested from States to submit comments and opportunities of improvement identified in the Plan, in order to be reviewed during the next session.

2.5 With no other point to discuss, the virtual session finished at 10:30 hours, Lima, Peru time.

APPENDIX C

SAM/PLAN/2

INTERNATIONAL CIVIL AVIATION ORGANIZATION
SOUTH AMERICAN REGIONAL OFFICE

SECOND VIRTUAL MEETING OF FOCAL POINTS FOR THE REGIONAL PLAN FOR THE SUSTAINABILITY OF AIR TRANSPORT IN THE SAM REGION

(SAM/PLAN/2)

REPORT

8 June 2018

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

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Report on Agenda Item 2: 2-1
Review of the axes of the SAM Plan as well as provision of comments and opportunities for improvement

Report on Agenda Item 3: 3-1
Establishment of teams for the review of the axes

Report on Agenda Item 4: 4-1
Other business

HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Second Virtual Meeting of Focal Points for the Regional Plan for the sustainability of air transport in the SAM Region (SAM/PLAN/2) was held on 8 June 2018, from 09:00 to 10:30 hours, Lima, Peru time.

ii-2 WORKING METHOD

The Meeting was developed through teleconference with the focal points nominated by States.

ii-3 AGENDA

The following agenda was adopted:

Agenda Item 1: **Review of the report of the First Virtual Meeting**

In this part of the Agenda, the report of the First Virtual Meeting was analysed to define subjects that may have been omitted involuntarily in the document.

Agenda Item 2: **Review of the axes of the SAM Plan as well as provision of comments and opportunities for improvement**

Under this subject, comments were received on the proposed Declaration to be presented at IWAF. Information, feedback, opportunities for improvement and clarifications on the objectives of each axis, as well as on their contents, were also collected.

Agenda Item 3: **Establishment of teams for the review of the axes**

Under this part of the Agenda, multinational teams were established to develop the specific objectives, goals and activities of each axis included in the SAM Plan, as well as to identify opportunities for improvements in the documents.

Agenda Item 4: **Other business**

Under this Agenda item the Meeting was able to review other aspects which have not been considered in the previous subjects and are related with the matters under analysis.

ii-4 **INTRODUCTION**

Mr. Oscar Quesada-Carboni, Deputy Director of the ICAO South American Regional Office, after welcoming the participants, asked them to give some introductory words.

ii-5 **ATTENDANCE**

The Virtual Meeting was attended by 25 delegates from 11 SAM Region States (Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Panama, Paraguay, Peru, Uruguay and Venezuela), 2 representatives of IATA and 6 ICAO officers.

The list of participants is shown in page iii-1.

SECOND VIRTUAL MEETING OF FOCAL POINTS FOR THE REGIONAL PLAN FOR THE SUSTAINABILITY OF AIR TRANSPORT IN THE SAM REGION

(SAM/PLAN/2)

LIST OF PARTICIPANTS

BOLIVIA
1. Carlos Alberto Caballero Guzmán

BRAZIL
2. Neverton Novais
3. Gil Lessa Amaral de Carvalho
4. Rodrigo Godinho
5. Claudio Fidalgo

CHILE
6. Jaime Binder
7. Macarena Roa
8. David Dueñas
9. Alfonso Sepúlveda de la Vega

COLOMBIA
10. Jazmin Alexandra Palomino Pineda

ECUADOR
11. María Luisa Ortega
12. Giovanna Hidalgo

GUYANA
13. Sahed Sulaman
14. Egbert Field (side meeting 18/6/18)

PANAMA
15. Carlos F. von Seidlitz W.

PARAGUAY
16. Roque Díaz Estigarribia
17. Liz Portillo

PERU
18. Luis Núñez
19. Fernando Torres
20. Jorge Yanqui
21. Arturo Luján

URUGUAY
22. Pablo Simone

VENEZUELA
23. Amira Padrón Barito
24. David Romero
25. José Pereira

IATA
26. Julio Pereira
27. Filipe Reis

ICAO
28. Oscar Quesada-Carboni
29. Verónica Chávez
30. Jorge Armoa
31. Fabio Salvatierra
32. Roberto Sosa
33. Javier Puente

Agenda Item 1: Review of the report of the First Virtual Meeting

1.1 Following the introduction made by participants, the Meeting went on to consider Agenda Item 1, for which Mr. Jorge Armoa, SAM AIM/MET Regional Officer, summarized the report on the First Virtual Meeting, which was transmitted to States on 25 May 2018 by letter LT 2/12-SA180.

1.2 In addition, the Secretariat reminded participants that the draft of the Aspirational Declaration planned to be presented at the ICAO World Aviation Forum (IWAF) for its endorsement by the Ministers of States, was attached to the aforementioned letter.

1.3 When considering the report on the First Meeting, following comments were collected:

1.3.1 **Brazil:** Delegates from DECEA participating for the State, indicated that there is an authority in Brazil (ANAC) and that the comments transcribed in the report were made by DECEA. In such sense, they request that when referring to Brazil, it should be mentioned that comments were provided by DECEA.

1.3.2 **Chile**: The delegate of Chile indicated that he supports the report. However, he clarified that it should be included that Chile has an open policy through which the expansion of its aeronautical activity was developed. In addition, he indicated that the wording related to LACAC Plan should be eliminated. Considering the comments made by Chile, the related paragraph in the report should finally read as follows:

> "**Chile** indicated that the Plan to consolidate connectivity in the SAM Region was ambitious, but that part of the way was already being carried out, for which he supports it. He mentioned that Chile had an open policy which served to develop an encouraging scenario for the installation of Low Cost Companies (LLC). At this point, he expressed his discrepancy with the need to develop secondary airports for these LLCs, since with a reformulation of the operations and the adequate management of the infrastructure of the main airports, the operations of the Low Cost could also be supported. He clarified that a plan of transformation like this one requires the efforts of all different institutions and that LACAC represents an important actor concerning air transport issues. The duplication of efforts should be avoided and the important thing is to add support in order to achieve the objectives of the Plan".

1.3.3 **Guyana**: Supported the report of the First Virtual Meeting but mentioned that it would be important to have a meeting with the English-speaking States to gather other comments concerning points that are not the competence of the civil aviation authority.

1.3.4 Delegates of the other participating States expressed their agreement with the content of the report on the First Meeting, for which Agenda Item 1 was closed.

Agenda Item 2: Review of the axes of the SAM Plan as well as provision of comments and opportunities for improvement

2.1 The Meeting went on to consider Agenda Item 2. In such sense, comments submitted by participant States and organizations were as follows:

2.1.1 **Venezuela**: Considered that concerning the Environment axis within the Declaration, it is necessary to indicate that the action plans and the participation within CORSIA by the States, is voluntary.

2.1.2 **IATA**: Expressed its support to the Aspirational Declaration, indicating however that same should be more concise and stronger, and that it should be appropriate for the political level.

2.1.3 **Perú**: Presented an extensive comment on the Aspirational Declaration, on each one of the axis of the Plan, which is summarized as follows:

a) Connectivity: It requires infrastructure, but accompanied by policy and strategies focused on the efficiencies of multilateral and bilateral agreements, reducing the transport tax and promoting favorable frameworks for foreign investment. Likewise, improvements to the infrastructure must be accompanied by a training programme to the staff that will manage the new infrastructure. They indicated that taking into account the Peruvian context, it would be better to work towards the air transport liberalization on a bilateral basis;

b) Safety: With reference to Objective B, *Progressively reduce fatal accidents to become the Region with major level of safety at world level*, they indicate that the goals and objectives will be included in the SSP, for which they develop two additional objectives;

c) Institutional strengthening: regarding this axis, they fully support it; and

d) Environment: With reference to this axis, they request to withdraw from the Declaration the management of flora and fauna that coexist with the aviation activity.

2.1.4 The Secretariat thanked Peru for its contribution. However, it was clarified that the Declaration is aspirational and that a second phase would be developed on a later stage, at civil aviation authorities' level, which would involve activities to be considered within the axes of the SAM Plan. The Secretariat considered that the points proposed by Peru, in a high percentage, should be focused on this second phase, within the tasks of the groups of each axis.

2.1.5 **Guyana**: To its turn, the delegate of Guyana supported the Declaration, indicating however that the IWAF would be attended by high-level (Ministerial) officials and therefore the Declaration should be more concise, without going into detail, at a ministerial level. He observed as well, that some comments included in the Declaration are also part of the SAM Plan and in his opinion, should not be included. He also asked if the SAM Plan would also be presented at the IWAF to be considered by the Ministers.

2.1.6 Regarding Guyana's consultation, the Secretariat clarified that the SAM Plan has been presented in several forums previously and that, in addition, the Fifteenth Meeting of Civil Aviation Authorities held in Asuncion, Paraguay, in December 2017, endorsed the Plan.

2.1.7 In a side teleconference conducted between the Civil Aviation Authority of Guyana and the Regional Office, that State indicated that it supports the SAM Plan, providing following comments on each of its axes:

a) Connectivity: There is a growing number of operators interested in operating in Guyana, given that progress is being made in the development of CAP USOAP as part of the State's strategy to increase connectivity.

   In regards to liberalization of air transport, GCAA believes that it is more important the concept of main place of business, rather than percentages of airline ownership.

   Referring to taxes, GCAA expressed that taxes is a sovereign matter. ICAO Regional Office's position, however, is that States should evaluate the impact that taxes have to civil aviation and take an informed decision if they are properly justified or if more economic and social benefits could be gained by removing them.

   In regards to facilitation, GCAA believes that there are many opportunities in removing or reducing the burden created by visas to travel.

   GCAA also commented that greater participation of SAM Region in the ICAO Air Services Negotiation Conferences (ICAN) should be encouraged.

b) Safety: Referring to accident and incidents investigation (AIG), GCAA expressed their limitations and some strategies to have more independence, but operating within the GCAA.

c) Institutional strengthening: Greater autonomy of the aeronautical authority within the State scheme is trying to be achieved. In regards to the level of independence, Guyana believes that this is a State responsibility and it is important striking a balance among State responsibilities and freedom to discharge its obligation as authority. For the ICAO Regional Office, the SAM Plan should provide a vision for the future, maintaining however State sovereignty as a very high level principle.

d) Environment: Regarding this axis, GCAA expressed that the ICAO Regional Office should provide more technical assistance on the implementation of MRV, which will become effective by 2019.

2.1.8 **Chile**: Fully supported the Declaration.

2.1.9 **Bolivia**, **Colombia** and **Ecuador**: Asked for one weed of time for its analysis and provide feedback.

2.1.10 **Brazil** (ANAC): Indicated that they are coordinating the implementation of the SAM Plan and will provide comments on the Declaration. Such comments will be sent by mail, but in general, same are related to the safety axis. He also agreed that the Declaration should be shorter.

2.1.11 Upon consultation of the Secretariat on the desirable length of the Declaration, the participating delegates indicated that it should be contained within a maximum of two to three pages.

Agenda Item 3: Establishment of teams for the review of the axes

3.1 With reference to Agenda Item 3, States provided names of the experts for each Working Group, which were formed as follows:

Air connectivity axis:

- David Dueñas (Chile)
- Amira Padron (Venezuela)
- Carlos Von Siedlitz (Panama)
- Carlos Caballero (Bolivia)
- Jorque Yanqui (Peru)
- Sergio Pérez Lauro (Uruguay)
- Virginia Silvera (Uruguay)
- Julio Pereira (IATA)
- Filipe Reis (IATA)

Safety axis:

- David Romero (Venezuela)
- Fernando Torres (Peru)
- Marcos Revetria (Uruguay)
- Julio Danzov (Uruguay)
- Julio Pereira (IATA)

Institutional strengthening axis:

- Macarena Roa (Chile)
- Luis Nuñez (Peru)
- Marisela Estrada (Venezuela)
- Pablo Simone (Uruguay)
- José Palermo (Uruguay)
- Oracio Márquez (IATA)

Environmental protection axis:

- José Pereira (Venezuela)
- Pedro Cardeillac (Uruguay)
- Adriana Jackson (Uruguay)
- Arturo Luján (Peru)
- Oracio Márquez (IATA)

Agenda Item 4: Other business

4.1 After forming the Working Groups, the Secretariat opened Agenda Item 4. Delegates indicated that they had no other comments and/or suggestions beyond requesting that it would be important to begin to focus the activities of each group in order to be able to begin to outline the activities in the context of the SAM Plan

4.2 With no other point to discuss, the virtual meeting finished at 10:30 hours, Lima, Peru time.

APPENDIX D

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SOUTH AMERICAN REGIONAL OFFICE

SAFETY MODULE

SOUTH AMERICAN SAFETY PLAN (SAMSP)

Original Version

01 August 2018

DRAFT

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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) and safety oversight margin (SOM) 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), Edition 2020-2022.

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

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Address	:	P.O. Box 4127, Lima 100, Peru

The present edition (original) includes guidance and recommendations of Doc 10004 – Global Aviation Safety Plan (GASP) - 2020-2022. Subsequent amendments and/or corrigenda will be indicated in the corresponding registration table, as per the procedure established in Page 5.

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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

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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 sectors 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 Traffic 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 Traffic 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 continuous evolution of a preventive strategy to improve safety performance through the SSP.

3.1.4 The first edition of Annex 19 became applicable on 14 November 2013, and consolidated texts related to SSP and to safety management systems (SMSs) taken from the existing Annexes, as well as related elements concerning the collection and use of safety data and State safety oversight activities.

3.1.5 Annex 19 evolved in two phases. The first phase focused on creating an Annex on safety management that consolidated and reorganised existing SARPs.

3.1.6 In the second phase, Amendment 1 to Annex 19 was introduced, making substantial changes to safety management provisions, as described below:

- ✓ an update of the provisions of the State safety programme (SSP) and their integration with the critical elements (CEs) of the State safety oversight (SSO) system;
- ✓ accidents during scheduled commercial air transport operations with aircraft over 5 700 kg;
- ✓ enhancement of provisions concerning safety management systems (SMSs);
- ✓ extension of the SMS to type design and/or engine and propeller manufacturing organisations; and
- ✓ update of provisions on protection of safety data and information and related sources.

3.1.7 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 aforementioned 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 (EI) 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 must 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 The effective implementation of an SSP is developed through a gradual process, since time is required for its complete maturation. Air transport system complexity and the State capacity maturity regarding flight safety supervision matters are factors that determine the time needed to set up an SSP.

3.2.9 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.

3.2.10 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 31 July 2018 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
- ✓ 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 objectives and 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 Oversight Audit Programme (USOAP) continuous monitoring approach (CMA)

4.2.1 USOAP CMA activities in the SAM Region started in November 2011. As of 31 July 2018, 5 CMA audits have been conducted, as well as 14 ICAO coordinated validation missions (ICVMs), 2 integrated validation activities (IVAs) and 5 off-site monitoring activities. The current effective implementation (EI) average in the SAM Region is **78.62**%, while the overall improvement average over the seven (7) years of analysis (November 2011-July 2018) is **+12.34%**, which indicates that the SAM Region has improved its EI by an average **1.76**% per year.

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 planning and resolving 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 been gradually decreased since 2009, achieving in 2017 an accident rate of **1.65** per every **1,000,000** departures, far below the global rate of **2.42**. In 2015, 2016 and 2017, the SAM Region remained below the world rate.

4.3.2 **Attachment C** to this plan presents a more detailed analysis of the accidents occurred in the SAM Region between 2009-2017 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 been gradually decreasing, with the exception of 2011 and 2013. In 2016, the rate increased slightly but remained stable in 2017.

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 aeroplanes of 2 250 kg or less and **21** occurred with aeroplanes over 2 250 kg.

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 that would allow all to 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 by the end of 2018.

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, Argentina, Uruguay and Paraguay requested their inclusion. At present, the aforementioned 11 States are active members of the SAM SSP implementation pilot project.

4.7 SAM performance with regard to the Declaration of Bogota

4.7.1 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%.

As mentioned in paragraph 4.3, the SAM accident rate for scheduled commercial air transport operations with aircraft over 5 700 kg has been gradually decreasing since 2009, reaching **1.65** accidents per 1,000,000 departures in 2017, far below the global rate of **2.42**. In 2015, 2016 and 2017, the SAM rate remained below the global rate, 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.

By December 2016, **24%** of the international aerodromes had been certified, thus exceeding the established goal. By July 2018, 31% had been reached.

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, together with EI and SOM improvement, 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.

5.3.2 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.

5.4 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. 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 July 2018, 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.

Safety oversight margin (SOM)

5.8.9 The safety oversight margin (SOM) of a State is the difference between the percentage of effective implementation (EI) of that State and its minimum percentage of EI. The minimum percentage of EI is the value derived from an overall linear regression of traffic *vs*. EI, applied to the traffic of the State.

5.8.10 The safety oversight margin application is available at the ICAO iSTARS website at www.icao.int/safety/iStars

5.8.11 This application is a tool that the State must use, in addition to the percentage of EI, to assess its safety oversight capabilities.

5.8.12 The safety oversight margin is the actual percentage of EI of a State, as well as the minimum percentage of EI that it should have based on traffic volume. Each audited State has a safety oversight margin.

5.8.13 The safety oversight margin can be positive or negative. Even those States that have a positive safety oversight margin could have unsatisfactory PQs that, if unresolved, could generate safety-related issues. A positive safety margin must not be considered as a stopping point for continuous safety improvement in a State.

5.8.14 The safety oversight margin is divided into three margins, which are calculated for three functional categories, as follows:

a) operations: this category combines the EI scores for USOAP audit areas related to personnel licensing and training (PEL), aircraft operations (OPS) and airworthiness (AIR);

b) air navigation: this category combines the EI scores for USOAP audit areas related to aerodromes and ground aids (AGA) and air navigation services (ANS); and

c) support functions: this category combines the EI scores for USOAP audit areas related to primary aviation legislation and specific operating regulations (LEG), civil aviation organisation (ORG) and aircraft accident and incident investigation (AIG).

5.8.15 A State has some level of control over certain risks related to the operations of its domestic air service operators. Typically, these are activities in the OPS, AIR and PEL categories. Compliance related to these categories mainly affects the operators of a State. The risks associated to the air navigation category affect all operations within a State (domestic and foreign); typically, these are related to compliance in the AGA and ANS areas. The three non-operational areas in the support functions category (LEG, ORG and AIG) have an indirect impact on all operations.

5.8.16 The overall EI score in the eight critical elements (CEs) of an effective safety oversight system covers all the audited areas and may not focus precisely on the size of the system or the level of complexity of aviation activities in a State. The safety oversight margin helps the aviation community to supplement a one-dimensional score (*i.e.*, the overall EI score) with one that provides a minimum EI score and takes traffic volume into account. Another advantage of using the iSTARS safety oversight margin application is that it allows States and Regions to prioritise activities in the operational, air navigation and other areas related to USOAP assistance.

5.8.17 In each of the three functional areas, the State is assigned a minimum EI score, which is calculated based on an overall linear regression of traffic, compared to the EI of all ICAO member States. The safety oversight margins in the operations category are calculated based only on flights conducted by State operators, while the other margins are calculated using all departures from the State. To calculate the safety oversight margin in the operations category, domestic air operator certificates (AOCs) are used. Hence, traffic in this category reflects the aircraft of State operators as a means to calculate traffic. To calculate the safety oversight margin in the air navigation category, use is made of all departures that use the airspace. To calculate the safety oversight margin in the support function category, all the traffic combined is used (*vs.* all traffic that uses the airspace, as in the ANS category). Traffic is based on flights inside and outside the States and does not include overflights.

5.8.18 Based on this calculation, a State with a negative safety oversight margin has an EI score that is too low compared to its traffic. It would be considered that such State has an inadequate oversight system based on its traffic volume. States with a negative margin should at least put their safety oversight margin on the positive side. An improved EI score or a reduced traffic volume will increase the safety oversight margin.

5.8.19 Since the safety oversight margin uses a weighted average based on the traffic volume of the State, the EI score of the State is compared to the weighted average and not to the overall average. Therefore, a State may have a high EI score but a negative safety oversight margin because its oversight capacity is not commensurate with its high traffic volume.

State safety programme (SSP) implementation

5.8.20 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

5.8.21 When calculating the accident, serious incident and incidents of greatest concern categories, the States will focus on those categories with the most critical, recurrent 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)

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

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

5.8.24 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.

5.8.25 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.

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

5.8.27 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.

5.8.28 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.

5.8.29 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.

5.8.30 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

5.8.31 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

5.8.32 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

5.8.33 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.

5.8.34 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 air navigation service and aerodrome infrastructure to support safe operations.

SAM strategic objectives

5.8.35 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 **All SAM States will consider the following strategic objectives in their national safety plans:**
By 2020	✓ implement a **sustainable SSP** that includes SSP fundamentals; ✓ contribute annually to the **10% gradual reduction in accident rates, number of accidents and fatalities in the SAM Region**, based on the calculated annual slope and the

Timeline	Strategic objectives **All SAM States will consider the following strategic objectives in their national safety plans:**
	number of accidents and fatalities for those operations that do not have information on departures; ✓ strengthen safety oversight capabilities by gradually improving effective implementation (EI) in order to **reach 95% by 2028 and a positive safety oversight margin (SOM+) by 2022**; ✓ increase regional collaboration; ✓ extend the use of industry programmes; and ✓ ensure the availability of appropriate air navigation service and aerodrome infrastructure to support safe operations.
By 2022	✓ continue enhancing SSPs in order to achieve an effective SSP by 2025; ✓ continue contributing annually to the 10% gradual reduction in accident rates, number of accidents and fatalities in the SAM Region, based on the calculated annual slope and the number of accidents and fatalities for those operations that do not have information on departures; ✓ continue improving effective implementation (EI) in order to reach 95% by 2028; ✓ **achieve a positive safety oversight margin (SOM+) by 2022 and maintain it over time**; ✓ increase regional collaboration; ✓ extend the use of industry programmes; and ✓ ensure the availability of the appropriate air navigation service and aerodrome infrastructure to support safe operations.
By 2024	✓ continue enhancing SSPs in order to achieve an effective SSP by 2025; ✓ continue contributing annually to the 10% gradual reduction in accident rates, number of accidents and fatalities in the SAM Region, based on the calculated annual slope and the number of accidents and fatalities for those operations that do not have information on departures; ✓ continue improving effective implementation (EI) in order to reach 95% by 2028; ✓ maintain a positive safety oversight margin (SOM+); ✓ increase regional collaboration; ✓ extend the use of industry programmes; and ✓ ensure the availability of the appropriate air navigation service and aerodrome infrastructure to support safe operations.

Timeline	Strategic objectives All SAM States will consider the following strategic objectives in their national safety plans:
By 2025	✓ implement an **effective SSP**, as appropriate to the complexity of their civil aviation systems; ✓ continue contributing annually to the 5% gradual reduction in accident rates, number of accidents and fatalities in the SAM Region, based on the calculated annual slope and the number of accidents and fatalities for those operations that do not have information of departures; ✓ continue to gradually improve effective implementation in order to reach 95% by 2028; ✓ maintain a positive safety oversight margin; ✓ increase regional collaboration; ✓ extend the use of industry programmes; and ✓ ensure the availability of the appropriate basic air navigation service and aerodrome infrastructure to support safe operations.
By 2028	✓ **achieve a consecutive period of 3 years without fatalities** in aircraft accidents and maintain it as from 2028; ✓ contribute annually to the 10% gradual reduction in accident rates, number of accidents and fatalities in the SAM Region, based on the calculated annual slope and the number of accidents and fatalities for those operations that do not have information of departures; ✓ **obtain 95% of EI** or better in the eight (8) critical elements of the SSP; ✓ maintain a positive safety oversight margin; ✓ increase regional collaboration; ✓ extend the use of industry programmes; and ✓ ensure the availability of the appropriate air navigation service and aerodrome infrastructure to support safe operations.

Safety performance indicators

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

5.8.37 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 and non-scheduled commercial air transport operations with aeroplanes over 5 700 kg and helicopters over 3 715 kg and with aeroplanes of 5700 kg or less and helicopters of 3 175 kg or less;
- ✓ number of accidents for all types of operations with aeroplanes over 5700 kg and helicopters over 3175 kg, and with aeroplanes of 5700 kg or less and helicopters of 3175 kg or less in all aviation sectors other than scheduled and non-scheduled commercial air transport, in case aircraft movement data are not available;
- ✓ Safety oversight margins;
- ✓ Globally harmonised SPIs and level of participation in industry assessment programmes; and
- ✓ Percentage of improvement in essential air navigation and aerodrome infrastructure to support safe operations.

Safety performance targets

5.8.38 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.

5.8.39 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) and SOM improvement and SSP implementation

5.8.40 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, SOM 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.

5.8.41 Considering that the SAM Region has improved its EI by **12.33%** during the past seven (7) years, corresponding to the USOAP CMA cycle, and that the average annual increase is 1.76% (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 proposed annual improvement 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 the complete review of the PQs. States will also achieve and maintain a positive safety oversight margin (SOM+) starting in 2020.

Table 5-2 – Indicators and targets regarding EI improvement, safety oversight margin (SOM) and SSP implementation

States with EI	**2020** % SSP Implementation % EI improvement	**2022** % EI Improvement and SOM+	**2024** % EI Improvement and SOM+	**2025** % SSP Implementation % EI	**2026** % EI Improvement and SOM+	**2028** % EI Improvement and SOM+

	and SOM improvement			Improvement and SOM+		
less than 65% **Group 1**	Sustainable SSP (100%)	80 % and SOM+	85 % and SOM+	Effective SSP (100%)	90 % and SOM+	95-100 % and SOM+
	75 % and SOM improvement			87.5% and SOM+		
between 65 and 74.99% **Group 2**	Sustainable SSP (100%)	85 % and SOM+	90 % and SOM+	Effective SSP (100%)	95 % and SOM+	95-100 % and SOM+
	80 % and SOM improvement			92.5% and SOM+		
between 75 and 84.99% **Group 3**	Sustainable SSP (100%)	90 % and SOM+	95 % and SOM+	Effective SSP (100%)	95 % and SOM+	95-100 % and SOM+
	85 % and SOM improvement			95% and SOM+		
between 85 and 95% **Group 4**	Sustainable SSP (100%)	95 % and SOM+	95 % and SOM+	Effective SSP (100%)	95 % and SOM+	95-100 % and SOM+
	95 % and SOM improvement			95% and SOM+		

Accident rate reduction

5.8.42 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.

5.8.43 For accidents occurred with aeroplanes over 5 700 kg and helicopters over 3 175 kg and with aeroplanes of 5 700 kg or less and helicopters of 3 175 kg or less in all aviation sectors other than scheduled and non-scheduled commercial air transport, States will establish the annual reduction percentages (goals/improvements) or the number of accidents and fatalities in case aeroplane and helicopter movement data are not available, in accordance with their safety oversight capabilities.

Table 5-3 – Accident rate reduction indicators and goals

Indicators by category and by type of operation	**2020 Goals**	**2022 Goals**	**2024 Goals**	**2026 Goals**	**2028 Goals**
Accident and fatality rate Scheduled commercial air transport with aircraft over 5 700 kg (See **Attachment C** for methods to calculate slopes, goals and alert levels)	Reduce **10%** below **2.10**, which corresponds to the value of the SAM slope estimated for **2020** **Goal: 1.89**	Reduce **10%** below **1.84**, which corresponds to the value of the SAM slope estimated for **2022** **Goal: 1.66**	Reduce **10%** below **1.63**, which corresponds to the value of the SAM slope estimated for **2024** **Goal: 1.46**	Reduce **10%** below **1.44**, which corresponds to the value of the SAM slope estimated for **2026** **Goal: 1.29** Zero fatalities	Reduce **10%** below **1.27**, which corresponds to the value of the SAM slope estimated for **2028** **Goal: 1.14**

					Zero fatalities
RE accident and fatality rate Scheduled commercial air transport with aircraft over 5 700 kg (See **Attachment C** for methods to calculate slopes, goals and alert levels)	Reduce **10%** below **1.12**, which corresponds to the value of the SAM slope estimated for **2020** **Goal: 1.01**	Reduce **10%** below **1.01**, which corresponds to the value of the SAM slope estimated for **2022** **Goal: 0.90**	Reduce **10%** below **0.91**, which corresponds to the value of the SAM slope estimated for **2024** **Goal: 0.82**	Reduce **10%** below **0.82**, which corresponds to the value of the SAM slope estimated for **2026** **Goal: 0.74** Zero fatalities	Reduce **10%** below **0.74**, which corresponds to the value of the SAM slope estimated for **2028** **Goal: 0.67** Zero fatalities
Accident and fatality rate for **non-scheduled** commercial air transport Aircraft over 5 700 kg and of 5 700 kg or less	Reduce **10%** below the value of the slope calculated by each state for **2020.**	Reduce **10%** below the value of the slope calculated by each state for **2022.**	Reduce **10%** below the value of the slope calculated by each state for **2024.**	Reduce **10%** below the value of the slope calculated by each state for **2026.** Zero fatalities	Reduce **10%** below the value of the slope calculated by each state for **2028.** Zero fatalities
Accident and fatality rate or number for operations other than scheduled and non-scheduled commercial air transport Aircraft over 5 700 kg and of 5 700 or less, used, for example, in: - general aviation - agriculture - training - business aviation	Reduce **10%** below the value of the slope calculated by each State for **2020**	Reduce **10%** below the value of the slope calculated by each State for **2022**	Reduce **10%** below the value of the slope calculated by each State for **2024**	Reduce **10%** below the value of the slope calculated by each State for **2026**	Reduce **10%** below the value of the slope calculated by each State for **2028.** Zero fatalities in these sectors and operations

Accident and incident rate control and monitoring alert levels

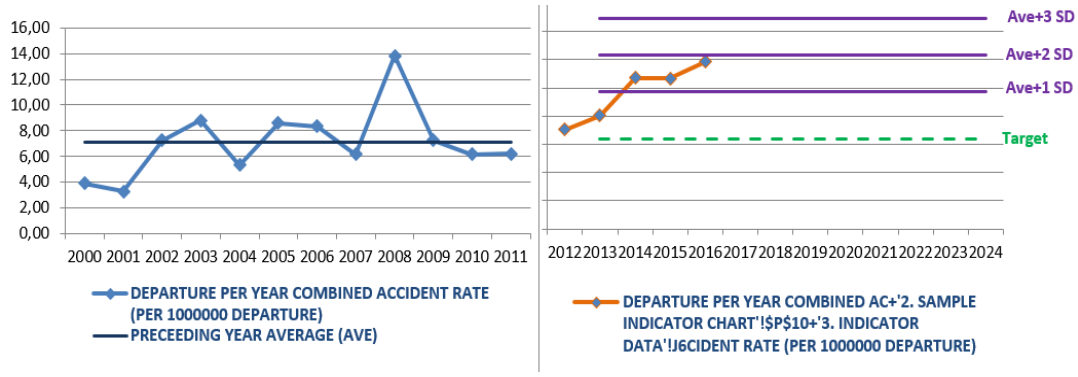
5.8.44 The determination of **alert levels** is associated with the trend behaviour of the historical data of an indicator. The reason is to ensure that the actual alert setting of an indicator has taken into consideration its own recent historical behaviour. Historical data performance is specifically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

a) the average value; and

b) the standard deviation (SD) value

5.8.45 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:

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

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

5.8.46 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.

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

Table 5-4 – Objectives, goals and indicators concerning State collaboration at regional level, use of industry programmes, and availability of the appropriate air navigation service and aerodrome infrastructure

Objectives	Goals	Indicators
Increase State collaboration at regional level;	By 2020, States needing assistance in categories with an SOM below zero will use the SRVSOP or other SAM States.	✓ Number of States that request support ✓ Number of States that actively request assistance ✓ Number of States that receive assistance ✓ Number of States that offer assistance
	By 2022, all States will provide safety risk information, including the SPIs of their SSP, to ICAO, RASG-PA, SRVSOP and ARCM	✓ Number of States that provide safety risk information to ICAO, RASG-PA, SRVSOP and ARCM ✓ Number of States that share their SSP SPIs with ICAO, RASG-PA, SRVSOP and ARCM ✓ Number of States that provide safety infromation to ICAO, RASG-PA, SRVSOP, ARCM

Objectives	Goals	Indicators
		and other States
	By 2022, all States with an SOM+ and an effective SSP will actively lead risk management activities of ICAO, RASG-PA, SRVSOP and ARCM	✓ Number of States with an SOM+ and an effective SSP that lead safety management activities of ICAO, RASG-PA, SRVSOP and ARCM
Extend the use of industry programmes	By 2020, all service providers will use globally-harmonised SPIs as part of their SMS.	✓ Number of service providers that use globally-harmonised metrics for their SPIs.
	By 2022, increase the number of service providers that participate in the corresponding industry assessment programmes recognised by ICAO.	✓ Number of service providers that participate in the corresponding industry assessment programmes recognised by ICAO.
Ensure the availability of the appropriate air navigation service and aerodrome infrastructure to support safe operations	By 2022, all States will implement the basic air navigation and airport inforastructure.	✓ Number of States that have implemented the basic air navigation and airport infrastructure.

5.9 Implementation tools

5.9.1 In order to meet the goals defined in **Tables 5-2, 5-3 and 5-4**, 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 also include:

- ✓ A timetable of activities (*e.g.,* a Gantt chart) to address the CAP, describing the tasks to be carried out by the State in order to achieve the EI and SOM improvement objectives and goals of its safety plan;
- ✓ The timetable of activities (*e.g.,* a Gantt chart) and Excel templates to review all prescriptive and SSP protocol questions;
- ✓ The SSP implementation plan, describing implementation phases and elements; and
- ✓ The mitigation plans for managing risk 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 off-line CAP management, it is recommended that States 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 aforementioned OLF. **Attachment F** shows a CAP model in Excel format.

Timetable of activities and Excel templates to review all prescriptive and SSP PQs

5.9.8 In order to review all prescriptive and SSP PQs, States will develop timetables of activities (*e.g.,* Gantt chart) and Excel templates for each audit area, similar to the CAP template shown in the OLF. Excel templates will allow States to work off-line. Once the individual CAPs have been entered in the Excel templates, they may be used for completing the OLF self-assessment template. **Attachment F** contains a sample CAP in Excel format.

SSP implementation plan

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

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

Mitigation plans to manage risk and prevent accidents

5.9.11 Based on the accident, serious incident and high-risk incident (HRC) categories identified, States will develop their mitigation plans in order to manage risk and prevent the occurrence of the aforementioned categories in all sectors of greater concern of their civil aviation systems.

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 safety planning and implementation at a strategic level, and will provide support to the States at a tactical level for the achievement of their objectives and goals.

5.10.6 The SAM Office will provide support to the States in the planning and implementation of their national plans. 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 ICAO, 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 representative.

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 groups 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 groups 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:

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

- ✓ **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 In order to provide support, the stakeholders will conduct an analysis of the situation in each State with respect to the USOAP CMA, using the OLF.

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 (SDCPS); 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 and SIMS, 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

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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 Growth (Per cent)	1997-2007	12.2	1.4	-0.4
	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

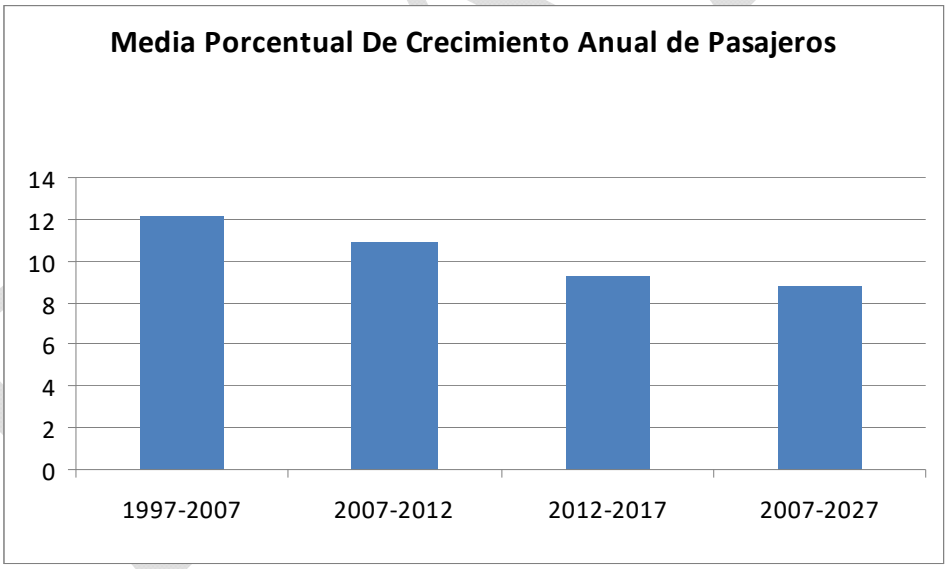
Media Porcentual De Crecimiento Anual de Pasajeros
14
12
10
8
6
4
2
0
1997-2007
2007-2012
2012-2017
2007-2027

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

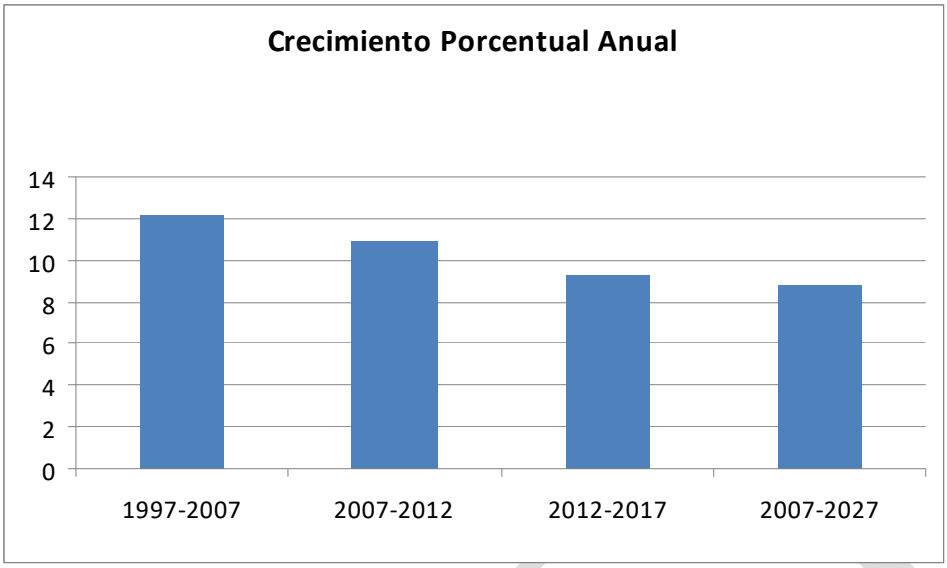
Crecimiento Porcentual Anual
14
12
10
8
6
4
2
0
1997-2007
2007-2012
2012-2017
2007-2027

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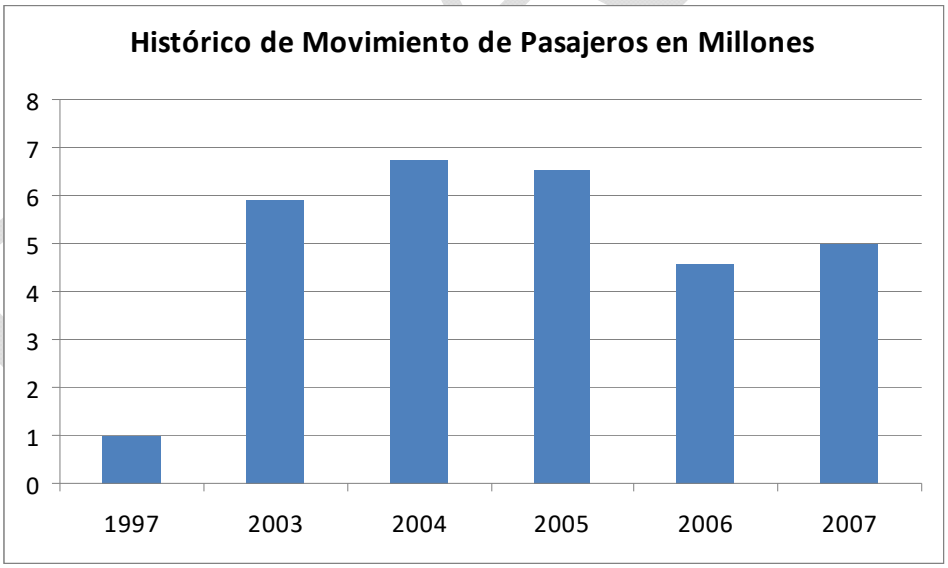
Table 2a: South America – Central America – Movement of passengers

	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

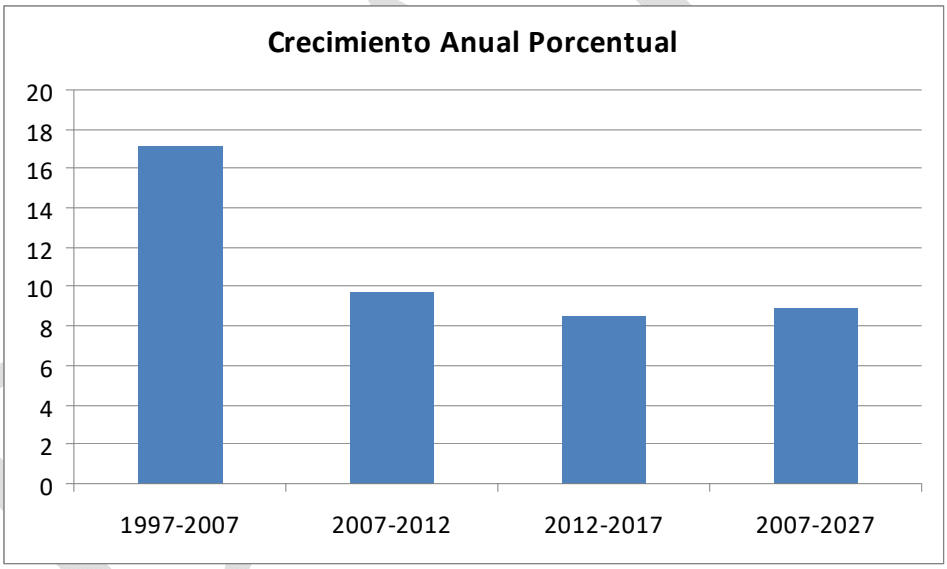
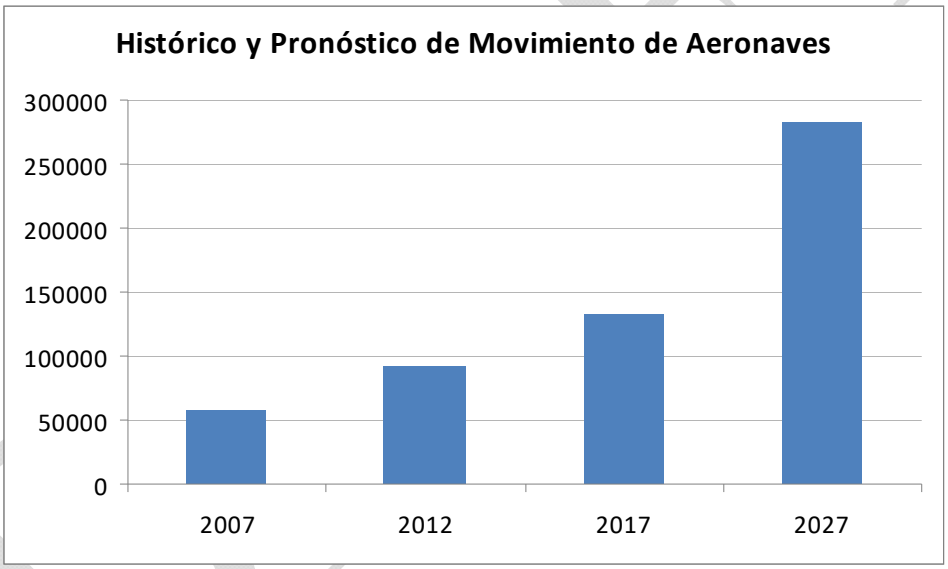

Crecimiento Anual Porcentual
20
18
16
14
12
10
8
6
4
2
0
1997-2007
2007-2012
2012-2017
2007-2027

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



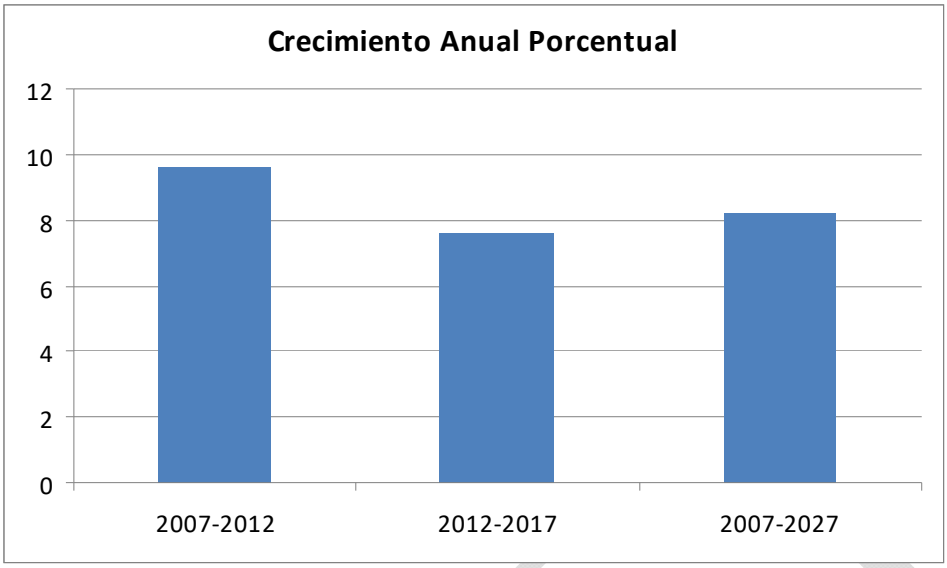

Crecimiento Anual Porcentual
12
10
8
6
4
2
0
2007-2012
2012-2017
2007-2027

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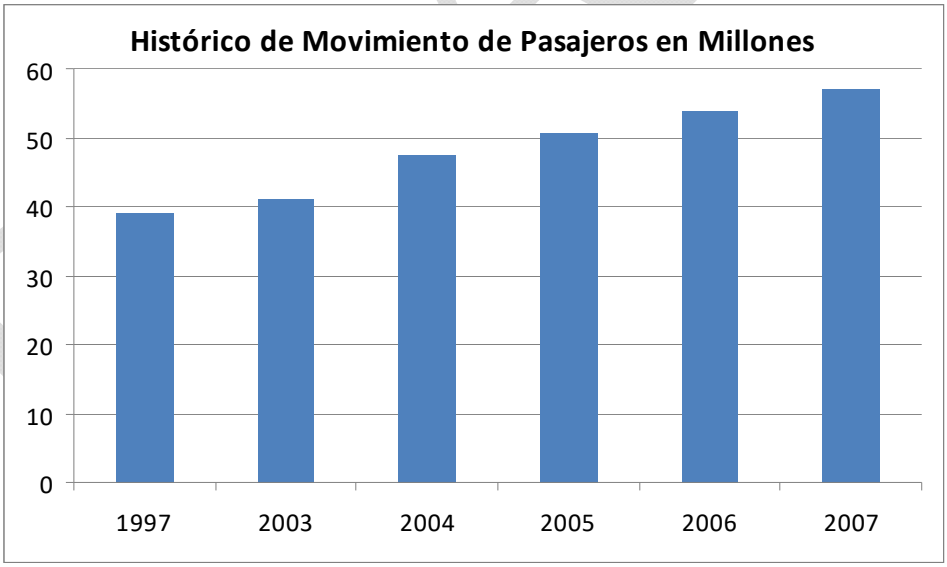
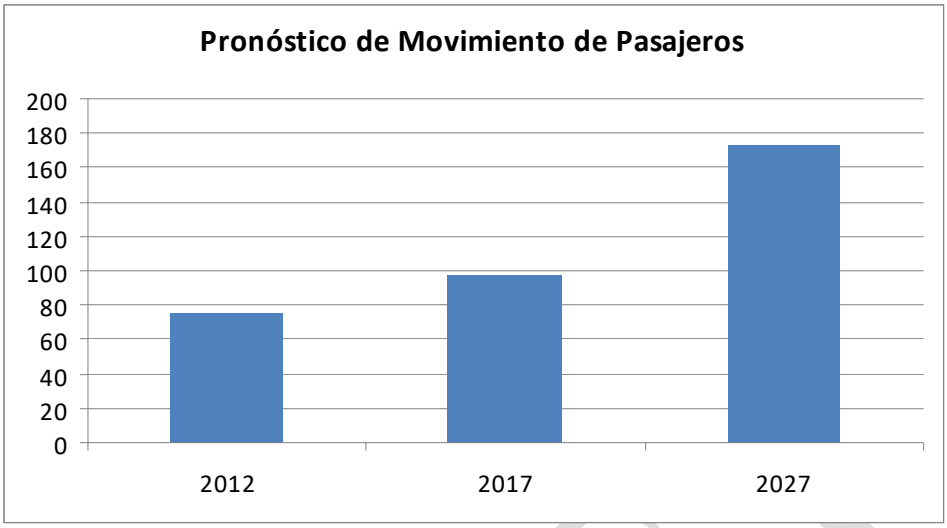
Table 3a: South America – North America – Movement of Passengers

	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

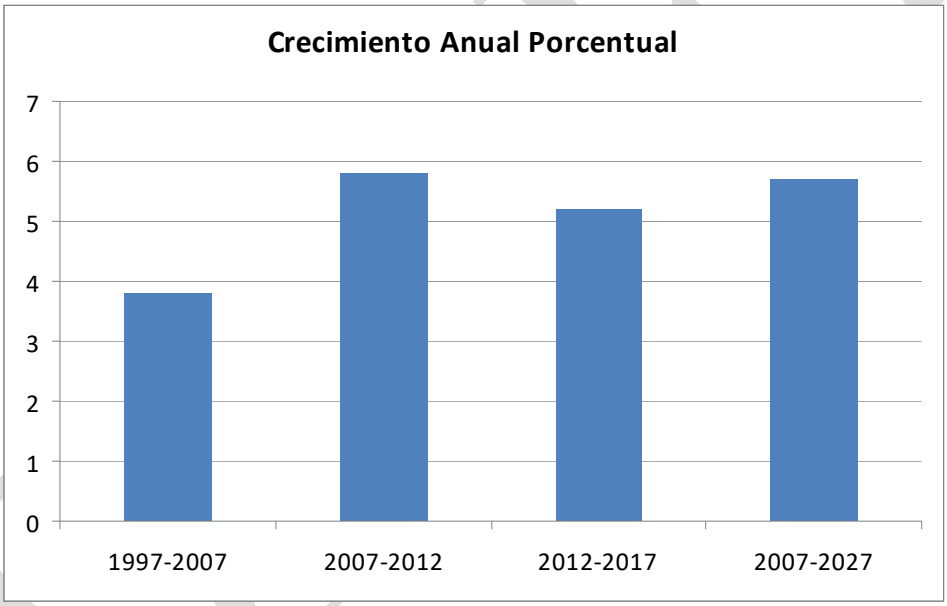

Crecimiento Anual Porcentual
7
6
5
4
3
2
1
0
1997-2007
2007-2012
2012-2017
2007-2027

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

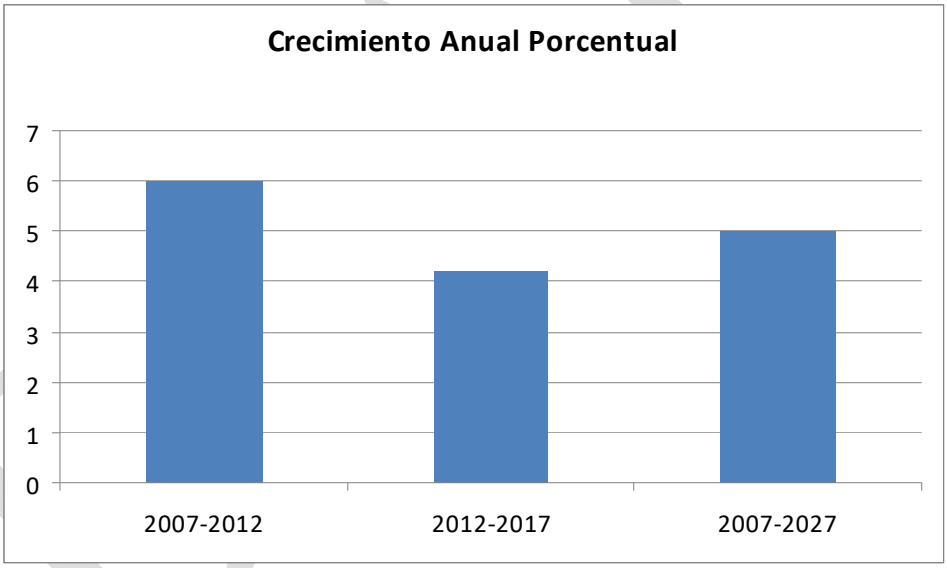
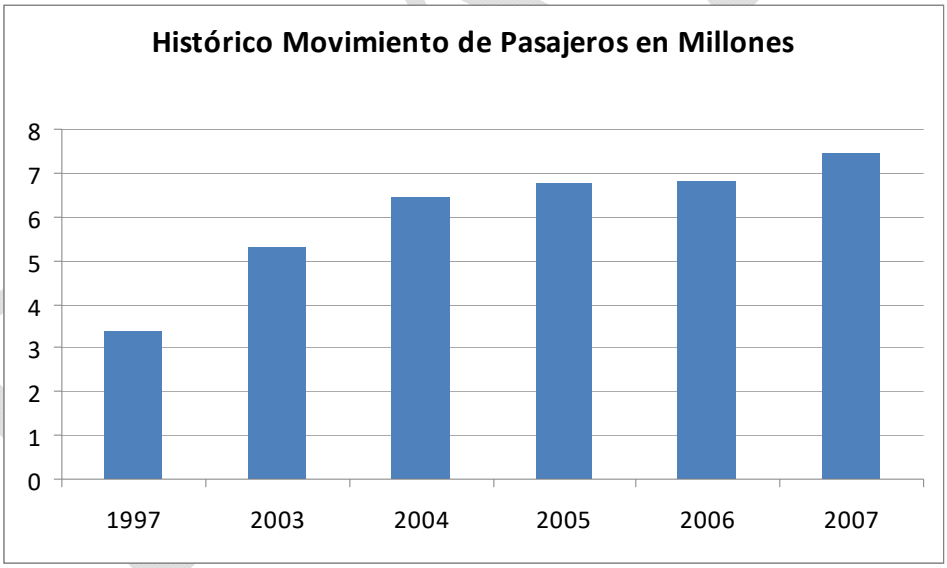


Table 4a: South Atlantic – Europe/South America Corridor - Passengers

	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

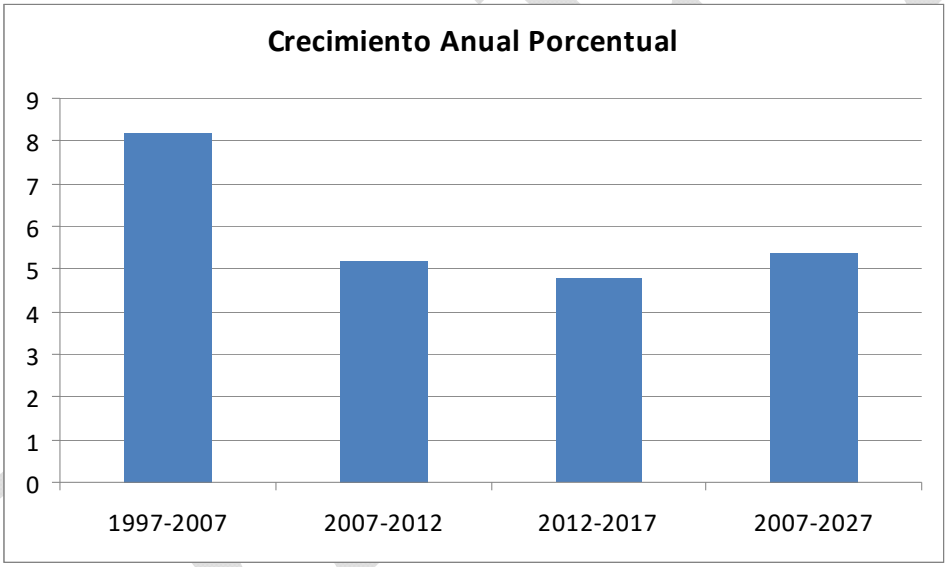
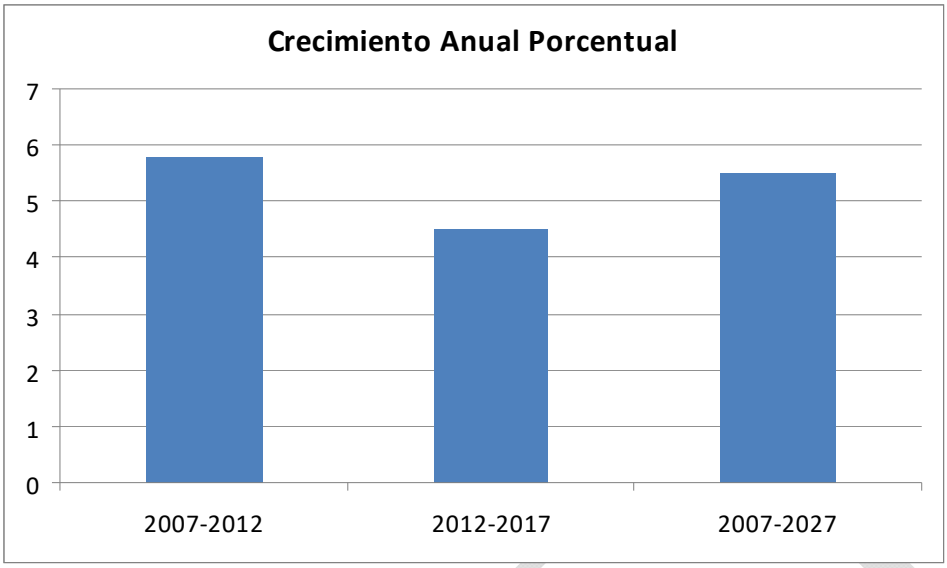

Crecimiento Anual Porcentual
9
8
7
6
5
4
3
2
1
0
1997-2007
2007-2012
2012-2017
2007-2027

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

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ATTACHMENT B

Analysis of SAM performance between November 2011 and July 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 the on-line framework (OLF) with 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 July 2018

2.1 USOAP CMA activities in the SAM Region started in 2011. By 31 July 2018, 5 CMA audits, 14 ICVMs, 2 integrated validation activities (IVAs), and 5 off-site monitoring activities had been carried out as shown in Table 1 below.

Table 1 – USOAP CMA activities – November 2011 - July 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)	
2018	Brazil (AIG)			Bolivia (MIR)
Total	05	14	2	5

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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 – July 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** **(% updated)**
02. Bolivia	2008: 72.26	2013: 67.73 (-4.53)	2016: **86.22** (+18.49)		2018: **82.21** (-4.01)	+ 09.95	**82.21**
03. Brazil	2009: 85.75	2018: 94.72 (AIG) (-0.35)	2015: **95.07** (+7.47)		2015: 87.60 (+1.85)	+ 8.97	**94.72**
04. Chile	2008: 84.29		2017: **94.1** (+11.05)	2017: **94.65** **(AIG)** (+0.55)		+ 10.36	**94.65**
05. Colombia	2007: 63	2017: **74.38** (+11.38)	2011: **78.23** (+15.23)			+ 11.71	**74.71** **(% updated)**
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** **(% updated)**
07. Guyana	2007: 44.21		2016: **64.4** (+20.19)			+ 21.01	**65.22** **(% updated)**
08. Panama	2005: 85.79	2015: **36.58** (-49.21)	2017:**61.79** (+25.21)			- 23.37	**62.42** **(% updated)**
09. Paraguay	2009: 51.04		2016: **71.82** (+18.19)		2016: 53.63 (+2.59)	+ 20.29	**71.33** **(% updated)**
10. Peru	2007: 68.22	2014: **74.34** (+6.12)				+ 6.59	**74.81**
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** (0.0)	2014 (report not available)	+ 30.23	**71.72** **(% updated)**
13. Venezuela	2009: 82.1		2013: **93.00** (+11.03)			+ 11.41	**93.51** **(% updated)**
Average	**66.28**	**- 9.76 per audit**	**14.78 per ICVM**	**0.27 per activity**	**0.18 per activity**	**+ 12.33** **(1.76)**	**78.62** (12.34)

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2.3 The table above shows that the overall average for the 7 years of analysis (November 2011 – July 2018) is **+ 12.34%**, which indicates that the EI of the SAM Region improved by an average of **1.76** % 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.

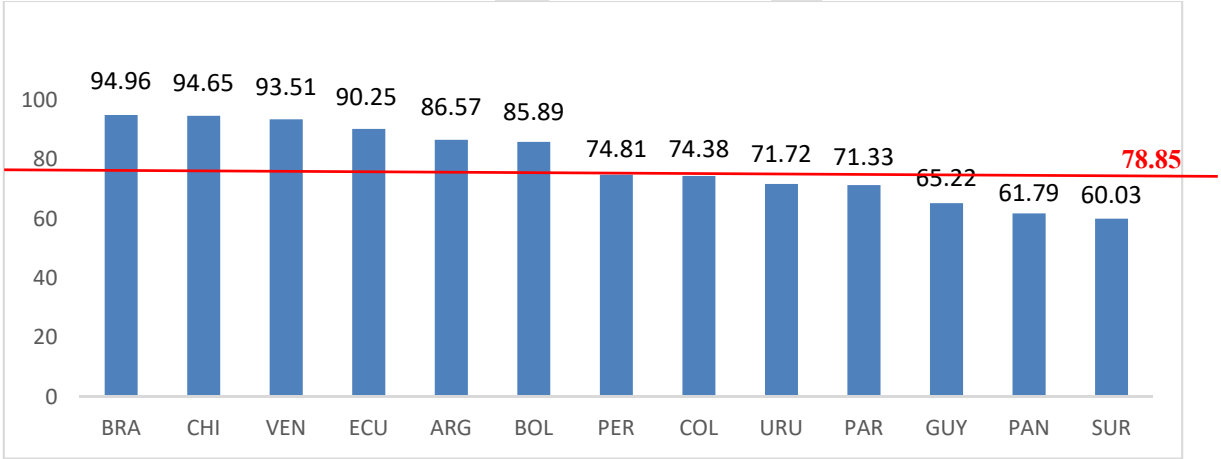
2.5 Likewise, a CMA audit has been scheduled for March 2018 in Brazil, only for the accident and incident investigation (AIG) area.

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.

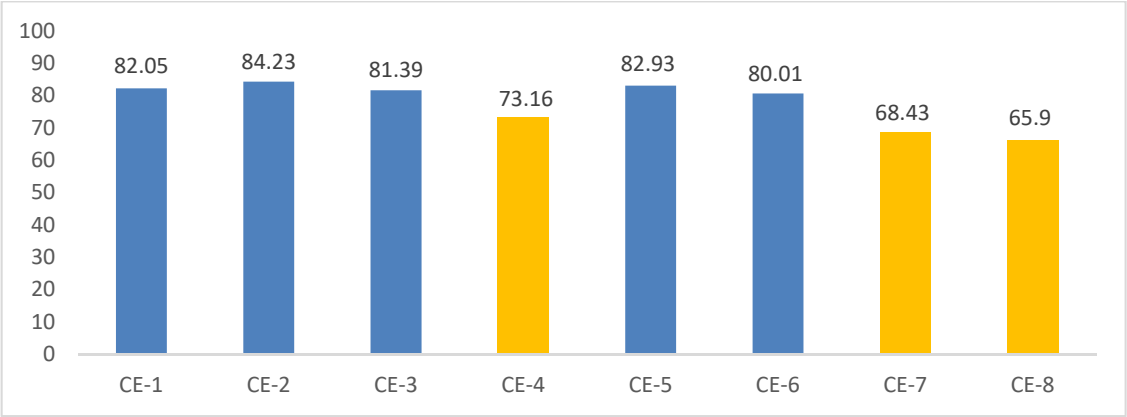
Table 3 – Status of SAM States in relation to the USOAP CMA (November 2011 – July 2018)



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.

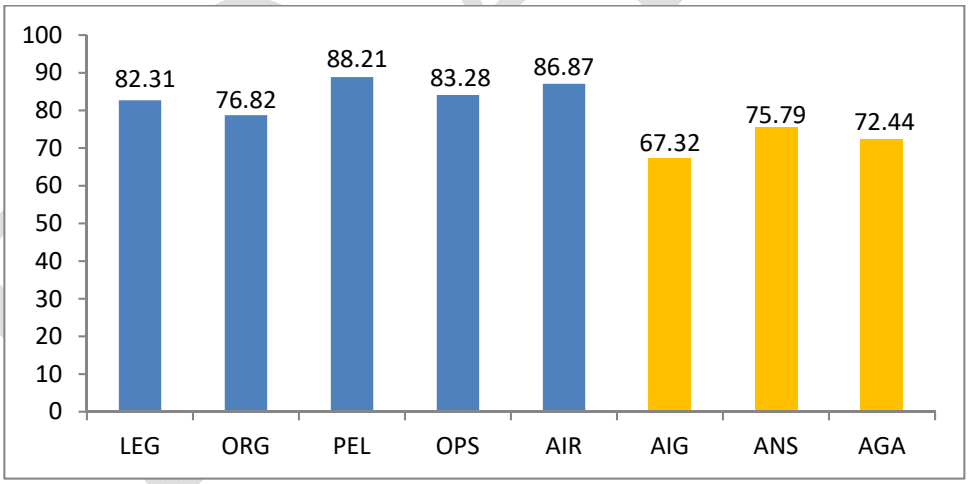
Table 4-1 – Average effective implementation (EI) of the SAM Region, by CE



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



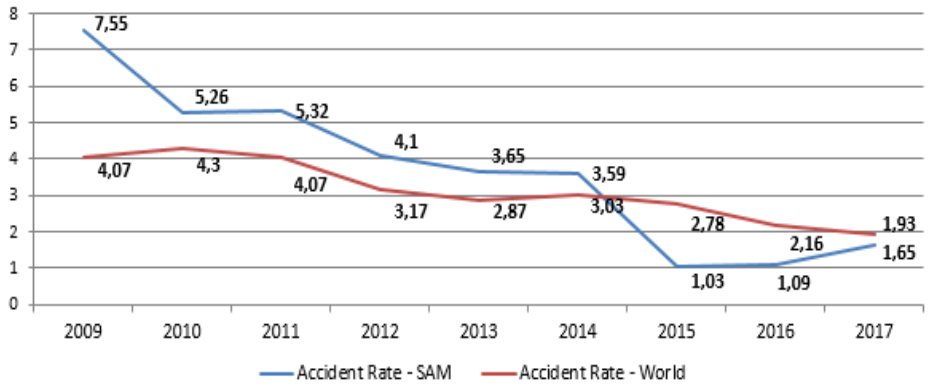
ATTACHMENT C

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.

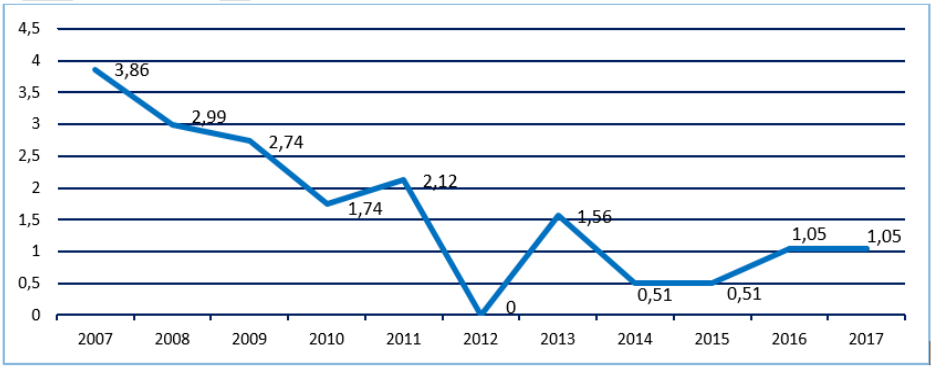
Table 1 – Accident rate in scheduled commercial air transport operations with aircraft over 5 700 kg



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



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:

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

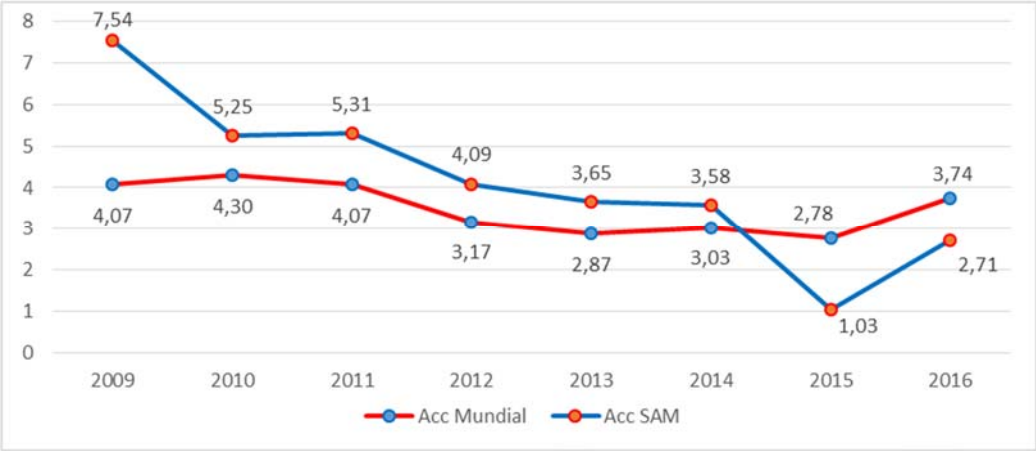
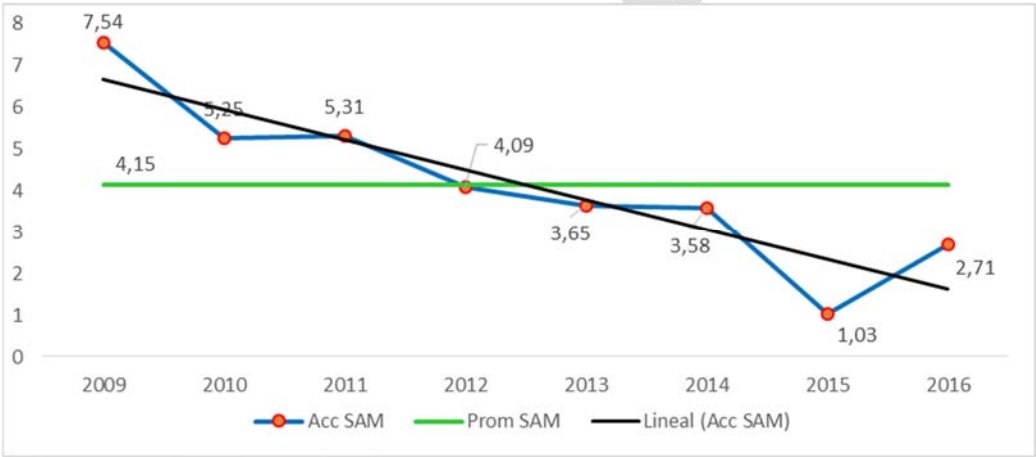


Figure D-2 – Average of accidents (4.15) and trend line in the SAM Region



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.

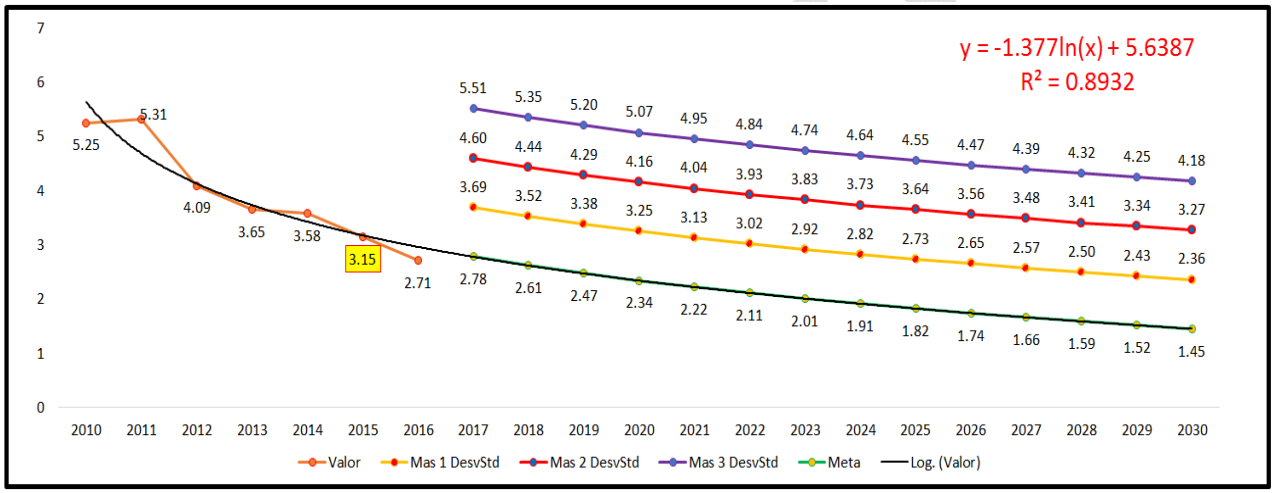
c) If the objective is to infer the expected values in future periods, the use of the trend line based on

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.

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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

$v = -1.183\ln(x) + 5.5178$

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

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.

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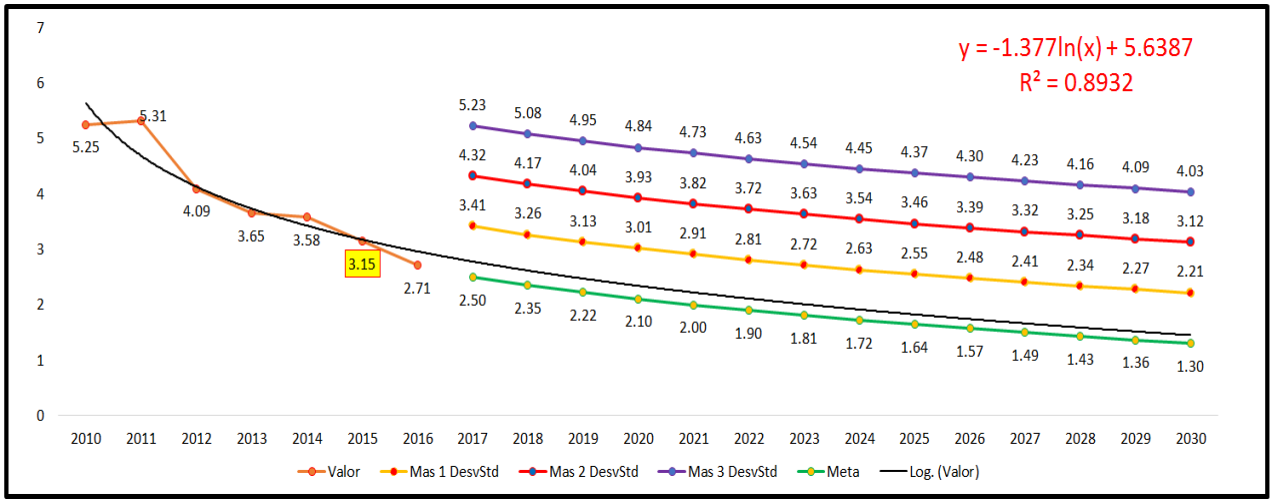
Figure D-4 – Goals established with a 10% improvement (- 10%) based on the values calculated on the accident slope line



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. The actual performance of the SAM Region is shown in the graph with a blue line.

Target = Value x (1 – Target)

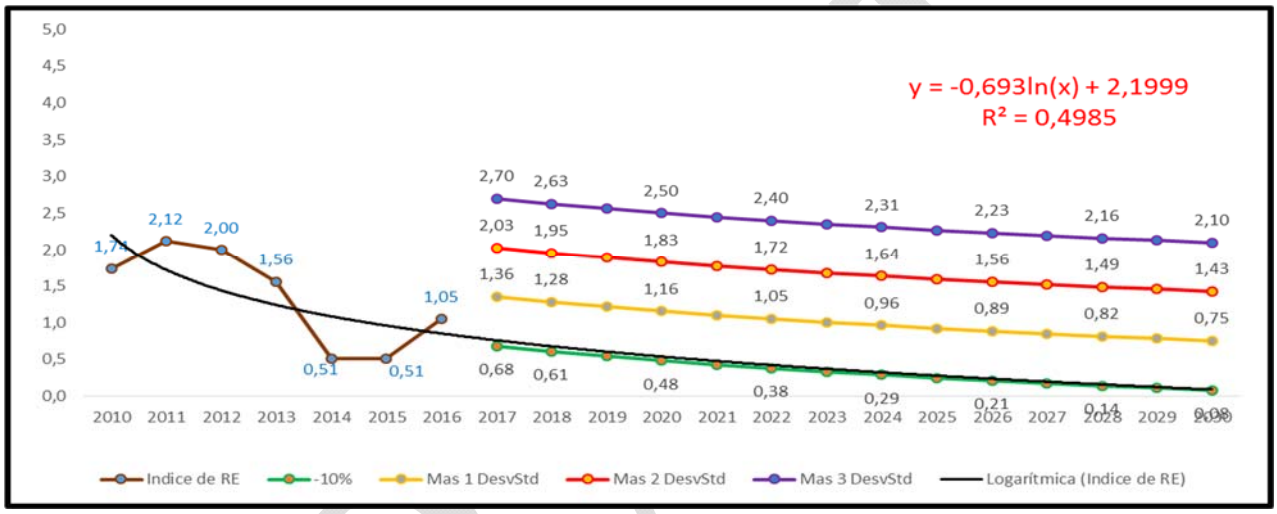
Alert = Target + [1,2,3 StdDev]

	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

4.5 This same methodology was used for runway excursion (RE) accident rates, based on the measurements and rates for years 2008 to 2013.

4.6 To calculate the slope and rates related to runway excursion (RE) accidents, the actual 2008-2013 values were used, except for years 2010 and 2012, which were interpolated to make values more homogeneous during this period. The actual values for years 2014 (0.51), 2015 (0.51), 2016 (1.05) and 2017 (1.05) were not taken into account because they were too low compared to those for the period 2008-2013, and would have created a significant distortion in the logarithmic slope. The following graph was obtained from the aforementioned values:

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]

4.7 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

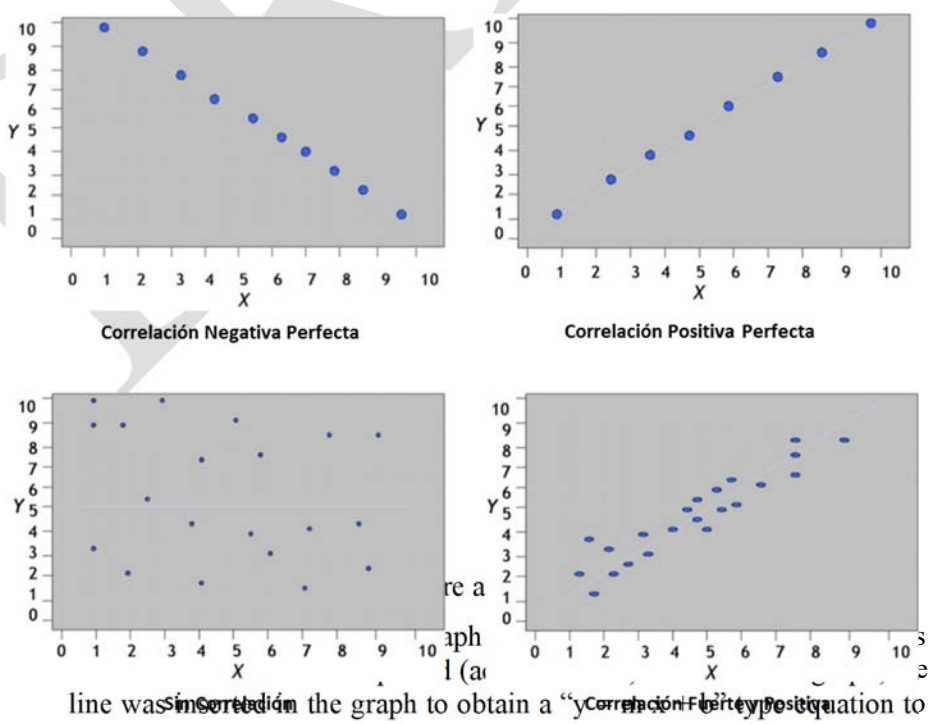
5.1 This analytical study is based on some statistical mathematical concepts related to:

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.



5.2 re a aph s obtained from l (a e "linear" trend line was inserted in the graph to obtain a "y = ax + 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 for the trend line "y = -1.512ln(x) + 5.7217", considering the period (year or order of same in the total data) as an independent variable (x), for total accidents in the SAM Region, and the equation for the trend line *"y = -0.791ln(x) + 3.1472"* for runway excursion accidents.

d) **Determination of the standard deviation:** Using the Excel standard deviation equation = STDEVPA (:) the standard deviation for the selected years was calculated based on historical or interpolated values.

e) Calculation of goals: For automatic calculation of goals, columns were inserted in the corresponding tables of the EXCEL sheets. Accordingly, the values selected for the Region and for the States can be inserted in the "Goal" box. A goal of 10% (10% improvement) has been selected for the SAM Region, so -10% must be inserted in the aforementioned box. Excel will automatically calculate and present the values in the corresponding tables and graphs.

6. Analysis of the selected goals

6.1 The graphs in which a 10% improvement (-10%) has been added show that the actual performance of the SAM Region (blue line) is below the slopes and goals calculated in the initial years. Accordingly, a conservative approach has been taken. Depending on the performance of the Region, this goal may be revised by increasing or reducing the improvement.

7. Considerations

7.1 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.

8. Conclusions

8.1 According to the methodology used, the historical data on SAM performance, and calculations made using the logarithmic function, a 10% improvement in total accident rates and runway excursion (RE) rates in scheduled air transport operations with aircraft over 5 700 kg is feasible by 2030.

8.2 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.

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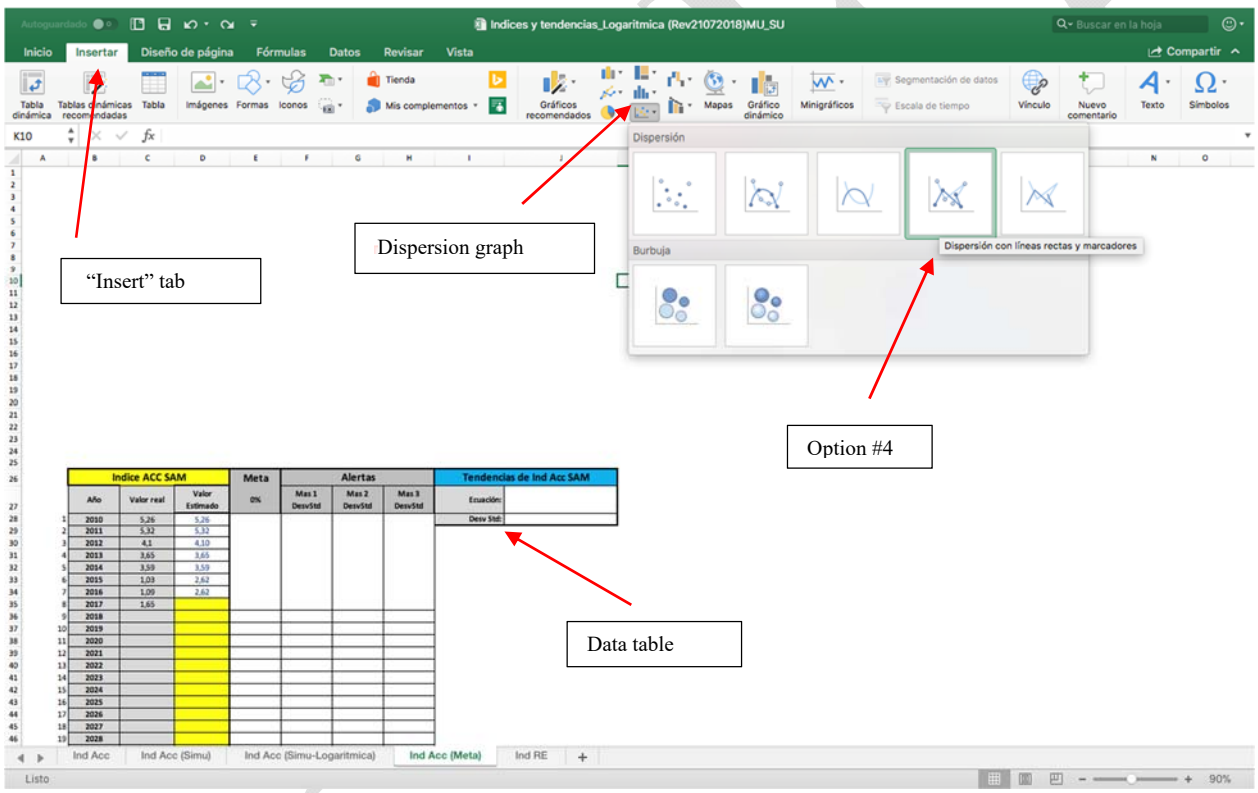
ATTACHMENT E

Instructions for the generation of graphs in Excel format, relating to aircraft accidents due to runway excursions (RE) in scheduled commercial air transport operations with aeroplanes over 5 700 kg and manual calculation of the logarithmic trend line and standard deviation (SD) in South American (SAM) Region

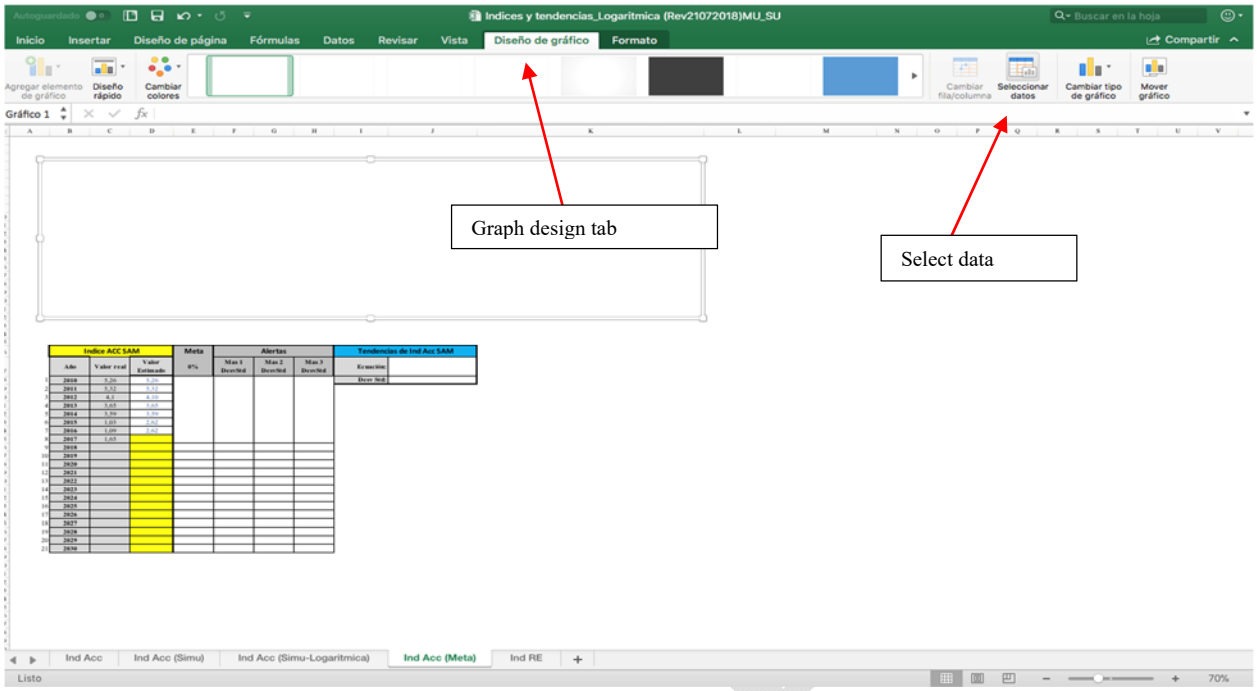
The analysis of indicators, slopes, goals and alert levels for aircraft accidents and RE accidents in scheduled commercial air transport operations with aeroplanes over 5700 kg starts with the generation of a graph reflecting all these values in the "Ind Acc (Meta)" tab in the Excel file "Rates and trends". The process below shows how each of the aforementioned values was plotted:

In order to start analysing and plotting the various values for each year, there must be a table containing the data for the year, in real value, and estimated values as shown in the following figure:

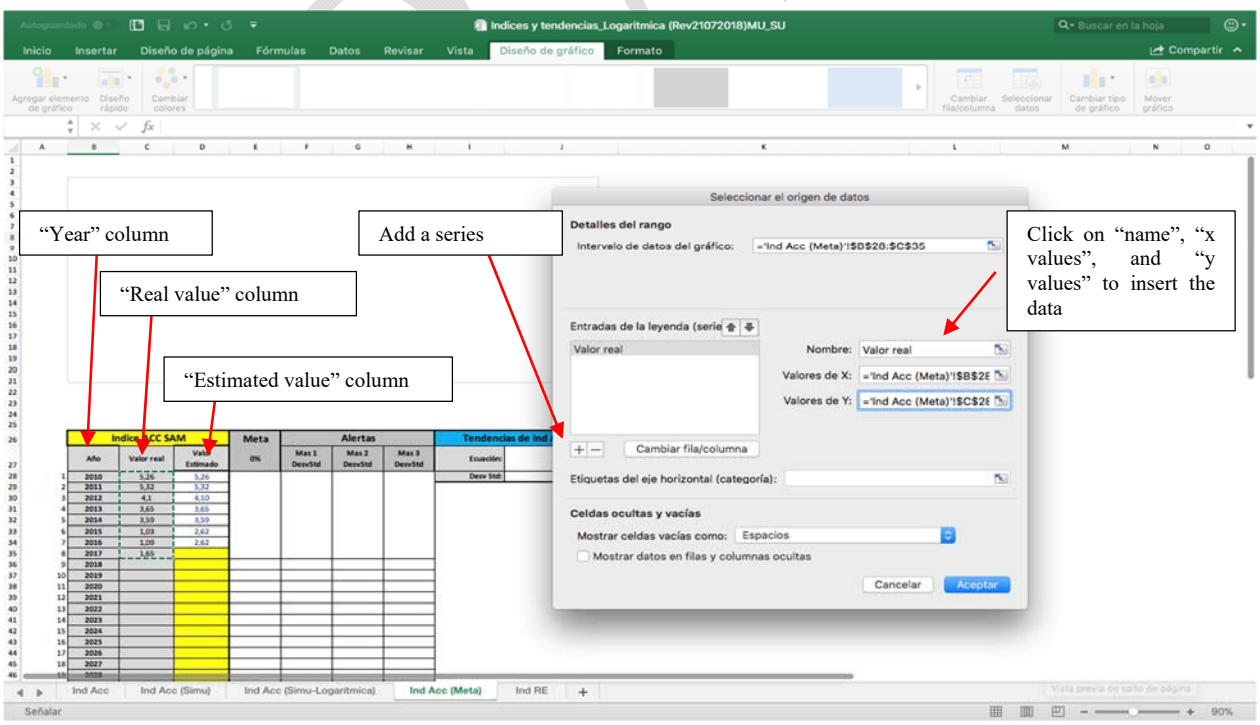
1. Click on the "Insert" tab in the top menu of Excel, then click on "Dispersion graph" and select the "fourth option".



2. A table will be immediately generated, with all data lines plotted. The next step is to select "Graph design" in the upper menu of Excel. Then click on "select data", as shown in the following figure:

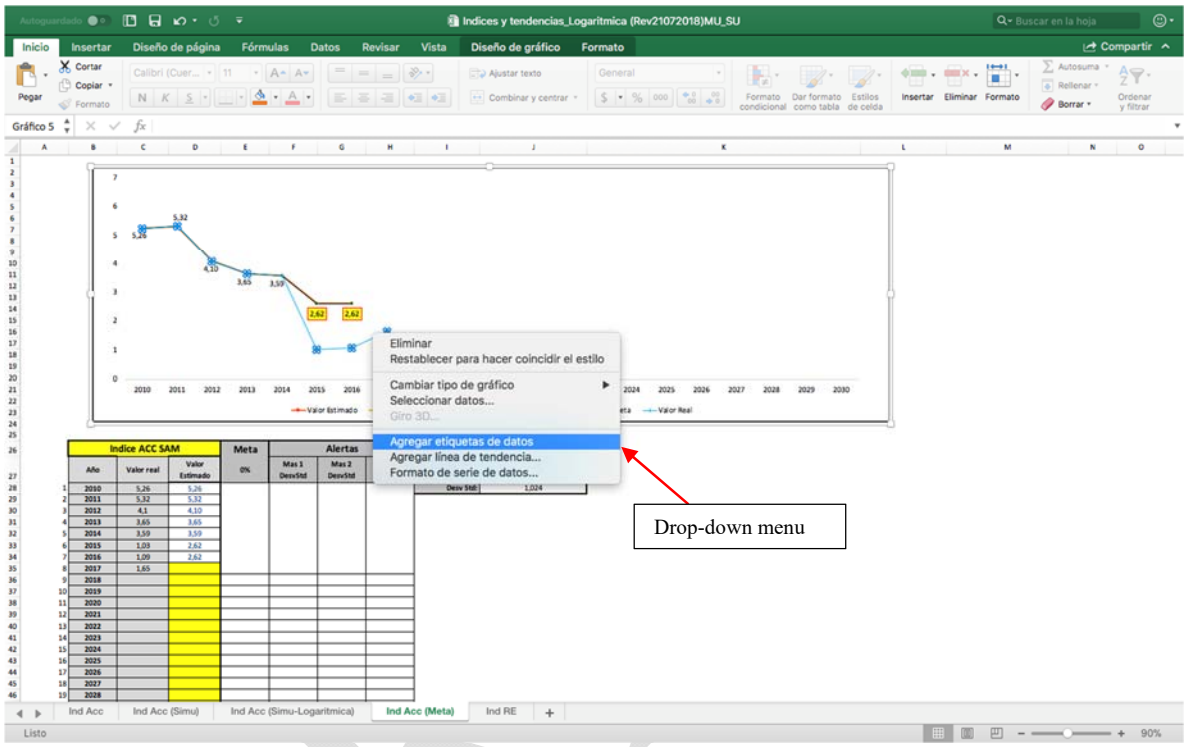


3. A new window called “Select data origin” will open, where the data to be plotted must be inserted. In this case, years go in the “x” axis, and data from the real value column go in the “y” axis. The following steps must be followed: Select the “+” sign to insert a new series, to be named “Real value”. Select “X values” and select the data contained in the Excel sheet in the “Year” column. Then select “Y values” and select the data contained in the Excel sheet in the “Real value” column, as shown in the following image:

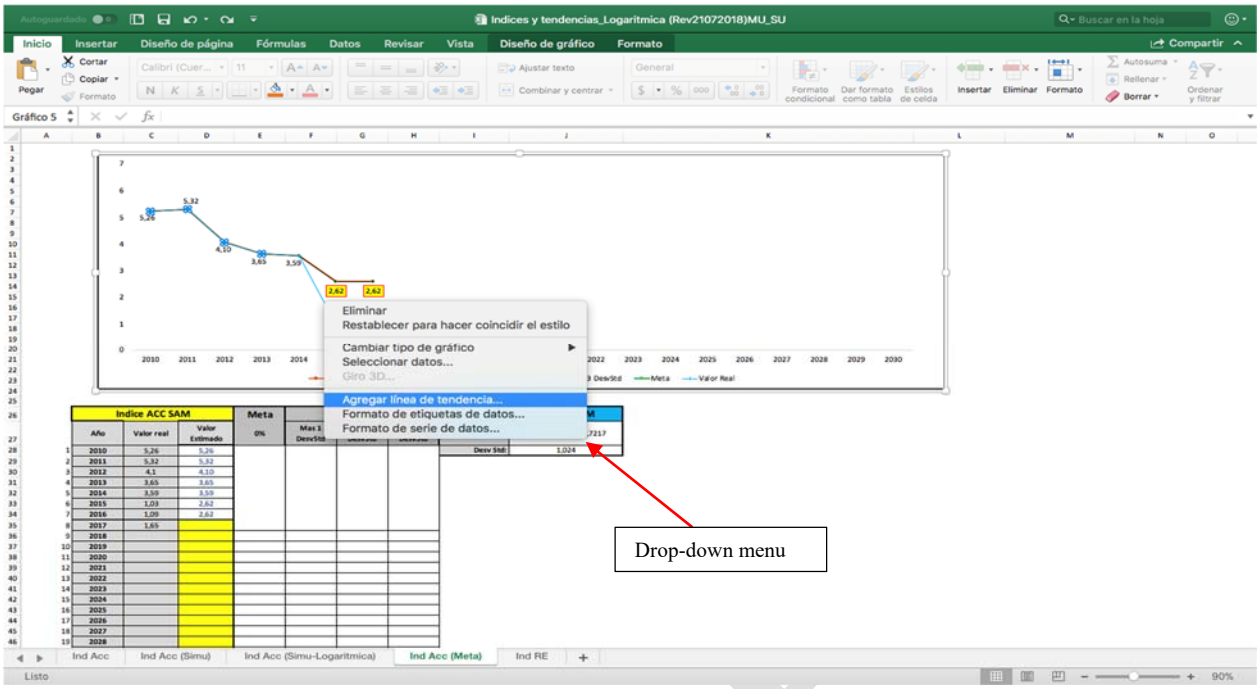


4. The same step as above (Step # 3) is followed to plot the “Estimated value” line with respect to the year, with the difference that, when selecting “name”, “Estimated value” must be written, and when selecting “Y values”, the data in the “estimated value” column must be selected”.

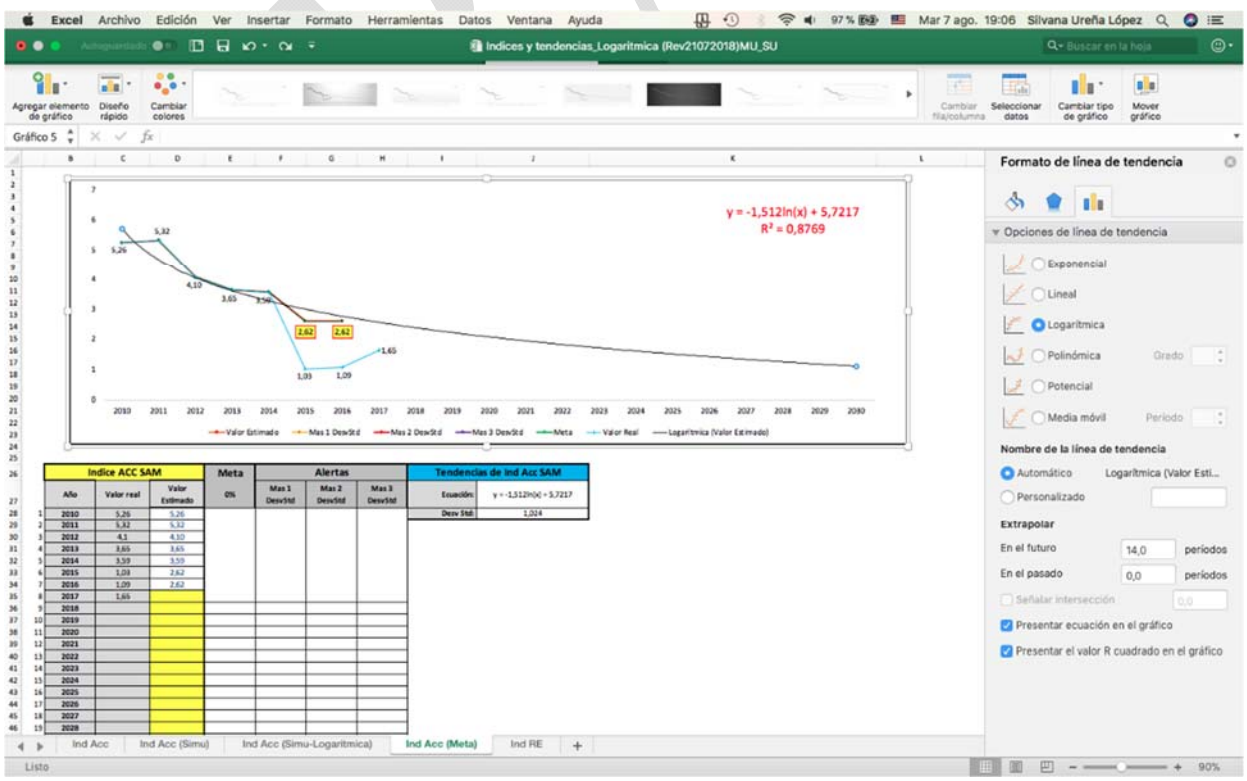
5. In order to put a value at each point of the “logarithmic line”, the following steps are followed: Right click on the line on which the values are to be inserted. Then, click on the option in the drop-down menu “Add data labels” as shown in the following figure:



6. In order to add the logarithmic trend line, the following steps are followed: Right click on the line containing the data to be applied to the trend line. In this case, it is the line called “Estimated value”. Then, click on the option of the drop-down menu “Add trend line” as shown in the following figure:



7. Immediately after clicking on the option "Add trend line", a new window will appear on the right side of Excel, called "Trend line format". In order to obtain a logarithmic line, follow these steps: Click on the "logarithmic" option from the "Trend line options" menu. In the "Trend line name" menu, click on "Automatic". In order to obtain future values on the trend line, indicate in the "extrapolate" menu how many future periods are required (in this case, it is 14 because those are the years missing since 2016). Finally, click on "Present equation on the graph" and "Present the R value squared on the graph" as shown in the following image:



8. With the equation of the logarithmic trend line, it is possible to calculate the data for future years in the table, in the "Estimated value" column. Likewise, it is possible to calculate the goal and the alerts with the following equations:

Indice ACC SAM			Meta	Alertas		
Año	Valor real	Valor Estimado	0%	Mas 1 DesvStd	Mas 2 DesvStd	Mas 3 DesvStd
2010	5.26	5.26				
2011	5.32	5.32				
2012	4.1	4.10				
2013	3.65	3.65				
2014	3.59	3.59				
2015	1.03	2.62				
2016	1.09	2.62				
2017	1.65	2.58				
2018		2.40	2.40	3.42	4.45	5.47
2019		2.24	2.24	3.26	4.29	5.31
2020		2.10	2.10	3.12	4.14	5.17
2021		1.96	1.96	2.99	4.01	5.04
2022		1.84	1.84	2.87	3.89	4.92
2023		1.73	1.73	2.76	3.78	4.80
2024		1.63	1.63	2.65	3.67	4.70
2025		1.53	1.53	2.55	3.58	4.60
2026		1.44	1.44	2.46	3.49	4.51
2027		1.35	1.35	2.38	3.40	4.42
2028		1.27	1.27	2.29	3.32	4.34
2029		1.19	1.19	2.22	3.24	4.26
2030		1.12	1.12	2.14	3.17	4.19

y = -1,512ln(x) + 5,7217

Alerta=Meta+[1,2,3 Desv Std]

Indice ACC SAM			Meta	Alertas		
Año	Valor real	Valor Estimado	-10%	Mas 1 DesvStd	Mas 2 DesvStd	Mas 3 DesvStd
2010	5.26	5.26				
2011	5.32	5.32				
2012	4.1	4.10				
2013	3.65	3.65				
2014	3.59	3.59				
2015	1.03	2.62				
2016	1.09	2.62				
2017	1.65	2.58				
2018		2.40	2.16	3.18	4.21	5.23
2019		2.24	2.02	3.04	4.06	5.09
2020		2.10	1.89	2.91	3.93	4.96
2021		1.96	1.77	2.79	3.82	4.84
2022		1.84	1.66	2.68	3.71	4.73
2023		1.73	1.56	2.58	3.61	4.63
2024		1.63	1.46	2.49	3.51	4.54
2025		1.53	1.38	2.40	3.42	4.45
2026		1.44	1.29	2.32	3.34	4.37
2027		1.35	1.22	2.24	3.26	4.29
2028		1.27	1.14	2.17	3.19	4.21
2029		1.19	1.07	2.10	3.12	4.14
2030		1.12	1.01	2.03	3.05	4.08

Meta=Valor x (1-Meta)

Alerta=Meta+[1,2,3 Desv Std]

9. In order to obtain the lines in the goal and alert graph, Steps 3 and 4 are repeated, but selecting in this case, for "Y values", the data contained in the "Goal" and "Alert" columns, respectively, whenever a new line is generated.

Logarithmic trend line

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The logarithmic trend line is a statistical procedure used for analysing the relationship between variables and predicting future data based on the line.
The correlation coefficient (R^2) indicates the degree of relationship between data, as described below:

- Varies between -1 and 1.
- Values of -1 or 1 indicate perfect correlation.
- Value equal to 0 indicates absence of correlation.
- Negative values indicate a reverse linear relationship, and positive values indicate a direct linear relationship.

Underlying the Excel dynamics of instantly generating the logarithmic trend line is a series of steps with the following formulae, which show how to obtain the logarithmic trend line, equation and correlation coefficient.

1) The first step is to obtain the mean of the "x" log and the mean of the "y" log, respectively:

$$\overline{\ln x} = \frac{\sum lnx_i}{n} \qquad (1)$$

where $\overline{\ln x}$ es the mean of the x log, $\sum lnx_i$ is the summation of each of the "x" logarithms, and the "n" logarithm is the amount of data used for the calculation.

$$\bar{y} = \frac{\sum y_i}{n} \qquad (2)$$

where "$\bar{y}$" is the mean of "y", $\sum y_i$ is the summation of all the data for "y", and "n" is the amount of data used for the calculation.

2) The second step is to obtain the following coefficients with the following equations:

$$S_{xx} = \frac{\sum(lnx_i)^2}{n} - \overline{\ln x}^2 \qquad (3)$$

where "S_{xx}" is the autocorrelation that exists among the data obtained from the "x" log. In this case, the same variable (lnx) is assessed, $\frac{\sum(lnx_i)^2}{n}$ is the summation of each of the "x" logs squared and divided by the amount of data used in the calculation, "$\overline{\ln x}^2$" is the mean of the "x" log squared.

$$S_{yy} = \frac{\sum {y_i}^2}{n} - \bar{y}^2 \qquad (4)$$

where "S_{yy}" is the autocorrelation that exists among the data obtained from "y". In this case, the same variable is assessed (y), $\frac{\sum {y_i}^2}{n}$ is the summation of all the values of "y" squared and divided by the amount of data used for the calculation, "$\bar{y}^2$" is the mean of "y" squared.

$$S_{xy} = \frac{\sum \ln x_i y_i}{n} - \overline{\ln x}\bar{y} \qquad (5)$$

Where "S_{xy}" is the correlation among the data obtained from "y" and from the "x" log. In this case, two variables are assessed ("y" and lnx), $\frac{\sum \ln x_i y_i}{n}$ is the summation of all the "x" logs multiplied by each of the valued of "y" and divided by the amount of data used in the calculation, "lnx" is the mean of the "x" log, and "$\bar{y}^2$" is the mean of "y".

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3) The following equations are used for finding coefficients "A and B" of the general logarithmic equation.

$$B = \frac{S_{xy}}{S_{xx}} \qquad (6)$$

where "B" is the general equation coefficient, S_{xy} is the correlation among the data obtained from "y" and from the "x" log, and S_{xx} is the autocorrelation among the data obtained from the "x" log.

$$A = \bar{y} - B\overline{\ln x} \qquad (7)$$

where "A and B" are the general equation coefficients, "$\bar{y}$" is the mean of "y" and "$\overline{\ln x}$"ec is the mean of the "x" log.

The general equation is described as follows:

$$y = A + Blnx \qquad (8)$$

where "A and B" are the coefficients of the general equation; "y" and "lnx" are the variables of the equation.

4) The following formula is used for obtaining "R^2":

$$R^2 = \frac{{S_{xy}}^2}{S_{xx}S_{yy}} \qquad (9)$$

Where "R^2" is the correlation coefficient, S_{xy} is the correlation among the data obtained from "y" and the "s" log, S_{xx} es la auto correlación que existe entre los datos obtenidos del logaritmo de "x" y "S_{yy}" es la auto correlación que existe entre los datos obtenidos de "y".

To illustrate this method, the procedure to obtain the logarithmic trend line is presented below, with the equations explained above, and using data from the "Ind Acc (Meta)" tab in the Excel file.

The first step is to define the "x" and "y" values. By definition, these values correspond to the following::

x values	y values
1	5,260
2	5,320
3	4,100
4	3,650
5	3,590
6	2,620
7	2,620

These are initial data that, in Excel, appear in columns "A and D" respectively.

Next, the mean of the "x" log and the mean of the "y" log are obtained, respectively, with equations (1) and (2). To this end, the "Inx" values are obtained first, replacing "x" values with the table previously shown, and doing a summation of "Inx" and "y" values.

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	ln(x)	y
	0,000	5,260
	0,693	5,320
	1,099	4,100
	1,386	3,650
	1,609	3,590
	1,792	2,620
	1,946	2,620
Summation	8,525	27,160

Applying the equations, and knowing that the amount of data is equal to (n=7), the result obtained is:

$$\overline{\ln x} = \frac{\sum lnx_i}{n} = \frac{8{,}525}{7} = 1{,}218$$

$$\bar{y} = \frac{\sum y_i}{n} = \frac{27{,}160}{7} = 3{,}880$$

In order to obtain coefficients "S_{xx}, S_{yy} y S_{xy}" the values for "lnx" and "y" squared individually are calculated first, and their multiplication (lnx and "y"). Then, the summation of the two is done as follows:

	ln(x)^2	y^2	ln(x)*y
	0,000	27,668	0,000
	0,480	28,302	3,688
	1,207	16,810	4,504
	1,922	13,323	5,060
	2,590	12,888	5,778
	3,210	6,864	4,694
	3,787	6,864	5,098
Summation	13,196	112,719	28,822

With the values obtained above and applying equations (3), (4) and (5),

$$S_{xx} = \frac{\sum (lnx_i)^2}{n} - \overline{\ln x}^2 = \frac{13{,}196}{7} - 1{,}218^2 = 0{,}402$$

$$S_{yy} = \frac{\sum {y_i}^2}{n} - \bar{y}^2 = \frac{112{,}719}{7} - 3{,}880^2 = 1{,}048$$

$$S_{xy} = \frac{\sum \ln x_i \, y_i}{n} - \overline{\ln x}\bar{y} = \frac{28{,}822}{7} - 3{,}880^2 = -0{,}608$$

Finally, equations (6) and (7) are used for obtaining coefficients A and B:

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$$B = \frac{S_{xy}}{S_{xx}} = \frac{-0{,}608}{0{,}402} = -1{,}512$$

$$A = \bar{y} - B\overline{\ln x} = 3{,}880 - (-1{,}512 * 1{,}218) = 5{,}7217$$

Replacing these values in the general formula, the following is obtained:

$$y = A + Blnx$$
$$y = 5{,}7217 - 1{,}512lnx$$

$$\boxed{y = -\ 1{,}512\ \ln(x) + 5{,}7217}$$

Equation (9) is used for obtaining the correlation coefficient R^2 based on the data previously derived:

$$R^2 = \frac{{S_{xy}}^2}{S_{xx}S_{yy}} = \frac{-0{,}608^2}{0{,}402*1{,}048} = 0{,}8769$$

Based on this analysis, it may be concluded that the logarithmic trend line and the R^2 correlation coefficient automatically calculated in Excel are equal to the values obtained manually.

The same procedure applies to the "Ind RE" tab in the Excel document, taking into account that the base values for "x " and "y" will vary.

Standard deviation (SD)

Standard deviation (SD) is a measure of dispersion that indicates how far values are with respect to the mean, and can be calculated using the following equation:

$$STDEVP = \sqrt{\frac{\Sigma(x-\mu)^2}{N}} \qquad (10)$$

where Σ is summation, 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.

To illustrate this measure of dispersion, the procedure to obtain the standard deviation applying the aforementioned equation will be explained below, using data from the "Ind Acc (Meta)" tab in the Excel file.

The average rate per year is as follows:

Year	Estimated value
2010	5.26
2011	5.32
2012	4.10
2013	3.65
2014	3.59
2015	2.62
2016	2.62

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First, the average value is obtained as follows:

$$\textbf{Average } (\mu) = \frac{5.26+5.32+4.10+3.65+3.59+2.62+2.62}{7} = 3.880$$

Then, the difference between each rate and the average is calculated, and each value squared:

$(\underline{5.26} - 3.880)^2 = (1.38)^2 = 1.90$
$(\underline{5.32} - 3.880)^2 = (1.44)^2 = 2.07$
$(\underline{4.10} - 3.880)^2 = (0.22)^2 = 0.05$
$(\underline{3.65} - 3.880)^2 = (-0.23)^2 = 0.05$
$(\underline{3.59} - 3.880)^2 = (-0.29)^2 = 0.08$
$(\underline{2.62} - 3.880)^2 = (-1.26)^2 = 1.59$
$(\underline{2.62} - 3.880)^2 = (-1.26)^2 = 1.59$

Finally, in order to obtain the standard deviation, equation (10) mentioned above is applied:

$$STDEVP = \sqrt{\frac{\sum(x-\mu)^2}{N}} = \sqrt{\frac{1.90 + 2.07 + 0.05 + 0.05 + 0.08 + 1.59 + 1.59}{7}}$$

$$STDEVP = 1.024$$

Based on this analysis, it may be concluded that the standard deviation automatically calculated in Excel is equal to the value obtained manually.

The same procedure applies to the "Ind RE" tab in the Excel document, taking into account that the base values of each rate will vary.

References:

Equations to calculate the logarithmic regression with least squares and correlation coefficients: https://keisan.casio.com/exec/system/14059930226691

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ATTACHMENT F

MODEL CONTENTS OF THE STATE SAFETY PLAN

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ATTACHMENTS

As applicable

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ATTACHMENT G

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							

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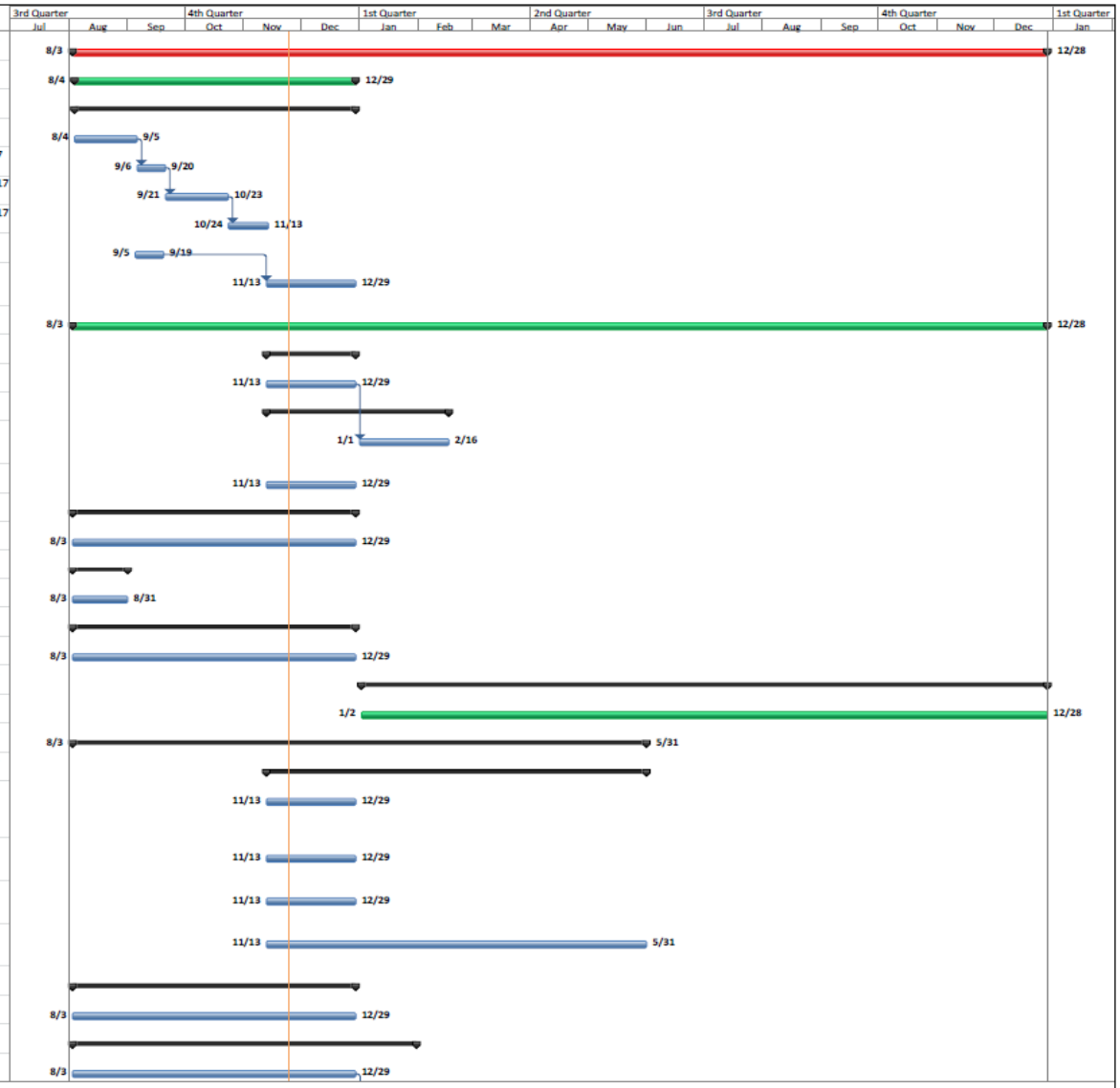
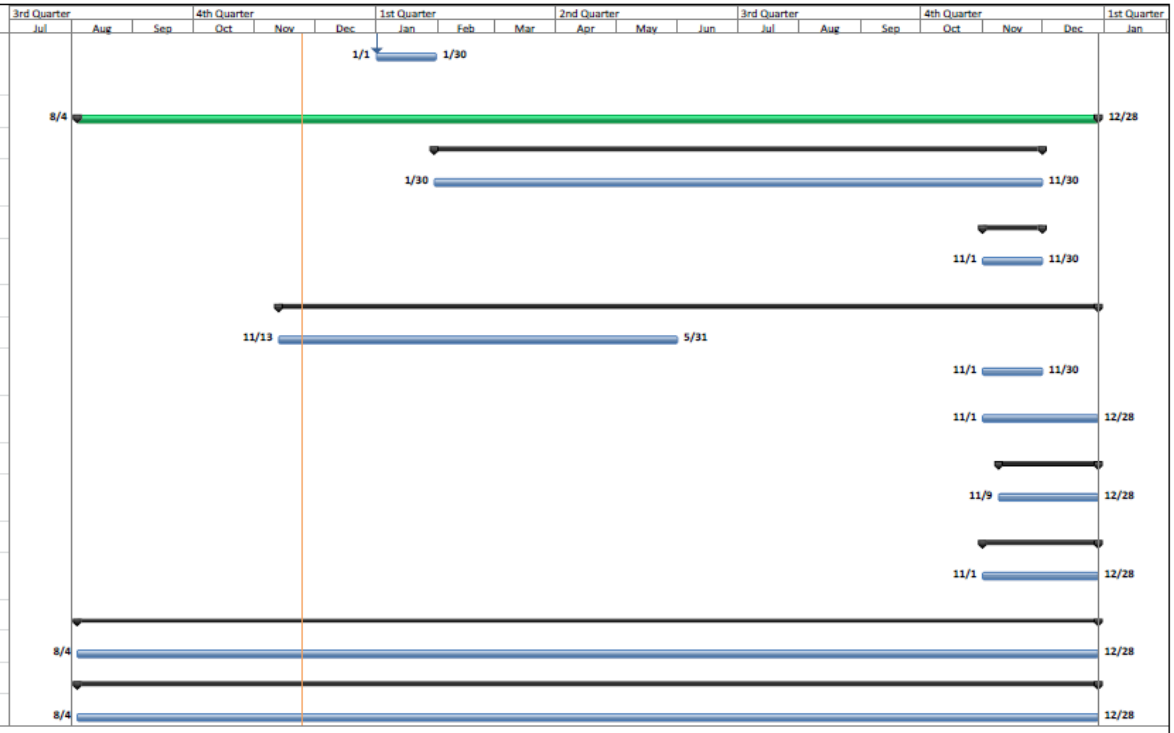
ATTACHMENT H

SSP IMPLEMENTATION PLAN

ID	Task Mod	Task Name	Duratio	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 I

STATE SAFETY REPORT MODEL

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Introduction

- Foreword
- Executive summary
- Global context for the annual safety performance review

1. Chapter 1: Continuous monitoring approach (CMA) of the Universal safety oversight audit programme

   1.1 Effective implementation (EI) improvement with respect to the established goals and previous periods
   1.2 Status of safety oversight margin (SOM) in the operations, air navigation and support categories
   1.3 Status of completion of the CAP
   1.4 Status of completion of the protocol question (PQ) review
   1.5 Activities carried out within the framework of the USOAP CMA

2. Chapter 2: Occurrences (accidents, serious incidents and incidents) in scheduled/non-scheduled commercial air transport with aeroplanes over 5 700 kg and helicopters over 3 175 kg

   2.1 Scheduled commercial air transport
   Aeroplanes
   Helicopters

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3. Chapter 3: Occurrences (accidents, serious incidents and incidents) in scheduled/non-scheduled commercial air transport with aeroplanes of 5 700 kg or less and helicopters of 3 175 kg or less

   3.1 Scheduled commercial air transport
   Aeroplanes
   Helicopters

   3.2 Non-scheduled commercial air transport
   Aeroplanes
   Helicopters

4. Chapter 4: Occurrences (accidents, serious incidents and incidents) in non-commercial operations (business aviation, general aviation, agricultural aviation, training aviation, other types of aerial work, etc.) with aeroplanes over 5 700 kg and helicopters over 3 175 kg

   4.1 Aeroplanes
   4.2 Helicopters

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5. Chapter 5: Occurrences (accidents, serious incidents and incidents) in non-commercial operations (business aviation, general aviation, agricultural aviation, training aviation, other types of aerial work, etc.) with aeroplanes of 4 700 kg or less and helicopters of 3 175 kg or less

   5.1 Aeroplanes
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7. Chapter 7: Occurrences (accidents, serious incidents and incidents) with remotely piloted aircraft (RPAs) and small unmanned aircraft (SUA) (drones)

8. Chapter 8: Reporting systems

   8.1 Mandatory safety reporting system
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9. Chapter 9: Progress made in mitigation plans to reduce accident rates

   9.1 Scheduled and non-scheduled commercial aviation
   9.2 Non-commercial aviation
   9.3 RPAs and SUAs

ATTACHMENTS

Where applicable

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ATTACHMENT J

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

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ATTACHMENT K

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

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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

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