SAM/IG/15

INTERNATIONAL CIVIL AVIATION ORGANIZATION
South American Office

Regional Project RLA/06/901

FIFTEENTH WORKSHOP/MEETING OF THE SAM IMPLEMENTATION GROUP

(SAM/IG/15)

FINAL REPORT

Lima, Peru, 11 to 15 May 2015

INDEX

HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Fifteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/15) was held at the premises of the ICAO South American Regional Office in Lima, Peru, from 11 to 15 May 2015, under the auspices of Regional Project RLA/06/901.

ii-2 OPENING CEREMONY AND OTHER MATTERS

Mr. Franklin Hoyer, Regional Director of the ICAO South American Office, greeted the participants for the continuous support provided to activities developed at regional scale by the South American Office, as well as the civil aviation authorities and national and private organizations of the ICAO South American Region for the continuous support to the activities of the SAM Implementation Group.

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

The Meeting agreed to hold its sessions from 09:00 to 15:30 hours, with appropriate breaks. The work was done with the Meeting as a Single Committee, Working Groups and Ad-hoc Groups.

Mr. Rafael Alberto Molina, delegate from Argentina, was unanimously elected as Chairman of the Meeting. Also, Mr. Iván Tulcán, delegate from Ecuador, was elected as Vice-Chairman.

Mr. Onofrio Smarrelli, RO/CNS SAM Office, Lima, acted as Secretary assisted by Messrs. Roberto Arca, RO/ATM/SAR and Mr. Jorge Fernandez RO/ATM/SAR/AIM Adviser.

In addition, the Secretariat counted with the support of Messrs. Julio Pereira, Rapporteur of the PBN Group; Omar Gouarnalusse, Rapporteur of the CNS Group; and Mauricio Ferrer, Rapporteurs of the AIDC Group, supported by Messrs. Ruben Silva and Jorge Merino.

ii-4 WORKING LANGUAGES

The working language of the Meeting was Spanish with simultaneous interpretation in English the first day (plenary) and the last day (review of the final report) and its relevant documentation was presented in Spanish and English.

ii-5 AGENDA

The following agenda was adopted:

Agenda Item 1: Follow up to conclusions and decisions adopted by SAM/IG meetings, tasks for the States regarding the new Electronic Air Navigation Plan (e-ANP) and to the State Industry collaborative processes for its transition of the current systems to those specified in the ASBU

Agenda Item 2: Optimization of the SAM air space

a) PBN in routes
b) PBN in Terminal Areas
c) PBN proceedings

Agenda Item 3 Implementation of the Air Traffic Flow Management (ATFM)

Agenda Item 4: Assessment of operational requirements to determine the implementation of improvements in communications, navigation and surveillance (CNS) capabilities for operations in route and terminal area

Agenda Item 5: Operational implementation of new ATM automated systems and integration of the existing systems

Agenda Item 6: Other business

ii-6 **ATTENDANCE**

The Meeting was attended by 61 participants from 10 States of the SAM Region (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Panamá, Paraguay, Peru, Uruguay and Venezuela), 1 NAM CAR State (United States), 1 EUR/NAT State (France), 1 International Organization (IATA) and 8 Observers from the aeronautical industry (ARINC, ATECH, BOEING-JEPESSEN, EMBRAER, IACIT, INDRA, SITA and THALES). The list of participants is shown in page iii-1.

ii.7 **LIST OF CONCLUSIONS**

No.	Title	Page
SAM/IG/15-1	Assessment of COPA and KLM proposals	2-6
SAM/IG/15-2	PBN implementation in South American TMAs	2-10
SAM/IG/15-3	Review of data contained in the SAM FASID Table AOP-1	2-12
SAM/IG/15-4	Reduction of the longitudinal separation between aircraft in the SAM airspace	3-6
SAM/IG/15-5	Requirements for ATS Speech communications between ATS adjacent boundary dependencies	4-4
SAM/IG/15-6	SITA AMHS Interconnection with AMHS Systems installed in the SAM Region	4-5
SAM/IG/15-7	Reduction of the longitudinal separation between aircraft in the SAM airspace	5-4
SAM/IG/15-8	Provision of facilities for the staff in charge of the operational implementation of the AIDC by the aeronautical authorities of the States	5-4
SAM/IG/15-9	Review and approval of the Guideline on technical/operational considerations for multilateration (MLAT) implementation	5-6

LISTA DE PARTICIPANTES / LIST OF PARTICIPANTS

ARGENTINA
1. Rafael Alberto Molina
2. Moira Lidia Callegare
3. Silvina Rotta
4. Rubén Silva
5. Guillermo Cocchi
6. Chistian Julián Dominguez
7. Enrique Muñoz
8. Omar Gouarnalusse
9. Gustavo Adolfo Chiri
10. José María Dayub

BOLIVIA
11. Maribel Jenny Choque Apaza
12. Jaime Yuri Alvarez Miranda

BRASIL / BRAZIL
13. Francisco Almeida da Silva
14. Eduardo Miguel Soares
15. Alessander de Andrade Santoro
16. Ricardo da Silva Miranda
17. Murilo Albuquerque Loureiro
18. Marcelo Marques Lobo
19. Luiz Antonio Dos Santos
20. José Airton Patricio

COLOMBIA
21. Mauricio Ferrer

CHILE
22. Alfonso De La Vega

ECUADOR
23. Iván Alfredo Tulcán Ormaza
24. Jorge Zúñiga

ESTADOS UNIDOS / U.S.A.
25. Braks Etta
26. Lorrie Fussell

FRANCIA
27. Damien Marcé

PANAMA
28. Flor E. Silvera
29. Mario Facey

PARAGUAY
30. Enrique Sánchez

PERÚ
31. Sady Beaumont Valdéz
32. Martha Soto Ansaldi
33. Jorge Taramona Perea
34. Rodrigo Aguirre Herrera
35. Tatiana Mendoza Tinco
36. Oscar Saavedra Angelats
37. Libio Benites Condori
38. Karla Albañil
39. Jorge Merino
40. Gino Lago
41. Raul A. Granda
42. Jhonny Avila
43. Jorge García VIllalobos

URUGUAY
44. Gustavo Turcatti
45. Antonio Lupacchino

VENEZUELA
46. Alfredo Alejandro Dávila Alfonzo
47. Eduardo J. Gallardo Martínez

ARINC
48. Manny Gongora (viene el miércoles)

ATECH
49. Delfim Ossamu Miyamaru
50. Eno Siewerdt

BOEING - JEPESSEN
51. Scott Blum

EMBRAER
52. Luis Henrique Malizia

IACIT
53. Luiz Antonio Freitas de Castro

IATA
54. Julio Pereira
55. Axel Fuentes (Aerolíneas Argentinas)
56. David Guerrero (AVIANCA)
57. Jose Antonio Zarabia Ramon (AVIANCA)

INDRA
58. Rodrigo San Martin Muñoz

SITA
59. Mansour Rezaei Mazinani
60. Adriana Mattos

THALES
61. Cuq Frederic

OACI / ICAO
62. Onofrio Smarrelli
63. Roberto Arca
64. Jorge Fernández

Agenda Item 1: Follow up to conclusions and decisions adopted by SAM/IG meetings, tasks for the States regarding the new Electronic Air Navigation Plan (e-ANP) and to the State Industry collaborative processes for its transition of the current systems to those specified in the ASBU

1.1 Under this agenda item, the Meeting reviewed the following papers:

a) WP/02 – *Review of the status of compliance of conclusions formulated by SAM Implemenetation Group meetings and pending activities(*presented by the Secretariat);
b) WP/03 – *Amendment to the CAR/SAM ANP SSR Code Table* (presented by the Secretariat);
c) WP/04 – *Follow up to the State-Industry collaborative process for its transition from current systems to those specified in the ASBU* (presented by the Secretariat);
d) NI/05 – *State-Industry collaborative process for the transition from current systems to those specified in the ASBU* (presented by IATA and RTCA).

Conclusions and decisions adopted by SAM/IG meetings

1.2 The Meeting reviewed the conclusions still valid, as well as pending activities of the workshops/meetings of the SAM Implementation Group (SAM/IG), as shown in **Appendix A** to this part of the Report. The list of conclusions and activities covers:

a) tasks to be carried out and/or the corresponding conclusion in the areas being analysed;
b) specific tasks leading to the fulfilment of the main task;
c) outcome expected from each task;
d) completion dates;
e) the parties responsible for their execution;
f) members supporting the task; and
g) the status of implementation of the task and, when required for better understanding, comments are included to explain the status of implementation.

1.3 Likewise, the Meeting completed the table contained in **Appendix B** to this agenda item which shows, for monitoring purposes, the tasks under the responsibility of the States.

Amendment to the Air Navigation Plan

1.4 The Meeting took note that the last allotment of SSR codes for States/Territories of CAR/SAM Regions was at the CAR/SAM/3 RAN meeting (Buenos Aires, Argentina, November 1999), and included in Part V of the CAR/SAM Air Navigation Regional Plan, Volume II, FASID.

1.5 Since RAN/CAR/SAM/3 meeting so far, no amendment has been made to SSR Codes. With the increasing traffic in the SAM Region and with the implementation of the automated systems, some States has experienced an accumulation in the allocation of SSR codes.

1.6 In this sense the Meeting examined the Secretariat proposals to amend the Table V of the FASID with the allocation of additional SSR codes for the following States (Argentina, Brazil, Chile, Colombia, Guayaquil, La Paz, Lima and Maiquetia) and concurred to proceed with the proposed amendment. The proposal of amendment of Table V of the FASID is shown in **Appendix C** to this part of the report.

1.7 The Secretariat will inform States when the FASID amendment process is concluded. States will await this approval to begin using the SSR Codes consented.

State Industry collaborative processes for the transition of the current systems to those specified in the ASBU

1.8 The Meeting took note on the actions carried out regarding conclusion SAM/IG/14-1 to enable the collaborative process State-Industry for the transition of the current system to those specified in the ASBU.

1.9 In this respect, it was informed that a draft project was made and approved as a GREPECAS project through the GREPECAS fast track process. The GREPECAS Secretariat sent a letter to GREPECAS member States on 10 December 2014 requesting them to examine and approve the project through the GREPECAS fast track process. The approval was received on 5^{th} February 2015. Only Argentina, Brazil, Chile, Cuba and United States forwarded replies. Taking into account that the letter indicated that the lack of reply would be understood as an approval, the Secretariat proceed to include it as a project of GREPECAS. Copy of the Project is presented as **Appendix D** to this Agenda Item.

1.10 The Meeting took note that the project should have been presented to the Eighth Coordination Meeting of Project RLA/06/901 (RCC/8) held in Lima, Peru from 25 to 27 February 2015 with the intention to include it in the project management mechanism. The project could not be presented in the RCC/8 given that RCTA and IATA failed collecting from the industry the required founds for the development of the project.

1.11 In this sense, RTCA and IATA reported that due to the lack of funds to carry out the project, this could not be done regionally, but instead it would be feasible from a project of collaborative process between a SAM Region State to be define, subsequently a new proposal from RTCA and IATA is been expected to be presented to the Third Meeting of the Programmes and Projects Review Committee (PPRC/3) of GREPECAS to be held in Mexico City, Mexico, from 21 to 23 July 2015.

APPENDIX A

STATUS OF APPLICATION OF CONCLUSIONS AND/OR TASKS ORIGINATED IN SAM/IG MEETINGS

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
1. ATS Routes Implementation							
2. Optimisation of ATS routes in the SAM Region							
2-4	Handling of air transport environmental problems	Obtaining of objective data over benefits that will be reached in terms of reduction of harmful gas emissions into the atmosphere.	• Known data. • Availability of information required for monitoring of environmental protection.	Permanent	States	N/A	**VALID** States should use IFSET tool. States have to provide reports during the PBN implementation process. Permanent task.
2-5	Prepare a measurable plan of performance, including gas emissions safety, efficiency, etc.	• Check available tools to carry out this task. • Prepare a measurable plan.	A measurable plan will be available which will permit a clear vision of the current and future status of performance regarding gas emissions, safety and efficiency.	SAM/IG/9	RLA/06/901	RO/ATM	**VALID** This task was included in the review of the action plan for the optimization of the SAM airspace, developed at SAM/IG/11 meeting. The Secretariat will evaluate the feasibility of developing the plan under the auspices of RLA/06/901 Project, taking into account the PBIP.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3. Implementation of Performance Based Navigation (PBN) in the SAM Region							
3-17	**Conclusion SAM/IG/5-4 Implementation of Continuous Descent Operations** That, recognizing the efficiency and environmental benefits of Continuous Descent operations, and the need to harmonize these operations in the interest of safety, States are encouraged to include the implementation of Continuous Descent operations (CDO) as part of their PBN implementation plans and to implement CDO in accordance with the ICAO CDO Manual.	States should include in their PBN programmes the CDO concept.	CDO implemented as per national requirements.	SAM/IG/15	States	RO/ATM	**FINALIZED** After the Second Workshop on PBN use in the design of airspaces in terminal areas, States may present their preliminary works, applying CDO and CCO techniques. PBN implementation national plans should indicate procedures in which CDO and CCO techniques are or will be applied.
3-18	**Conclusion SAM/IG/11-1 Support to the SAM States in the redesign of their TMAs** That, Project RLA/06/901 consider the viability of: a) Replicate the Course/ Workshop on Airspace Design at the Lima Regional Office for one week, with an intensive schedule, with experts of the Region, Project and IATA instructors, that have already offered their support to this initiative; and b) Create a support team to	Conduct courses on PBN design in terminal areas for the SAM Region, in the Lima Regional Office.	Base design of selected terminal areas, in order to allow States to deepen and implement new TMAs based on PBN design.	PBN/4 Workshop	RLA/06/901 Project	ATM/ROs and Miami Course instructors	**VALID** The First Workshop on design of airspace using PBN was conducted in Bogota, Colombia from 12 to 23 May 2014 and the Second Workshop for the presentation of State's preliminary designs was held in Lima, Peru, from 8 to 12 September 2014. Following activities will be submitted for the approval of RCC: a) Third PBN Workshop, from 09 to 13 March 2015;

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	assist a group of States that are aligned in their traffic flows, in the development of a basic design aimed at main international airports.						b) Fourth PBN Workshop, from 17 to 21 August 2015. Support teams were replaced by the 4 PBN Workshops, which have the objective to guiding the 4 PBN implementation phases (planning, design, validation and implementation). Panama and Bolivia did not attend the First Workshop on design of airspace using PBN.
3-19	**Conclusion SAM/IG/11-2 Implementation of the concept of the Flexible Use of the Airspace in the SAM Region** That, the States of the SAM Region use the Guidance for the implementation of the Concept of the Flexible Use of the Airspace in the SAM Region, shown in Appendix E to the item 2 of the SAM/IG/10 Meeting, for the design and management of the airspace of the Flight Information Regions under its jurisdiction.	Implement Civil-Military Coordination and Cooperation Committees. Coordinate flexible use of prohibited, restricted and dangerous areas affecting the airspace optimization.	Redesign and coordination for optimized use of prohibited, restricted and dangerous areas.	SAM/IG/16	States	RO/ATM	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-26	**Conclusion SAM/IG/12-2 PBN approach instrument procedures** That SAM States: a) publish the navigation specification corresponding to such SIDs and STARs RNAV not having such indication at present; b) complete the implementation of APV procedures for all instrument flight runway ends, whether as primary approach or as support to precision approach, with a view to completing 70% of PBN approaches by 2014 and 100% by 2016; and c) advise the Regional office of any changes in the status of implementation of instrument approach procedures, whether conventional or PBN, in each SAM/IG meeting, in order to update regional efficiency indicators.	Implement APV procedures for all instrument flight runway ends.	70% of APV approaches 100% of APV approaches Information papers in SAM/IG meetings	2014 2016 2016	States	RO/ATM	**VALID** Paragraph b) superseded by Bogota Declaration. Paragraph c) superseded by Conclusion SAM/IG/14-4.
3-28	**Conclusion SAM/IG/14-3 PBN implementation at the South American TMAs** That, in order to give continuity to the PBN						**SUPERSEDED BY CONCLUSION SAM/IG/15-02**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	implementation process at the main SAM TMAs, States meet the following requirements: a) Develop the Action Plan for the implementation of the PBN airspace concept in the selected TMA/airspace, in order to make up the SAM PBN Project; b) complete data collection and processing, with a view to give consistency to the PBN design of the TMA and/or airspace selected by the State; c) develop, as necessary, a new PBN airspace concept based on data collection and processing and on the recommendations of the second PBN workshop; d) conduct the validation of the preliminary design, taking into account the minimum requirements listed in Appendix D to this part of the report; e) review, as necessary, the airspace concept based on validation results, until a satisfactory PBN design is attained for the implementation phase, which shall be submitted to the third PBN workshop;	Planning tasks Design tasks Validation tasks	Action Plan on Air Space concept Presentation of draft design of the new concept of air space Validation of the new air space	SAM/IG/15 SAM/IG/15	STATES STATES		

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	f) submit the PBN design of the selected TMA and/or airspace to the SAM Regional Office (icaosam@icao.int) before 20 February 2015; g) participate in the teleconferences in preparation for the third PBN workshop to be held on the following tentative dates: - 19 November 2014 - 18 December 2014 - 05 February 2015 - 25 February 2015	Implementation tasks					
3-29	**Conclusion SAM/IG/14-4 Follow-up of the PBN goals established in the Bogota Declaration** a) complete the template contained in Appendix E to this part of the report; b) do the calculations and/or collect data on (estimated and actual) fuel and CO_2 savings, using the IFSET tool for the estimates; c) send the data cited in a) and b) to the SAM Regional Office before 30 June and 31 December each year.	Complete details of PBN implementation at each international airport contained in the Air Navigation Plan Calculate fuel and CO2 savings achieved with the optimization of the air spaces	Submission of data to Regional office	SAM/IG/16	STATES	RO/ATM	**VALID** Note: literal b) for the estimation of fuel savings and C O_2 emissions, another tools approved by the Stares can be used

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-30	**Conclusion SAM/IG/14-5 National PBN implementation plans** That SAM States submit their updated national PBN implementation plans to the SAM/IG/15 meeting, using the model National PBN implementation plan shown in Appendix I to this part of the Report	Updating of PBN National Implementation Plans	PBN Plan updated	SAM/IG/16	STATES	RO/ATM	**VALID**
3-31	**Conclusion SAM/IG/14-6 Projects and/or action plans for PBN redesign of the main South American TMAs** That SAM States: a) send the **Project and/or Action Plans for PBN redesign of the main TMA(s)** selected by their Administration, in order to complete the SAM PBN Project that is contained in **Appendix J** to this part of the Report, to the SAM Regional Office by 31 December 2014; b) send the corresponding updates to the aforementioned Project and/or Plans to the SAM Regional Office as soon as possible, so as to ensure harmonisation of activities under the SAM PBN Project.	Determination of the selected air spaces to be optimized with the implementation of PBN	Inform selected airspace for its redesign or optimization Report updates	SAM/IG/16	STATES	RO/ATM	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-32	**Conclusion SAM/IG/14-7 Implementation of Stage 1 of Version 03 of the SAM route network** That the ICAO SAM Office: a) coordinates the conduction of implementation teleconferences, taking into account the activities mentioned in **Appendix L** to this part of the report. The first teleconference will be conducted on 26 November at 15:00 UTC; b) coordinates the conduction of coordination teleconferences. The first teleconference will be held on 10 December at 15:00 UTC.	Coordinate via teleconference the routes to be implemented	ICARD Codes and Geographical coordinates	SAM/IG/16	RO/ATM STATES	RO/ATM	**VALID** Amendment SAM 15/01 ATM implemented with annual savings of 2.133 Tons of fuel, equivalents to a reduction of 6.738 Tons of CO_2
3-33	**Conclusion SAM/IG/14-8 ICAO phraseology** That the ICAO SAM Office: a) submit the issues concerning the use of phraseology to ICAO Headquarters, with a view to attaining global harmonisation; b) study the feasibility of harmonising the use of phraseology in the SAM Region, based on an amendment to Doc 7030.	Submit an IOM to ICAO Headquarters to inquire on the application of phraseology non-harmonized with Doc 4444	ICAO HQ reply	SAM/IG/15	RO/ATM	HQ	**FINALIZED** HQ has delivered the enquiry to a panel for its study. By the moment the standardized phraseology indicated in Doc 4444 continues being used.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
4. Standards and procedures for performance based navigation operations approval							
4-11	**Para 4.9 SAM/IG/6 report-** Establish standard criteria for the Regional System on ground and flight Validation of flight procedures through satellite-based PBN instruments.	Prepare standardised criteria.	Uniform application of Validation criteria on ground and flight procedures through satellite-based PBN instruments.	SAM/IG/9	RLA/99/901	RO/FLS	**VALID** The draft CA 91-012 – Flight validation (FV) of satellite-supported instrument flight procedures (IFP) of performance based navigation (PBN) was presented during the SAM/IG/6. To this respect, the Meeting requested the Secretariat to send a survey of flight inspection experts for comments and further approval. The Secretariat will consult with SAM RO/FLS on the status of this Conclusion.
4-12	**Conclusion SAM/IG/14-9 Aircraft and operator PBN capacity database** That the ICAO SAM Office send to SAM States information on the use of the aircraft and operator PBN capacity database, requesting that the aforementioned database be completed by 15 March 2015.	Complete the implementation of the capacity of aircraft and operators PBN database; and circulate a letter to States requesting to complete the data.	a) Application accessible from web b) Data base updated	SAM/IG/16	RO/TC		**VALID** Pending letter to States. Consultations with the SRVSOP are being made regarding procedures with administrations to keep database updated once it is published. Link: http://srvsop.icao.int/CapacidadAeronaves/login

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5- ATFM implementation							
5-11	**Conclusion SAM/IG/5-7 ATFM Teleconferences in the SAM Region** That SAM States continue to hold weekly ATFM teleconferences between flow management units or flow management positions (FMU / FMP) to improve the exchange of information among participating States.	Implement ATFM teleconferences	Coordination between FMU/FMP carried out.	Permanent	States	RO/ATM	**VALID** REDDIG II includes a speech communications sub-network to support this application. Weekly teleconferences are not being held, but various States transmit the teleconference format by e-mail.
5-16	**Conclusion SAM/IG/6-8 ATFM AIP SUPP/AIC Model** That the States of the ICAO South American Region, when preparing their national AIC, use as a reference the ATFM AIP SUPP/AIC model shown in Appendix E to this part of the report.	Prepare AIC	Harmonised publications in the SAM Region	October 2016	States	RO/ATM	**VALID**
5-23							**FINALIZED**
5-24	**Conclusion SAM/IG/14-10 ATFM preparatory activities** That SAM States do their utmost to: a) increase the number of ATFM-trained personnel to the extent required to fulfil ATFM functions; and	Establish the minimum staff to provide the ATFM system Deliver at national level the ATFM training courses	Sufficient human resources Trained national staff	SAM/IG/15	STATES	RO/ATM	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	b) provide ATFM training to their personnel through national courses conducted by instructors trained in courses provided within the framework of Project RLA/06/901, with a view to multiplying training.						
5-25	**Conclusion SAM/IG/14-11 Conduction and updating of runway and ATC sector capacity calculations** a) conduct runway capacity calculations at the main international airports and publish them in the AIP no later than the SAM/IG/16 meeting; b) update runway capacity calculations at the main international airports and publish them in the AIP when: - the difference between calculated values and the actual acceptance values is 20% or more; -separations are reduced or sequencing is improved; and/or - new procedures or airspace designs are implemented that have a direct or indirect impact on the acceptance rate declared based on runway capacity calculations;	Establish runway acceptance capacity at international airports Update runway capacity calculations according to criteria defined in b) and adjust procedures or resign them if necessary	Publication of runway calculations Proceedings or redesign implemented if necessary	SAM/IG/15	STATES	RO/ATM	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	c) conduct or update sector capacity calculations at ATC units, and determine the need for adjusting the number of controllers assigned, at least every two years.	Update the ATC capacity calculations and adjust the number of controllers assigned					

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6. Assessment of operational requirements in order to determine the implementation of communications and surveillance (CNS) capabilities improvement for en-route and terminal area operations							
6-15	**Conclusion SAM/IG/12-3 International AMHS interconnection** That, with regard to international operational AMHS interconnections and with the aim of solving apparent incompatibility problems between the systems installed in Argentina, Brazil and Venezuela with the AMHS in Peru, these States carry out corresponding efforts so: a) their providers determine and inform the precise causes preventing the interconnections, and appropriately indicate the procedures to solve them; and b) they inform the results of the evaluation at	a) Determine the precise causes preventing the AMHS interconnection between Argentina, Brazil and Venezuela with Peru. b) Present the results to SAM/IG/13.	Procedures to complete the AMHS interconnection between Argentina, Brazil and Venezuela with Peru.	December 2015	Argentina, Brazil, Peru and Venezuela	RO/CNS	**VALID** Although positive trials have been made between Brazil and Peru, Brazil asked Peru to undertake new trials using AMHS equipment in operation and not AMHS equipment on trial and development, by applying the trial protocol used by Brazil in Spain.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	SAM/IG/13 meeting.						
6-17	**Conclusion SAM/IG/13-7 Implementation of the RAIM availability prediction service in the SAM Region** That, with the aim of achieving a successful implementation of the RAIM availability prediction service and its effective use by States: a) SAM States, the Secretariat and the RAIM service provider carry out necessary coordinations through web teleconferences to define, among other aspects, the website format, the mode of access to the service with the assignment of a password, as well as verification of the veracity of the information; b) The Secretariat make the amendments required to the SAM advisory circulars on PBN procedures to mention the existence of the RAIM availability prediction service; c) States of the Region that have not adhered to the prediction service inform of their intent to join same; and d) RLA/06/901 member States, once the service is operational, make use of it and motivate its use by all	a) Website format, the mode of access to the service; b) Amendment to advisory circulars; c) Inclusion of new States; d) Use of the service.	RAIM availability prediction service in operation	Dec 2015	States, Regional Office	RO/CNS RO/FLS	**VALID** a) Completed b) Completed c) Pending d) Completed

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	interested parties.						
6-18	**Conclusion SAM/IG/14-12 Requirement for a basic course on CISCO routers and switches for personnel in charge of REDDIG II maintenance and operation** That the Eighteenth Meeting of the REDDIG Coordination Committee, to be held in Lima, in March 2015 consider approving the conduction of a basic course on CISCO IP routers and switches, the content of which is presented in **Appendix A** to this agenda item.	Present requirement to RCC/18 (Lima, Peru, 2-4 March 2015)	Basic Course on CISCO IP routers and switches course	March 2015	Member States of project RLA/03/901	ICAO	**CONCLUDED** RCC/18 Meeting approved the proposed training activity that will be carried out on the second semester of 2015.
6-19	**Conclusion SAM/IG/14-13 AMHS interconnection trial procedures** That SAM States, when conducting AMHS interconnection trials, use as a reference the list of procedures aligned with the SAM AMHS interconnection guide shown in **Appendix B** to this agenda item.	Use of the list of procedures for the AHMS interconnection trials	Implementation of the list of procedures for the AHMS interconnection trials	December 2016	SAM STATES	ICAO	**VALID**
6-20	**Conclusion SAM/IG/14-14 Implementation of the SITA data link service through the REDDIG II**	Provide technical information to the RCC/18 Meeting to analyse the implementation of the SITA data link service in	Technical information for the RCC/18 Meeting to analyse the	March 2015	SITA	REDDIG Adminis-tration	**COMPLETED** SITA presented the information during the RCC/18 and the meeting

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	That SITA provides to the Eighteenth meeting of the Coordination Committee of Project RLA/03/901 (RCC/15) to be held in Lima, Peru, on 2-4 March 2015, detailed technical information on bandwidth requirements for each of the States of the Region that use SITA data link, and on the costs that the States of the Region currently pay through the SITA communication network, so that the RCC/15 meeting may analyse the feasibility of using the REDDIG to transport the data links to SITA data processors in Brazil through the Recife node.	the REDDIG II	implementation of the SITA data link service in the REDDIG II				agreed an initial proceeding for the implementation.
6-21	**Conclusion SAM IG/14-15 Use of the RAIM availability prediction service** That the operational implementation of the RAIM prediction service be carried out in two stages: a first stage of free dissemination from 15 December 2014 to 15 October 2015, and a second phase, to be analysed at the SAM/IG/16, to define whether or not the prediction service will continue to have free access.	Implementation of the RAIM availability prediction service via WEB in two stages	RAIM availability prediction service via WEB implemented in two states as indicated in the conclusion	SAM/IG/16	Member States of Project RLA/06/901	ICAO SAM OFFICE	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7. Operational implementation of new ATM automated systems and integration of the existing systems							
7-11	**Conclusion SAM/IG/14-16 Approval of the 2015 Plan of Activities for AIDC implementation** That the Coordination Meeting (RCC/8) review and approve the 2015 timetable of activities for AIDC implementation, shown in **Appendix B** to this agenda item.	Approval of the 2015 Plan of Activities for the AIDC implementation	Plan of Activities for the AIDC implementation 2015 reviewed and approved	February 2015	Member States of project RLA/06/901	ICAO SAM OFFICE	**CONCLUDED** RCC/8 approved the proceding.
7-12	**Conclusion SAM IG/14-18 Exception in the insertion of alternate aerodromes** That: a) Airlines operating to the United States that will apply exceptions to the insertion of the alternate aerodrome, insert “ZZZZ” in box 16 of the FPL and specify ALTN//NIL in box 18. b) States include such procedures in the respective AIPs.			December 2015	Airlines and SAM States	ICAO SAM OFFICE	**VALID**
7-13	**Conclusion SAM/IG/14-17 Updating of FASID Table CNS4** That SAM States send to the Secretariat at the ICAO SAM Office the updated FASID Table CNS4 by 15 December 2014.	Updating of the FASID Table CNS4	FASID Table CNS4 updated	July 2015	SAM Region States	ICAO SAM OFFICE	**VALID** Only a few States has sent the CNS 4 table updated. Reception was extended until July 2015.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
8. Follow up to conclusions and decisions adopted by SAM/IG meetings, results of the thirty-eighth session of the ICAO Assembly (A38) and thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13) and progress made in the development of the new electronic Air Navigation Plan (e-ANP)							
8-1	**Conclusion SAM/IG/13-1 Alignment of the national air navigation plans with the ICAO Global Air Navigation Plan (GANP) and SAM Performance-Based Air Navigation Implementation Plan (PBIP)** That SAM States amend their national air navigation plans, with the aim of aligning them with the new ICAO Global Air Navigation Plan (GANP, 4th Edition) and SAM Performance-Based Air Navigation Implementation Plan (PBIP) approved at the thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13), and present any progress made in October 2014, at SAM/IG/14 meeting		National air navigation plans aligned with ASBU	SAM/IG/16	States	ICAO SAM Office	**VALID** States will inform progress at SAM/IG/16.
8-2	**Conclusion SAM/IG/13-2 Designation of national focal points to coordinate activities in support of the ICAO position at the ITU WRC-15** That SAM States, if they have not done so yet, designate a national focal point to coordinate, as	Designate focal points	Focal point	31 June 2014	States	RO/CNS	**VALID** Not all States have designated focal points. Colombia, French Guiana, Guyana, Suriname and Uruguay are still pending.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	necessary, between ICAO and the national bodies responsible for managing the radio frequency spectrum, with a view to supporting the ICAO position at the ITU WRC-15 shown in Appendix C to this part of the Report, notifying the Regional Office no later than 31 May 2014.						
8-3	**Conclusion SAM/IG/13-3 Designation of a national focal point for the drafting of the new regional e-ANP** That, with the aim that SAM States can coordinate with the ICAO SAM Regional Office the provision of the data necessary for the drafting of the new regional electronic air navigation plan (e-ANP): a) The ICAQ SAM Regional Office will send a State letter in early June 2014, requesting the nomination of a national focal point; and b) SAM States will officially inform by 1 August 2014 the name of the designated focal point, and provide a brief resumé, telephone number and electronic mail of the incumbent.	Designate focal points	Focal point	01 Aug 2014	States	RO/ATM	**VALID** Not all States have informed their focal point. Secretariat sent letter SA-280 on 12 June 2014. Information of Bolivia, Ecuador, French Guiana, Guyana, Panama, Paraguay, Suriname and Venezuela is still missing
8-4	**Conclusion SAM/IG/14-1**	Project for the implementation	Project for the	December	IATA	ICAO SAM	**CONCLUDED**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	State-industry collaborative process for the transition from current systems to those specified in the ASBU That the following action be taken to make possible the State-industry collaborative process for the transition from current systems to those specified in the ASBU: a) IATA, with the support of the ICAO SAM Regional Office, develop a draft project related to the State-industry collaborative process for the transition from current systems to those specified in the ASBU; b) IATA, with the support of the ICAO SAM Regional Office, send the aforementioned draft to SAM States before 26 November 2014; c) the ICAO SAM Regional Office coordinate a teleconference on 28 November 2014, with the participation of SAM States and IATA, with a view to analysing and approving the draft project;	of the State-Industry collaborative process for the transition from the current systems to those specified in the ASBu	implementation of the State-Industry collaborative process for the transition from the current systems to those specified in the ASBu	2014	ICAO SAM OFFICE	OFFICE	

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	d) the ICAO SAM Regional Office coordinate the approval of the draft project through the *fast-track* mechanism of the GREPECAS Programmes and Projects Review Committee; **e)** the ICAO SAM Regional Office submit the project to the coordination meeting of Project RLA/06/901, with a view to including it in the management mechanisms of the aforementioned regional project.						
9. Matters related to safety							
9-1	**Conclusion SAM/IG/13-9 IATA safety events indicators for SAM States** Encourage States to develop, jointly with operators, Secretariat and other ATM community stakeholders deemed relevant, the methodology allowing the use of the data on safety events and indicators registered by airlines through IATA, in order to identify and mitigate any potential risk to	Activities of States with operators for the analysis of safety events	SMS analysis and mitigating measures	Inform at each SAM/IG meeting	States	RO/ATM	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	operations, setting goals, priority areas and action plan.						
10. Amendments to ICAO Documents							
10-1	**Conclusion SAM/IG/14-19 Implementation of Amendment 6 to the 15th edition of the *Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444*)** That SAM States take the following action to implement the new procedures foreseen in Amendment 6 to the 15th edition of the Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444): a) Amend national standards and procedures, including compliance with the flight plan and associated messages. b) Amend aeronautical information publications. c) Amend ATS unit procedures. d) Amend crew procedures. e) Amend ANS safety protocols. f) Train crews, air traffic controllers, and aeronautical information operators.	Amend standards, protocols, procedures and manuals of national application to comply with requirements of Doc 4444.	Implementation of Amendment 6 of Doc 4444	SAM/IG/15	STATES	RO	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	g) Assess and, if necessary, modify ATC systems.						
10-2	**Conclusion SAM/IG/14-20 Implementation of the new SLOP foreseen in Amendment 6 to the 15th edition of the *Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444*)** That: a) SAM States study the feasibility of applying the new SLOP foreseen in Amendment 6 to the 15th edition of the Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444) and present their results to the SAM/IG/15 meeting; **b)** IATA and SAM users study the feasibility of the aforementioned SLOP, from the point of view of the associated workload for pilots, and present their results to the SAM/IG/15 meeting.	Evaluation of the SLOP technique in their air spaces (IATA) Evaluation of users regarding their cabin crew workload	Evaluations	SAM/IG/15	STATES IATA	RO/ATM	**VALID**

APPENDIX B

FOLLOW-UP OF CONCLUSIONS AND PENDING TASKS OF THE SAM/IG MEETING

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
1-1 **SAM/IG/1-1** **CAR/SAM PBN Roadmap** That ICAO SAM States, in implementing RNAV/RNP, take the pertinent actions to follow guidelines contained in the CAR/SAM PBN Roadmap as shown in Appendix C to this part of the report.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	--	**YES**	**O/G**	**YES**	**YES**	**YES**	**YES**	**YES**	**PER:** Dec 2009
1-1 That States examine: a) Impact of RNAV routes implementation in the airspace Aircraft fleet, Air traffic services, and b) Establish pertinent coordination so as to enable integrated, harmonious and timely implementation of more direct RNAV routes.	**YES**	**O/G**	**YES**	**YES**	**YES**	**O/G**	--	**O/G**	**O/G**	**O/G**	**YES**	**O/G**	**YES**	**YES**	**ARG:** COORDINATION PBN IMPLEMENTATION GROUP **COL:** June **ECU**: Local coordination with corresponding area. **PAR:** SAM/IG/ 5 **PER**: SAM/IG/5 **VEN:** Mar 2010
2-1 Implementation of RNAV routes	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	--	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	
2-3 **Conclusion** **SAM/IG/2-1** **PBN implementation Programme for en-route operations** That the ICAO SAM States take appropriate actions to follow the guidelines and comply with the targets established in the PBN implementation for en-route operations, which is shown in Appendix B to this part of the Report.	**YES**	**YES**	**YES**	**YES**	**YES**	--	--	**YES**	**YES**	**YES**	**OG**	**YES**	**YES**	**YES**	**PER**: Nov 2010

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
2-10 **Conclusion SAM/IG/2-2** **Initial AIC** That States of ICAO SAM Region using as model the AIC presented in Appendix C to this part of the Report: a) publish in the AIRAC date of 9 April 2009 an Aeronautical Information Circular (AIC) informing the aeronautical community on their intention to implement RNAV 5 on 18 November 2010; b) reflect in this AIC the specific YEStuations within the airspace under their jurisdiction.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**YES**	**YES**	**YES**	**O/G**	**YES**	**YES**	**GUY:** Nov. 2009 **SUR:** Will inform 15 Nov. 2009
2-12 **Conclusion SAM/IG/2-3** **Survey on the Fleet Navigation Capacity** That States conduct a survey on the fleet navigation capacity, using, to that end, the form contained in Appendix D to this part of the Report, and send the information collected to the ICAO South American Regional Office, on the following dates: a) Aircraft operating commercial flights, which have more than 5 700 kg. of MTOW – 15 February 2009; b) Aircraft operating commercial flights, which have less than 5 700 kg. of MTOW – 15 May 2009; c) Other aircraft registered in the Region–15 Aug 2009.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**COL:** Initially had same problem as Venezuela but after holding PBN seminars we have started the approval process. **PAR**: completed a) pending b) and c). **VEN**: fruitless surveys have been carried out in view of the little knowledge that operators and aircraft owners have on PBN concept. A dissemination campaign is being carried to, to enable the improvement of data provided by the same.
2-13 1.2 Collect air traffic data to understand air traffic flows in a specific airspace.	**YES**	**NO**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**O/G**	**YES**	**YES**	**YES**	**YES**	**YES**	**PER**: carried out Jul 2009. Delivered to SAM Office. Only ARG, BOL, CHI, COL, PAR and URU have submitted corresponding data collection as of Dec 2013.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
2-14 **Conclusion SAM/IG/2-4** **PBN Implementation Model for TMA and Approach** That States/Territories and International Organizations use the PBN Implementation Model for TMA and Approach in the preparation of their PBN implementation programmes for TMA and Approach, shown in Appendix E, item 2 SAM/IG/2 Report.	**YES**	**O/G**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**ECU**: Submitted**.** **PER:** Dec 2009, this model is being used. **SUR**: 15 Nov 2009. **VEN**: 18 Nov 2010.
3-1 **Conclusion SAM/IG/2-5** **Advisory Circular CA 91-002 and Job Aid for Aircraft and operators RNAV 5 operational approval** That States of ICAO South American Region: a) Use as an acceptable compliance source in aircraft and operators RNAV 5 operational approval Advisory Circular CA 91-002 and Job Aid for Aircraft and operators RNAV 5 operational approval, presented in Appendices A and B, respectively, to this part of the Report. b) Publish respective national regulations up to April 2009.	**YES**	**YES**	**YES**	**YES**	**YES**	**O/G**	**--**	**O/G**	**O/G**	**YES**	**YES**	**--**	**YES**	**YES**	**COL**: Information circular was published and may be seen at the hyperlink:CI 5102-082-002 **ECU**: Coord. with OPS **PER**: Dec 2009 **BRA** and **PAN:** publication is being harmonized with CA LAR. **BOL**: 2009 **PAR:** Official signature pending Oct. 2010.
3.5 **Conclusion SAM/IG/3-3** **PBN Implementation National Plans** That States of ICAO South American Region, present their PBN Implementation National Plans to SAM/IG/4 Meeting, using PBN Implementation Plan Model, shown in Appendix B of this part of the Report, as well as using the action plan models and information contained PBN Implementation Project TMA Operations and Short Term Approximations of SAM Region, approved by SAM/IG/2 Meeting.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**				**YES**	**YES**		**YES**	**YES**	**BOL:** delivered Dec. 2009. **ECU**: Submitted (electronic version pending). **VEN:** finalised and delivered.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
4-5 **Initial ATFM AIC Model**	**YES**	**YES**	**N/A**	**YES**	**YES**	**YES**	**--**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**NO**	**YES**	**BRA:** information published in the AIP. **GUY**: 22 Oct 2009.
Conclusion SAM/IG/3-1 **ATS Route Network Optimising in the South American Region** That the ICAO SAM States take relevant action to follow the guidelines and meet the target dates established in the ATS Route Network Optimising Programme in the South American Region that appears in Appendix B to this part of the report.	**YES**	**YES**	**YES**	**YES**	**O/G**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**VEN:** pertinent actions taken.
Conclusion SAM/IG/3-4 **Advisory Circulars CA 91-008, CA 91-009 and CA 91-010** That States of the SAM Region: a) use as acceptable means of compliance in aircraft approval and exploiters for RNP APCH, RNP AR APCH and APV/Baro-VNAV operations, Advisory Circulars CA 91-008, CA 91-009 and CA 91-010, shown in Appendices B, C and D, respectively to this part of the report; and b) publish the corresponding national regulations until 5 October 2009.	**O/G**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**BOL**: published in RAB 91 **COL:** published the following information circular: CI-5102-082-008 CI-5102-082-009 CI-5102-082-010 **PAR:** in final process of publication. **VEN:** published in September 2010 CA RNAV5, RNP-1, RNP AR APCH and APV-BARO/VNAV.
Conclusion SAM/IG/4-1 **SAM routes network point of contact** That SAM States designate a point of contact to support the development of task 2.2.5 of the Action Plan for optimisation of the SAM Routes Network, and send the corresponding data (email and telephone) until 31 January 2010.	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**BOL:** TBD **URU:** Gustavo Turcatti Tel.5982 604 0408 Int. 5111 blantur@gmail.com **VEN**: Carlos Gonzalez and Pablo Rattia

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/4-2 **Advisory Circulars for Aircraft approval and operators for RNP 10 operations, RNAV 5, RNAV 1 and 2, Basic RNP 1, RNP APCH, RNP AR APCH and APV/baro-VNAV** That States of ICAO South American Region, according to the PBN implementation plans: a) use the Advisory Circulars (AC), in developing their acceptable means of compliance of approval of aircraft and operators for RNP 10 operations, RNAV 5, RNAV 1 and 2, Basic RNP 1, RNP APCH, RNP AR APCH and APV/baro-VNAV, that are shown in Appendices A1, A2, B1, B2, C1, C2, D1, D2, E1, E2, F1, F2, G1 and G2 of this part of the report; and	**O/G**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**BOL**: published in RAB 91. **COL**: Following information circulars: CI-5102-082-001 CI-5102-082-002 CI-5102-082-003 CI-5102-082-008 CI-5102-082-009 CI-5102-082-010 **PAR**: in final process of publication. **VEN**: RNP10, RNAV2, RNP APP AR pending.
b) that job aids of aforesaid circulars be incorporated into Inspector's manuals of Operations and airworthiness.	--	--	--	**YES**	**YES**	--	--	--	--	--	--	--	--	--	**COL**: Airworthiness inspector guide can be consulted at hyperlink: Guía inspector Aeronavegabilidad
Conclusion SAM/IG/4-3 **Continued data collection about PBN Fleet Capacity in the South American Region** The Meeting considered that: a) efforts should be continued in order that each State, through its PBN Focal Points, conduct such actions to send, as soon as possible, information, about its PBN fleet capacity to ICAO Regional Office. The information collected by States should, as far as possible, be sent to the Regional Office in a file with Excel format. b) each State is responsible for providing data and, as time passes, updates or further details on the submitted data should be made; c) to facilitate the updating of data, the file of the survey of each state	**O/G**	**O/G**	**YES**	**YES**	**YES**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	**NO**	**O/G**	**YES**	**YES**	**COL:** Had the same difficulties as Venezuela, and finally the information was collected. However, we believe this item should be considered as completed since it was pre-assessment and we are now in the implementation process. **VEN:** fruitless surveys have been carried out in view of the poor knowledge that operators and aircraft owners have. A dissemination campaign is being carried out to enable improvement of data provided by the same.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
be posted on the website of the SAM Office, in order that each State, through a code, can have access to information on its fleet , and thus can perform the update of the data entered , and send it, via e-mail, to the Regional Office.															
Conclusion SAM/IG/5-1 **Training programme and documentation for air traffic controllers and AIS operators** That SAM States use the material shown in Appendix A to this part of the report as guidance material for air traffic controllers and AIS operators.	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**--**	**O/G**	**--**	**YES**	**NO**	**--**	**YES**	**YES**	**ARG:** PBN Workshop and recurrent courses ATS instructors **BOL:** PBN and ATC recurrent seminars were held. **COL**: Training for controllers and flight plan personnel has already started. There will be a transition period, since this amendment is effective as of April 2012. **URU**: PBN training was initiated. **VEN:** final training phase at the IUAC (Instituto Universitario de Aeronautica Civil).
Conclusion SAMIG/5-2 **PBN/RNAV5 seminars for operators** That SAM States, in view of the few operators that have requested the approval, and the need to encourage them to start this process, conduct PBN seminars in which operators are informed about the corresponding approval procedures.	**YES**	**YES**	**YES**	**YES**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	**YES**	**NO**	**O/G**	**YES**	**YES**	**BOL:** PBN seminars were carried out at all levels. **COL**: Several seminars were conducted for operators and several commercial operators have already started the process. It is suggested that the restrictions to be applied to uncertified operators as of 22 Sep 2011, be published. **VEN**: continuously.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAMIG/5-3 **Data Collection** That: a) SAM States collect data on flights conducted on domestic and international routes in the upper airspace (FL 245 or above) of the SAM Region during the period 1 to 15 July 2010, and send them to the SAM Regional Office before 13 August 2010; and b) That the sample be consistent with the form and the guidelines for completing the form described in Appendix B to this part of the Report, using the Excel format.	**YES**	**YES**	**YES**	**YES**	**NO**	**--**	**--**	**O/G**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**VEN**: sent to the regional office and delivered during SAM/IG/6 Meeting.
Conclusion SAM/IG/5-4 **Implementation of Continuous Descent Operations** That, recognizing the efficiency and environmental benefits of Continuous Descent operations, and the need to harmonize these operations in the interest of safety, States are encouraged to include the implementation of Continuous Descent operations (CDO) as part of their PBN implementation plans and to implement CDO in accordance with the ICAO CDO Manual.	**YES**	**O/G**	**O/G**	**YES**	**O/G**	**--**	**--**	**O/G**	**--**	**YES**	**NO**	**--**	**NO**	**NO**	**ARG:** Star design under CDO concept was included in the PBN implementation Plan **URU:** will request support of Regional Office to restructure airspace and procedures construction. During 2014 two theoretical/practical training workshops were held for the SAM Region, with the support of RLA/06/901 Project
Conclusion SAMIG/5-7 **ATFM Teleconferences in the SAM Region** That SAM States continue to hold weekly ATFM teleconferences between flow management units or flow management positions (FMU / FMP) to improve the exchange of information among participating States.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**	**NO**	**YES**	**YES**	**YES**	**NO**	**YES**	**YES**	Web REDDIG II includes a speech communications sub-network to meet initial ATFM requirements. REDDIG II includes an IP sub-network for teleconferences.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/6-1 **Application of further actions to reduce the risk and risk rate resulting from the SAM ATS routes network optimisation safety plan** That States, ATS providers and aircraft **operators**, take the necessary measures to apply recommendations and further actions in order to reduce the risk and resulting risk rate as shown in Appendix 1 to Chapter 4 of the Safety Plan for the SAM Region ATS routes network, as shown in Appendix A to this part of the report.	**NO**	**O/G**	**YES**	**O/G**	**O/G**	--	--	--	--	**O/G**	**NO**	--	**YES**	**YES**	
Conclusion SAM/IG/6-2 **Application of subsequent actions to reduce the RNAV5 safety plan risk and the resulting risk rate** That States, ATS providers and aircraft users take the necessary measures to apply further action to reduce the RNAV5 safety plan risk and the resulting risk rate, as shown in Appendix 1 to Chapter 4 of the safety plan for RNAV5 implementation in the SAM Region, shown in Appendix I to this part of the report.	**NO**	**O/G**	**YES**	**O/G**	**O/G**	--	--	--	--	**O/G**	**NO**	--	**YES**	**YES**	
Conclusion SAM/IG/6-3 **Forms CMA F5 and CMS F6** That SAM States take pertinent action in order to apply forms CMA F5 and CMA F6, attached as Appendices A and B to this part of the report, and send them to CARSAMMA as soon as the PBN approval of aircraft and operators is established.	**YES**	**O/G**	**YES**	**YES**	**YES**	--	--	--	--	**O/G**	**NO**	--	**YES**	**YES**	**BOL:** Approvals completed
Conclusion SAM/IG/6-4 **ENR 3.3 – Table model of the AIPs** That SAM States, in publishing in their AIPs RNAV routes, use the ENR table model shown in Appendix D to this part of the report.	**YES**	**YES**	**YES**	**YES**	**YES**	--	--	--	--	**YES**	**YES**	--	**YES**	**YES**	**CHI:** As defined in SAM/IG/7

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/6-5 **Lateral navigation deviation reporting form** That SAM States take the corresponding action in order to use the monitoring programme and particularly lateral navigation deviation reporting form attached as Appendix F to this part of the report, and send it to CARSAMMA on the tenth day of each month.	**NO**	**--**	**YES**	**YES**	**YES**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	
Conclusion SAM/IG/6-9 **Actions required for AMHS interconnection** That SAM States, in view of the delays in the interconnection of the AMHS, proceed with the following actions:	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Actions corresponding to parts a), b) and c) of this Conclusion have been completed, pending only part d). French Guiana (France) has no AMHS. Uruguay installed its AMHS in March 2014.
a) Require from their AMHS providers the necessary support to successfully end the necessary interconnections;	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	
b) Make necessary arrangements to train personnel in the interconnection tasks, with the aim of minimizing the dependency with their providers;	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**NO**	**YES**	**YES**	**YES**	**N/A**	**YES**	
c) Maximize pertinent coordination; and	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	
d) States that have not yet done so, complete the drafting and signature of the MoU.	**O/G**	**N/A**	**O/G**	**O/G**	**O/G**	**O/G**	**N/A**	**O/G**	**O/G**	**YES**	**O/G**	**O/G**	**N/A**	**O/G**	
Conclusion SAM/IG/7-1 **ATS routes network optimisation programme of the South American Region, Phase 3, Version 02** That ICAO SAM States take pertinent actions to follow the guidelines and comply with established deadlines to continue with Phase 3, Version 02 of the ATS routes network optimisation programme of the South American Region, shown in Appendix A to this part of the report.	**--**	**YES**	**--**	**YES**	**O/G**	**--**	**--**	**--**	**--**	**O/G**	**--**	**--**	**NO**	**--**	

Conclusión/Tarea **Conclusion/Task**	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES** **REMARKS**
Conclusion SAM/IG/7-2 **Implementation of RNAV-5** That SAM States implement RNAV-5 in continental airspace routes, on 20 October 2011, at 09:01 UTC.	**YES**	**YES**	**YES**	**YES**	**YES**	--	--	--	--	**YES**	--	--	**YES**	**YES**	
Conclusion SAM/IG/7-3 **Documentation to be published for the implementation of RNAV-5** That SAM States publish the following documentation no later than 22 September 2011, effective on 20 October 2011: a) Amendment to the AIP or AIP Supplement containing the applicable standards and procedures, including the corresponding in-flight contingencies, the model of which appears in Appendix C to this part of the report; and b) The ENR 3.3 Tables that correspond to RNAV routes, using the model shown in Appendix D to this part of the report. Note: Appendix E contains 4 examples that may be used as a reference by the States.	**YES**	**YES**	**YES**	**YES**	**YES**	--	--	--	--	**YES**	--	--	**YES**	--	
Conclusion SAM/IG/7-4 **Publication of the trigger NOTAM** That SAM States publish the trigger NOTAM no later than 13 October 2011, using the following model: In keeping with AIC xx and AIP Supplement xx, RNAV-5 will start to be applied on RNAV routes of the continental airspace in the xx FIR at 09:01 UTC of 20 October 2011.	**YES**	**YES**	**YES**	**YES**	**YES**	--	--	--	--	**YES**	**YES**	**NOV 2012**	**YES**	**YES**	
Conclusion SAM/IG/10-1 **Safety Plan for the implementation of routes Phase 3, Version 02** That SAM Region States determine the viability of the SAM ATS Route Network Optimization (ATSRO) Programme based on a risk assessment, in order to ensure safety within their FIRs.			**NO**												

Conclusión/Tarea **Conclusion/Task**	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES** **REMARKS**
Conclusion SAM/IG/10-2 **Implementation of the new concept of flexible use of the airspace in the ICAO South American Region** That States in the SAM Region, if deemed appropriate, recommend the definitive approval of the Guidelines for the Implementation of the Flexible Use of Airspace Concept in the ICAO South American Region for the design and airspace management of the flight information region under their jurisdiction.			**NO**												
Conclusion SAM/IG/11-4 - International AMHS interconnection That, with regard to international operational AMHS interconnections, if bilateral arrangements conducted by States do not permit another solution, same should make adjustments in their systems in order that they are compatible with mode TP0 as a whole and in accordance with Regulation RFC 1006.	**NO**	**YES**	**NO**	**YES**	**YES**	**YES**	**N/A**	**YES**	**YES**	**NO**	**YES**	**YES**	**N/A**	**NO**	**SUPERSEDED** By Conclusion SAM/IG/12-3
Conclusion SAM/IG/11-5 - Use of the radio frequency spectrum **That, the States of the SAM Region:** a) Ensure the VSAT networks operating in the band between 3.4 to 4.2 Ghz with regard to the IMT services, informing of any interference to both the pertinent national entity and the ICAO SAM Regional Office;	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	Regarding part a), only one interference occurred in REDDIG node in Lima which was reported and corrected. In the other nodes no interferences occurred, for which only one "YES" is included for Peru.
b) Examine lists COM 1 to 3 and confirm the use of the frequencies assigned, notifying of any changes therein; and	**O/G**	**O/G**	**O/G**	**O/G**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	
c) Count with a mechanism agreed upon with the national authority enabling detection and solving the use of unauthorized transmissions causing inconveniences to the aeronautical services.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	

Conclusión/Tarea Conclusion/Task	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES REMARKS**
Conclusion SAM/IG/12-2 - PBN instrument approach procedures That SAM States: a) publish the navigation specification corresponding to such SIDs and STARs RNAV not having such indication at present; b) complete the implementation of APV procedures for all instrument flight runway ends, whether as primary approach or as support to precision approach, with a view to completing 70% of PBN approaches by 2014 and 100% by 2016; and c) advise the Regional Office of any changes in the status of implementation of instrument approach procedures, whether conventional or PBN, annually, in order to update regional efficiency indicators.			**O/G**	**O/G**											
Conclusion SAM/IG/12-3 - International AMHS interconnection That, with regard to international operational AMHS interconnections and with the aim of solving apparent incompatibility problems between the systems installed in Argentina, Brazil and Venezuela with the AMHS in Peru, these States carry out corresponding efforts so: a) Their providers determine and inform the precise causes preventing the interconnections, and appropriately indicate the procedures to solve them; and b) They inform the results of the evaluation at SAM/IG/13 meeting.	**O/G**		**YES**	**O/G**							**O/G**			**O/G**	
Conclusion SAM/IG/13-1 – Alignment of the national air navigation plans with the ICAO Global Air Navigation Plan (GANP) and SAM Performance-Based Air Navigation Implementation Plan (PBIP) That SAM States amend their national air navigation plans, with	**O/G**	**O/G**	**YES**	**O/G**	**YES**	**O/G**	**N/A**	**N/A**	**N/A**	**O/G**	**O/G**	**N/A**	**N/A**	**N/A**	

Conclusión/Tarea **Conclusion/Task**	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES** **REMARKS**
the aim of aligning them with the new ICAO Global Air Navigation Plan (GANP, 4th Edition) and SAM Performance-Based Air Navigation Implementation Plan (PBIP) approved at the thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13), and present any progress made in October 2014, at SAM/IG/14 meeting.															
Conclusion SAM/IG/13-2 – Designation of national focal points to coordinate activities in support of the ICAO position at the ITU WRC-15 That SAM States, if they have not done so yet, designate a national focal point to coordinate, as necessary, between ICAO and the national bodies responsible for managing the radio frequency spectrum, with a view to supporting the ICAO position at the ITU WRC-15 shown in Appendix C to this part of the Report, notifying the Regional Office no later than 31 May 2014.	**YES**	**YES**	**YES**	**YES**	**NO**	**YES**	**NO**	**NO**	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**	
Conclusion SAM/IG/13-3 – Designation of a national focal point for the drafting of the new regional e-ANP That, with the aim that SAM States can coordinate with the ICAO SAM Regional Office the provision of the data necessary for the drafting of the new regional electronic air navigation plan (e-ANP): a) The ICAO SAM Regional Office will send a State letter in early June 2014, requesting the nomination of a national focal point; and b) SAM States will officially inform by 1 August 2014 the name of the designated focal point, and provide a brief resumé, telephone number and electronic mail of the incumbent.	**YES**		**YES**	**YES**	**YES**	**YES**				**YES**		**YES**			Pending information from Bolivia, Guyana, French Guiana, Panama, Paraguay, Suriname and Venezuela

Conclusión/Tarea **Conclusion/Task**	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES** **REMARKS**
Conclusion SAM/IG/13-5 – **Draft proposal on Second Part of ICAO Doc 9971** That SAM States send by 30 September 2014, comments on draft proposal on Second Part of ICAO Doc 9971 aiming to provide required information for the optimization of the Manual, as deemed appropriate.	**NO**	**NO**	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**COMPLETED** Only Brazil, Chile and Colombia submitted comments. The meeting adopted comments made by Brazil and Colombia in order to inform Headquarters and that same are considered at the Panel.
Conclusion SAM/IG/13-6 – **Review of the advanced RNP (A-RNP) and RNP 0.3 advisory circulars** That, with the aim of approving Advisory Circulars AC 91-007 and AC 91-012 for Advanced RNP (A-RNP) and RNP 0.3 operations: a) the ICAO South American Regional Office will send the States of the SAM Region and by 15 May 2014, the AC 91-007 and AC 91-012, for their review and comments; b) SAM States will submit their comments by 15 August 2014; and c) The SAM/IG Secretariat will include the comments received in the advisory circulars and present them at SAM/IG/14 meeting, for their approval.															
Conclusion SAM/IG/13-7 – **Implementation of the RAIM availability prediction service in the SAM Region** That, with the aim of achieving a successful implementation of the RAIM availability prediction service and its effective use by States: a) SAM States, the Secretariat and the RAIM service provider carry out necessary coordination through web teleconferences to define, among other aspects, the website format, the mode of access to the service with the assignment of a password, as well as verification of the veracity of the information;	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**			**YES**	**YES**	**YES**		**YES**	**YES**	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
b) The Secretariat make the amendments required to the SAM advisory circular son PBN procedures to mention the existence of the RAIM availability prediction service; c) States of the Region that have not adhered to the prediction service inform of their intent to join same; and d) RLA/06/901 member States, once the service is operational, make us of it and motivate its use by all interested parties.	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**NO**	**NO**	**O/G**	**O/G**	**O/G**	**NO**	**O/G**	**O/G**	
Conclusion SAM/IG/13-8 – Actions on air traffic flow control measures That in view of air traffic flow operational restrictions, SAM States adopt following measures: a) consider the text on flow control measures used in the ATS 06/14 Multilateral Meeting, or similar, for inclusion in the Letters of Operational Agreement between ATS dependencies; b) consider of utmost priority to take necessary and urgent actions to avoid the adoption of unilateral flow restrictions that could severely affect air traffic flow; c) implement air traffic flow control measures, if necessary, based on well-founded studies of ATS sector capacities, and coordinate same previously with ATC dependencies responsible for ATS supply in adjacent FIRs. d) consider the application of gradual control measures using as far as possible separations based on distance, by taking advantage of existing ATS surveillance tools; e) use in messages established for communicating flow control	**YES**	**YES**	**YES**			**YES**				YES					**Argentina:** Used text shown under paragraph a) in their national Letters of Agreement, as well as with Bolivia, Chile and Paraguay. **Bolivia**: Used text shown under paragraph a) in their LOAs with Argentina and Paraguay. **Ecuador:** Used the text shown under paragraph a) in their LOA between Guayaquil and Bogota. **Paraguay**: Used the text shown under paragraph a) in their LOAs with Bolivia and Argentina.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
measures, terminology and format as detailed in Manual on Air Traffic Flow Management for CAR/SAM Regions, Version 1.1, October 2010, Chapters 12 and 13.															
Conclusion SAM/IG/13-9 **IATA safety events indicators for SAM States** Encourage States to develop, jointly with operators, Secretariat and other ATM community stakeholders deemed relevant, the methodology allowing the use of the data on safety events and indicators registered by airlines through IATA, in order to identify and mitigate any potential risk to operations, setting goals, priority areas and action plan.															
Conclusion SAM/IG/14-1 **State-industry collaborative process for the transition from current systems to those specified in the ASBU** That the following action be taken to make possible the State-industry collaborative process for the transition from current systems to those specified in the ASBU: a) IATA, with the support of the ICAO SAM Regional Office, develop a draft project related to the State-industry collaborative process for the transition from current systems to those specified in the ASBU; b) IATA, with the support of the ICAO SAM Regional Office, send the aforementioned draft to SAM States before 26 November 2014; c) the ICAO SAM Regional Office coordinate a teleconference on 28 November 2014, with the participation of SAM States and IATA, with a view to analyzing and approving the draft project;															a) A draft project was developed. a) The draft project was sent to SAM States for review. b) Teleconference was held and the draft was approved. c) The draft was circulated and approved by fast track GREPECAS mechanism. d) Project document is presented as Appendix D of agenda item 1 of SAM/IG/15.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
d) the ICAO SAM Regional Office coordinate the approval of the draft project through the *fast-track* mechanism of the GREPECAS Programmes and Projects Review Committee; **e)** the ICAO SAM Regional Office submit the project to the coordination meeting of Project RLA/06/901, with a view to including it in the management mechanisms of the aforementioned regional project.															
Conclusion SAM/IG/14-2 **Meetings and resources required for the conduction of activities under the South American Airspace Optimisation Action Plan** That the ICAO Regional Office submit to the coordination meeting of Project RLA/06/901, the following requirements for meetings and resources for the conduction of activities under the South American airspace optimisation action plan:				**YES**											
Conclusion SAM/IG/14-3 **PBN implementation at the South American TMAs** That, in order to give continuity to the PBN implementation process at the main SAM TMAs, States meet the following requirements: a) Develop the Action Plan for the implementation of the PBN airspace concept in the selected TMA/airspace, in order to make up the SAM PBN Project; b) complete data collection and processing, with a view to give consistency to the PBN design of the TMA and/or airspace selected by the State; c) develop, as necessary, a new PBN airspace concept based on data collection and processing and on the				**YES**											Replaced by Conclusion 15/2.

Conclusión/Tarea **Conclusion/Task**	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES** **REMARKS**
recommendations of the second PBN workshop; d) conduct the validation of the preliminary design, taking into account the minimum requirements listed in Appendix D to this part of the report; e) review, as necessary, the airspace concept based on validation results, until a satisfactory PBN design is attained for the implementation phase, which shall be submitted to the third PBN workshop; f) submit the PBN design of the selected TMA and/or airspace to the SAM Regional Office (icaosam@icao.int) before 20 February 2015; g) participate in the teleconferences in preparation for the third PBN workshop to be held on the following tentative dates: - 19 November 2014 - 18 December 2014 - 05 February 2015 - 25 February 2015															
Conclusion SAM/IG/14-4 **Follow-up of the PBN goals established in the Bogota Declaration** a) complete the template contained in Appendix E to this part of the report; b) do the calculations and/or collect data on (estimated and actual) fuel and CO_2 savings, using the IFSET tool for the estimates; c) send the data cited in a) and b) to the SAM Regional Office before 30 June and 31 December each year.			**O/G**	**O/G**											
Conclusion SAM/IG/14-5 **National PBN implementation plans**	**YES**		**YES**	**YES**											

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
That SAM States submit their updated national PBN implementation plans to the SAM/IG/15 meeting, using the model National PBN implementation plan shown in Appendix I to this part of the Report															
Conclusion SAM/IG/14-6 **Projects and/or action plans for PBN redesign of the main South American TMAs** That SAM States: a) send the **Project and/or Action Plans for PBN redesign of the main TMA(s)** selected by their Administration, in order to complete the SAM PBN Project that is contained in **Appendix J** to this part of the Report, to the SAM Regional Office by 31 December 2014; b) send the corresponding updates to the aforementioned Project and/or Plans to the SAM Regional Office as soon as possible, so as to ensure harmonisation of activities under the SAM PBN Project.			**YES**	**O/G**											
Conclusion SAM/IG/14-7 **Implementation of Stage 1 of Version 03 of the SAM route network** That the ICAO SAM Office: a) coordinates the conduction of implementation teleconferences, taking into account the activities mentioned in **Appendix L** to this part of the report. The first teleconference will be conducted on 26 November at 15:00 UTC; b) coordinates the conduction of coordination teleconferences. The first teleconference will be held on 10 December at 15:00 UTC.	**YES**	**YES**	**YES**	**YES**						**YES**					
Conclusion SAM/IG/14-8 **ICAO phraseology** That the ICAO SAM Office:															ICAO HQ has submitted the consultation to a panel for evaluation. By the

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
a) submit the issues concerning the use of phraseology to ICAO Headquarters, with a view to attaining global harmonisation; b) study the feasibility of harmonising the use of phraseology in the SAM Region, based on an amendment to Doc 7030.															moment the standardized phraseology indicated in Doc 4444 continue in use. THIS CONCLUSION WOULD BE CONCLUDED.
Conclusion SAM/IG/14-9 **Aircraft and operator PBN capacity database** That the ICAO SAM Office send to SAM States information on the use of the aircraft and operator PBN capacity database, requesting that the aforementioned database be completed by 15 March 2015.				**O/G**											Letter pending submitting to States; in parallel consultations through the SRVSOP are being made to States to receive procedures as how to keep database updated once it is published.
Conclusion SAM/IG/14-10 **ATFM preparatory activities** That SAM States do their utmost to: a) increase the number of ATFM-trained personnel to the extent required to fulfil ATFM functions; and b) provide ATFM training to their personnel through national courses conducted by instructors trained in courses provided within the framework of Project RLA/06/901, with a view to multiplying training.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**			**YES**	**YES**	**YES**		**YES**	**YES**	
Conclusion SAM/IG/14-11 **Conduction and updating of runway and ATC sector capacity calculations** a) conduct runway capacity calculations at the main international airports and publish them in the AIP no later than the SAM/IG/16 meeting; b) update runway capacity calculations at the main international	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**			**YES**	**YES**	**YES**			**YES**	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
airports and publish them in the AIP when: - the difference between calculated values and the actual acceptance values is 20% or more; -separations are reduced or sequencing is improved; and/or - new procedures or airspace designs are implemented that have a direct or indirect impact on the acceptance rate declared based on runway capacity calculations; c) conduct or update sector capacity calculations at ATC units, and determine the need for adjusting the number of controllers assigned, at least every two years.															
Conclusion SAM/IG/14-12 Requirement for a basic course on CISCO routers and switches for personnel in charge of REDDIG II maintenance and operation That the Fifteenth Meeting of the REDDIG Coordination Committee, to be held in Lima, in March 2015 consider approving the conduction of a basic course on CISCO IP routers and switches, the content of which is presented in **Appendix A** to this agenda item.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**YES**	**YES**	**YES**	**YES**	RCC/18 Meeting approved to conduct a basic course on CISCO IP routers and switches.
Conclusion SAM/IG/14-13 AMHS interconnection trial procedures That SAM States, when conducting AMHS interconnection trials, use as a reference the list of procedures aligned with the SAM AMHS interconnection guide shown in **Appendix B** to this agenda item.	**O/G**	**O/G**	**YES**	**O/G**	**O/G**	**O/G**	**N/A**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	Implementation of procedure in progress.
Conclusion SAM/IG/14-14 Implementation of the SITA data link service through the REDDIG II That SITA provides to the Fifteenth meeting of the Coordination Committee of Project RLA/03/901 (RCC/15) to be held in Lima, Peru, on 2-4 March 2015, detailed technical information on bandwidth															RCC/18 Meeting approved the implementation of the SITA data link service through the REDDIG II beginning trials with Chile.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
requirements for each of the States of the Region that use SITA data link, and on the costs that the States of the Region currently pay through the SITA communication network, so that the RCC/15 meeting may analyse the feasibility of using the REDDIG to transport the data links to SITA data processors in Brazil through the Recife node.															
Conclusion SAM IG/14-15 **Use of the RAIM availability prediction service** That the operational implementation of the RAIM prediction service be carried out in two stages: a first stage of free dissemination from 15 December 2014 to 15 October 2015, and a second phase, to be analysed at the SAM/IG/16, to define whether or not the prediction service will continue to have free access.	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**N/A**	**N/A**	**O/G**	**O/G**	**O/G**	**N/A**	**O/G**	**O/G**	The implementation of the RAIM prediction service via WEB in fee access phase, is in process in RLA/06/901 Member States.
Conclusion SAM/IG/14-16 **Approval of the 2015 Plan of Activities for AIDC implementation** That the Coordination Meeting (RCC/8) review and approve the 2015 timetable of activities for AIDC implementation, shown in **Appendix B** to this agenda item.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**N/A**	**YES**	**YES**	**YES**	**N/A**	**YES**	**YES**	RCC/8 Meeting approved the activities for the implementation of the AICD
Conclusion SAM/IG/14-17 **Updating of FASID Table CNS4** That SAM States send to the Secretariat at the ICAO SAM Office the updated FASID Table CNS4 by 15 December 2014.	**YES**	**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**YES**	**NO**	**YES**	**NO**	**YES**	**NO**	**NO**	Activity incomplete.
Conclusion SAM IG/14-18 **Exception in the insertion of alternate aerodromes** That: a) Airlines operating to the United States that will apply exceptions to the insertion of the alternate aerodrome, insert “ZZZZ” in box 16 of the FPL and specify ALTN//NIL in box 18. b) States include such procedures in the respective AIPs.	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	Activity under implementation process.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/14-19 **Implementation of Amendment 6 to the 15th edition of the *Procedures for air navigation services –Air traffic management (PANS-ATM, Doc 4444*)** That SAM States take the following action to implement the new procedures foreseen in Amendment 6 to the 15th edition of the Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444): a) Amend national standards and procedures, including compliance with the flight plan and associated messages. b) Amend aeronautical information publications. c) Amend ATS unit procedures. d) Amend crew procedures. e) Amend ANS safety protocols. f) Train crews, air traffic controllers, and aeronautical information operators. g) Assess and, if necessary, modify ATC systems.															
Conclusion SAM/IG/14-20 **Implementation of the new SLOP foreseen in Amendment 6 to the 15th edition of the *Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444*)** That: a) SAM States study the feasibility of applying the new SLOP foreseen in Amendment 6 to the 15th edition of the Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444) and present their results to the SAM/IG/15 meeting; **b)** IATA and SAM users study the feasibility of the aforementioned SLOP, from the point of view of the associated workload for pilots, and present their results to the SAM/IG/15 meeting.			**O/G**												

SSR CODE ASSIGNMENT SYSTEM / (INTERNATIONAL AND DOMESTIC) CAR AND SAM REGIONS
SISTEMA DE ASIGNACIÓN DE CÓDIGO / (INTERNACIONAL Y NACIONAL) REGIONES CAR Y SAM

I = International use / Uso internacional
D = Domestic use / Uso nacional

	STATE OR FIR / ESTADO O FIR																					
CODIGO	Argentina	Asunción	Brasil	Cayenne	Central American	Chile	Colombia	Curacao	Georgetown	Guayaquil	Habana	Kingston	La Paz	Lima	Maiquetía	México	Montevideo	Panamá	Paramaribo	Piarco	Port au Prince	Santo Domingo
0	GENERAL PURPOSE / FINES GENERALES																					
0001 - 0077											D			D								
0100 - 0177																		I				
0200 - 0277																		I				
0300 - 0377	I				D						I									D		
0400 - 0477	I				D						I									D		
0500 - 0577	I				D																	
0600 - 0677	I						D					D				D						
0700 - 0777	I											D				D						
1000 - 1077		D	D	D	D											D				D		
1100 - 1177			D										D			D	D	D		D		
1200 - 1277			D		D	D	D		D							D	D	D		D		D
1300 - 1377			D		D	D	D									D				D	D	
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2000		SEE REFERENCE ANNEX 10, VOL IV, 2.~~5.4.7~~1.4.5 / VER REFERENCIA ANEXO 10, VOL. IV 2.1.4.5 ~~2.5.4.7~~																				
2001 - 2077	D										D											
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	STATE OR FIR / ESTADO O FIR																					
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2200 - 2277						D	I															
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	STATE OR FIR / ESTADO O FIR																					
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5400 - 5477		I								I											I	
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7400 - 7477																						
7500	UNLAWFUL INTERFERENCE / INTERFERENCIA ILÍCITA																					
7600	COMMUNICATION FAILURE / FALLA DE COMUNICACIONES																					
7700	EMERGENCY / EMERGENCIA																					

PROJECT: STATE-INDUSTRY COLLABORATIVE PROCESS FOR THE TRANSITION FROM EXISTING SYSTEMS TO THOSE SPECIFIED IN THE ASBU

SAM Region	**PROJECT DESCRIPTION (DP)**	DP N°	
Programme	**Project Title**	**Start**	**End**
SAM Implementation Group (SAM/IG) *(Programme coordinator: Onofrio Smarrelli)*	State-Industry collaborative process for the transition from existing systems to those specified in the ASBU *Project coordinator: Marco Vidal (IATA)*	2015	2016

Objective	The objective of the Project is to take due account the constant evolution and harmonised modernisation of air transportation systems in South America. The State-Industry collaborative process for the transition from the existing systems to those specified in the ASBU will be a fundamental contribution to regional or State implementation plans, making use of the ASBU-based methodology, aligned with the strategic objectives of the GANP. The Project will focus on implementation in the short- and medium-term framework, with a view to achieving initial operational capacity in 2017.
Scope	The scope of the project is to produce a report that includes a complete list of ASBU modules, with deadlines, locations, and expected benefits. Furthermore, it shall include all the critical components of each capability of the modules to be considered, with a view to deriving the relevant benefits for all ATM stakeholders.
Metrics	• Project budget and scope • Delivery of work packages • Quality of deliverables

Strategy	The Project will apply the following strategic framework: • **WHAT** operational capabilities described in ASBU modules will be implemented, defined not only based on technologies, but also on procedures, decision-making support tools, and all the other relevant aspects, including the desired benefit in terms of performance. • **WHERE** (what airports, what airspace) to implement each capability. • **WHO** in the user community (for example, airlines, general aviation, cargo airlines, military) will commit to make the necessary investments for using the new capabilities. • **WHEN** must the capability be fully implemented and providing benefits. The process used in the Project will guarantee that all operational capabilities in the final list of priorities include at least one user committed to be part of implementation and to make the necessary investments. The Project methodology includes business case analysis and assures those who must invest that benefits exceed costs and that there is a reasonable expectation that the air navigation service provider (ANSP) and the community will deliver on the benefits of the new capabilities. It is of critical importance for the success of ATM modernisation to understand that, in order to deliver the benefits of any operational capability, the States and its aeronautical stakeholders must take some associated initiatives. It is essential that the work associated to these critical elements be included in the implementation plan. The Project report will focus on the following objectives: a) use the lessons learned from the "NextGen mid-term implementation task force" as a basis and apply a similar framework to support the Project; b) serve as a mechanism to define the steps required to implement the short- and medium-term operational capabilities defined in the SAM Performance-Based Air Navigation Implementation Plan (PBIP); The Project Report will be sent to the GREPECAS Programmes and Projects Review Committee (PPRC).
Goals	• Project delivered within budget and scope. • Work packages delivered on time. • Quality of deliverables validated by ICAO.

Rationale	The 38th General Assembly of ICAO approved the Global Air Navigation Capacity and Efficiency Plan for the period 2013-2018. The Global Aviation System Block Upgrades (ASBU) Plan will allow aviation to visualise global harmonisation, capacity improvements, environmental efficiency enhancements required by modern traffic worldwide. In this sense, the State-Industry collaborative process for the transition from existing systems to those specified in the ASBU will provide a complete list of ASBU modules, with deadlines, locations and expected benefits, including the critical components of each module capability that must be addressed in order to deliver benefits to all ATM stakeholders.
Related projects	• All projects within the context of the SAM/IG.

Project deliverables	**Relationship with the Regional performance-based plan (PFF)**	**Responsible party**	**Status of implementation***	**Delivery date**	**Comments**
Start-up meeting. Goal: Define the Project plan.				SAM/IG/14	Meeting #1
Meeting to agree on ASBU and the methodology. Goal: All members at the same level of understanding				Feb. 2015	Virtual meeting
Complete high-level cost-benefit analysis. Goal: CBA document.				Jul. 2015	

Project deliverables	Relationship with the Regional performance-based plan (PFF)	Responsible party	Status of implementation*	Delivery date	Comments
Apply criteria to the modules; produce initial implementation list. Goal: Initial list of capabilities of the module to be implemented (ASBU B0 and B1 subset).				Jul. 2015	Meeting #2
Location criteria. Goal: Final list of site selection criteria.				Jul. 2015	Meeting #2
Prioritise locations. Goal: Select implementation sites.				Jul. 2015	Meeting #2
Preparation of the report. Goal: Draft report.				SAM/IG/16	Period of virtual comments
Review of final implementation report with all the capabilities and associated elements/incentives. Goal: Final report.				SAM/IG/17	
Resources required	450K US dollars				

*

Grey	Task not yet started
Green	Activity under way as scheduled
Yellow	Activity under way, started with some delay but estimated to be completed on time
Red	It has not been possible to carry out this activity on the date foreseen; mitigation measures are required

Agenda Item 2: Optimization of the SAM air space
a) PBN in routes
b) PBN in Terminal Areas
c) PBN proceedings

2.1 Under this Agenda Item, the Meeting analysed the following working papers:

a) WP/05 - *Progress made in the implementation of the Airspace Optimization Action Plan* (presented by the Secretariat);
b) WP/06 - *Results of the PBN/3 Workshop* (presented by the Secretariat);
c) WP/07 - *Results of the First Workshop on the Interface between TMAs and Version 03 of the South American Route Network* (presented by the Secretariat);
d) WP/20 - *Planning process of the new structure of PBN circulation in Brazil* (presented by Brazil);
e) IP/06 - *PBN Implementation Plan of the Republic of Argentina* (presented by Argentina); and
f) IP/08 - *PBN Implementation Plan in the Southern Region of Brazil - PBN SUL* (presented by Brazil).

Progress made in the implementation of the Airspace Optimization Action Plan

2.2 The Meeting took note that, taking into account the need to further PBN implementation in the SAM Region, the SAM/IG/14 meeting formulated Conclusion SAM/IG/14-2 (*Meetings and resources required for the conduction of activities under the South American Airspace Optimization Action Plan*), requesting Regional Project RLA/06/901 to increase the number/duration of activities related to the aforementioned implementation during 2015 and 2016, in order to ensure compliance with the goals established in the Bogota Declaration.

2.3 However, given the budgetary limitations of Project RLA/06/901, it was not possible to secure the necessary economic resources. In this regard, the Eighth Coordination Meeting of Project RLA/06/901 (February 2015) did not approve the following activities: Version 03 of the SAM Route Network; Version 03 of the SAM Route Network (final version); ATS/RO/8; SAM PBN instrument procedure design Workshop.

2.4 **En-route PBN**

2.4.1 The Meeting recalled that the SAM/IG/14 meeting formulated Conclusion SAM/IG/14-7 (*Implementation of Stage 1 of Version 03 of the SAM Route Network*). As a result of the teleconferences mentioned in this conclusion, the Route Network was optimised through amendment SAM 15/01-ATM. In this regard, 13 RNAV routes were added, 7 RNAV routes and 3 conventional routes were realigned, and 6 conventional routes and 1 RNAV route were eliminated. Annual savings calculated using IFSET tool from this implementation, considering the actual number of flights, are equivalent to 2,133 tons of fuel and a CO_2 reduction of 6,738 tons.

2.4.2 The Meeting was of the opinion that it is necessary to continue with the implementation of Stage 1 of Version 03 of the SAM Route Network through the flow-driven strategy. In this regard, the Meeting agreed that the next flow to be dealt with would be the one involving Argentina, Brazil, and Uruguay through teleconferences, and the first teleconference would be held on June 3, 2015 at 15:00 UTC (10:00 Lima time).

2.4.3 The Meeting highlighted the importance of coordinating effectively with the States that did not attend the ATS/RO/6 meeting, particularly Colombia, as well as the ICAO NACC Office of Mexico. In that sense, the Meeting has requested that once again the Secretariat try the coordination with those mentioned States and with the NACC Office, with a view that the proposals of Stage 1 of the Version 03 of the Network of Routes SAM are evaluated.

First Workshop on the Interface between TMAs and Version 03 of the South American ATS Route Network

2.4.4 The Meeting was informed that in order to mitigate the fact that experts had not been hired, to continue with the detailed study of the ATS Route Network with a view to developing Version 03, the ICAO SAM Regional Office proposed the conduction of two workshops on the interface between TMAs and Version 03 of the South American ATS Route Network. The First Workshop was held at the SAM Regional Office from March 16 to 20, 2015. The report of the First Workshop on the Interface between TMAs and Version 03 of the SAM Route Network appears in **Appendix A** to this working paper

2.4.5 The Meeting took note that the objectives of the Workshop were the following:

a) Main: Develop Stage 2 of Version 03 of the SAM ATS Route Network, based on the validated PBN design of airspaces selected by SAM States.

b) Other objectives: Fine-tune the routes of Stage 1 of Version 03 of the SAM Route Network; propose the implementation of other routes.

2.4.6 The workshop was divided into two groups that analysed the main flows used by States to handle international traffic in the Region. Group 1 basically covered the "Atlantic" Region, while Group 2 basically analysed the "Pacific" Region.

Work methodology adopted by the workshop

Use of trunk routes and SIDs/STARs to connect the main airports to the Route Network

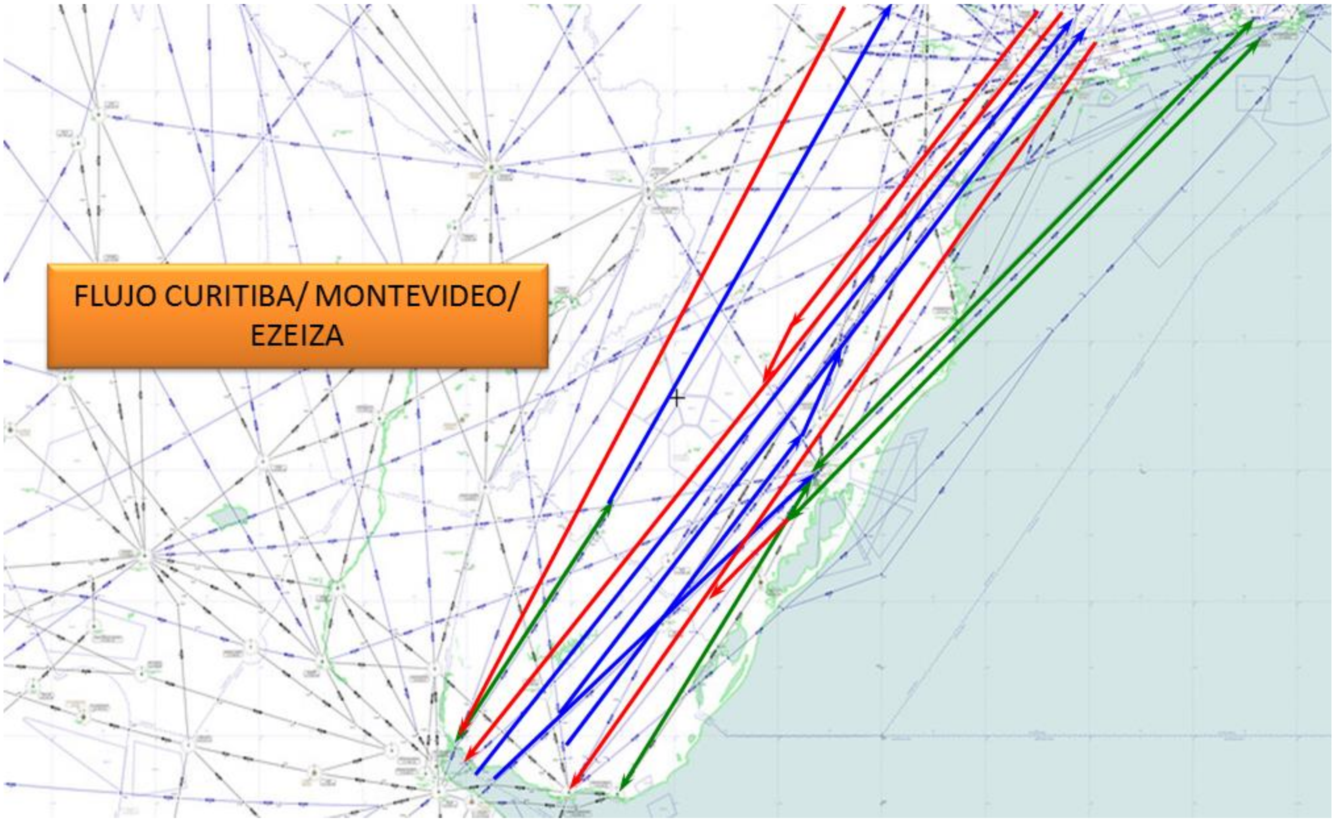
2.4.7 The Meeting took note that the workshop concluded that, taking into account the interrelationship between regional and domestic route networks, planning and implementation should be integrated in order to optimize airspace structure.

2.4.8 The SAM ATS Route Network should be implemented using a *top-down* strategy in order to identify the main regional traffic flows, based on which an integrated regional/domestic network that meets airspace user and ANSP requirements may be developed. This network should consider the need to integrate airports that are not directly served by it, through SIDs/STARs between the main airports and trunk routes, covering the main regional flows

Examples of trunk routes and their connection through the SIDs/STARs proposed by the workshop

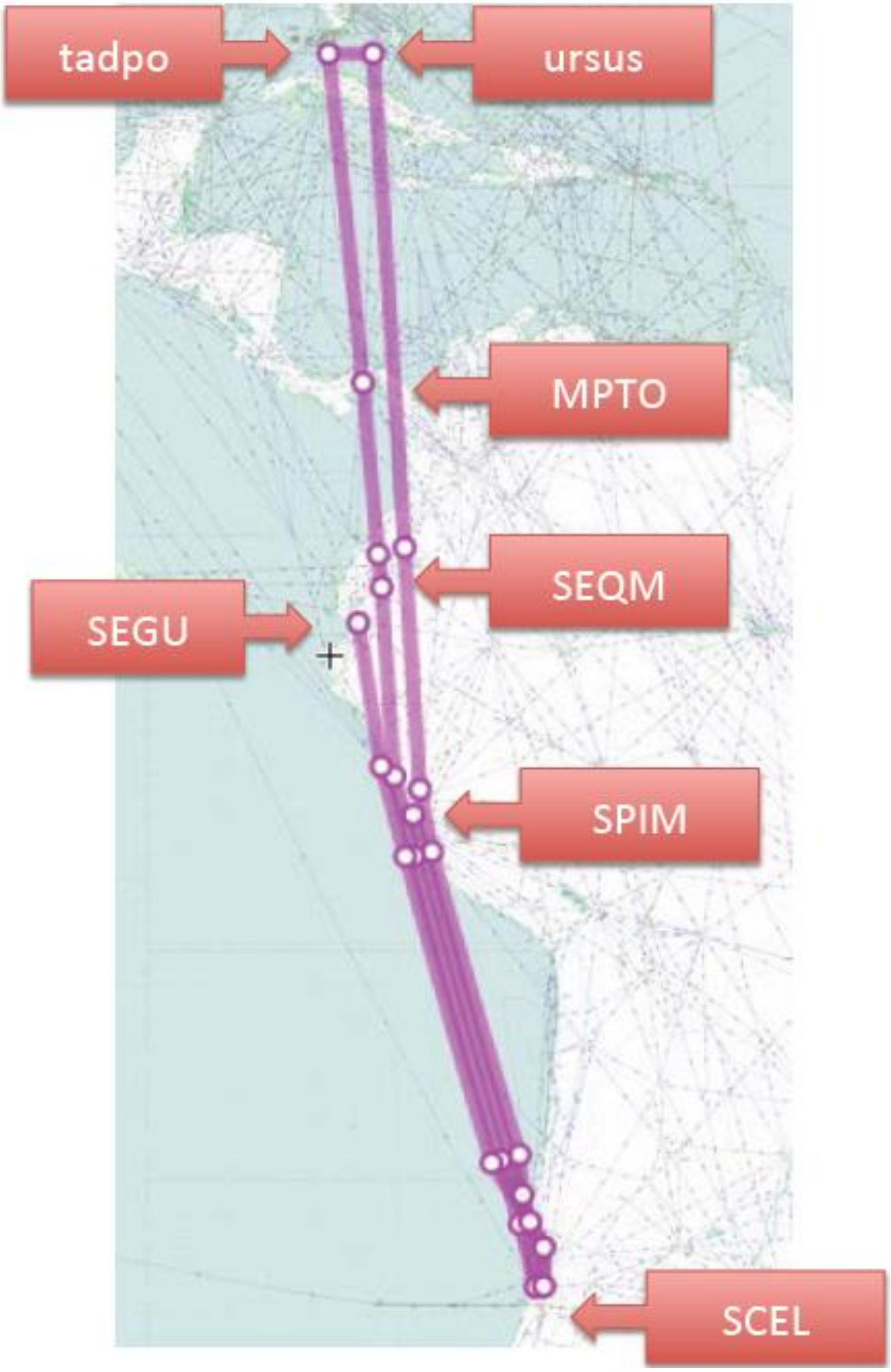
2.4.9 Some examples of trunk routes proposed by the workshop are shown below:

a) Curitiba/Montevideo/Ezeiza FIR flow



b) Miami /Santiago de Chile north-south flow

The parallel RNAV routes proposed along the Santiago de Chile/Miami flow take into account the entry and exit points at the Santiago and Lima TMAs, as well as the existing entry points to the Miami FIR (URSUS and TADPO). The “trunk” route would serve the flows of: Santiago-Chile, Lima, Guayaquil, Quito, and Panama.



Use of entry and exit points of the main TMAs

2.4.10 Although most South American TMAs have not yet reached the required level of maturity, through a validation process, it was possible to develop proposals for new routes based on consistent entry and exit points, in the case of the Lima and Santiago TMAs, whose PBN designs have already been implemented. Proposals were also made concerning the entry and exit points initially proposed for the Montevideo and Buenos Aires TMAs.

Routes proposed for the Lima/Santiago flow, based on the entry and exit points implemented under the PAMPA and PROESA projects for the Lima and Santiago, Chile terminals

Location of holding points

2.4.11 A preliminary assessment was made of the location of holding points in the STARs serving the airports of the Baires TMA, starting in the Montevideo FIR. In this sense, it would be the first experience in which the aircraft flow would be regulated by a foreign ACC through STARs and the corresponding holding points. Accordingly, it would be important to agree on optimum levels, identifying decision and holding points, and establish the corresponding Letter of Operational Agreement, as soon as the PBN designs of the Baires and Carrasco TMAs are validated.

Calculation tool

2.4.12 The Meeting took note that typically, when calculating the distance flown, for purposes of comparing the current and the proposed situation, the calculation takes into account only the en-route distance. However, in order to make a calculation that is closer to reality, it is necessary to use, at least, the corresponding SID and STAR segments. When considering the proposals and the recommended paths submitted for analysis and assessment, the workshop agreed on the importance of having the appropriate resources and tools for obtaining data and information as realistic as possible. In this regard, the workshop received the effective contributions of users/operators, who shared their resources with the working groups

2.4.13 For example, COPA Airlines contributed with the analysis of proposals submitted for its consideration and other proposals analysed by the States, providing its support with the flight calculation and projection system for the paths being analysed. A comparison between current and proposed routes revealed the most direct paths, which are of vital importance to define flight efficiency based on route length, fuel savings, and CO_2 emissions.

User proposals

2.4.14 At the first workshop, COPA Airlines and KLM presented a number of improvements in order to optimize the ATS Route Network. After analysing the proposals, the Meeting found that some possess a significant degree of complexity, but some have a low degree of complexity that could be implemented in the short term. The proposals presented appear in Appendix A to this part of the report.

2.4.15 Considering the proposals made by COPA and KLM, the Meeting formulated the following conclusion:

Conclusion SAM/IG/15-1: **Assessment of COPA and KLM proposals**

Taking into account proposals made by COPA and KLM contained in Appendix A to this part of the report:

a) SAM States concerned shall assess the feasibility of implementing the proposals made by COPA;

b) Colombia shall assess the proposals made by KLM.

ATS Routes

2.4.16 The participation of a larger number of experts, mostly from SAM States, has favoured the conceptual proposal development phase, taking into account that each expert is well aware of the operational reality of his own State. However, the relatively large number of experts makes it difficult to collect and record the details needed for the implementation phase.

2.4.17 Once again, it was noted that the group responsible for developing Stage 2 of Version 03 of the SAM ATS Route Network encountered a scenario with missing information, especially regarding entry and exit points in the PBN design of the main SAM TMAs. In this regard, it should be recalled that the implementation of Version 03 of the Route Network depends on consistent and harmonised implementation of SAM TMAs, and that a delay in project implementation in one or more States could affect the other States and the Regional PBN implementation project as a whole.

2.4.18 The concept of trunk routes, using SIDs/STARs to link the main airports, was properly used initially, but more in-depth and detailed analysis is required to reach a level of maturity in order to move to the implementation phase.

2.4.19 Negotiations have started between States that have airports near the borders, thus requiring STARs and SIDs in the neighbouring FIR, given the proximity between the airport and the political border. Accordingly, the existing Letters of Operational Agreement need to be reviewed.

2.4.20 The participation of COPA Airlines and KLM, although not directly related to the main objective of the workshop, has contributed significantly to the activities of the event, mainly in terms of the use of more appropriate tools, and proposal of some relatively simple adjustments to the existing route network that could result in effective operational gains.

2.5 PBN in Terminal Areas

Results of PBN/3 Workshop

2.5.1 The Meeting took note that the Third Workshop on PBN Airspace Design in the SAM Region was held at the Regional Office on 9-13 March 2015, with the participation of experts from the aeronautical authorities, air navigation services providers, and civil aircraft operators of the South American Region. The summary of PBN/3 Workshop is available on the Web site of the Regional Office under the following link:
http://www.icao.int/SAM/Pages/ES/MeetingsDocumentation_ES.aspx?m=2015-PBN3.

2.5.2 The Meeting was informed that at the Third Workshop on PBN airspace design, the participants took note of some progress made in the PBN Project, although the required full validation had not been attained yet.

Positive Aspects of the PBN/3 Workshop:

2.5.3 In general, although some progress was noted in the implementation of the PBN Project in the States attending the event, as described below, the level of maturity that was expected for the validation stage was not attained.

2.5.4 The Meeting recognized that the participation of one or more leading operators in the various PBN implementing phases could significantly help advance the planning, design, and validation processes. This was observed more clearly in the projects submitted by Chile, Panama and Peru.

2.5.5 Other positive aspects are: the investment in personnel training, mainly in PANS-OPS, for example, the Basic PANS-OPS and PBN course conducted in Ecuador, the process underway for conducting PANS-OPS PBN and RNP AR courses in Argentina, as well as the strategy of Peru to send experts to courses at ENAC in France. Also noteworthy was the strategy of Guyana to send an expert for training in airspace planning at the Singapore Academy. The structuring of procedure design sectors, including the acquisition of procedure design software in Argentina and Peru, as well as the existing structure in Brazil, were also highlighted during the workshop.

2.5.6 The feasibility of the PBN implementation methodology proposed by PBN workshops, starting with the initial workshop held in Miami in March 2013, has already been confirmed by successful implementations in the Lima and Santiago TMAs under the PROESA and PAMPA Projects, respectively.

2.5.7 Note was taken of proper implementation by several States of risk analysis for safety validation of the proposed PBN designs.

2.5.8 It has also been noted that the use of *Flight Operations Quality Assurance* (FOQA) data is one of the best tools for design, and especially, for post-implementation assessment of a PBN airspace concept, because it offers real data on the benefits derived from implementation.

2.5.9 The evolution of the flexible use of airspace (FUA) concept was applied in Ecuador, with the use of SER-4 starting at FL180, which will permit the creation of a direct route between Guayaquil and Galapagos, applying CDO and CCO criteria, resulting in significant operational gains in terms of fuel savings and thus CO_2 emissions.

2.5.10 The delegations of Paraguay and Uruguay established preliminary contact for the exchange of experts, whereby Paraguay would send PANS-OPS experts to Uruguay to conduct a PANS-OPS course, while Uruguay would offer its ATC simulator and the corresponding experts to Paraguay to conduct a more in-depth assessment of PBN design at the Asunción TMA.

2.5.11 The Panama project showed significant progress in the design of Tocumen TMA, where the participation of its main operator contributed to collaborative decision-making. In the case of Guyana, which had not attended the previous PBN workshops, significant efforts were being made, and which should continue to be supported by the Administration for successful completion.

Improvement opportunities identified during PBN/3 Workshop:

2.5.12 The Meeting noted that the main objective of the PBN/3 Workshop was to analyse PBN design validation. However, the States submitted part of the data required for validation, but full validation had not been achieved, preventing progress to the next implementation phase.

2.5.13 In that regard, the workshop was of the opinion that the States must redouble their efforts to complete the validation phase as soon as possible, since this delay has a negative impact on the optimum development of Version 03 of the SAM Routes Network, except for such TMAs where PBN implementation is already consolidated (Lima, Santiago, and Rio de Janeiro).

2.5.14 The Meeting encouraged SAM States to improve the use of the Action Plan model so that it may be a true reflection of the activities to be performed, based on the resources available in each State.

2.5.15 States are requested to pay special attention to the setting of deadlines, so that they will take into account the results that may be obtained in each activity to be performed in each phase of the process.

2.5.16 It is important to note that, for example, in the case of TMA Lima -middle/high complexity airspace, the implementation process took 15 months. In most of the cases analysed, the time allotted seems too long.

2.5.17 The delegations of Brazil and Peru presented the restructuring of their PBN projects, involving some delays in the dates foreseen because of other priorities established by each State.

2.5.18 The Meeting took note that there were still some States where the lack of human resources in the PANS-OPS field prevented follow-up of the PBN implementation project. The most serious case is that of Uruguay, whose only PANS-OPS expert has retired.

2.5.19 The Meeting regretted the absence of some States at the workshop and the negative impact it had on regional optimisation programmes applied to South American airspace.

Operational complexity of airspace

2.5.20 The Meeting was informed that the workshop identified differences in some aspects that should be taken into account in the various air traffic scenarios that may be encountered in the Region.

2.5.21 The operational complexity of the scenarios to be analysed by airspace planners, with a view to identifying opportunities for design improvements and thus increase the efficiency or capacity, is not limited to high or low air traffic volume. A comprehensive analysis for the optimisation of these complex airspaces could take into account the need to optimise the flexible use of airspace (FUA), terrain or obstacle restrictions, the different types of aircraft, flight rules, local weather conditions, provided they are significant, or airspace classification, among other elements.

2.5.22 In scenarios of a lower operational complexity, it is possible to use more direct horizontal flight profiles, for instance, directly from the initial STAR segment to the IAF.

2.5.23 It is assumed that, in a scenario of low complexity, operations are already significantly efficient, especially in settings with ATS surveillance. Accordingly, the main challenge for the validation process, in terms of efficiency, is to ensure that fuel consumption and CO_2 emissions are reduced or, in the worst-case scenario, remain the same, generating benefits in other strategic objectives, like safety.

2.5.24 In this sense, it should be noted that airspace planners must stay focused on aircraft separation rather than on “path separation”, bearing in mind that a STAR and/or SID in a low-complexity setting must be as direct as possible and must not “prevent” other STARs and SIDs from being also as direct as possible. This assessment is essential during the validation phase.

2.5.25 There are scenarios that, due to their low operational complexity, permit the implementation of RNP AR APCH procedures to improve efficiency, taking into account that the natural spacing between successive approaches enables ATC to use the RNP AR APCH procedure, in combination with other procedures for aircraft not approved for RNP AR APCH.

2.5.26 For scenarios of higher operational complexity, the PBN/3 workshop deemed it advisable to make a more in-depth use of the airspace planning techniques foreseen in Doc 9992.

2.5.27 In these scenarios, the main challenge is to strike a balance between optimum horizontal and vertical profiles, through direct paths and optimum crossing windows, and ATCO workload.

PBN/4 Workshop

2.5.28 The Meeting was of the opinion that in order to continue with the established strategy, the States must complete the validation phase. It should be noted that the PBN/4 Workshop focuses on the following aspects of the implementation stage:

a) Go/no-go decision.

b) Pre-implementation review:
- ATC system update.
- Training programme.
- Approach, arrival and departure charts.

- Area and en-route charts.
- Contingency and back-up procedures.
- Letters of Operational Agreement.
- ATC unit procedures.
- User preparation.

2.5.29 Considering the impact that the results of the PBN/4 Workshop has in relation to the TMA Interface Workshop and the timing considered to fulfil the validation phase and preparatory activities for the implementation of PBN in the concerned airspaces, the Meeting deemed convenient changing the date of the PBN/4 Workshop for 7 to 11 September, 2015 and carry out the activities planned for the TMA Interface Workshop within the framework of the ATS/ RO/7 Meeting of 12 to 16 October, 2015.

2.5.30 Based on the above, and with a view to ensuring the success of the PBN/4 Workshop, the Meeting formulated the following conclusion:

Conclusion SAM/IG/15-2: **PBN Implementation in South American TMAs**

That, in order to continue the PBN Implementation process in selected TMAs, States shall comply with the following requirements:

a) Submit a consistent and feasible Action Plan to the SAM Office for its inclusion in, and harmonisation with, the SAM PBN Implementation Plan and in harmony with the updated PBN National Plan.

b) Complete the validation of the PBN design of the TMA (SMS, IFSET, ground validation of procedures).

c) Prepare an ATCO training programme.

d) Complete the aeronautical charts (IAC, SID, STAR, ARC, ERC).

e) Prepare the Letter of Operational Agreement model.

f) Complete the "operational model"/ Operating Manual.

g) Participate in Project follow-up teleconferences on:
- 27 May
- 18 June
- 17 July
- 03 August
- 19 August (subject to subsequent confirmation)

h) Deadline for delivery of the material developed under items a) thru f): **3 August 2015**.

i) Participation in the PBN/4 Workshop: tentative date 7 to 11 September, 2015

Note: PBN/4 Workshop is subject to timely submission of the material requested in the previous paragraph by sufficient number of States.

Assessment of the PBN/3 Workshop

2.5.31 The Meeting was informed that a survey was conducted to measure the degree of satisfaction of participants with respect to the PBN/3 Workshop. Survey details are given in **Appendix B** to this part of the report. In summary, the results revealed that 89% of participants rated the workshop as excellent, while 11% rated it as good.

SID & STAR implementation at International Airports

2.5.32 The Meeting recalled that the Bogota Declaration urges States to implement PBN SIDs and STARs at international aerodromes in order to attain the established goals, based on CDO and CCO techniques. Information collected to date on the status of implementation of PBN SIDs and STARs at international airports is shown in **Appendix C** to this part of the report, noting that:

a) Information highlighted in yellow indicates the goals of the Bogota Declaration and the participation of each State in the attainment of each goal. Information in red shows the status of the SAM Region, which is the main indicator to take into account, considering the Regional nature of the goal to be attained.

b) The information was provided by SAM States, except for Colombia, Guyana, French Guiana, and Suriname, whose information had not been received to date and was taken directly from the respective AIP.

c) RNAV SIDs and STARs lacking navigation specifications were considered as PBN SIDs and STARs.

d) Airports that had already undergone a complete PBN redesign were considered as airports in which CDOs and CCOs had been implemented, provided that they had considered, inter alia, training of controllers, the necessary changes in letters of agreement and operational procedures preventing aircraft from needlessly levelling during ascent or descent. SAM States should report what airports they consider have gone through the CDO and CCO implementation process.

e) Consideration was only given to airports with at least one threshold with IFR operations, according to Table FASID AOP-1, which is the official AGA information available at the South American Regional Office. The AGA Section of the SAM Regional Office provided the file used (file: FASID-TABLE AOP-1-SAM_ApprvMaster_Dec2014).

f) Only thresholds with IFR operations were taken into account, in accordance with Table FASID AOP-1.

g) It was noted that several States showed inconsistencies in their information concerning their international airports in FASID Table AOP-1, such as:

- Thresholds appearing as VFR in Table AOP-1 (Table AOP-1 code “NINST”) were declared as IFR by PBN coordinators. Furthermore, some of these VFR thresholds have IFR approach, departure and/or arrival procedures.
- The number of thresholds in Table AOP-1 is different from that provided by the State coordinators of the PBN Project, denoting that Table AOP-1 probably has not been updated in terms of magnetic declination.

- Airports or airport thresholds declared as international by PBN Project coordinators do not appear in Table AOP-1.
- Airports and some airport thresholds shown in Table AOP-1 are not declared as international by PBN Project Coordinators.

2.5.33 **Appendix D** to this part of the report contains detailed information by State, international airport, and IFR threshold, in accordance with the information shown in SAM FASID Table AOP-1.

2.5.34 Taking into account inconsistencies between information contained in SAM FASID Table AOP-1 and information provided by PBN Project Coordinators and/or contained in State aeronautical publications, it is essential for each State to carefully review the information contained in the aforementioned Table to properly assess compliance with the goals of the Bogota Declaration. Accordingly, the Meeting formulated the following conclusion:

Conclusion SAM/IG/15-3: Review of data contained in the SAM FASID Table AOP-1

That, in order to ensure proper assessment of compliance with the goals of the Bogota Declaration concerning the implementation of PBN SIDs/STARs/IACs at SAM international airports, SAM States conduct a complete review of SAM FASID Table AOP-1, attached hereto as **Appendix E,** with a view to identifying the following, among other relevant aspects:

a) Thresholds shown as VFR in Table AOP-1 (Table AOP-1 code “NINST”) and declared as IFR by PBN Project Coordinators. Furthermore, some of these VFR thresholds have IFR approach, departure and/or arrival procedures.

b) The number of thresholds shown in Table AOP-1 is different from that supplied by PBN Project Coordinators, denoting that probably Table AOP-1 has not been updated with regards to magnetic declination.

c) Airports or airport thresholds declared as international by PBN Project Coordinators that do not appear in Table AOP-1.

d) Airports and some airport thresholds shown in Table AOP-1 that are not declared as international by PBN Project Coordinators.

2.6 PBN approach procedures

2.6.1 The Meeting was of the opinion that it was important to note that another commitment of States with respect to PBN implementation is the attainment of the goals established in ICAO Assembly Resolution A37-11. In addition to approaches comprised in the redesign of TMAs selected by States, the SAM/IG/14 meeting acknowledged the need to make an effort to also meet the goals of the Bogota Declaration. Accordingly, the goals to be attained by States are: 70% of thresholds with APV approaches by 2014, and 100% by 2016. Information collected to date on the status of implementation of approach procedures at international airports and duly updated is also contained in Appendices C and D to this report.

2.7 Terms of Reference and Work Programme of the SAM/PBN/IG

2.7.1 The Meeting reviewed the terms of reference and work programme of the SAM PBN Implementation Group, whose revised contents are shown in **Appendix F** to this part of the report.

2.8 **PBN Points of Contact**

2.8.1 The updated list of focal points for PBN matters is contained in **Appendix G** hereto. The Meeting shall update the information on focal points as necessary to ensure effective participation in PBN teleconferences and the updating of the SAM PBN Project.

2.9 **National PBN Implementation Plans**

2.9.1 The Meeting recalled that taking into account the importance of harmonising national PBN implementation plans with the South American Airspace Optimisation Action Plan and the Bogota Declaration, the SAM/IG/14 meeting formulated Conclusion SAM/IG/14-5 (*National PBN Implementation Plans*), urging SAM States to submit their National PBN Implementation Plans at this Meeting, based on the model attached hereto as **Appendix H**.

2.9.2 Chile and the Republic of Argentina have presented their National PBN Implementation Plans. The Meeting congratulated the delegates of both countries and particularly Argentina, considering the plan presented accurately reflects the purpose of planning, mainly the main TMAs undergoing a complete redesign process and implementation tentative dates for departure, arrival and approach procedures. The Meeting considered that the Argentina PBN Plan be attached hereto as **Appendix I** to this part of the report.

2.10 **Project A1 (PBN Implementation)**

2.10.1 The Meeting took note that SAM/IG/14 meeting assessed the draft SAM PBN Project prepared by the Secretariat, and approved its basic structure and the part concerning en-route PBN implementation. The SAM/IG/14 meeting felt that the States should submit their national projects and/or action plans for PBN implementation in TMAs to complete the SAM PBN Project. It should be noted that, once completed and approved by the PBN Implementation Group, the aforementioned Project would replace the South American Airspace Optimisation Action Plan. Accordingly, States were expected to present the required information at this Meeting in order to complete the SAM PBN Project, pursuant to Conclusion SAM/IG/14-6 (*Projects and/or Action Plans for PBN redesign of the main South American TMAs*).

2.10.2 In this regard, the following States submitted their updates: Brazil and Panama.

Brazil

2.10.3 By virtue of post-implementation activities in the PBN TMA Project in Rio de Janeiro/ São Paulo, the merger of the Navegantes terminal by the Curitiba and Florianópolis Terminals, new air circulation at TMA Belo Horizonte, adjustments to the PBN Brasilia Project, preparations for the 2016 Olympic Games and other activities undertaken by the project team, it was decided that the implementation will be in 2017, in view of the priorities described above are required to improve air traffic during the Rio 2016 Olympic Games.

2.10.4 Schedule of major activities is provided below:

Implementation of route in the FIR and Operational PBN Implementation in the Terminal Control Area - Curitiba, Florianopolis, and Porto Alegre - 22/Jun/17	
Airspace Concept	30/Jul/16
Performance Measurement	26/Aug/16
Safety assessment	30/Sep/16

Process of collaborative decision making (CDM)	28/Oct/16
ATC automated systems	24/Feb/17
Policies and Procedures	31/Mar/17
Air Navigation Publication Procedures	26/Apr/17
Approval of aircraft and operators	28/Apr/17
Training	27/May/17
Post-implementation monitoring	22/Jun/18

Panama

2.10.5 Due to some drawbacks, Panama rescheduled its PBN implementation date in the Panama terminal area to January 2016. The amended schedule of activities is included below:

Amended schedule of activities	**START DATE**	**FINISH DATE**	**REMARKS**
Preliminary drafts submitted for validation	October 2014	March 2015	Panama did not participate the first PBN workshop; so it only joined PBN 2 and 3 Workshops in October 2014 and March 2015 respectively.
Operational design evaluation by the ATC simulator.	27 April 2015	23 May 2015	ATC validation. This phase of the program is subject to contingencies with ATC simulator. Hence, we have anticipated a contingency of 7 to 10 days, depending on the severity of the contingency.
CDM with users of the aviation industry.	28 May 2015	26 June 2015	Users validation In this period, some flights will be allowed to perform the procedure in order to gather information to issue comments and evaluate the design effectiveness based on the Bogota Declaration goals. (CCO / CDO, fuel savings, etc.)
ATC personnel training (simulation)	13 July 2015	19 September 2015	During this phase, all ATC staff will be trained in the new designs.
Publication date process	August 2015	November 2015	AIRAC Cycles
Go live date	November 2015 (if no contingencies)	January 2016 (deadline)	

2.11 PBN phraseology

2.11.1 The Meeting recalled the ICAO and FAA phraseology issue and formulated Conclusion SAM/IG/14-8 (*ICAO phraseology*).

2.11.2 Based on the aforementioned conclusion, the Meeting was informed that the Secretariat had sent an internal memorandum to the ICAO Air Navigation Bureau in Montreal, submitting the issue discussed at the SAM/IG/14 meeting. In this regard, the Bureau has responded as follows:

a) *A proposal for amendment to Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM, Doc 4444) is currently being developed by the Air Traffic Management Operations Panel (ATMOPSP) to specifically address the issue of the use of phraseology related to the application of restrictions on SID and STAR.*

b) *The proposal will be presented to the Air Navigation Commission (ANC) for preliminary review during its 199th Session, between 27 April and 26 June 2015.*

c) *In view of the objective of the amendment, consistent with the resolution of the issue in question, it appears that the issue was identified as a safety concern. The relevance of an amendment to Doc 7030 to address the specific concern should be evaluated in light of the proposed amendments to PANS-ATM related to SID/STAR when they are transmitted to States and international organizations for comments.*

2.11.3 Based on the responses sent by the Bureau of Navigation, the Meeting was of the opinion that the SAM States should assess the implementation of the phraseology in a PBN environment and implement, if necessary, appropriate mitigation measures, using as example the practices adopted by Brazil and Peru

2.12 Planning process of the new structure of PBN circulation in Brazil

2.12.1 The Meeting took note that during the process of planning the new structure of PBN circulation in Brazil, there were identified some waypoints used in RNAV SID or STAR, common to more than one aerodrome, which would be named according to the ICARD method, as established in the reference documentation

2.12.2 The Brazilian delegation reported that it had had some difficulties to name new waypoints, as well as to change existing names due to the large quantity of changes, taking into consideration that the identification must be unique and the impossibility of using waypoints which are close and have similar phonetics.

2.12.3 In view of the aforesaid, the Brazilian Administration performed studies to reduce the use of ICARD identification (5LNC), with the purpose of reducing the impact resulting from the large quantity of alterations.

2.12.4 During the studies, the Brazilian Administration suggested not to use the ICARD identification to name waypoints used in RNAV SIDs and STARs procedures, common to more than one terminal control area or used in procedures common to more than one aerodrome which are not used in en-route flights. When the situation previously described occurs, the criteria applied would be the use of five- alphanumeric "*Name-Codes*". The five alphanumeric "*Name-Codes*" must include not more than three numbers with alphabetic characters chosen from the Terminal designator.

2.12.5 In discussing the proposal of the Brazilian delegation, the Meeting was of the opinion that the Secretariat should enquire the ICAO Headquarters regarding possible policy and operational implications relating to the adoption of alphanumeric "name-code" in the cases described in the preceding paragraphs.

2.12.6 The users present at the Meeting indicated that there would be no signs of problems with the databases of the aircraft if the Brazilian proposal were adopted. However, it would be advisable to deepen the analysis in order to confirm that there would be no difficulties with the databases.

2.12.7 The Meeting was also of the opinion that Brazil, if necessary, could implement the proposal, pending the outcome of the aforementioned consultation, provided that Brazil publishes on its AIP the convention and applicable rules, and any differences with the Annexes and PANS, ensuring that there would be no impact on the aircraft databases.

2.13 **Results of ionosphere impact evaluation on GBAS operation in Brazil**

2.13.1 Upon analysing the results of the validation of the impact of the ionosphere on GBAS operations in Brazil, the SAM PBN Implementation Group concluded that the uncertainty and possible delay in the implementation of GBAS in the SAM Region could further drive the PBN implementation, mainly RNP AR procedures and maintain ILS operations.

2.14 **FPL coding of new navigation specifications**

2.14.1 A State presented to the Meeting a proposal for FPL codification of the new navigation specifications contained in the latest revision of ICAO Document 9613, Fourth Edition, May 2013.

2.14.2 In this regard, the Secretariat informed the Meeting that if new codes were to be included to be used in the FPL, it would be necessary to change the FDPS system; otherwise, flight plans would be rejected thus affecting flight safety. It was suggested that for these cases, as outlined in the PANS ATM, the information be recorded in the NAV/ descriptor, since this field allows free text and would solve the situation in the short term at no cost to operators or ANSPs. It was also reported that this matter is being considered by ICAO and the PBNSG Working Group for worldwide application.

APPENDIX A

FIRST WORKSHOP ON THE INTERFACE BETWEEN TMAs AND VERSION 03 OF THE SOUTH AMERICAN ATS ROUTE NETWORK

FINAL REPORT

INTERNATIONAL CIVIL AVIATION ORGANIZATION

South American Regional Office

Regional Project RLA/06/901

FIRST WORKSHOP ON THE INTERFACE BETWEEN TMAs AND VERSION 03 OF THE SOUTH AMERICAN ATS ROUTE NETWORK

FINAL REPORT

Lima, Peru, 16 to 20 March 2015

1. INTRODUCTION

1.1. The First Workshop on the Interface between TMAs and Version 03 of the South American Route Network was held on 16-20 March 2015 at the ICAO South American Regional Office.

1.2. The objectives of the workshop were:

Main: Develop Stage 2 of Version 03 of the SAM Route Network, based on the validated PBN design of airspaces selected by SAM States.

Other objectives: Fine-tune the routes of Stage 1 of Version 03 of the SAM Route Network; propose the implementation of other routes.

1.3. The workshop worked in two groups, which analysed the main flows through which States handle international traffic in the Region. Group 1 basically analysed the "Atlantic" Region, while Group 2 mainly analysed the "Pacific" Region.

Composition of Group 1:

NAME	STATE	POSITION/FUNCTION
Sandra Naumovitch	Argentina	Expert
Alexander Bastos	Brazil	Expert/Coordinator
Marcelo Lobo	Brazil	Expert/XLSX templates
Luis Rojas	Bolivia	Expert
César Varela	Bolivia	Expert
Robin Dacak	Paraguay	Expert/PPT presentation
Tomás Yentzch	Paraguay	Expert/Rapporteur
Adriana San-German	Uruguay	Expert
Miguel Miraballes	Uruguay	Expert
José Tristão	Advisor	Expert

Composition of Group 2:

NAME	STATE	POSITION/FUNCTION
Tomas Macedo	Peru	Expert
Luis Perales	Peru	Expert
Christian Ramos	Ecuador	Expert
Marcelo Valencia	Ecuador	Expert
Arturo Griffiths	Bolivia	Expert
Ana T. Montenegro	Panama	Expert
Héctor Ibarra	Chile	Expert/Rapporteur
Marco Abarca	Chile	Expert

ICAO OFFICERS		
Julio Pereira	ICAO	ATM/SAR Officer
Roberto Arca	ICAO	ATM/SAR/AIM Officer

2. **PART I**

2.1. The information contained in this part of the report corresponds to the main objective, and involved the analysis of some proposals concerning Stage 2 of Version 03 of the SAM ATS Route Network, based on the validated or proposed PBN design for en-route and terminal airspaces of the States.

2.2. In this regard, an analysis was made of representative flows between the CAR and SAM Regions that were of interest to the States and some airlines, which submitted proposals based on efficient paths in terms of fuel savings and CO_2 emissions.

2.3. The suggested improvement options are numbered from 01 onwards, identifying the affected FIRs and describing the suggested proposals, as well as the tasks or actions to be performed for the conduction of the relevant study.

Suggested proposal – 01

RNAV ROUTE PORTO ALEGRE/LIMA

- NOTE: It is important to consider the need to apply the Flexible Use of Airspace concept together with RNAV, CCO, and CDO, applying them in airspace restructuring. Within this context, the proposed RNAV route Porto Alegre/Lima will go from the POR VOR to the ARSUN position in the crossing of airways UM664 and UM548 in the La Paz FIR, and from there on, the existing UM548 is used.
- This same airway will serve the city of Asuncion with two STARs positioned for the Lima/Porto Alegre flow and *vice versa.*
- This path design will avoid penetration of segregated airspaces in the Santiago and Asunción FIRs.

<table>
<tr><th>FIR</th><th>PROPOSAL</th><th>PATH</th><th>AWY</th><th>ACTIVITIES</th></tr>
<tr><td rowspan="4">Curitiba,
Resistencia,
Asuncion,

La Paz,
Lima</td><td rowspan="2">RNAV route Porto Alegre/Lima

Proposal “A”</td><td>Current segment

SBPA/ SBFI/ SGAS/ SPIM

1802,4 NM</td><td>UL216/ UM548</td><td rowspan="2">• Proposal by the State (NE)
• Route data
• Statistical data
• Analysis of the proposal
• CNS analysis
• Savings
• SMS analysis
• LOAs
• Publications
• CTA training
• …</td></tr>
<tr><td>Proposed segment

SBPA/ SGAS/ SPIM

1756.2 NM

Up to the ASIA VOR

46.2 NM saved</td><td>U…./UM548</td></tr>
<tr><td rowspan="2">New RNAV route Porto Alegre/

Lima

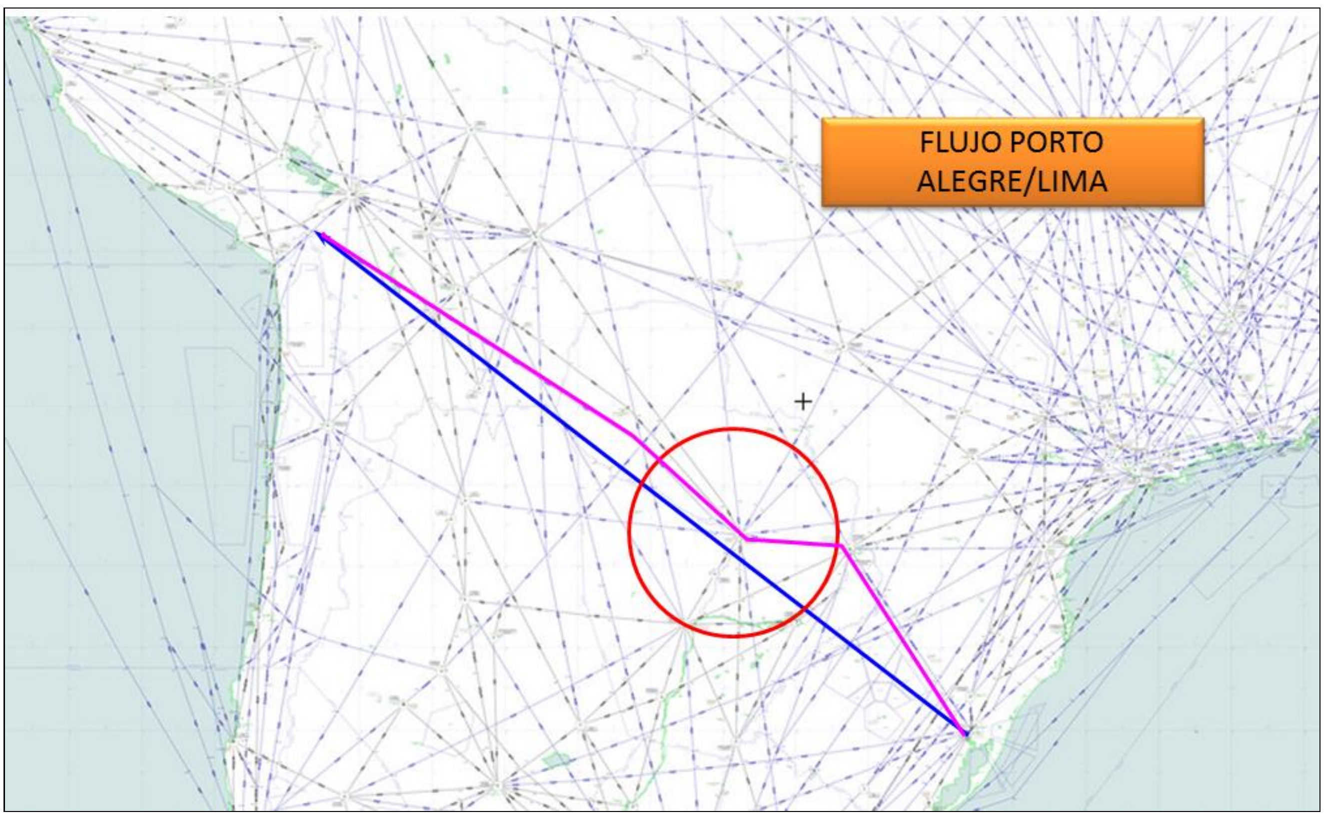
Proposal “B”</td><td>Current segment

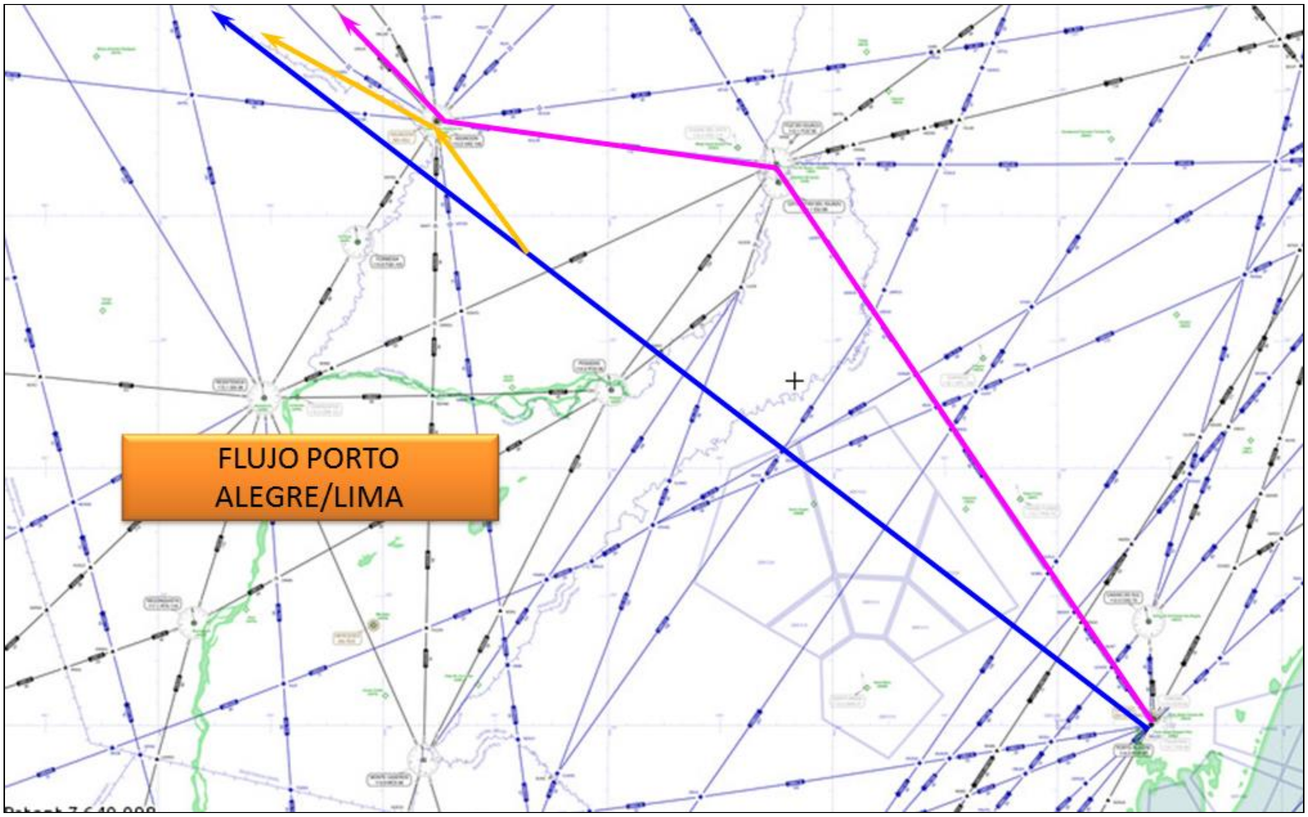
SBPA/ SBFI/ SGAS/ SPIM

1802.4 NM</td><td>UL216/ UR563/ UM548</td><td rowspan="2">• Proposal by the State (NE)
• Route data
• Statistical data
• Analysis of the proposal
• Analysis of restricted airspace
• CNS analysis</td></tr>
<tr><td>Proposed segment

SBPA/SPIM</td><td>U….</td></tr>
</table>

		1750.5 NM Up to ASIA VOR Via ARSUN 52.3 NM saved	This path had been previously proposed, but no implementation decision had been made. In light of progress with implementation in the region, and with a view to obtaining the biggest and best advantages for users, a new study on proposals A and B is recommended.	• Savings • SMS analysis • LOAs • Publications • CTA training • …




FLUJO PORTO
ALEGRE/LIMA

<table>
<tr><td colspan="5">Suggested proposal – 02

 IMPLEMENT SIDs/STARs </td></tr>
<tr><td colspan="5">

These paths will connect arrival and departure routes in the western sector of the Asuncion TMA.
The Letter of Operational Agreement with Resistencia must be reviewed to facilitate coordination and transfer of control and responsibility of flights that use these routes.
Routes UL793 and UM799, which are used by the north/south flow with Asuncion as alternate in case Buenos Aires is closed, can also be added.
This principle may be applied for channelling flows from the La Paz FIR to the Buenos Aires terminal.

</td></tr>
<tr><th>FIR</th><th>PROPOSAL</th><th>PATH</th><th>AWY</th><th>ACTIVITIES</th></tr>
<tr><td>Asuncion/
Resistencia</td><td>SID/STAR</td><td>SGAS/ UM789

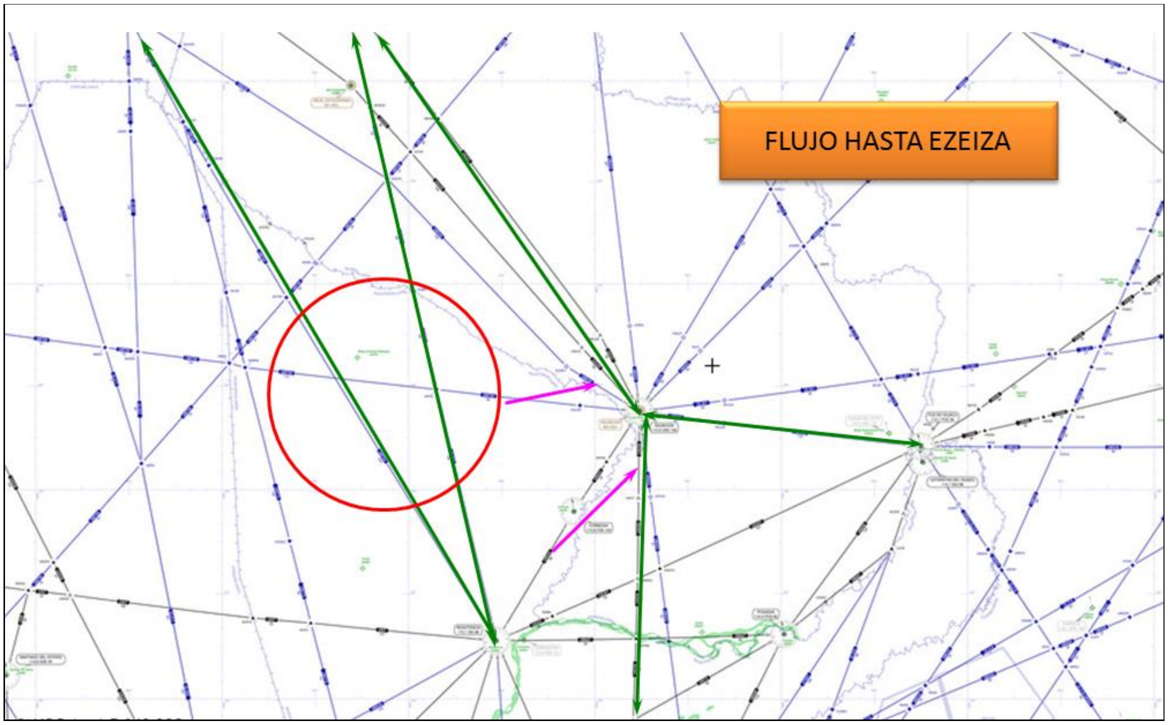
SGAS/UR554

UL793

UM799</td><td>SIDs and STARs</td><td>

Proposal by the State (NE)
Data on SIDs and STARs
Analysis of the proposal
Savings
SMS analysis
LOAs
Publications
…

</td></tr>
</table>



Suggested proposal – 03

IMPLEMENT SIDs/STARs

- These actions will improve the efficiency and safety of operations to the three existing controlled aerodromes in the terminal area and to the other visual aerodromes serving general aviation and military aircraft.
- It will also permit a more efficient use of airspace and PBN improvements contemplated for the sector, optimizing arrival and departure paths.
- It should be noted that instrument arrival paths to runway 23 of Guaraní and runway 14 of Foz are overlapping; this can be easily solved with a STAR/SID properly designed to serve both runways.
- Consider the possibility of incorporating position COSTA of A311 into UM548, requested by BR.

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Resistencia, Curitiba, Asuncion	Implementation of SID/STAR at the FOZ TMA	Departures and arrivals at the airports of Foz, Guarani, Yguazu	SID/STAR SARP, SBFI, SGES	• The Administration of Brazil will start arrangements for a meeting between the representatives of Argentina, Brazil, and Paraguay to analyse and review the proposed SIDs and STARs to be implemented. • The States must submit proposals, statistical data on IFR and VFR flights and projections. • Submit proposal of amendment to the existing LOA.

Suggested proposal – 04

ENTRY AND EXIT POINTS AT THE EZEIZA AND CARRASCO TERMINALS

- Optimization is advancing gradually, analysing PAPIX/ KUKEN paths that impact Uruguayan airspace. This requires consensus concerning optimum levels, and identification of decision and holding points.

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Ezeiza, Montevideo	Define entry and exit points at the Ezeiza and Carrasco terminals	Models of the Tango Project of Argentina	Baires TMA SID / STAR	• Incorporate the SIDs/STARs of the Tango Project of Argentina into the airspace structure. • Submit the relevant proposal to the affected State. • Review and update LOA. • Make the relevant publications. • Training of the staff involved. • …

SID: LANDA-BIVAM-ATOVO-EZ913-ASADA-GBE- EZ965- DORVO-

STAR: PAGON-SAN ANTONIO-TORUL-VALOS-GENERAL BELGRANO-TENIL-ESLAN-PAPIX-KUKEN-

<table>
<tr><td colspan="5">Suggested proposal – 05

HOLDING POINTS AT THE MONTEVIDEO FIR</td></tr>
<tr><td colspan="5">Holding points need to be defined at the Montevideo FIR, which will serve the STARs of the airports in the Baires terminal.
A consensus should be reached regarding optimum levels, identifying decision and holding points.</td></tr>
<tr><th>FIR</th><th>PROPOSAL</th><th>PATH</th><th>AWY</th><th>ACTIVITIES</th></tr>
<tr><td>Ezeiza, Montevideo</td><td>Establish holding points at the Montevideo FIR, for the Ezeiza STARs.</td><td>Models of the Tango Project</td><td>Baires TMA STAR</td><td>Incorporate the STARs of the Tango Project of Argentina into the airspace structure.
Submit the relevant proposal to the affected State.
Review and update LOA.
Make the relevant publications.
Training of the staff involved.
…</td></tr>
</table>

Suggested proposal – 06

CALCULATION TOOL

- When assessing the proposals and recommended paths, it is important to have the appropriate resources and tools to obtain data as close as possible to reality. In this sense, the effective contribution of users/operators who have shared their resources with the working groups should be highlighted.
- COPA has contributed with the analysis of the proposals submitted to its consideration, and has provided the system for calculating and projecting flights in the paths concerned. The results provide information on the most direct paths, comparing the existing and the planned route, which is of vital importance for determining flight efficiency based on route length, fuel savings and CO_2 emissions.

Suggested proposal - 07

NEW RNAV ROUTE

- Brazil proposes the creation of a new RNAV route network connecting the Curitiba, Montevideo, and Ezeiza FIRs.

Note 1: This principle can be used for channelling flows among the Curitiba, Buenos Aires, and Montevideo FIRs.

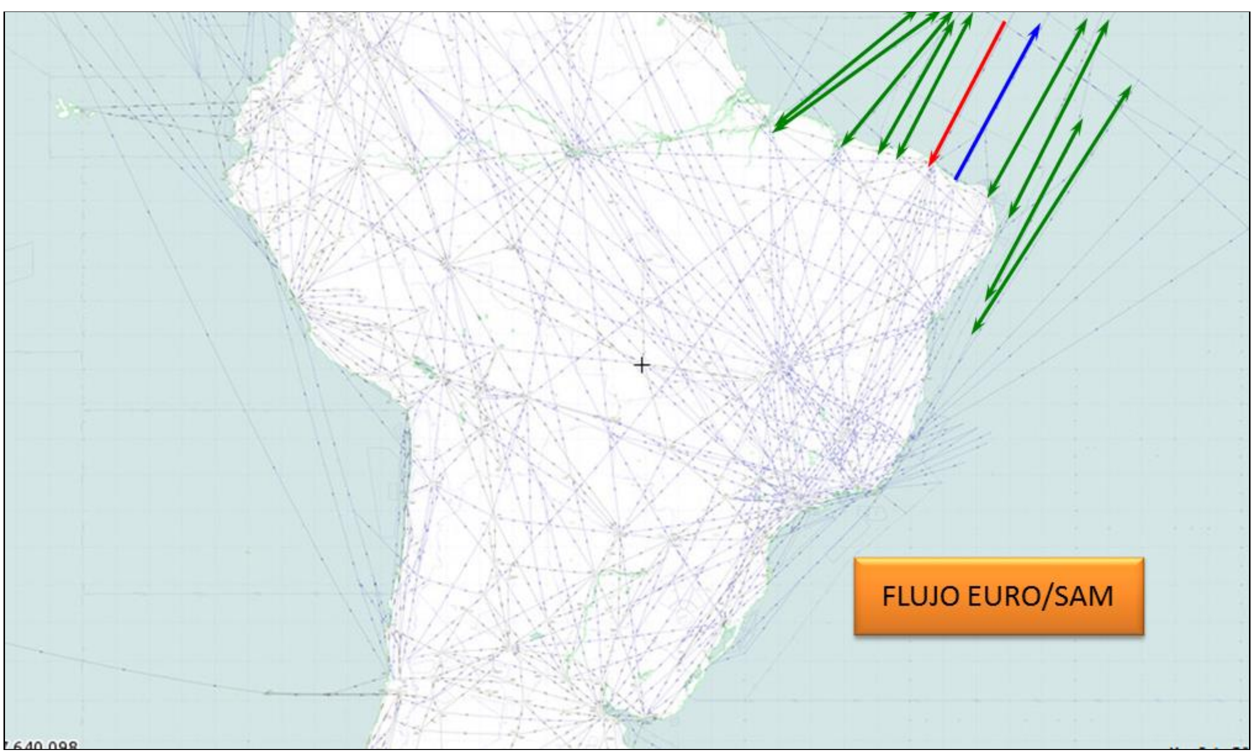
Note 2: The request seeks to enhance safety.

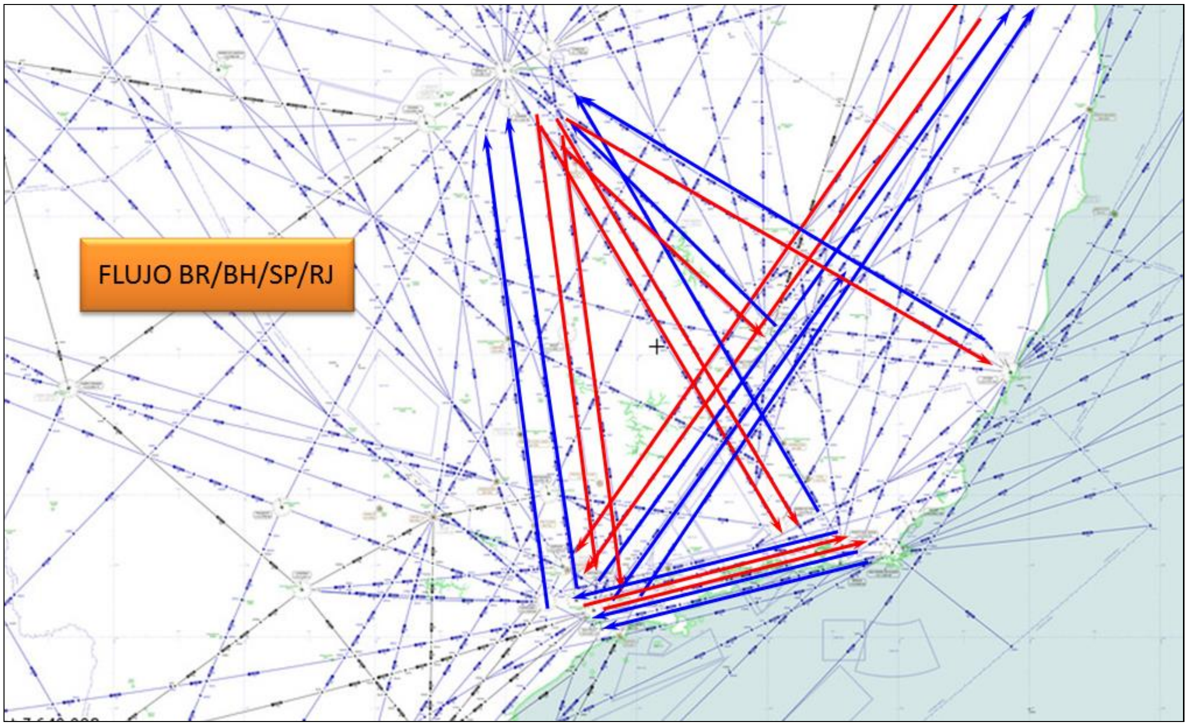
Note 3: The creation of the new route network involves applying the concept of parallel routes, maintaining the existing flows in routes UZ30, UZ21, UZ23, UZ14 and UZ36, up to the boundary between the Montevideo and the Ezeiza FIRs.

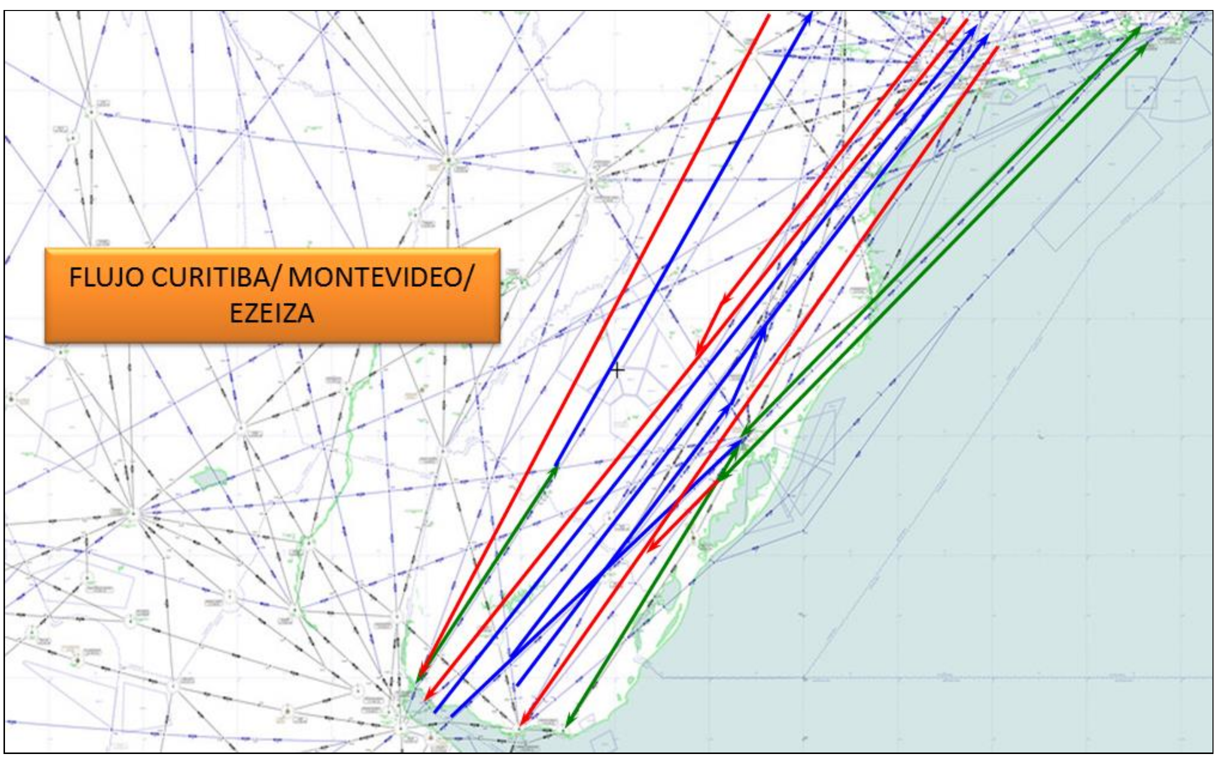
Nota 4: Define the flow between Rio de Janeiro and the Montevideo and Buenos Aires airports.

FIR	PROPOSAL	PATH	DIRECTION OF THE AWY	ACTIVITIES
Curitiba, Montevideo, Ezeiza.	Realign UM661	VOR ADA/ S2350.06W4327.23/S 3012.17W5053.53/S32 21.36W5337.40	Aldeia/S3012.17W505 3.53 (two-way); S3012.17W5053.53/S 3221.36W5337.40 (one-way)	
	Extend route UM424	VOR LDS/S3012.17W5053.53	VOR LDS/S3012.17W5053.53 (two-way)	Eliminate UA305 from LDS to POR; the route will be extended from EZE to LDS, in accordance with Proposal Nº4 of the master table.
	Change the direction of route UN857	MELO/POR	MELO/POR (one-way)	
	Realign route UM540	VOR SCP/OPROR/SCC	VOR SCP/OPROR/SCC (one-way)	Eliminate UM548 from RONUT to ANISE; UW21 from FLN to SAT; UZ36 from ANISE to SCP; UW47 from CTB to RDE

	Realign route UM788	VUKAS/NADAR/S27 25.13W4953.60	VUKAS/NADAR/S27 25.13W4953.60 (one-way)	
	Realign route UM792	ANDAN/S2725.13W4 953.60/BCO	ANDAN/S2725.13W4 953.60/BCO (one-way)	Eliminate UW24 from CGO to CTB
	New RNAV route	S3434.57W5750.50/S 3328.07W5624.69/UT GER	S3434.57W5750.50/S 3328.07W5624.69/UT GER (one-way)	
	New RNAV route	ILMUR/NOBEL/PAPI X	ILMUR/NOBEL/PAPI X (one-way)	
	Realign route UM654	SIDUL/UMGOR/MSS	SIDUL/UMGOR/MSS (one-way)	
	Realign route UN741	PUREU/LIVAD/MAL BA/SIDUL/GAMOT/ KUKEN	PUREU/SIDUL (one-way); SIDUL/KUKEN (two-way)	Obs: Proposal Nº86 and Nº87 of the master table
Curitiba	Realign/extend route UZ30	ITBAG/KEBOG/PER NA/NOBEL	ITBAG/KEBOG/PER NA/NOBEL (one-way)	




FLUJO BR/BH/SP/RJ


FLUJO CURITIBA/ MONTEVIDEO/
EZEIZA

2.4. **Results of the analysis by Group 2**

Suggested proposal

<table>
<tr><td colspan="5">Proposal 01

MIAMI /SANTIAGO DE CHILE NORTH-SOUTH FLOW</td></tr>
<tr><td colspan="5">• Within this context, the proposed parallel RNAV routes in the Santiago de Chile/Miami flow are analysed taking into account the entry and exit points at the SCEL and SPIM TMAs; and URSUS and TADPO at the MIA FIR.
• This trunk route will serve the flows of the following cities: Santiago de Chile, Lima, Guayaquil, Quito, and Panama.
• The new unidirectional parallel routes between Santiago de Chile and Lima will permit compliance with the strategic objective related to safety.</td></tr>
<tr><th>FIR</th><th>PROPOSAL</th><th>PATH</th><th>AWY</th><th>ACTIVITIES</th></tr>
<tr><td rowspan="2">Santiago, Antofagasta, Lima, Guayaquil, Bogota, Panama</td><td rowspan="2">Santiago/ Miami flow</td><td>Existing segment

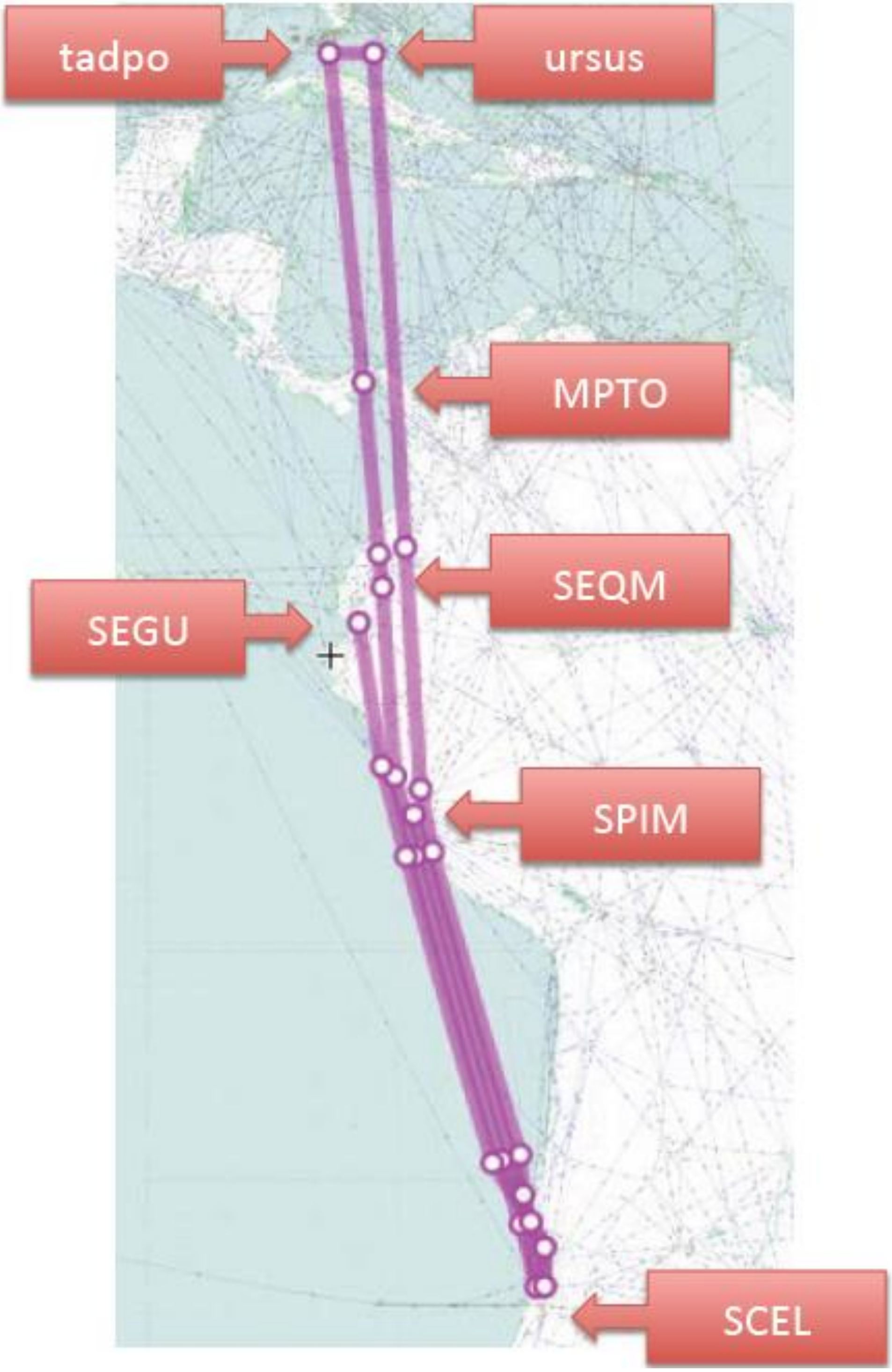
SCEL/ SPIM/ SEGU/ SKBO/MPZL</td><td>UL780/ UL302</td><td rowspan="2">• Proposal by States.
• Data on the route
• Statistical data
• Analysis of the proposal
• CNS analysis
• Savings
• SMS analysis</td></tr>
<tr><td>Proposed segment

Create route parallel to unidirectional UL780.

Create route parallel to UL302 extending to serve the MIA flow.</td><td>UL780 realigned from MOXES to the north.

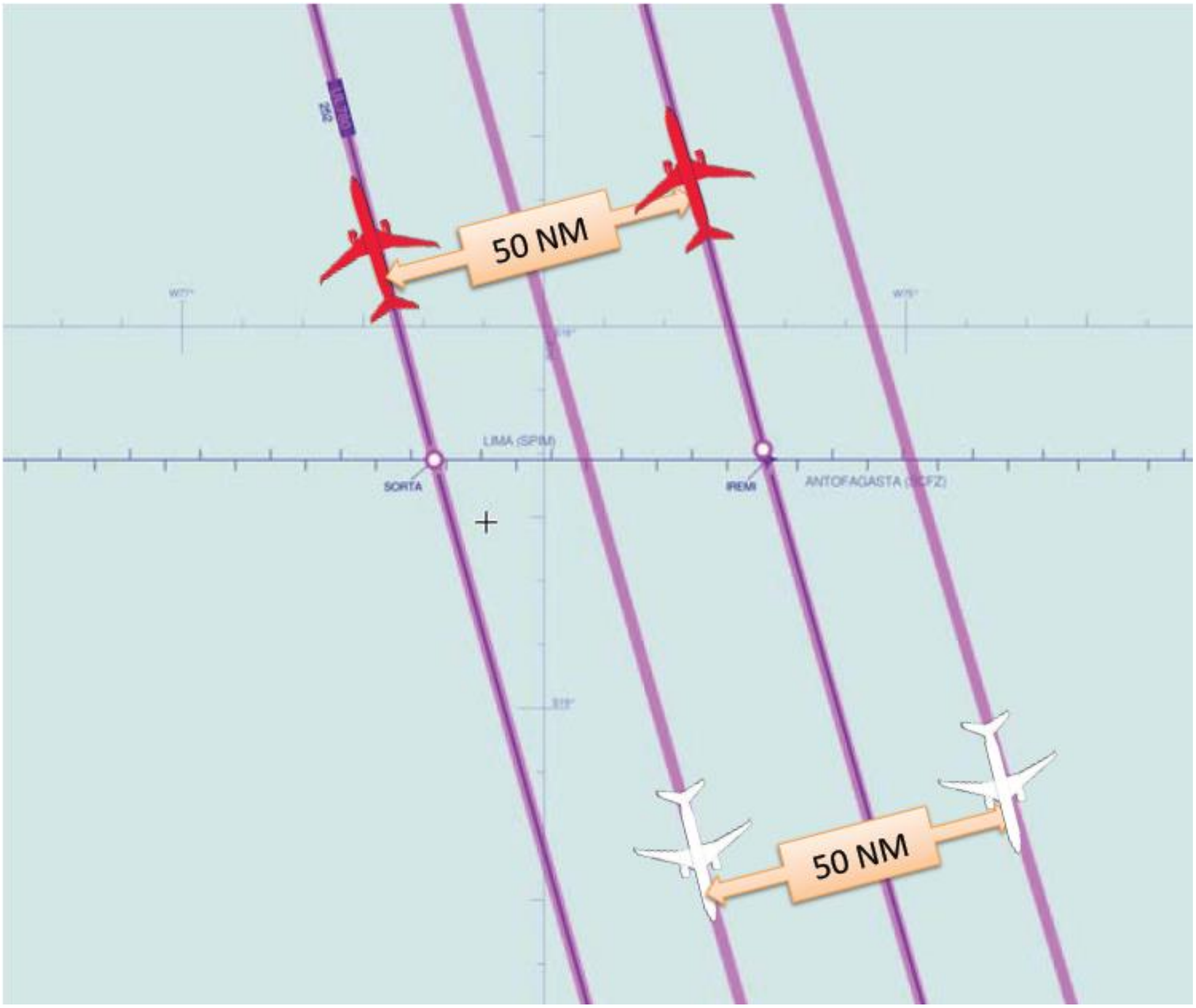
U…new route parallel to UL780.

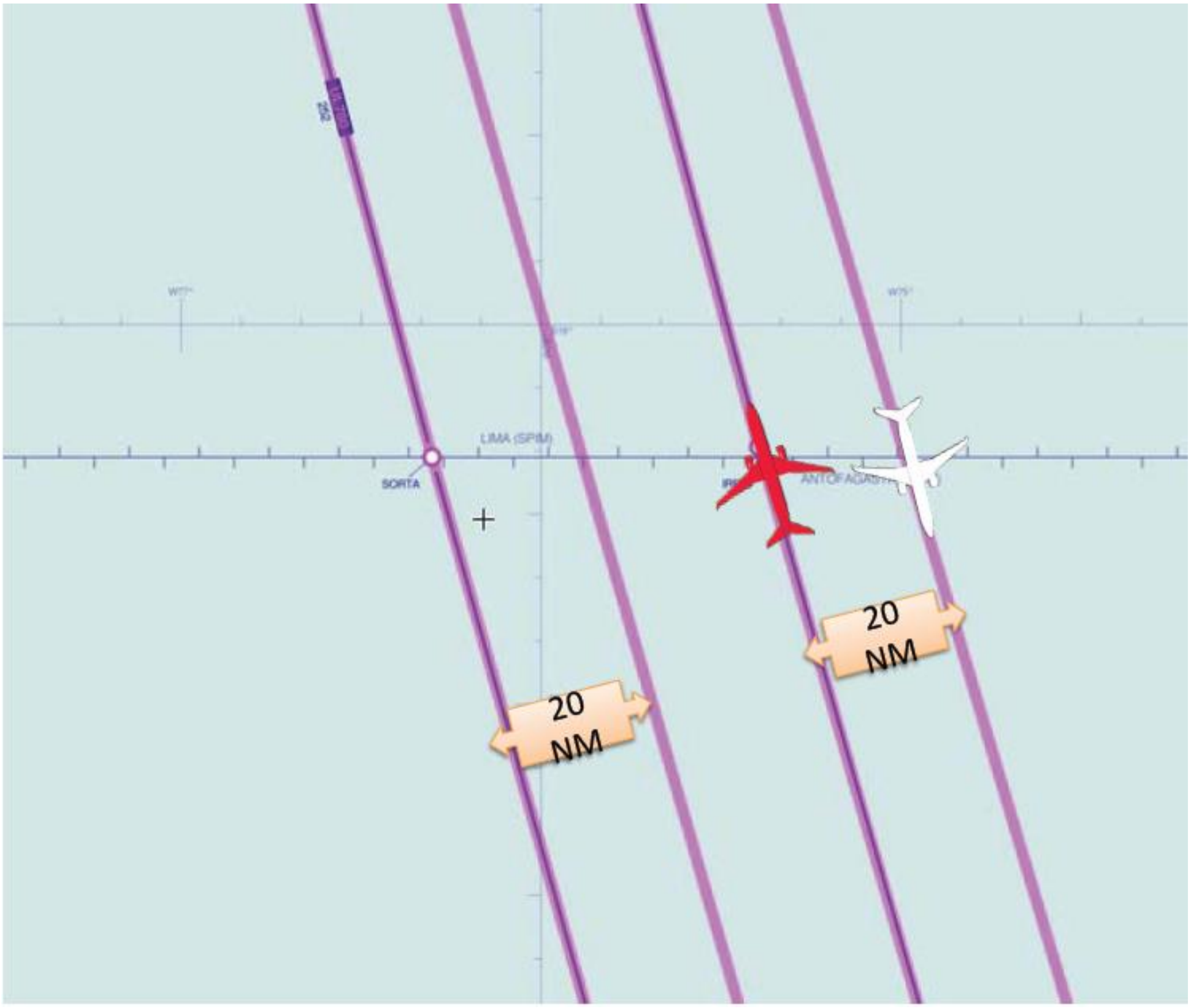
New route parallel to UL302 extending to URSUS.</td></tr>
</table>

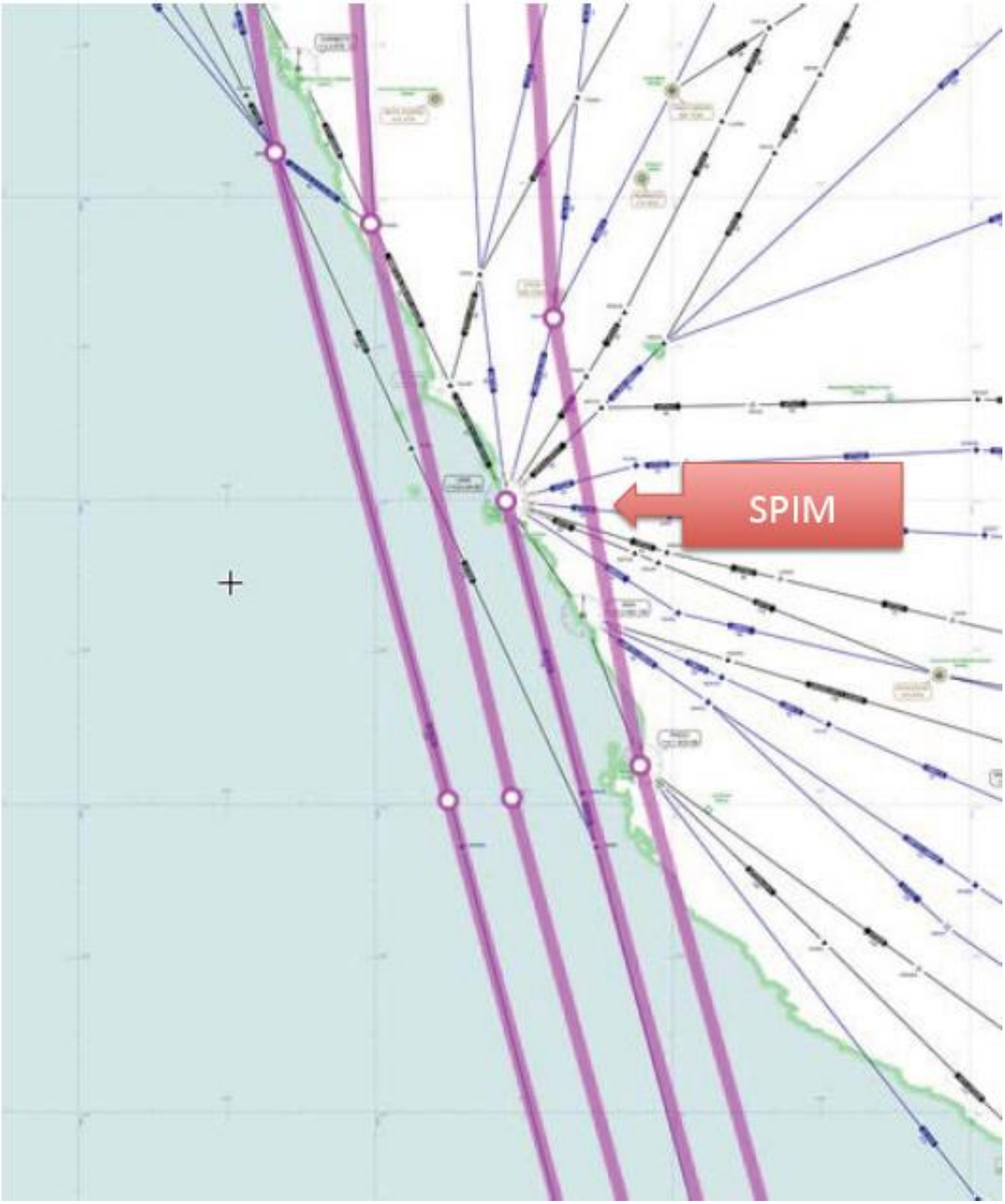

tadpo
ursus
MPTO
SEQM
SEGU
SPIM
SCEL


SPIM
SCEL

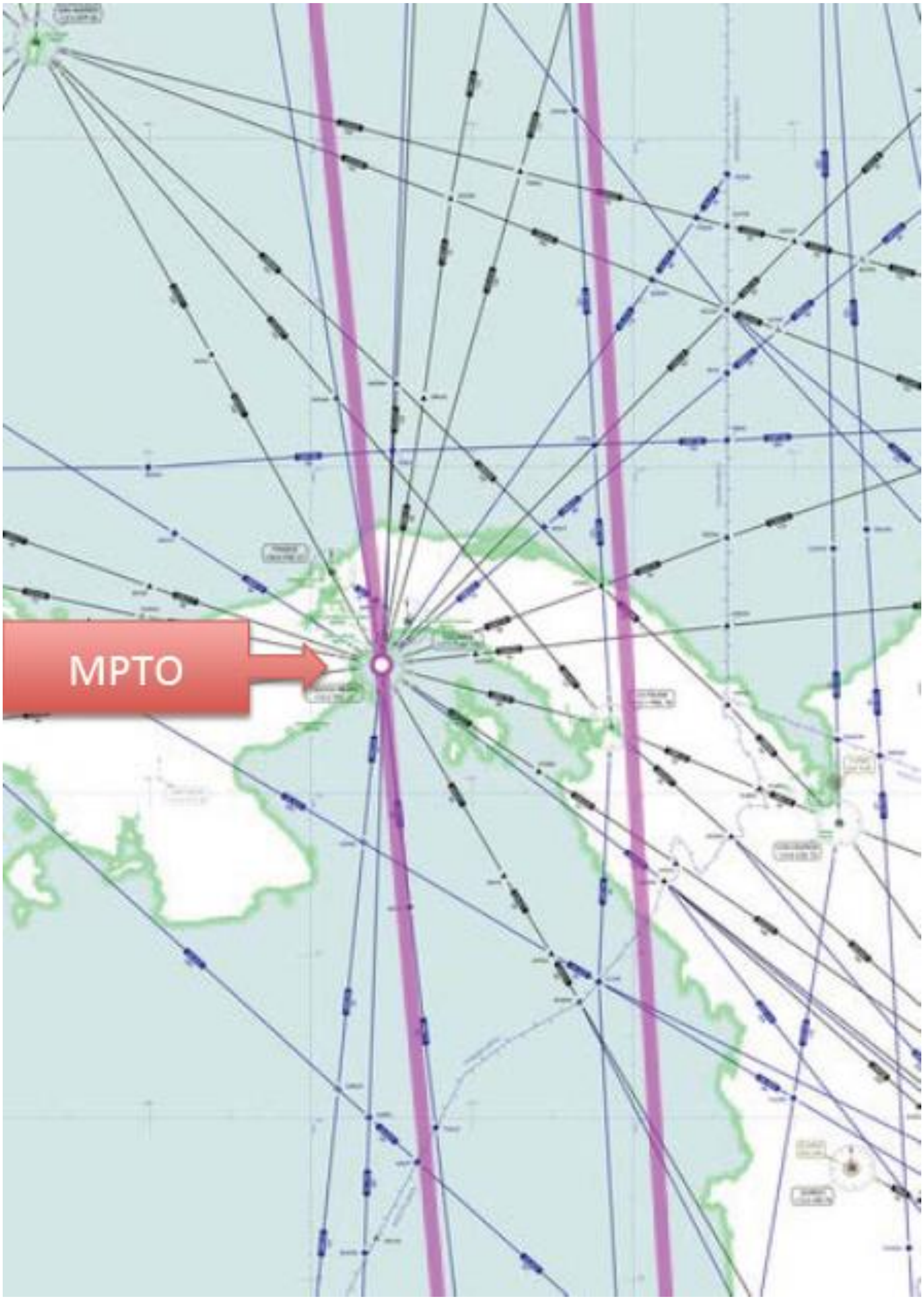

179° 95nm
SCEL


50 NM
LIMA (SPIM)
SORTA
IREMI
ANTOFAGASTA (SCFZ)
50 NM


SORTA
LIMA (SPIM)
ANTOFAGASTA
20 NM
20 NM


SPIM


SEQM
SEGU


MPTO

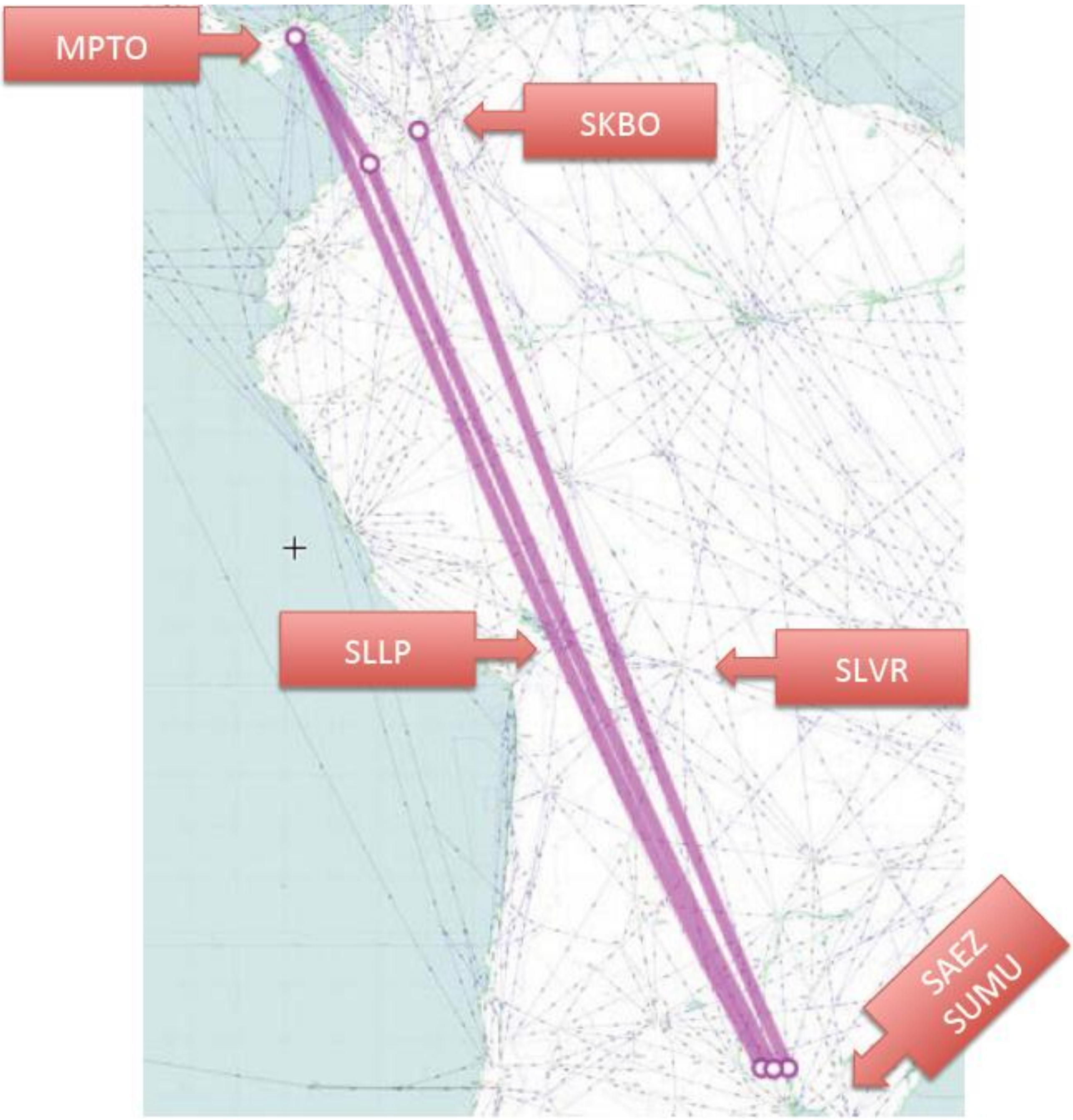

tadpo
ursus

Proposal 02

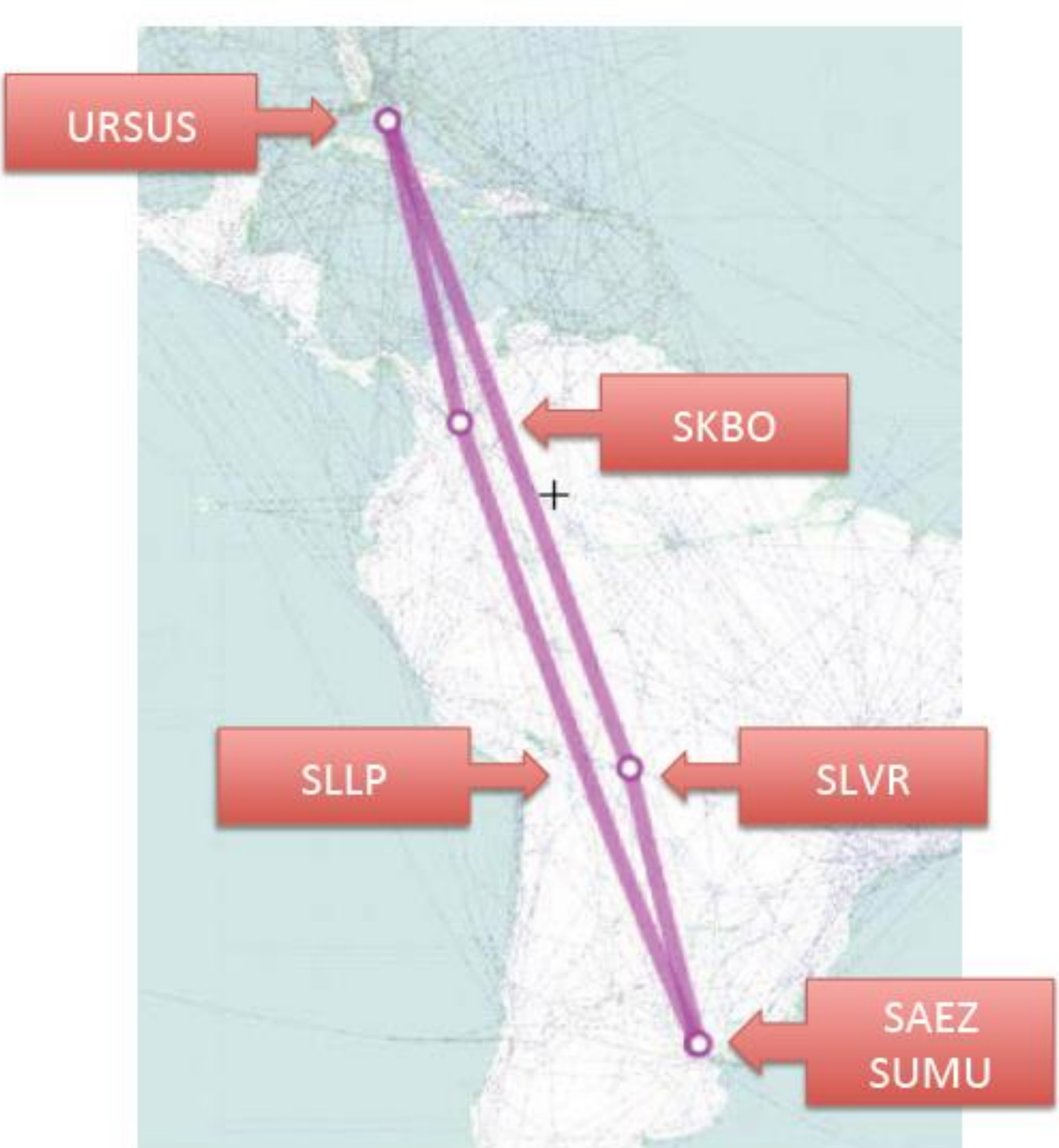
PANAMA /BUENOS AIRES NORTH-SOUTH FLOW

- RNAV route in the Panama /Buenos Aires - Montevideo flow.
- This trunk route will serve the flows of the cities of: Panama, Cali, Iquitos, La Paz, Buenos Aires, and Montevideo.
- Possibility of establishing a parallel RNAV5 route

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Panama, Bogota, Lima, Guayaquil, Amazonica, La Paz, Cordoba, Ezeiza.	Panama/ Buenos Aires, Montevideo flow	Bidirectional route from Panama terminal to Baires terminal.	UA321/ UR559/ UA558/ UW8	• Proposal by the States. • Data on the route • Statistical data • Analysis of the proposal • CNS analysis • Savings • SMS analysis


MPTO
SKBO
SLLP
SLVR
SAEZ
SUMU

<table>
<tr><td colspan="5">Proposal 03
MIAMI /BUENOS AIRES NORTH-SOUTH FLOW</td></tr>
<tr><td colspan="5">• RNAV route in the Miami/ Bogotá /Buenos Aires flow.
• RNAV route in the Miami/ Viru Viru flow.
• These trunk routes will serve the flows in the cities of: Miami, Bogotá, Santa Cruz de la Sierra, and Buenos Aires.</td></tr>
<tr><th>FIR</th><th>PROPOSAL</th><th>PATH</th><th>AWY</th><th>ACTIVITIES</th></tr>
<tr><td>Miami, Bogota, Ezeiza.</td><td>Miami /Bogota/ Buenos Aires flow</td><td>Bidirectional route from URSUS - Bogota to Baires terminal.</td><td>UA321/ UR559/ UA558/ UW8</td><td>• Proposal by the States.
• Data on the route
• Statistical data
• Analysis of the proposal
• CNS analysis
• Savings
• SMS analysis</td></tr>
</table>


URSUS
SKBO
SLLP
SLVR
SAEZ
SUMU

Proposal 04

LIMA / SAO PAULO WEST-EAST FLOW

- RNAV route in the Lima /Sao Paulo flow.
- This trunk route will serve the flows in the cities of: Lima, La Paz, Viru Viru, and Sao Paulo.

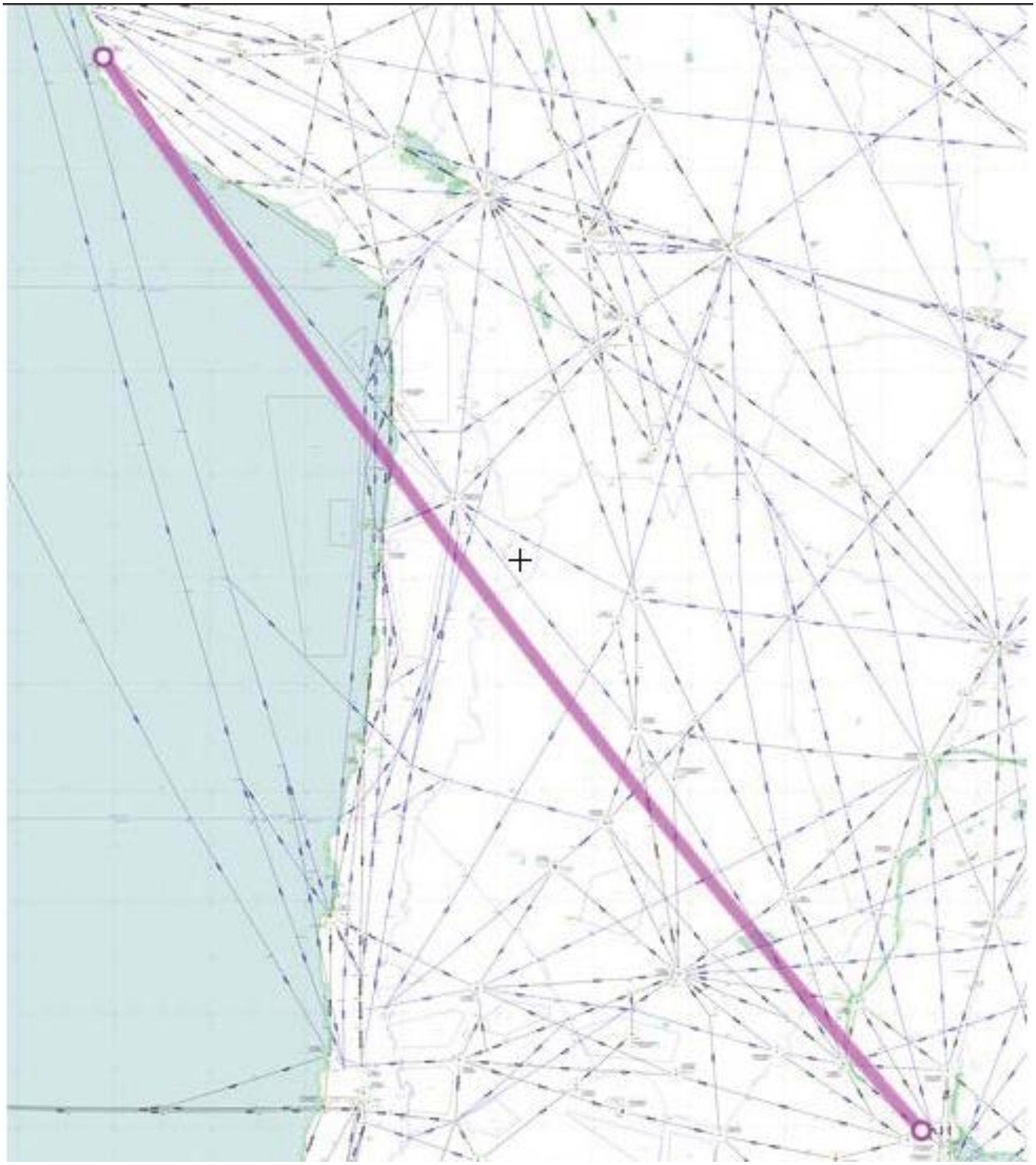
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Lima, La Paz, Curitiba.	Lima /La Paz, Viru Viru and Sao Paulo flow.	Bidirectional route from Lima terminal to Sao Paulo terminal.	UM415	• Proposal by the States. • Data on the route • Statistical data • Analysis of the proposal • CNS analysis • Savings • SMS analysis

Proposal 05

LIMA / BUENOS AIRES WEST-EAST FLOW

- RNAV route in the Lima / Buenos Aires flow.
- This trunk route will serve the flows in the cities of: Lima and Buenos Aires.

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Lima, Antofagasta, Cordoba and Ezeiza.	Lima/Buenos Aires flow	Bidirectional route from Lima terminal to Baires terminal	UL550	• Proposal by the States. • Data on the route • Statistical data • Analysis of the proposal • CNS analysis • Savings • SMS analysis



3. **PART II**

3.1. Other objectives established for the workshop include fine-tuning the routes of Stage 1 of Version 03 of the SAM Route Network and receiving proposals from users or providers in the Region for the implementation of other routes, as needed, for analysis by the group.

3.2. **Suggested proposals**

Suggested proposal – 01

NEW RNAV ROUTE

Note 1: Corresponds to proposal Nº 34 of the master table.

Note 2: The request seeks to enhance safety in the traffic between the Montevideo and Ezeiza FIRs.

- Uruguay proposes the creation of a new RNAV route in the segment CRR/DUR/LOA/UL550 to PISCO.
- The UB555 is eliminated in all its length (CRR/PAR).
- All the benefits of the PBN operational concept are obtained in the direct RNAV navigation segments; according to the comparison between the current flight plan and the new proposed route using the IFSET tool, fuel savings amount to 1.10% (10 tonnes of fuel). CO_2 amounts to -31.600, accounting for 88 operations per month.
- The difference in distance between the existing and the proposed paths was calculated using the tool of Copa Airlines, resulting in 18 NM of distance saved.

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Montevideo, Ezeiza, Resistencia, Cordoba, Antofagasta, Lima	New RNAV route	Carrasco/Durazno/ Calama/ UL550/ Asia/Pisco	Eliminate UB555, in all its length	Define LOA responsibilities, design and publications

Suggested proposal – 02

ELIMINATION OF ROUTE UA556

- Corresponds to proposal Nº 24 in the master table.
- The request seeks to enhance safety in the traffic between the Montevideo and Resistencia FIRs.
- Uruguay proposes that traffic joins the existing RNAV UM402 through SEKLO to CRR.
- UA556 is eliminated from MCS to CRR.
- All the benefits of the PBN operational concept are obtained in the direct RNAV navigation segments.
- Consumptions and savings are being analysed.

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Montevideo, Ezeiza, Resistencia Asuncion	Elimination of route	Monte Caseros/ Carrasco	Eliminate UA556, from MCS to Carrasco.	Define LOA responsibilities, design and publications

Suggested proposal – 03

ELIMINATION OF ROUTE UA305 AND EXTENSION OF UM424

- Eliminate route UA305 in the EZE/CRR/LDS/POR segment
- Extend UM424 in the EZE/CRR/LDS/POR segment. This segment will be unidirectional EZE/LDS/POR.
- Corresponds to proposal Nº 4 in the master table
- This proposal is consistent with the modifications foreseen by Brazil.

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Ezeiza, Montevideo, Curitiba	Eliminate route UA305 and extend UM424	Santiago de Chile/ Argentina/Uruguay	Eliminate route UA305 Extend UM424	Submit proposal to update LOA SMS Publish

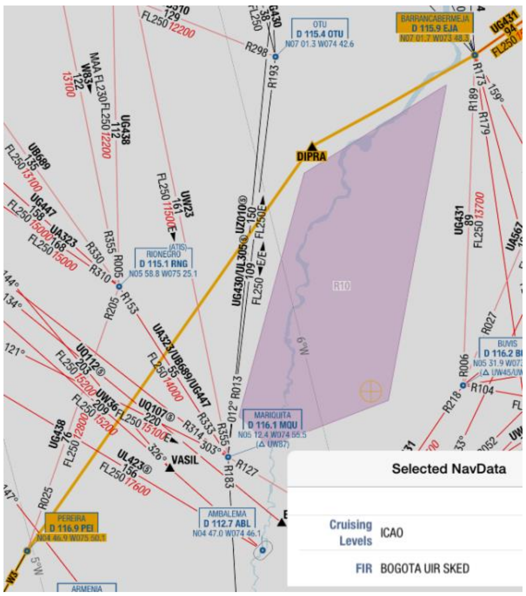
3.3. **KLM proposals**

3.3.1. SHORT-TERM ROUTE OPTIMIZATION INITIATIVES

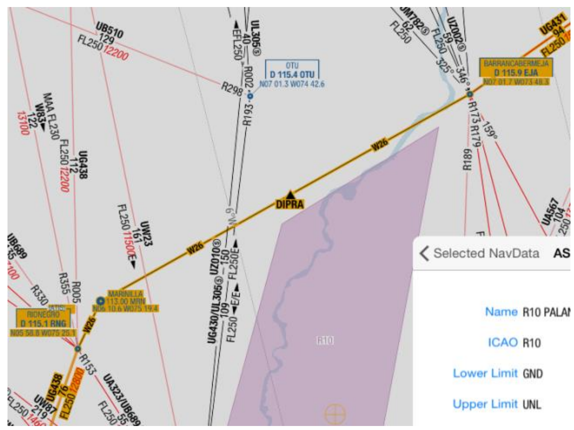
KLM Royal Dutch Airlines requested the Civil Aviation Authority of Colombia to consider the implementation of the following route optimization initiatives in the short term (by order of preference):

3.3.1.1. New upper airway north of restricted area R10 Palanquero:

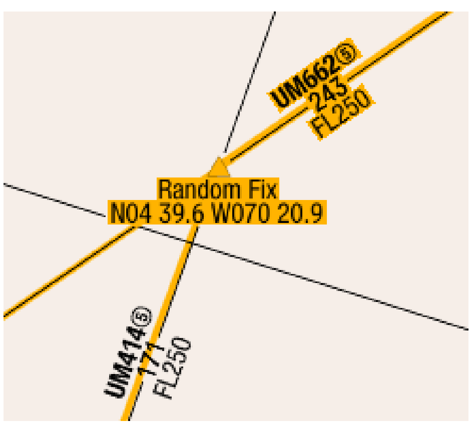
a) New upper route: PEI-DIPRA-EJA (preferred).
b) Or, alternatively, an upper route over lower airway W26 between RNG and EJA (routing: RNG-MRN-DIPRA-EJA).



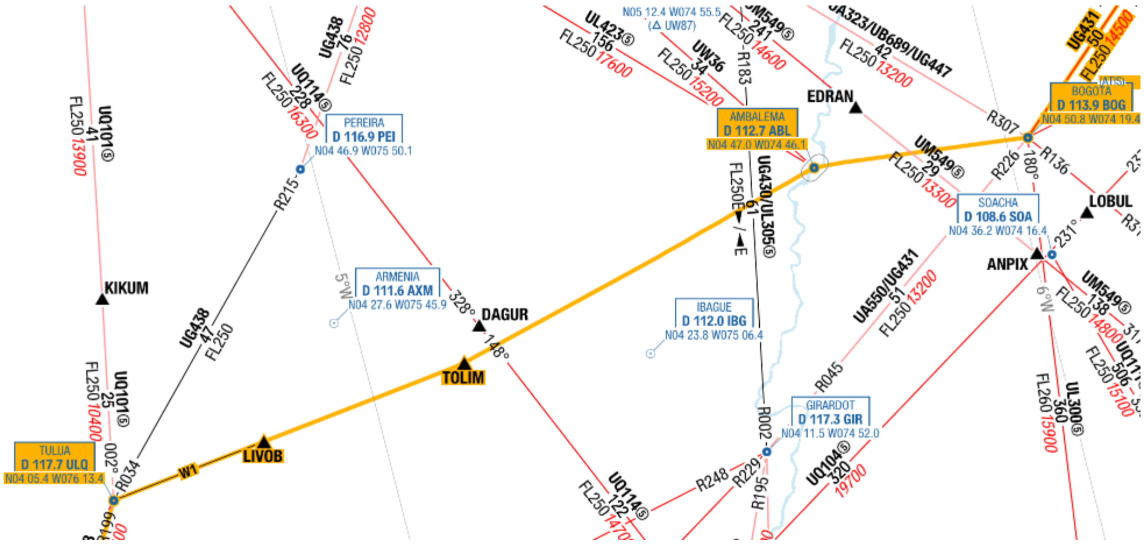
or



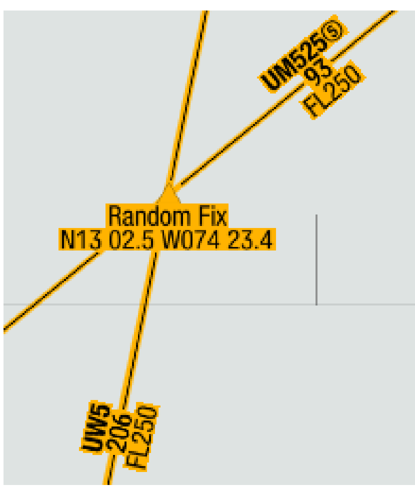
3.3.1.2. Establishment of a new reporting point at the intersection of airways UM414-UM662, to allow a transfer between these airways.



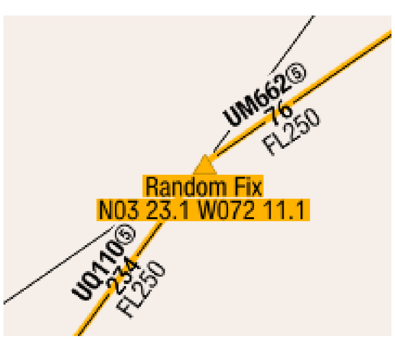
3.3.1.3. New upper airway over lower airway W1 between ULQ-ABL, and W17 between ABL-BOG (routing: ULQ-LIVOB-TOLIM-ABL-BOG).



3.3.1.4. Establishment of a new reporting point at the intersection of airways UW5 and UM525, to allow a transfer between these airways.



3.3.1.5. Establishment of a new reporting point at the intersection of airways UQ110-UM662 to allow a transfer between these airways.



3.3.2. In addition to short-term proposals, the workshop assessed KLM proposals, with the following results:

PROPOSAL KLM 1A				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Bogota and Barranquilla	Direct RNAV route (conditioned upon crossing SKR10)	PEI – EJA in the upper level		Refer request to Colombian authorities

PROPOSAL KLM 1B				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Bogota and Barranquilla	New RNAV route In order to avoid SKR10 on the north	PEI – DIPRA - EJA in the upper level		Refer request to Colombian authorities

PROPOSAL KLM 1C				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Bogota and Barranquilla	Create RNAV route in the upper level over existing lower route. In order to avoid SKR10 on the north		W26 between RNG - EJA	Refer request to Colombian authorities

PROPOSAL KLM 1D				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Bogota and Barranquilla	Create RNAV routes in the upper level over existing lower routes. In order to avoid SKR10 on the south		W1 – W17 between ULQ and BOG.	Refer request to Colombian authorities

PROPOSAL KLM 2				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Bogota and Barranquilla	Create direct RNAV route to optimize exit from Cali.	Direct segment between RNG and BAQ VORs		Refer request to Colombian authorities

PROPOSAL KLM 3				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Guayaquil, Bogota and Barranquilla	Establish WPT at the intersection of UW5 and UM525 routes		UW5 – UM525	Feasible in the short term. Submit request to Colombian authorities

PROPOSAL KLM 4				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Bogota and Barranquilla	Direct RNAV route from Ecuador to northern Colombia	TCO – OROSA and establish a WPT at the intersection with UM525.	UR564 – UG438 – CTG – UA574.	Refer request to Colombian authorities

	Create RNAV route between GYV and RHC.	At VULKY – OSIGO –TCO – WPT (INT UQ101) – BUTAL – WPT (INT UG444) - RHC		Assessed by AD HOC Group 2. Ecuador deemed it feasible in the medium term.

PROPOSAL KLM 5				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Bogota and Barranquilla	Create routes to enter/exit the BAQ UIR close to the Guajira peninsula.	VOR/DME RHC – RNG –TCO.		Refer request to Colombian authorities

PROPOSAL KLM 6				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Bogota	Establish WPT at the intersection of routes UM414 and UM662		UM414 – UM662	Feasible in the short term Submit request to the Colombian authority

PROPOSAL KLM 7				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Bogota	Establish new route from ILMUX - AMAYA and establish WPT at the intersection of routes UQ110 and UM662 and of routes UM414 and UM662		UM414 – UM662 UQ110 – UM662	Feasible in the short term Submit request to the Colombian authority Peru considers that the new route could go from IQT to AMAYA.

PROPOSAL KLM 8				
FIR	**PROPOSAL**	**PATH**	**AWY**	
Guayaquil	Establish WPT at the intersection of routes UW21 and UM662		UW21 – UM662	Ecuador considers it feasible in the short term

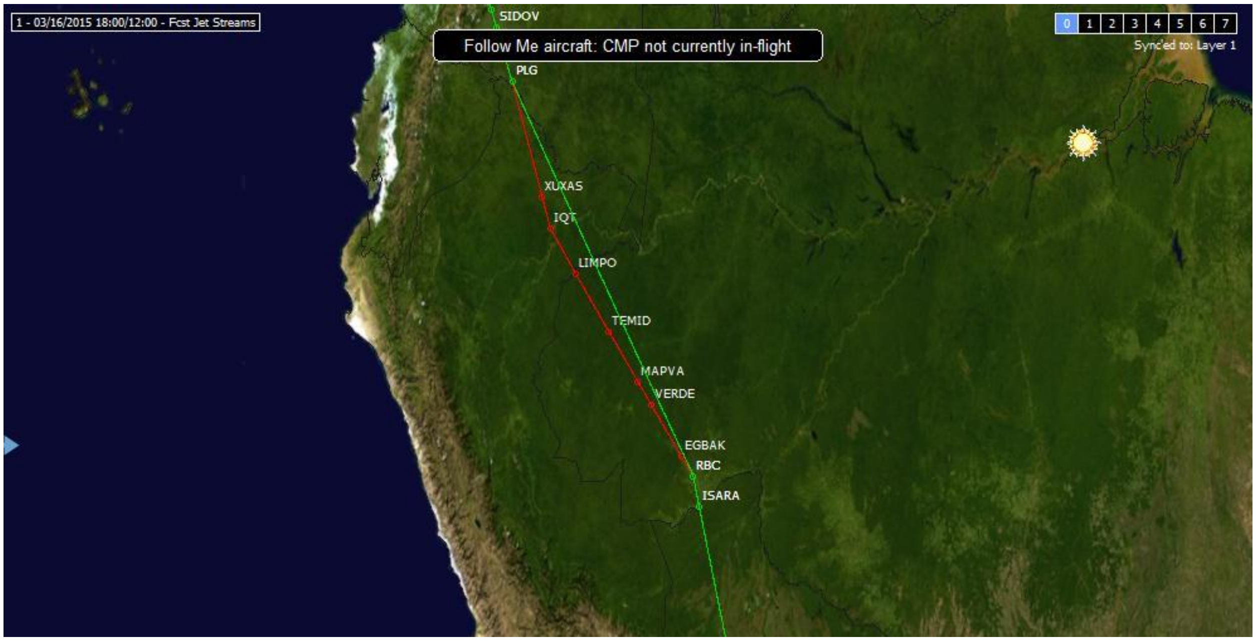
3.4. **Proposals by COPA**

EXISTING AND PROPOSED ROUTES - COPA AIRLINES
• COPA has proposed and discussed segments between Panama and the different cities of the Region, with the representatives of each State concerned. • Some of the analysed proposals are being applied through paths that can be optimized using the adjusted existing route network. COPA Airlines will make the corresponding arrangements for regular use of the recommended paths. • Likewise, it has been noted that other paths will achieve their optimum profile by only adjusting some short segments identified in specific FIRs, thus permitting the implementation of RNAV routes by adjusting paths and optimizing the route. • It should also be noted that the adjustments made or to be made in Stage 2 of Version 03 will significantly favour major destinations in Argentina, Paraguay and Uruguay.

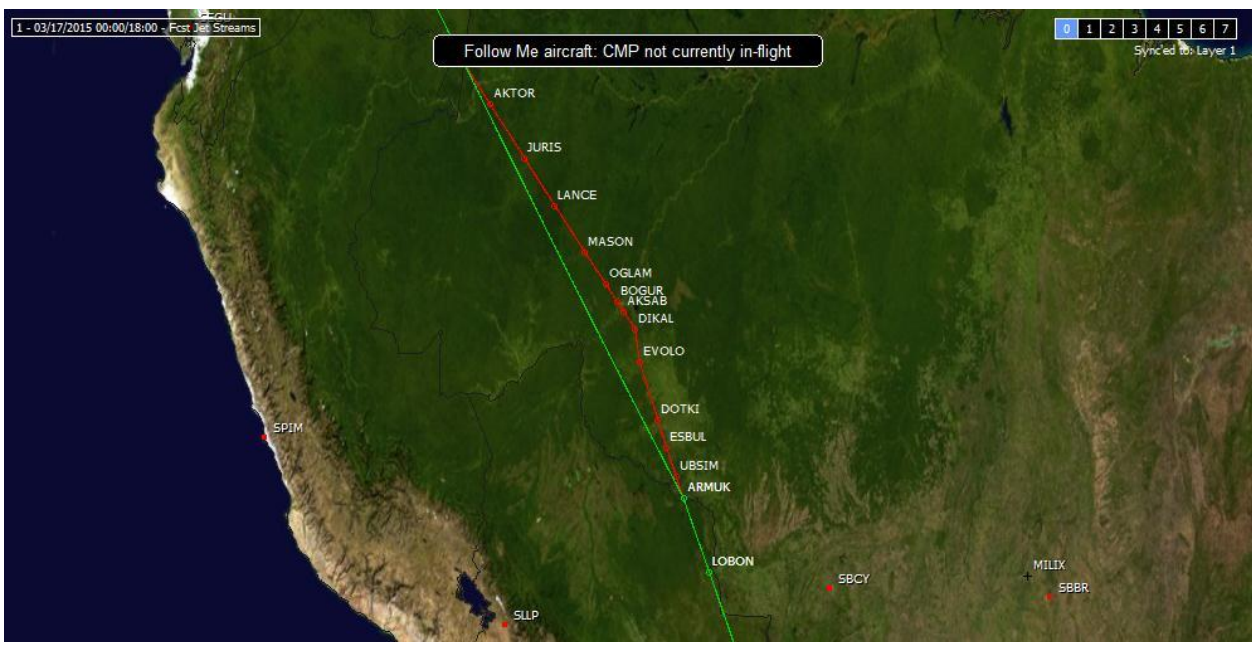
EXISTING AND PROPOSED ROUTES - COPA AIRLINES:		
ORG-DST	**ROUTE (EXISTING/PROPOSED)**	**NM (EXISTING/ PROP)**
MPTO-SAEZ	MPTO OREPI1B IRATA BUSMO UA321 RCO UL417 ERE UA558 MULTA UW24 SNT SNT6A SAEZ	2825
	MPTO OREPI1B IRATA BUSMO UA321 PLG RBC UL417 ERE UA558 MULTA UW24 SNT SNT6A SAEZ	2817
MPTO-SBGL	MPTO OREPI1A DAKMO UM549 MTU UM782 ABIDE UM549 OGTIT UZ40 BSI UZ6 ISOPI UZ35 LUVSU UZ24 OGMUK VAKUB1A SBGL	2906
	MPTO OREPI1A DAKMO UM549 MTU UM782 ABIDE UM549 OGTIT POVOX OGMUK VAKUB1A SBGL	2867
MPTO-SBPA	MPTO OREPI1B DAKMO UQ114 ASAPA UL655 DIKAL UL793 EVOLO UL216 FOZ UL216 EAGLE EAGLE1 SBPA	2737
	MPTO OREPI1B DAKMO UQ114 ASAPA ARMUK UL216 FOZ UL216 EAGLE EAGLE1 SBPA	2724

EXISTING AND PROPOSED ROUTES - COPA AIRLINES:		
ORG-DST	**ROUTE (EXISTING/PROPOSED)**	**NM (EXISTING/ PROP)**
MPTO-SBRF	MPTO OREPI1A DAKMO UW87 MQU UA323 MNS UZ11 ILNOT ILNOTA SBRF	2907
	MPTO OREPI1A DAKMO UW87 MQU UA323 SGC ILNOT REC SBRF	2904
MPTO-SCEL	MPTO OREPI1A OREPI BUXOS UL780 SULNA UT315 TOY UL302 ISGUD UQ815 SIMOK SIMOK1A SCEL	2612
	MPTO OREPI1A OREPI BUXOS UL780 VAKUD ISGUD UQ815 SIMOK SIMOK1A SCEL	2603
MPTO-SGAS	MPTO OREPI1B IRATA UA321 LIMPO UM784 PALIV UA320 UKELA SGAS	2448
	MPTO OREPI1B IRATA UA321 LIMPO UM784 KILEV MCL UA320 UKELA SGAS	2434
MPTO-SUMU	MPTO OREPI1A OREPI IRATA UA321 BUSMO UQ106 PLG UA321 LIMPO UM784 PALIV UA320 MOROS UL793 SIS UW7 MCS UA556 MONSA MONSA1C SUMU	2932
	MPTO OREPI1A OREPI IRATA UA321 BUSMO UQ106 PLG UA321 LIMPO UM784 PALIV MCS UA556 MONSA MONSA1C SUMU	2897
MPTO-SLVR	MPTO OREPI1B IRATA UA321 PAKES PAKES VVI SLVR	1883
	MPTO OREPI1B IRATA UA321 PLG EGBAK UA321 PAKES VVI SLVR	1874
SACO-MPTO	SACO IRAVO LOGET UW6 SDE GAVEX UBRIX UL417 RCO UA321 IRATA ITEDO1 MPTO	2699
	SACO IRAVO LOGET UW6 SDE GAVEX UA558 PAZ UR559 IQT UA321 IRATA ITEDO1 MPTO	2620
SBPA-MPTO	SBPA JAUNT1A JAUNT UM216 EVOLO UL793 DIKAL UL655 ASAPA UQ114 DAKMO ITEDO1 MPTO	2879
	SBPA JAUNT1A JAUNT UL216 SIDAK ASAPA UQ114 DAKMO ITEDO1 MPTO	2860
SBRF-MPTO	SBRF IBEK2A IBEK ILNOT UZ11 MNS UA323 MQU UW87 DAKMO ITEDO1 MPTO	2909
	SBRF IBEK2A IBEK ILNOT SGC UA323 MQU UW87 DAKMO ITEDO1 MPTO	2906
SGAS-MPTO	SGAS VAS UA321 CLO A321 ASIKO UA321 BUSMO ITEDO1 MPTO	2436
	SGAS VAS UA321 RBC SIDOV UA321 BUSMO ITEDO1 MPTO	2429
SLVR-MPTO	SLVR PAKES1 PAKES UA321 BUSMO ITEDO1 MPTO	1646
	SLVR PAKES1 PAKES UA321 RBC SIDOV UA321 BUSMO ITEDO1 MPTO	1637

MPTO-SAEZ



MPTO-SBPA



MPTO-SBGL

SBPA-MPTO

MPTO-SBRF

SBRF-MPTO

MPTO-SCEL


1 - 03/16/2015 18:00/12:00 - Fcst Jet Streams
Follow Me aircraft: CMP not currently in-flight
0 1 2 3 4 5 6 7
Sync'ed to: Layer 1
IVSUP
KILEV
ALBEG
OBKUL
DIBUG
MALVA
SAVRA
MUDIL
ESELA
MOROS
ILPUR
UKELA
SGAS
UBRIX
MILIX
RAXUS


1 - 03/16/2015 18:00/12:00 - Fcst Jet Streams
Follow Me aircraft: CMP not currently in-flight
0 1 2 3 4 5 6 7
Sync'ed to: Layer 1
GYV
KNOG
TRU
SREN
MOXES
SORTA
ISPEL
LIVOR
SULNA
TIVGU
SIBOT
TOY
EDRON
MILIX
RAXUS
UBRIX

SGAS-MPTO

MPTO-SUMU

SLVR-MPTO

MPTO-SLVR

SACO-MPTO


1 - 03/16/2015 18:00/12:00 - Fcst Jet Streams
Follow Me aircraft: CMP not currently in-flight
0 1 2 3 4 5 6 7
Sync'ed to: Layer 1
RINOS
SIGIX
MAPVA
VERDE
MUNEB
BOBAS
EGBAK
ASOLA
RBC
ISARA
OPTOP
RAXUN
KADOX
NIRBO
KIBUX
NESKI
PAZ
LOKOX
LONAB
GELAS
EGUSU
UDUNI
PALIV
ASDAS
ASETO
ESMUR
OROKO
PUBUM
JUJ
IMBER
GAVEX
SDE
MILIX
RAXUS

Quantification of benefits:							
N°	**ORIGIN-DESTINA-TION**	**CUR-RENT NM**	**PRO-POSED NM**	**NM/ FLIGHT SAVINGS**	**ANNUAL KG FUEL SAVINGS***	**ANNUAL KG CO2 SAVINGS****	**FLIGHTS PER YEAR**
1	MPTO-SAEZ	2825	2817	8	40,652.93	128,463.27	884
2	MPTO-SBGL	2906	2867	39	209,840.87	663,097.16	936
3	MPTO-SBPA	2737	2724	13	27,201.59	85,957.04	364
4	SBPA-MPTO	2879	2860	19	39,756.18	125,629.52	364
5	MPTO-SBRF	2907	2904	3	3,587.02	11,334.99	208
6	SBRF-MPTO	2909	2906	3	3,587.02	11,334.99	208
7	MPTO-SCEL	2612	2603	9	88,778.83	280,541.11	1716
8	MPTO-SGAS	2448	2434	14	46,033.47	145,465.76	572
9	SGAS-MPTO	2436	2429	7	23,016.73	72,732.88	572
10	MPTO-SUMU	2932	2897	35	115,083.67	363,664.40	572
11	MPTO-SLVR	1883	1874	9	29,592.94	93,513.70	572
12	SLVR-MPTO	1646	1637	9	29,592.94	93,513.70	572
13	SACO-MPTO	2699	2620	79	165,302.00	522,354.32	364
					822,026.22	**2,597,602.85**	

References:
*(NM/FLIGHT SAVINGS)*FLIGHTS PER YEAR*(5.75kg/NM)
**(AHORRO KG FUEL ANNUAL*3.16)

Pre-arrangements between Copa Airlines – States

- MPTO – SBGL: The proposal was refused by the Brazilian State, since it is over a "*one-way*" route for flights leaving SBGL.
- MPTO – SAEZ: Pending confirmation by the Brazilian State if PLG – RBC direct is included in the "*master*" route redesign document.
- MPTO – SBPA: Only involves the Brazilian State. An analysis will be conducted to see if ASAPA – ARMUK direct is included in the "*master*" route redesign document. According to the State, there should be no problem with its inclusion, if so required.
- SBPA – MPTO: The Brazilian State agrees, in the absence of confirmation with the "*master*" route redesign document. The Bolivian State proposes that route SIDAK ALGIB VAROM ASAPA be used.
- MPTO – SBRF: The Brazilian State authorises direct from BRACO (FIR boundary) to some point prior to arrival (*e.g.:* ILNOT); or from VVC if authorised by the Colombian State.
- SBRF – MPTO: The Brazilian State authorises direct from some point after departure (*e.g.*: ILNOT) to BRACO (FIR boundary); or to VVC if authorised by the Colombian State.
- MPTO – SCEL: The Chilean State made two counterproposals *via* OREPI TOKUT EVLIM ATOGO LIM ILMAR TOY ISGUD SIMOK (airways UL780 and UM302).
- MPTO – SGAS: Paraguay made a counterproposal *via* BUSMO PLG IQT RBC TRI VIR UKELA.
- SGAS – MPTO: Paraguay made a counterproposal *via* UKELA VIR TRI RBC IQT PLG BUSMO.
- MPTO – SUMU: Try route using airway UM402 instead of UA556, which is normally used. Use route BUSMO PLG IQT RBC TRI VIR and from thereon, *via* KIMIK SEKLO MUKIB MIGOT ILSIM ETEXU OGLAP ANDAN VUKAS CRR to SUMU.
- MPTO – SLVR: Pending confirmation by the Brazilian State as to the inclusion of PLG – RBC direct in the "*master*" route redesign document.
- SLVR – MPTO: Pending confirmation by the Brazilian State as to the inclusion of PLG – RBC direct in the "*master*" route redesign document.
- SACO – MPTO: The Bolivian State proposes that route JUJ TEBOK RBC or route OVKUL KILEV be used through airway UM784.

- - - - - - -

APPENDIX B

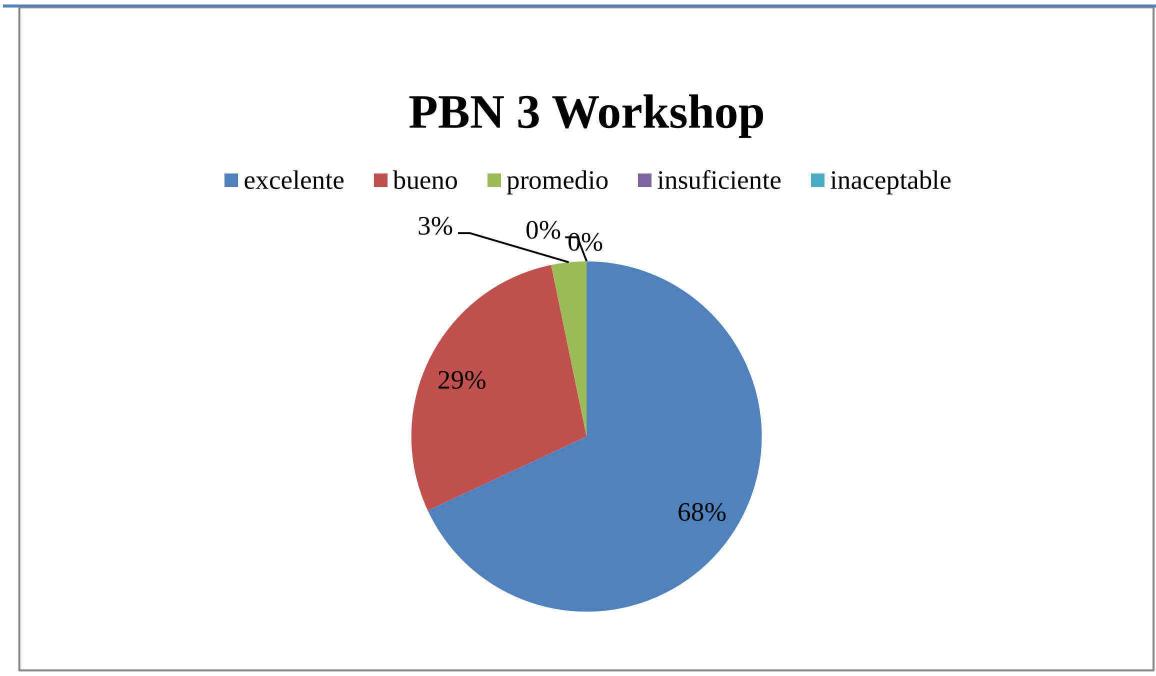
THIRD WORKSHOP ON THE USE OF PBN IN AIRSPACE DESIGN IN THE SAM REGION

SURVEY RESULTS

ASSESSMENT OF COURSE CONTENTS

(**Rating**: **5** = *Excellent* / **4** = *Good* / **3** = *Fair* / **2** = *Inadequate* / **1** = *Unacceptable*)

	Average
a) How relevant were the topics discussed?	4.96
b) How do you rate the training programme of the PBN workshop?	4.63
c) How do you rate the training material?	4.5
d) Is theory reinforced with exercises and practices?	4.58
e) Are topics related to reality and/or applicable to real cases?	4.79
f) How do you rate the level of information?	4.67
g) Has the workshop met your expectations?	4.88
h) Is the information provided sufficient to carry out the PBN implementation plan in your State or company?	4.58
i) Would the material and information provided in the workshop permit the conduction of a course/workshop in your State or company?	4.46
General average	4.67



What would you suggest to improve the workshop?

- Create an Internet forum for queries, suggestions, etc., so as not to wait for teleconferences to make them.
- More information should have been provided to better understand the validation stage.
- The summary of each presentation can be made and included in the final report, with corresponding notes to improve where necessary.
- Have an updated database among States so they can identify areas of improvement between adjacent TMAs or city pairs.
- Stay focused on the development of topics.
- Monitor and give continuity to activities.
- Continued participation of airlines/IATA. Feedback by users is very important.
- The schedule was a little too long.
- Allow Julio to continue participating at the next workshop.
- More participation by the representatives of the operators.
- Urge States to send the documentation duly in advance to the meeting.
- All presentations should be posted on the ICAO website in order to be able to follow the conference.
- All the material was excellent and posted on the website on a timely basis.

Comments

- The workshop was well organized and set out. I learnt a lot of new concepts.
- The true value of the workshop lies not only on the theoretical knowledge shared but also on the transfer of experiences and lessons learned by States in the different PBN implementation phases.
- Congratulations to the participating States, ICAO officers, experts and Office staff.
- Thanks to the States for sharing their experiences.
- Excellent opportunity for sharing our reality with the States of the Region, and make it possible to introduce the necessary improvements, developing and sharing material to further PBN implementation at regional level.
- Excellent assistance provided by ATM officers.
- Continue with this type of events, since they help experts to share experiences that benefit States that are just starting to develop new procedures.
- Very timely workshop that enabled the exchange among States and training for PBN implementation in the CAR/SAM Regions.

13 March 2015

-END-

Status of Implementation of PBN procedures – SAM Region

ESTADO	IAC						SID		STAR		CCO	CDO
	APV					LNAV						
	IAP APV	IAP RNPAR	IAP APV o RNP AR	IAP APV AIPORT	IAP RNPAR "ONLY" AIRPORT	IAP LNAV	SID PBN AIRPORT	SID PBN	STAR PBN AIRPORT	STAR PBN		
Argentina	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	31,25%	20,83%	0,00%	0,00%
Bolivia	16,67%	0,00%	16,67%	25,00%	0,00%	33,33%	25,00%	16,67%	0,00%	0,00%	0,00%	0,00%
Brasil	82,76%	5,17%	82,76%	85,19%	11,11%	89,66%	85,19%	86,21%	33,33%	39,66%	10,42%	10,42%
Chile	60,00%	30,00%	75,00%	75,00%	50,00%	85,00%	75,00%	61,11%	87,50%	80,00%	5,88%	5,88%
Colombia	0,00%	8,33%	8,33%	9,09%	9,09%	75,00%	81,82%	83,33%	66,67%	66,67%	0,00%	0,00%
Ecuador	0,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%	0,00%	0,00%
Guyana Francesa	0,00%	0,00%	0,00%	0,00%	0,00%	100,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Guyana	0,00%	0,00%	0,00%	0,00%	0,00%	75,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Panamá	28,57%	57,14%	57,14%	50,00%	40,00%	57,14%	20,00%	28,57%	20,00%	28,57%	0,00%	0,00%
Paraguay	100,00%	0,00%	100,00%	100,00%	0,00%	100,00%	50,00%	50,00%	0,00%	0,00%	0,00%	0,00%
Perú	0,00%	33,33%	33,33%	25,00%	37,50%	11,11%	12,50%	22,22%	75,00%	77,78%	12,50%	12,50%
Surinam	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Uruguay	0,00%	0,00%	0,00%	0,00%	0,00%	62,50%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Venezuela	100,00%	0,00%	100,00%	100,00%	0,00%	100,00%	100,00%	85,71%	0,00%	0,00%	0,00%	0,00%
Región SAM	43,27%	11,11%	49,71%	46,39%	14,29%	63,16%	51,02%	50,89%	37,37%	36,84%	4,49%	4,49%

Observations:

1) Information highlighted in yellow indicates the goals of the Bogota Declaration and the participation of each State in the attainment of each goal. Information in red shows the status of the SAM Region, which is the main indicator to take into account, considering the regional nature of the goal to be attained.

2) Column IAP APV or RNP AR considers that thresholds have an APV procedure, either through an IAC APV based on RNP APCH with VNAV or through an IAC RNP APCH AR.

3) The information was provided by SAM States, except for Colombia, Guyana, French Guiana and Suriname, whose information had not been received to date and was taken directly from the respective AIP.

4) RNAV SIDs and STARs lacking navigation specifications were considered as PBN SIDs and STARs.

5) Airports that had already undergone a complete PBN redesign were considered as airports in which CDOs and CCOs had been implemented.

6) Consideration was only given to airports with at least one threshold with IFR operations, according to Table FASID AOP-1, which is the official AGA information available at the South American Regional Office. The AGA Section of the SAM Regional Office provided the file used (file: FASID-TABLE AOP-1-SAM_ApprvMaster_Dec2014).

7) Only thresholds with IFR operations were taken into account, in accordance with Table FASID AOP-1. which is the official AGA information available at the South American Regional Office. The AGA Section of the SAM Regional Office provided the file used (file: FASID-TABLE AOP-1-SAM_ApprvMaster_Dec2014).

8) It was noted that several States showed inconsistencies in their information concerning their international airports in FASID Table AOP-1, such as:
   - Thresholds appearing as VFR in Table AOP-1 (Table AOP-1 code "NINST") were declared as IFR by PBN coordinators. Furthermore, some of these VFR thresholds have IFR approach, departure and/or arrival procedures.
   - The number of thresholds in Table AOP-1 is different from that provided by the State coordinators of the PBN Project, denoting that Table AOP-1 probably has not been updated in terms of magnetic declination.
   - Airports or airport thresholds declared as international by PBN Project coordinators do not appear in Table AOP-1.
   - Airports and some airport thresholds shown in Table AOP-1 are not declared as international by PBN Project Coordinators.

	FECHA DE RECOLECCIÓN DE DATOS: 10 OCTUBRE 2014														
			IAP												
			APV					LNAV	SID		STAR				
ESTADO	AEROPUERTOS INTERNACIONALES ANP CAR/SAM	Umbrales IFR	IAP APV	IAP RNPAR	IAP APV o RNP AR	IAP APV o RNP AR AIPORT	IAP RNPAR only AIRPORT	IAP LNAV	SID PBN AIRPORT	SID PBN	STAR PBN AIRPORT	STAR PBN	CCO	CDO	OBS
ARGENTINA	SABE BUENOS AIRES/Aeroparque Jorge Newbery	13	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SAEZ BUENOS AIRES/Ezeiza Ministro Pistarini	11	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		29	NO	NO	NO			NO		NO		NO	NO		
		35	NO	NO	NO			NO		NO		NO	NO		
	SADF BUENOS AIRES/San Fernando	23	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SARI CATARATAS DEL IGUAZÚ/My. D. Carlos Eduardo Krause	13	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		31	NO	NO	NO			NO		NO		NO			
	SAVC COMODORO RIVADAVIA/General Mosconi	25	NO	NO	NO	NO	NO	NO	NO	NO	SI	SI	NO	NO	
	SACO CORDOBA/Ing. Aer. A.L. Taravella	18	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SASJ JUJUY/Gobernador Guzmán	34	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SAZM MAR DEL PLATA/Bgdier. Gral. B. de la Colina	13	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SAME MENDOZA/El Plumerillo	18	NO	NO	NO	NO	NO	NO	NO	NO	SI	NO	NO	NO	
		36	NO	NO	NO			NO		NO		SI			
	SAZN NEUQUEN/Presidente Perón	9	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SARE RESISTENCIA/Resistencia	21	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SAWG RIO GALLEGOS/Piloto Civil N. Fernández	7	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		25	NO	NO	NO			NO		NO		NO			
	SAAR ROSARIO/Rosario	20	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SASA SALTA/Salta	24	NO	NO	NO	NO	NO	NO	NO	NO	SI	NO	NO	NO	
		2	NO	NO	NO			NO		NO		SI			
	SAZS SAN CARLOS DE BARILOCHE/San Carlos de Bariloche	11	NO	NO	NO	NO	NO	NO	NO	NO	SI	SI	NO	NO	
		29	NO	NO	NO			NO		NO		NO			
	SAWH USHUAIA/Malvinas Argentinas	25	NO	NO	NO	NO	NO	NO	NO	NO	SI	SI	NO	NO	
		7	NO	NO	NO			NO		NO		NO			
BOLIVIA	SLCB COCHABAMBA/Jorge Wilsterman	14	NO	NO	NO	NO	NO	NO	SI	NO	NO	NO	NO	NO	
		32	NO	NO	NO			NO		SI		NO			
	SLLP LA PAZ/El Alto	10	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SLVR SANTA CRUZ/Viru Viru	16	NO	NO	NO	SI	NO	SI	NO	NO	NO	NO	NO	NO	
		34	SI	NO	SI			SI		NO		NO			
	SLTJ TARIJA/Oriel Lea Plaza	13	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
BRASIL	SBBE BELÉM/Val-de-Cáes Intl	6	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		24	SI	NO	SI			SI		SI		NO			
	SBCF BELO HORIZONTE/Tancredo Neves Intl	16	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		34	SI	NO	SI			SI		SI		NO			
	SBBV BOA VISTA//Boa Vista Intl	8	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		26	SI	NO	SI			SI		SI		NO			
	SBBR BRASÍLIA/Brasília Intl	11L	SI	NO	SI	SI	NO	SI	SI	SI	SI	SI	SI	SI	
		29R	SI	NO	SI			SI		SI		SI			
		11R	SI	NO	SI			SI		SI		SI			
		29L	SI	NO	SI			SI		SI		SI			
	SBKP CAMPINAS/Viracopos Intl	15	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	
		33	SI	NO	SI			SI		SI		SI			
	SBCG CAMPO GRANDE/Campo Grande Intl	6	SI	NO	SI	SI	NO	SI	SI	SI	SI	SI	NO	NO	
		24	SI	NO	SI			SI		SI		SI			
	SBCR CORUMBÁ/Corumbá Intl	9	NO	NO	NO	SI	NO	NO	SI	NO	NO	NO	NO	NO	
		27	SI	NO	SI			SI		SI		NO			
	SBCZ CRUZEIRO DO SUL/Cruzeiro do Sul Intl	10	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		28	SI	NO	SI			SI		SI		NO			
	SBCY CUIABÁ/Marechal Rondon Intl	17	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		35	SI	NO	SI			SI		SI		NO			
	SBCT CURITIBA/Afonso Pena Intl	15	SI	NO	SI	SI	NO	SI	SI	SI	SI	SI	NO	NO	
		33	SI	NO	SI			SI		SI		SI			
	SBFL FLORIANOPOLIS/Hercilio Luz Intl	14	SI	NO	SI	SI	NO	SI	SI	SI	SI	SI	NO	NO	
		32	SI	NO	SI			SI		SI		SI			
	SBFZ FORTALEZA/Pinto Martins Intl	13	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		31	SI	NO	SI			SI		SI		NO			
	SBFI FOZ DO IGUAÇU/Cataratas Intl	14	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		32	NO	NO	NO			SI		SI		NO			
	SBMO MACEIO/Zumbi dos Palmares	12	NO	NO	NO	NO	NO	SI	SI	SI	NO	NO	NO	NO	
		30	NO	NO	NO			SI		SI		NO			
	SBMQ MACAPÁ/Macapá Intl	8	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		26	SI	NO	SI			SI		SI		NO			
	SBEG MANAUS/Eduardo Gomes Intl	10	NO	NO	NO	SI	NO	SI	NO	NO	NO	NO	NO	NO	
		28	SI	NO	SI			SI		NO		NO			
	SBNT NATAL/Augusto Severo Intl	16L	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		34R	SI	NO	SI			SI		SI		NO			
	SBPP PONTA PORÃ/Ponta Porã Intl	4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		22	NO	NO	NO			NO		NO		NO			
	SBPA PORTO ALEGRE/Salgado Filho Intl	11	SI	NO	SI	SI	NO	SI	SI	SI	SI	SI	NO	NO	
		29	SI	NO	SI			SI		SI		SI			
	SBRF RECIFE/Guararapes Intl	18	SI	NO	SI	SI	NO	SI	SI	SI	SI	SI	SI	SI	
		36	SI	NO	SI			SI		SI		SI			
	SBGL RIO DE JANEIRO/Galeão, Antonio Carlos Jobim Intl	10	SI	NO	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	
		28	SI	NO	SI			SI		SI		SI			
		15	SI	SI	SI			SI		SI		SI			
	SBSV SALVADOR/Deputado Luis Eduardo Magalhães Intl	10	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		28	SI	NO	SI			SI		SI		NO			
	SBSN SANTARÉM/Santarém Intl	10	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		28	SI	NO	SI			SI		SI		NO			
	SBSL SÃO LUIS/Marechal Cunha Machado Intl	6	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		24	SI	NO	SI			SI		SI		NO			
	SBGR SÃO PAULO/Guarulhos Intl	09L	SI	NO	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	
		27R	SI	NO	SI			SI		SI		SI			
		09R	SI	SI	SI			SI		SI		SI			
		27L	SI	NO	SI			SI		SI		SI			
	SBTT TABATINGA/Tabatinga Intl	12	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		30	NO	NO	NO			NO		NO		NO			
	SBUG URUGUAIANA/Rubem Berta intl	27	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	

ESTADO	AEROPUERTOS INTERNACIONALES ANP CAR/SAM	Umbrales IFR	IAP						SID		STAR		CCO	CDO	OBS
			APV					LNAV							
			IAP APV	IAP RNPAR	IAP APV o RNP AR	IAP APV o RNP AR AIPORT	IAP RNPAR only AIRPORT	IAP LNAV	SID PBN AIRPORT	SID PBN	STAR PBN AIRPORT	STAR PBN			
CHILE	SCFA ANTOFAGASTA/Cerro Moreno	01	NO	SI	SI			SI		SI		SI			
		19	NO	SI	SI	SI	SI	SI	SI	SI	SI	SI	NO	NO	
	SCAR ARICA/Chacalluta	02	NO	NO	NO	NO	NO	SI	SI	NO	SI	SI	NO	NO	
	SCIE CONCEPCIÓN/Carriel Sur	02	SI	SI	SI			SI		SI		SI			
		20	SI	NO	SI	SI	SI	SI	SI	SI	SI	SI	NO	NO	
	SCIP ISLA DE PASCUA/AP Mataveri	10	NO	NO	NO			SI		NO		NO			
		28	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SCDA IQUIQUE/Gral. Diego Aracena	01	NO	NO	NO			NO		NO		NO			
		19	NO	SI	SI	SI	SI	SI	SI	SI	SI	SI	NO	NO	
	SCTE PUERTO MONTT/El Tepual	17	SI	NO	SI			SI		SI		SI			
		35	SI	NO	SI	SI	NO	SI	SI	SI	SI	SI	NO	NO	
	SCCI PUNTA ARENAS/Pdte. C. Ibañez del Campo	07	SI	NO	SI			SI		NO		SI			
		12	SI	NO	SI			SI		NO		SI			
		19	NO	NO	NO	SI	NO	NO	NO	NO	SI	NO	NO	NO	
		25	SI	NO	SI			SI		NO*		SI			
		30	SI	NO	SI			SI		NO*		SI			
	SCEL SANTIAGO/Arturo Merino Benítez	17R	SI	SI	SI			SI		SI		SI			
		35L	SI	NO	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	
		17L	SI	SI	SI			SI		SI		SI			
		35R	SI	NO	SI			SI		SI		SI			
COLOMBIA	SKBQ BARRANQUILLA/Ernesto Cortissoz	05	NO	NO	NO	NO	NO	SI	SI	SI	SI	SI	NO	NO	
	SKBO BOGOTÁ/Eldorado/Distrito Capital	13L	NO	NO	NO	NO	NO	SI	SI	SI	SI	SI	NO	NO	
		13R	NO	NO	NO			SI		SI	SI	SI			
	SKBG BUCARAMANGA/Palonegro	17	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SKCL CALI/Alfonso Bonilla Aragón	01	NO	NO	NO	NO	NO	SI	SI	SI	SI	SI	NO	NO	
	SKCG CARTAGENA/Rafael Nuñez	19	NO	NO	NO	NO	NO	SI	SI	SI	SI	SI	NO	NO	
	SKCC CUCUTA/Camilo Daza	16	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SKLT LETICIA/Alfredo Vásquez Cobo	03	NO	NO	NO	NO	NO	NO	SI	SI	NO	NO	NO	NO	
	SKPE PEREIRA/Matecaña	08	NO	NO	NO	NO	NO	SI	SI	SI	SI	SI	NO	NO	
	SKRG RIONEGRO/José María Córdoba	19	NO	NO	NO	NO	NO	SI	SI	SI	NO	NO	NO	NO	
	SKSP SAN ANDRES I./Sesquicentenario	06	NO	NO	NO	NO	NO	SI	SI	SI	SI	SI	NO	NO	
	SKSM SANTA MARTA/Simon Bolivar	01	NO	SI	SI	SI	SI	SI	SI	SI	SI	SI	NO	NO	
ECUADOR	SEGU GUAYAQUIL/Jose Joaquin de Olmedo	21	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		3	NO	NO	NO			NO		NO		NO			
	SELT LATACUNGA/Cotopaxi	19	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		1	NO	NO	NO			NO		NO		NO			
	SEMT MANTA/Eloy Alfaro	24	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		6	NO	NO	NO			NO		NO		NO			
	SEQU QUITO/Mariscal Sucre	36	NO	SI	SI	SI	SI	SI	SI	SI	SI	SI	NO	NO	
		18	NO	SI	SI			SI		SI		SI			
FRENCH GUYANA	SOCA CAYENNE/Rochambeau	8	NO	NO	NO	NO	NO	SI	NO	NO	NO	NO	NO	NO	
		26	NO	NO	NO			SI		NO		NO			
GUYANA	SYGO GEORGETOWN/Ogle International Airport	7	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		25	NO	NO	NO			SI		NO		NO			
	SYCJ GEORGETOWN/Cheddi Jagan Int´l Airport	6	NO	NO	NO	NO	NO	SI	NO	NO	NO	NO	NO	NO	
		24	NO	NO	NO			SI		NO		NO			
PANAMA	MPBO BOCAS DEL TORO/Bocas Del Toro	08	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
		26	NO	NO	NO			NO		NO		NO			
	MPDA DAVID/Enrique Malek	04	NO	NO	NO	NO	NO	SI	NO	NO	NO	NO	NO	NO	
	MPPA PANAMÁ/Pacífico	36	SI	SI	SI	SI	SI	SI	NO	NO	NO	NO	NO	NO	
	MPTO PANAMÁ/Tocumén Intl	03R	NO	SI	SI			SI		SI		SI			
		03L	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	NO	NO	
		21L	NO	SI	SI			NO		NO		NO			
PARAGUAY	SGAS LUQUE/Silvio Pettirossi	2	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
		20	SI	NO	SI			SI		SI		NO			
	SGES MINGA GUAZÚ/Guaraní	5	SI	NO	SI	SI	NO	SI	NO	NO	NO	NO	NO	NO	
		23	SI	NO	SI			SI		NO		NO			

ESTADO	AEROPUERTOS INTERNACIONALES ANP CAR/SAM	Umbrales IFR	IAP						SID		STAR		CCO	CDO	OBS
			APV					LNAV							
			IAP APV	IAP RNPAR	IAP APV o RNP AR	IAP APV o RNP AR AIPORT	IAP RNPAR only AIRPORT	IAP LNAV	SID PBN AIRPORT	SID PBN	STAR PBN AIRPORT	STAR PBN			
PERU	SPQU AREQUIPA/Rodríguez Ballón Intl	10	NO	NO	NO	NO	NO	NO	NO	NO	SI	SI	NO	NO	
	SPHI CHICLAYO/Cap. José Quinoñes Gonzalez	01	NO	NO	NO	NO	NO	SI	NO	NO	SI	SI	NO	NO	
	SPZO CUZCO/Velazco Astete	28	NO	SI	SI	SI	SI	NO	NO	NO	SI	SI	NO	NO	
	SPQT IQUITOS/Crnel. FAP Francisco Secada Vignetta	06	NO	SI	SI	NO	SI	NO	NO	NO	NO	SI	NO	NO	
	SPIM LIMA-CALLAO/Jorge Chávez Intl	15	NO	NO	NO	NO	NO	NO	SI	SI	SI	SI	SI	SI	
		33	NO	NO	NO			NO		SI		NO			
	SPSO PISCO/Pisco	22	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
	SPTN TACNA/Crnel. FAP Carlos Ciriani Santa Rosa	02	NO	SI	SI	SI	SI	NO	NO	NO	SI	SI	NO	NO	
	SPRU TRUJILLO/Capitan Carlos Martínez de Pinillos	2	NO	NO	NO	NO	NO	NO	NO	NO	SI	SI	NO	NO	
SURINAM	SMJP ZANDERY/Johan Adolf Pengel Intl	11	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	
		29	**NO**	**NO**	**NO**			**NO**		**NO**		**NO**			
URUGUAY	SULS MALDONADO/Int. C/C, Carlos A. Curbelo Laguna del Sauce	8	NO	NO	NO	NO	NO	SI	NO	NO	NO	NO	NO	NO	
		26	NO	NO	NO			SI		NO		NO			
		19	NO	NO	NO			NO		NO		NO			
		1	NO	NO	NO			NO		NO		NO			
	SUMU MONTEVIDEO/Carrasco Intl Gral. Cesáreo L. Berisso	6	NO	NO	NO	NO	NO	SI	NO	NO	NO	NO	NO	NO	
		24	NO	NO	NO			SI		NO		NO			
		1	NO	NO	NO			SI		NO		NO			
		19	NO	NO	NO			NO		NO		NO			
VENEZUELA	SVBC BARCELONA/Gral. José Antonio Anzóategui Intl	15	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
	SVMI CARACAS/Simón Bolívar Intl, Maiquetía	10	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
	SVMC MARACAIBO/La Chinita Intl	3L	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
	SVMG MARGARITA/Intl Del Caribe Gral. Santiago Marino	9	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
	SVJC PARAGUANA/Josefa Camejo Intl	9	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
	SVSA SAN ANTONIO DEL TÁCHIRA/San Antonio del Táchira Intl	17	SI	NO	SI	SI	NO	SI	SI	NO	NO	NO	NO	NO	
	SVVA VALENCIA/Zim Valencia Intl	28	SI	NO	SI	SI	NO	SI	SI	SI	NO	NO	NO	NO	
			43.27%	11.11%	49.71%	46.39%	14.29%	63.16%	51.02%	50.89%	37.37%	36.84%	4.49%	4.49%	

APPENDIX D

PBN PROCEDURES AT INTERNATIONAL AIRPORTS

INFORMATION BY STATE

FASID TABLE AOP-1 SAM

APPENDIX E

FASID TABLE AOP-1 SAM

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso		Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa		RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas						Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
					APP	TWR	ATIS	AFIS	Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento		ILS	VOR	NDB /L	GNS S	PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	TDZ	MID	END
1		2		3	4				5	6	7	8	9		10				11										12								13		
ARGENTINA																																							
SABE	BUENOS AIRES/Aeroparque J. Newbery	SAEZ	Ezeiza	7	X	X	X		13	4D	PA1	X	B757	2100	2D				X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SACO	Córdoba						31		NINST		B757	160							L								X		X			X		X			
		SAZM	Mar del Plata																																				
		SAME	Mendoza																																				
		SUMU	Montevideo																																				
		SAAR	Rosario																																				
SAEZ	Ezeiza/Ministro Pistarini	SGAS	Asunción	9	R	X	X		11	4E	PA3	X	B747	3300	XD	XD			X		L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	RS	SABE	Buenos Aires						29		NPA		B747	385							L								X		X			X		X			
		SACO	Córdoba																																				
		SULS	Maldonado						17	4E	NINST		B747	3105							L	X							X	X	X		X	X	X	X			
		SAZM	Mar del Plata						35		PA1	X	B747	385	2	XD			X		L								X		X	X		X		X	X		
		SAME	Mendoza																																				
		SUMU	Montevideo																																				
		SBPA	Porto Alegre																																				
		SARE	Resistencia																																				
		SAAR	Rosario																																				
		SBGR	São Paulo																																				
SADF	SAN FERNANDO			4	X	X			05	3C	NINST		F27-600	1801						X	L	X			X			X	X	X	X		X	X	X	X			
	RG								23		NPA		F27-600	45		XD				X	L								X		X			X		X			
SARI	CATARATAS DEL IGUAZÚ / My. D. C. E. Krause	SGAS	Asunción	6	X	X			13	4E	NPA		B747	3300		X			X		L	X			X			X	X	X	X		X	X	X	X			
	RNS & AS	SGES	Ciudad del Este						31		PA1	X	B747	260	XD						L								X		X	X		X		X	X		
		SARE	Resistencia																																				
SAVC	COMODORO RIVADAVIA/ Gral. E. Mosconi	SCTE	Puerto Montt	6	X	X			07	4D	NINST		B757	2810		XD	X		X		L	X			X			X	X	X	X		X	X	X	X			
	RS	SAWG	Río Gallegos						25		PA1	X	B757	157	X						L								X		X	X		X		X	X		
		SAZS	San C. de Bariloche																																				
SACO	CORDOBA/Ing. Aer. A.L.V. Taravella	SAEZ	Ezeiza	9	R	X	X	05	18	4E	PA1	X	B747	3200	2D	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SAME	Mendoza						36		NINST		B747	350							L								X		X			X		X			
		SUMU	Montevideo																																				
		SARE	Resistencia						05	4C	NINST		MD80	56FCWT							L	X			X			X	X	X	X	X	X	X	X	X			
		SAAR	Rosario						23		NINST										L	X						X	X	X	X	X	X	X	X	X			
		SCEL	Santiago																																				
SASJ	JUJUY/Gobernador Guzmán	SCFA	Antofagasta	6	X	X			16	4D	NINST	X	B757	2944						X	L	X			X			X	X	X	X		X	X	X	X			
	RS	SARE	Resistencia						34		PA1		B757	160	X	XD	X		X		L								X		X	X		X		X	X		
		SASA	Salta																																				

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso		Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa		RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas					Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
					APP	TWR	ATIS	AFIS	Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento	ILS	VOR	NDB /L	GNS S	PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	TDZ	MID	END
1		2		3	4				5	6	7	8	9	10				11										12								13		
SAZM	MAR DEL PLATA/Astor Piazolla	SABE	Buenos Aires	6	R	X			13	4D	PA1	X	B757 2200	2D	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RG & AS	SAEZ	Ezeiza						31		NINST		B757 118							L								X		X			X		X			
		SUMU	Montevideo																																			
SAME	MENDOZA/El Plumerillo	SAEZ	Ezeiza	6	R	X	X		18	4C	NPA		MD80 2835		XD				X	L	X			X			X	X	X	X		X	X	X	X			
	RS	SACO	Córdoba						36		PA1	X	MD80 93	X		X		X		L								X		X	X		X		X	X		
		SAZN	Nuequén																																			
		SCEL	Santiago																																			
SAZN	NEUQUÉN/Presidente Perón	SCIE	Concepción	6	X	X			09	4C	PA1	X	MD80 2570	X	XD	X		X		L	X			X			X	X	X	X		X	X	X	X	X		
	RNS & AS	SCTE	Puerto Montt						27		NINST		MD80 90							L								X		X	X		X		X			
		SAZS	San C. de Bariloche																																			
SARE	RESISTENCIA	SGAS	Asunción	7	R	X			03	4C	NINST		MD80 2770							L	X			X			X	X	X	X		X	X	X	X			
	RNS & AS	SAEZ	Ezeiza						21		PA1	X	MD80 80	2D	XD	X		X		L								X		X	X		X		X	X		
		SACO	Córdoba																																			
		SARI	Iguazú																																			
		SAAR	Rosario																																			
		SASA	Salta																																			
SAWG	RÍO GALLEGOS/Piloto Civil N. Fernández	SAVC	Comodoro	7	X	X			07	4E	NPA		B747-200 3549		XD					L	X			X			X	X	X	X		X	X	X	X			
	RS	SCCI	Rivadavia						25		PA1	X	B747-200 330	2		X		X		L								X		X	X		X		X	X		
		SAWH	Punta Arenas																																			
			Ushuaia																																			
SAAR	ROSARIO/Islas Malvinas	SAEZ	Ezeiza	8	X	X			02	4E	NINST		B747 3000							L	X			X			X	X	X	X		X	X	X	X			
	RS	SACO	Córdoba						20		PA1		B747 360	X	XD	X		X		L								X		X	X		X		X	X		
		SARE	Resistencia																																			
SASA	SALTA/ General D. Martín Miguel de Güemes	SCFA	Antofagasta	6	X	X			02	4C	PA1	X	B757 3000	X	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SASJ	Jujuy						20		NINST		B757 160							L								X		X			X		X			
		SARE	Resistencia																																			
									06	4C			B757 2400																									
									24				B757 160																									
SAZS	SAN CARLOS DE BARILOCHE	SAVC	Comodoro	7	R	X	X		11	4C	NPA		B737 2348		XD	X				L	X			X			X	X	X	X		X	X	X	X			
	RNS & AS	SAZN	Rivadavia						29		PA1	X	B737 95	2D				X		L								X		X	X		X		X	X		
		SCTE	Neuquén																																			
			Puerto Montt																																			

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso		Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa		RFF	ATS APP	ATS TWR	ATS ATIS	ATS AFIS	Physical characteristics Caractéristiques physiques Características físicas: Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento	Radio aids Aides radio Radioayudas: ILS	VOR	NDB /L	GNS S	Lighting aids Aides lumineuses Ayudas luminosas: PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	Marking aids Marques Señalamiento: DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	RVR: TDZ	MID	END
1		2		3	4				5	6	7	8	9	10				11										12								13		
SAWH	USHUAIA/Malvinas Argentinas	SCCI	Punta Arenas	9	X	X			07	4D	NPA		B757 2800								X			X			X	X	X	X		X	X	X	X			
	RNS & AS	SAWG	Río Gallegos						25		PA1	X	B757 102	XD	X			X		L								X		X	X		X		X	X		
BOLIVIA																																						
SLCB	COCHABAMBA/ Aeropuerto Internacional Jorge	SCDA	Iquique	8	X	X	X	X	14	4D	NPA		B767 3800		XD	X				L	X			X			X	X	X	X	X	X	X	X	X			
	Wilstermann	SLLP	La Paz						32		PA1	X	B767 160	XD				X		L								X		X	X		X		X	X		
	AS	SPIM	Lima-Callao																																			
		SLVR	Santa Cruz																																			
		SLTJ	Tarija																																			
SLLP	LA PAZ/ Aeropuerto Internacional de El Alto	SPQU	Arequipa	7	X	X	X	X	10	4D	PA1	X	DC-10-30 4000	X*D	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SCAR	Arica						28		NINST		DC-10-30 124							L								X		X	X		X		X			
		SLCB	Cochabamba																																			
		SLVR	Santa Cruz																																			
SLVR	SANTA CRUZ/ Aeropuerto Internacional Viru Viru	SLCB	Cochabamba	9	X	X	X	X	16	4E	NPA		B747 3500		XD	X			X	L	X			X			X	X	X	X	X	X	X	X	X			
	RS	SLLP	La Paz						34		PA1	X	B747 290	X				X		L								X		X	X		X		X	X		
SLTJ	TARIJA/ Aeropuerto Internacional de Alternativa	SLCB	Cochabamba	7	X	X			13	4C	NPA		B727 2672		XD	X				L								X	X	X		X	X	X	X			
	Cap. Av. Oriel Lea Plaza	SASJ	Jujuy						31		NINST		B727 78							L								X		X			X		X			
	RNS & AS	SLVR	Santa Cruz																																			
BRAZIL																																						
SBBE	BELÉM/Val de Cans/Júlio Cezar Ribeiro, PA	SBMQ	Macapá	8	R	X	X		06	4D	PA1	X	B767 2377	XD	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SBSN	Santarém						24		NPA		B767 181							L								X	X	X			X		X			
		SBSL	São Luís																																			
SBCF	BELO HORIZONTE/ Tancredo Neves, MG	SBBR	Brasília	9	R	X	X		16	4E	PA1	X	B777 2222	XD	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		X
	RS	SBGL	Rio de Janeiro						34		NPA	X	B777 247							L								X		X			X		X			
		SBGR	São Paulo																																			
SBBV	BOA VISTA/ Atlas Brasil Cantanhede, RR	SBMN	Manaus	6	X	X			08	4D	PA1	X	B737 2013	XD	XD	X			X	L	X			X			X	X	X	X	X			X	X			
	RS	SMSN	Santarém						26		NPA		B737 61							L	X			X				X		X	X							
SBBR	BRASÍLIA/ Pres. Juscelino Kubitschek, DF	SBCF	Belo Horizonte	8	R	X	X		11L	4E	PA1	X	B747 2450	X	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SBCG	Campo Grande						29R		PA1	X	B747 350	XD						L								X		X	X		X		X			
		SBGL	Rio de Janeiro						11R	4E	NPA	X	B747 2550	XD																								
		SBSV	Salvador						29L		NPA	X	B747 360	XD						L								X					X		X			

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso	Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa	RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas					Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
			APP	TWR	ATIS	AFIS	Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento	ILS	VOR	NDB /L	GNS S	PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	TDZ	MID	END
1	2	3	4				5	6	7	8	9	10				11										12								13		
SBKP CAMPINAS/Viracopos, SP RS	SBGL Rio de Janeiro SBGR São Paulo	8	R	X	X		15 33	4E	PA1 PA1	X X	B747 2400 B747 363	X	XD	X		X		L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X X	X	
SBCG CAMPO GRANDE/Campo Grande, MS RS	SGAS Asunción SBBR Brasília SBKP Campinas	8	R	X	X		06 24	4E	PA1 NPA	X	MD11 1955 MD11 286	XD	XD	X		X		L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		
SBCR CORUMBÁ/Corumbá, MS RS	SBCG Campo Grande SBCY Cuiabá	6	X			X	09 27	4C	NPA NPA	 X	B737 1351 B737 54			X				L L	X X			X X			X	X X	X	X X		X	X X	X	X X			
SBCZ CRUZEIRO DO SUL/Cruzeiro do Sul, AC RS	SPIM Lima-Callao SBTT Tabatinga	6				X	10 28	4C	NPA NPA		B737 1972 B737 61		XD					L L	X			X			X	X X	X	X X	 X	X	X X	X	X X			
SBCY CUIABÁ/Marechal Rondon, MT I RS	SBBR Brasília SBCG Campo Grande	6	R	X			17 35	4C	PA1 NPA		B737 1848 B737 61	XD	XD					L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		
SBCT CURITIBA/Afonso Pena , PR RS	SBFL Florianópolis SBFI Foz do Iguaçu SBGR São Paulo	8	R	X	X		15 33	4D	PA3 NPA	X X	B767 1641 B767 168	X X	XD	X		X	 X	L L	X	X	X	X	X	X	X	X X	X	X X	X	X	X X	X	X X	X	X	X
SBFL FLORIANÓPOLIS/ Hercílio Luz , SC RS	SBCT Curitiba SBFI Foz do Iguaçu SBPA Porto Alegre	6	R	X	X		14 32	4C	PA1 NPA	X	B737 2014 B737 52	X	XD	X		X		L L	X			X			X	X X	X X	X X	X	X	X X	X	X X	X		
SBFZ FORTALEZA/Pinto Martins, CE RS	SBBE Belém SBRF Recife SBSL São Luís	8	R	X	X		13 31	4E	PA1 NPA	X X	MD11 2197 MD11 248	XD	XD *	X		X		L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		
SBFI FOZ DO IGUAÇU/ Cataratas, PR RS	SGAS Asunción SGES Ciudad del Este SBPA Porto Alegre	8	R	X			14 32	4D	PA1 NPAT	X	B767 2250 B767 177	X	XD	X		X X	X	L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		
SBMQ MACAPÁ/ Alberto Alcolumbre, AP RS	SBBE Belém SOCA Cayenne SBSN Santarém	6	X	X			08 26	4C	NPA NPA		B737 1789 B737 59		XD			X		L L	X			X			X	X X	X X	X X		X	X X	X	X X	X		
SBMO MACEIO/Zumbi dos Palmares, AL RS	SBRF Recife SBSV Salvador	8	X	X			12 30	4C	PA1 NPA	X	B767 2600 B767 263	XD	XD		X	X		X	X			X	X		X	X X	X	X X	X	X	X X	X	X X	X		
SBEG MANAUS/Eduardo Gomes, AM RS	SBBE Belém SBCY Cuiabá SBSN Santarém	8	R	X			10 28	4D	PA1 NPA	X X	MD11 2214 MD11 270	XD	XD	X		X		L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso		Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa		RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas						Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
					APP	TWR	ATIS	AFIS	Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento		ILS	VOR	NDB /L	GNS S	PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	TDZ	MID	END
1		2		3	4				5	6	7	8	9		10				11										12								13		
SBNT	NATAL/Augusto Severo, RN	SBFZ	Fortaleza	8	R	X	X		16L	4E	NPA	X	MD11	1945	X	XD	X		X		L	X			X			X	X	X	X		X	X	X	X	X		
	AS	SBRF	Recife						34R		NPA		MD11	235							L								X	X	X			X		X			
SBPP	PONTA PORÃ/Ponta Porã, MS	SBCG	Campo Grande	6				X	03	4C	NPA		B737	1481			X				L	X			X			X	X	X	X		X	X	X	X			
	RNS	SBFI	Foz do Iguaçu						31		NPA		B737	58							L								X		X			X		X			
SBPA	PORTO ALEGRE/Salgado Filho, RS	SGES	Ciudad del Este	8	R	X	X		11	4D	PA1	X	B767	1984	X	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SBFL	Florianópolis						29		PA1		B767	218							L								X		X			X		X			
		SUMU	Montevideo																																				
SBRF	RECIFE/Guararapes– Gilberto Freyre, PE	SBFZ	Fortaleza	8	R	X	X		18	4E	PA1	X	MD11	2696	XD	XD	X		X	X	L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SBNT	Natal						36		NPA	X	MD11	270							L								X		X			X		X			
		SBSV	Salvador																																				
SBGL	RIO DE JANEIRO/Galeão-Antônio Carlos Jobim,	SBCF	Belo Horizonte	9	R	X	X		10	4E	PA2	X	B747	3457	XD	XD	X		X		L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	RJ	SBBR	Brasília						28		PA1	X	B747	380	XD				X		L								X		X	X		X		X	X		
	RS	SBKP	Campinas																																				
		SBRF	Recife						15	4E	PA1	X	B747	2748	XD		X		X		L	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	
		SBSV	Salvador						33		NINST		B747	380							L								X		X			X		X			
		SBGR	São Paulo																																				
SBSV	SALVADOR/Deputado Luis Eduardo Magalhães,	SBBR	Brasília	8	R	X	X		10	4E	PA1	X	MD11	2754	XD	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	BA	SBRF	Recife						28		PA1	X	MD11	267	XD						L								X		X			X		X			
	RS	SBGL	Rio de Janeiro																																				
SBSN	SANTARÉM/Maestro Wilson Fonseca, PA	SBBE	Belém	6	X	X			10	4D	NPA	X	B737	1999	XD	XD	X		X		L	X			X			X	X	X	X		X	X	X	X	X		
	AS	SOCA	Cayenne						28		NPA		B737	61							L								X		X			X		X			
		SBMQ	Macapá																																				
		SBEG	Manaus																																				
SBSL	SÃO LUÍS/Marechal Cunha Machado, MA	SBBE	Belém	8	X	X			06	4D	PA1	X	B767	2007	XD	XD	X		X		L	X			X			X	X	X	X		X	X	X	X	X		
	AS	SBFZ	Fortaleza						24		NPA		B767	329							L	X			X				X		X			X		X			
SBGR	SÃO PAULO/Guarulhos- Governador André	SBCF	Belo Horizonte	9	R	X	X		09R	4E	PA2	X	B747	2222	XD	XD	X		X		L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	Franco Montoro, SP	SBBR	Brasília						27L		PA2	X	B747	280	X		X		X		L	X	X						X		X	X		X		X	X		
	RS	SBKP	Campinas																																				
		SBPA	Porto Alegre						09L	4E	PA2	X	B747	2741	X		X		X		L	X	X	X	X	X			X	X	X	X	X	X	X	X	X		
		SBRF	Recife						27R		NPA	X	B747	380	X		X				L	X	X						X		X			X		X			
		SBGL	Rio de Janeiro																																				
		SBSV	Salvador																																				

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso		Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa		RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas					Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
					APP	TWR	ATIS	AFIS	Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento	ILS	VOR	NDB /L	GNS S	PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	TDZ	MID	END
1		2		3	4				5	6	7	8	9	10				11										12								13		
SBTT	TABATINGA/Tabatinga, AM RS	SBCZ SPQT SKLT	Cruzeiro do Sul Iquitos Leticia	6				X	12 30	4C	NPA NPA		B737-300 1973 B737-300 61			X				X	X X						X	X X	X	X X		X	X X	X	X X			
SBUG	URUGUAINA/Rubem Berta, RS RS	SBPA SARP SARI	Porto Alegre Posadas Cataratas de Iguazu	3				X	09 27	3C	NINST NPA		EMB-120 1254 EMB-120 11			X					X X			X X			X	X X	X	X X		X	X X	X	X X			
Chile																																						
SCFA	ANTOFAGASTA/ AP. Cerro Moreno AS	SCAR SCDA SASJ SASA SCEL	Arica Iquique Jujuy Salta Santiago	6	R	X			19 01	4D	NPA NPA	X	B767 2599 B767 155		XD	X		X		L L	X			X			X X	X X	X X	X X	X X	X X	X X	X	X X			
SCAR	ARICA/ AP. Chacalluta RS	SCFA SCDA SLLP	Antofagasta Iquique La Paz	6	X	X			02 20	4D	NPA NINST	X	A320 2170 A320 72		XD	X		X		L L	X			X			X X	X X	X X	X X	X X	X X	X X	X X	X X			
SCIE	CONCEPCIÓN/ AP. Altn. Carriel Sur RS	SAZN SCEL SCTE	Neuquén Santiago Temuco	7	X	X			02 20	4D	PA1 NPA	X	A320 2300 A320 72	X	XD XD	X		X	X	L L	X			X			X X	X X	X X	X X	X	X	X X	X	X X	X		
SCDA	IQUIQUE/ AP. Diego Aracena RS	SCFA SCAR SLCB	Antofagasta Arica Cochabamba	6	R	X			19 01	4D	PA1 NPA	 X	B767 3350 B767 155	X	XD XD	X X		X	X	L L	X X			X X			X X	X X	X X	X X	X X	X X	X X	X X	X X			
SCTE	PUERTO MONTT/ AP. El Tepual RS	SAVC SCIE SAZN SAZS	Comodoro Rivadavia Concepción Neuquén San C. de Bariloche	6	R	X			17 35	4D	NPA PA1	X X	A320 2650 A320 72	 2	XD XD	X X		 X	 X-	L L	X X			X		 X	X X	X X	X X	X X	X X	X X	X X	X X	X X	 X		
SCCI	PUNTA ARENAS/ AP. Pdte. Carlos Ibañez del Campo AS	SAWG SAWE SAWH	Río Gallegos Río Grande Ushuaia	6	R	X			07 25	4D	NPA PA1	 X	A320 2790 A320 72	 XD	XD XD	X	 X	 X	 -	L L	X X			X X		 X	X X	X X	X X	X X	X X	X X	X X	X X	X X	 X		-
									12 30	4D	NPA NPA	X	A320 2400 A320 72		XD					L L	X			X				X X	X	X X	X X		X X					
									01 19	3B	NINST NPA	X	C-130 1677 C-130 72								X X							X X	X X	X X	X X	X X	X X	X X	X X			

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso		Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa		RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas					Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
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1		2		3	4				5	6	7	8	9	10				11										12								13		
SCEL	SANTIAGO/ **AP.** Arturo Merino	SCFA	Antofagasta	9	R	X	X		17R	4E	PA1	X	B747 3800	XD	XD	X		X	X	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
	Benítez	SGAS	Asunción						35L		NPA		B747 380		XD					L	X	X		X	X	X	X	X	X	X	X	X	X	X	X			
	RS	SAEZ	Ezeiza																																			
		SCIE	Concepción						17L	4E	PA1		B747 3800	3	XD	X		X	X	L	X	X		X				X	X	X	X	X	X	X	X	X	X	X
		SACO	Córdoba						35R		NPA		B747 380		XD			X	X	L	X	X		X				X	X	X	X	X	X	X	X			
		SAME	Mendoza																																			
		SUMU	Montevideo																																			
SCIP	ISLA DE PASCUA / AP Mataveri	NIUE	Niue	8	X	X			10	4D	PA1	X	B747 3300	XD	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	NCRG	Rarotonga						28		NPA		B747 380							L	X							X	X	X	X	X	X	X	X	X		
		NTAA	Tahiti																																			
COLOMBIA																																						
SKBQ	BARRANQUILLA/Ernesto Cortissoz/Atlantico	SKCG	Cartagena	7	R	X	X		05	4E	PA1	X	A320 3000	X	XD	X		X	X	L	X	X		X	X		X	X	X	X	X	X	X	X	X	X		
	RS	SVMC	Maracaibo						23		NINST		A320 330							L							X	X		X		X	X		X			
		TNCA	Oranjestad																																			
		MPTO	Panamá																																			
		SKRG	Rionegro																																			
SKBO	Bogotá /Eldorado/Distrito Capital	SKBQ	Barranquilla	10	R	X	X	X	13L	4E	PA1	X	B747 3800	1	XD	X		X	X	L	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X
	RS	SKCL	Cali						31R		NINST		B747 396							L								X	X	X	X	X	X	X	X	X	X	X
		SKCG	Cartagena																																			
		SEGU	Guayaquil						13R	4E	PA2	X	B747 3800	2					X					X				X	X	X	X	X	X	X	X	X	X	X
		MPTO	Panamá						31L		NINST		B747 396							L								X	X	X	X	X	X	X	X	X	X	X
		SEQM	Quito																																			
		SKRG	Rionegro																																			
SKBG	BUCARAMANGA/Palonegro	SKCC	Cucuta	6	X	X	X		17	4C	PA1	X	A320 2170	X	XD	X				L	X	X	X	X	X		X	X	X	X	X	X		X	X	X		X
	RS	SKRG	Rionegro						35		NINST		140/F/A/X/T																									
		SKEJ	Barrancabermeja																																			
SKCL	CALI/Alfonso Bonilla Aragón/Valle	SKCG	Cartagena	7	R	X	X		01	4D	PA1	X	A320 3000	X	XD	X		X	X	L	X	X		X			X	X	X	X	X	X	X	X	X	X		
	RS	SKLT	Leticia						19		NINST		A320 293							L								X		X		X	X		X			
		SKRG	Rionegro																																			
		SKBO	Bogotá																																			
SKCG	CARTAGENA/Rafael Nuñez/Bolívar	SKBQ	Barranquilla	7	X	X	X		01	4D	NINST		A320 2540		XD	X			X	L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SVMC	Maracaibo						19		NPA		A320 150	X	XD	X				L							X	X		X	X				X	X		
		MPTO	Panamá																																			
		SKRG	Rionegro																																			

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso		Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa		RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas					Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
					APP	TWR	ATIS	AFIS	Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento	ILS	VOR	NDB /L	GNS S	PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	TDZ	MID	END
1		2		3	4				5	6	7	8	9	10				11										12								13		
SKCC	CUCUTA/Camilo Daza/Norte de Santander	SKBQ	Barranquilla	7	X	X	X		16	4C	PA1		A320 2320	X	XD	X		X	X	L	X			X			X	X	X	X	X	X	X	X	X	X		
	RNS & AS	SKCG	Cartagena						34		NINST		A320 107							L								X		X	X		X		X	X		
		SVMC	Maracaibo																															X				
		SVSA	San Antonio del						02		NINST		A320 1920							L									X	X	X		X		X	X		
			Táchira						20		NINST		A320 107								X			X			X	X		X	X		X		X			
SKLT	LETICIA/Alfredo Vásquez Cobo/Amazonas	SKCL	Cali	6	X	X	X		03	4C	PA1		E190 2010	X	XD	X			X	L	X			X			X	X	X	X	X		X	X	X	X		
	RNS & AS	SPQT	Iquitos						21		NINST		E190 160							L				X			X	X		X			X		X			
		SBTT	Tabatinga																																			
SKPI	PEREIRA/Matecaña	SKCL	Cali	7	X	X	X		08	4C	NPA		A320 2020		XD	X				L	X			X			X	X	X	X	X	X		X	X	X		X
	RS	SKRG	Rionegro						26		NINST		50/F/B/X/T																									
		SKBO	Bogota																																			
SKRG	RIONEGRO/José María Córdoba/Antioquia	SKCL	Cali	8	R	X	X		18	4D	PA1		A320 3500					X	X	L	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
	RS	SKCG	Cartagena						36		NINST	X	A320 330	X	XD	X				L								X	X	X	X	X	X	X	X	X	X	X
		MPTO	Panamá																																			
		SKBO	Bogotá																																			
SKSP	SAN ANDRÉS/Gustavo Rojas Pinilla/San Andrés	MROC	Alajuela	7	R	X	X		06	4C	NPA		A320 2375		XD	X		X	X	L	X	X	X	X			X	X	X	X	X		X	X	X	X		
	RS	MNMG	Managua						24		NINST		A320 150							L							X	X		X	X		X		X	X		
		MPTO	Panamá																																			
		MNPC	Puerto Cabezas																																			
		MSLP	San Salvador																																			
		MHTG	Tegucigalpa																																			
SKSM	SANTA MARTA/Simón Bolívar	SKCG	Cartagena	6	X	X	X		01	3C	NPA		A320 1700		XD	X				L	X						X	X	X	X	X	X		X	X	X		X
	RS	SKBQ	Barranquilla						19		NINST		69/F/A/X/T																									
		SKCC	Cucuta																																			
ECUADOR																																						
SEGU	GUAYAQUIL/José Joaquín Olmedo	SKCL	Cali	9	R	X	X		03	4E	NPA		B747		XD	X			X	L	X			X			X	X	X	X		X	X	X	X	X	X	
	RS	SPHI	Chiclayo						21		PA1	X	B747 325	X						L								X		X	X				X			
		SELT	Latacunga																																			
		SPIM	Lima-Callao																																			
		SEQM	Quito																																			
		SKRG	Rionegro																																			
		SKBO	Bogotá																																			
SELT	LATACUNGA/Cotopaxi	SEGU	Guayaquil	8	X	X			19	4E	PA1	X	B747 3641	X	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RNS & AS	SEQM	Quito						01		NPA		B747 340															X		X			X		X			

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso		Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa		RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas						Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
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1		2		3	4				5	6	7	8	9		10				11										12								13		
SEMT	MANTA/Eloy Alfaro	SPHI	Chiclayo	8	X	X			06	4E	NPA		B747	2852		XD	X			X	L	X			X			X	X	X	X		X	X	X	X	X		
	RS	SEGU	Guayaquil						24		PA1	X	B747	325	X						L								X		X	X				X			
		SELT	Latacunga																																				
		SEQM	Quito																																				
SEQM	QUITO/Mariscal Sucre	SKCL	Cali	9	R	X	X		18	4E	NPA		B747	4098		XD	X		X	X	L	X			X			X	X	X	X		X	X	X	X	X	X	
	RS	SEGU	Guayaquil						36		PA1	X	B747	340	X						L								X		X	X				X			
		SELT	Latacunga																																				
		MPTO	Panamá																																				
		SKRG	Rionegro																																				
		SKBO	Bogotá																																				
FRENCH GUIANA																																							
(France)																																							
SOCA	CAYENNE/Rochambeau	SBBE	Belém	9	R	X			08	4E	PA1	X	B747	3200	2*D	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SBSN	Santarém						26		NPA		B747	347							L								X		X			X		X			
		SYCJ	Timehri																																				
		SMJP	Zandery																																				
GUYANA																																							
SYCJ	Georgetown /Cheddi Jagan Int'l Airport	SOCA	Cayenne	10	X	X			06	4D	PA1	X	B757	2286	2*D	XD		X			L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	TTPP	Port of Spain						24		NPA		B757	110				X			L	X							X		X			X		X			
		SMJP	Zandery											- AS -																									
													B747	256																									
SYGO	Georgetown/Ogle International Airport	SYCJ	Timehri/Cheddi	5	X	X			07	3C	NPA	X	AT72	1280.5				X		X	S	X			X			X	X	X	X	X	X	X	X	X			
	RS		Jagan						25		NPA		AT72	15				X			S	X												X		X			
PANAMA																																							
MPBO	BOCAS DEL TORO/Bocas del Toro	MPDA	David	4		X			08	3B	NPA		ATR42	1500		XD						X							X	X	X		X						
	RG & AS	MPMG	Panamá						26		NPA		ATR42	12															X		X		X						
MPCH	CHANGUINOLA/Cap. Manuel Niño	MPDA	David	5		X			03	3C	NINST		ATR72	1100							L	X			X			X	X	X	X		X		X	X			
	RG & AS								21		NINST		ATR72	21							L								X		X					X			
MPDA	DAVID/Enrique Malek	MROC	Alajuela	7		X			04	4D	NPA		B757	2600		XD					L	X			X			X	X	X	X	X	X	X	X	X			
	RS	MPBO	Bocas del Toro						22		NINST		B757	123							L								X		X	X		X		X			
		MPMG	Panamá																																				
MPMG	PANAMÁ/Marcos A. Gelabert	MPDA	David	6	R	X	X		18	3C	NINST	X	F70	1800				XS			L	X			X			X	X	X	X		X	X	X	X	X		
	RG & AS	MPTO	Panamá						36		NINST		F70	68							L								X		X								

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso	Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa	RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas					Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
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1	2	3	4				5	6	7	8	9	10				11										12								13		
MPPA PANAMA/Pacifico	MPDA David	7	R	X			18	4D	NINST	X	B757-200 2,500								X			X			X	X	X	X	X	X	X	X				
AS	MPTO Panama						36		NPA		70/F/C/X/U				XS											X		X			X	X				
	SKCL Cali																																			
	SKBQ Barranquilla																																			
	MRLB Liberia																																			
	SKSP San Andres																																			
	MROC Alajuela																																			
MPTO PANAMÁ/Tocumen Intl	MROC Alajuela	9	R	X	X		03R	4E	PA1	X	A340 3050	2*	XD	X	XS	X		L	X			X	X	X	X	X	X	X	X	X	X	X	X	X		
RS	SKBQ Barranquilla						21L		NPA		A340 350						X	L								X		X			X	X		X		
	SKCL Cali										140/R/C/X/U																									
	SKCG Cartagena																																			
	MPDA David						03L	4E	NPA		A340 2682		XD			X		L	X						X	X	X	X	X	X	X	X	X			
	MRLB Liberia						21R		NINST		A340 180							L								X		X			X		X			
	MPMG Panamá										74/F/C/W/U																									
	SKSP San Andrés																																			
PARAGUAY																																				
SGAS LUQUE/Silvio Pettirossi Intl.	SAEZ Ezeiza	9	R	X			02	4D	NPA		A320 3300	2*D	XD	X			X	L	X			X			X	X	X	X		X	X	X	X			
RS	SBKP Campinas						20		PA1	X	B747 370							L								X		X	X		X		X	X		
	SBCG Campo Grande																																			
	SGES Ciudud del Este																																			
	SACO Córdoba																																			
	SBFI Foz do Iguaçu																																			
	SUMU Montevideo																																			
	SBPA Porto Alegre																																			
	SARE Resistencia																																			
	SBGR São Paulo																																			
SGES MINGA GUAZÚ/Guaraní Intl.	SGAS Asunción	9	R	X			05	4E	NPA		B747 3400		XD				X	L	X			X			X	X	X	X		X	X	X	X			
RS	SBFL Florianópolis						23		PA1	X	B747 336	2*						L								X		X	X		X		X	X		
	SBFI Foz do Iguaçu																																			
	SARI Iguazú																																			
	SARE Resistencia																																			
PERU																																				
SPQU AREQUIPA/INTL Alfredo Rodríquez Ballón	SPZO Cuzco	7	R	X			09	4D	PA1	X	B757 2980	XD	XD			X		L	X			X			X	X	X	X	X	X	X	X	X	X		
AS	SLLP La Paz						27		NINST		B757 100							L								X		X			X		X			
	SPIM Lima-Callao																																			

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso	Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa	RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas					Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
			APP	TWR	ATIS	AFIS	Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento	ILS	VOR	NDB/L	GNSS	PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	TDZ	MID	END
1	2	3	4				5	6	7	8	9	10				11										12								13		
SPHI CHICLAYO/ INTL Capitán FAP José Abelardo Quinoñes Gonzalez; Gran General del Aire del Peru AS	SEGU Guayaquil SPQT Iquitos SPIM Lima-Callao	8	R	X			01 19	4D	PA1 NINST	X	B767 2520 B767 141	XD	XD	X		X		L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		
SPZO Cusco/INTL Teniente FAP Alejandro Velazco Astete RS	SPQU Arequipa SLLP La Paz SPIM Lima-Callao SPSO Pisco	7	R	X	X		10 28	4D	NINST NPA		B757 3400 B757 104		XD				X	L L								X X	X	X X		X	X X	X	X X			
SPQT IQUITOS/ INTL Coronel FAP Francisco Secada Vignetta RS	SPHI Chiclayo SEGU Guyaquil SKLT Leticia SPIM Lima-Callao	8	R	X			06 24	4D	PA1 NINST	X	B767 2500 B767 145	XD	XD	X		X		L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		
SPIM LIMA-CALLAO/ INTL Jorge Chávez RS	SPQU Arequipa SPHI Chiclayo SLCB Cochabamba SEGU Guayaquil SPQT Iquitos SPSO Pisco SEQM Quito SPRU Trujillo	9	R	X	X		15 33	4E	PA2 NPA	X	B747 3507 B747 380	XD	XD	X		X		L L	X	X	X	X			X	X X	X	X X	X	X	X X	X	X X	X	X	
SPSO PISCO/INTL Pisco AS	SPZO Cusco SPIM Lima-Callao	9	X	X			04 22	4E	NINST PA1	 X	B747 3020 B747 358	 X	XD			 X		 L	X			X		X	X	X X	X	X X		X	X X	X	X X			
SPTN TACNA/ INTL Coronel FAP Carlos Ciriani Santa Rosa RG		7	X	X			02 20	4C	PA1 NINST	X	B727 2500 B727 71	XD	XD			X		L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		
SPRU TRUJILLO/ INTL Capitán FAP Carlos Martínez de Pinillos AS	SPIM Lima-Callao	7	X	X			01 19	4C	PA1 NINST	X	B727 2550 B727 71	X	XD					L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		
SURINAME																																				
SMZO PARAMARIBO/Zorg en Hoop RG		3		X			11 29	1A	NINST NINST		DH6 610 DH6 6							S S								X X	X	X X		X	X	X				
SMJP ZANDERY/Johan Adolf Pengel Intl RS	SBBE Belém TBPB Bridgetown SOCA Cayenne SYCJ Georgetown TTPP Port of Spain	9	X	X			11 29	4E	PA1 NPA	X	B747 3480 B747 330	2*	XD	X		X		L L	X			X			X	X X	X	X X	X	X	X X	X	X X	X		

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso		Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa		RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas						Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
					APP	TWR	ATIS	AFIS	Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento		ILS	VOR	NDB /L	GNSS	PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	TDZ	MID	END
1		2		3	4				5	6	7	8	9		10				11										12								13		
URUGUAY																																							
SULS	MALDONADO/Intl. C/C, Carlos A. Curbelo	SAEZ	Buenos Aires	7		X			08	4C	NPA		B737	2133		XD		X		X	L	X			X			X	X	X	X			X		X			
	"Laguna del Sauce"	SUMU	Montevideo						26		NPA		B737	45		XD	X	X		X	L								X		X			X		X			
	RS	SBPA	Porto Alegre																																				
									01	3C	NPA	X		1600		XD	X				L	X			X				X	X	X				X	X			
									19		NPA			38		XD				X	L								X		X					X			
SUMU	MONTEVIDEO/ Intl. de Carrasco "Gral. Cesáreo	SGAS	Asunción	9	R	X			06	4E	NPA	X	MD11	3200		XD		X		X	L	X	X		X			X	X	X	X	X	X	X	X	X			
	L. Berisso"	SAEZ	Buenos Aires						24		PA1	X	B747	45	1D	XD	X	X	XM		L				X				X		X	X			X	X	X		
	RS	SBKP	Campinas																																				
		SACO	Córdoba																																				
		SAZM	Mar del Plata						01	4E	NPA	X		2250				X		X	L	X			X				X	X	X	X	X	X	X	X			
		SBPA	Porto Alegre						19		PA1	X		45	1D				XM		L				X				X		X	X			X	X	X		
		SAAR	Rosario																																				
VENEZUELA																																							
SVBC	BARCELONA/Gral. José Antonio Anzóategui Intl	SVMI	Caracas	9	X	X	X		15	4E	PA1	X	B747	3000	2*D	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RNS	SVMC	Maracaibo						33		NINST		B747	210							L								X		X			X		X			
		SVMG	Margarita																																				
SVMI	MAIQUETIA/Simón Bolívar Intl	SKBQ	Barranquilla	9	R	X			10	4E	PA1	X	B747	3500	X	XD	X		X		L	X			X				X	X	X	X	X		X	X		X	
	RS	TBPB	Bridgetown						28		NINST	X	B747	372							L	X			X			X	X	X	X	X	X		X	X		X	
		TFFF	Fort-de-France																																				
		SVMC	Maracaibo						09			X										X			X				X	X	X	X	X		X	X		X	
		SVMG	Margarita						27		NINST																												
		TNCE	Oranjestad																																				
		TFFR	Pointe-à-Pitre																																				
		TTPP	Port of Spain																																				
		SVVA	Valencia																																				
		TNCC	Willemstad																																				
SVMC	MARACAIBO/La Chinita Intl	SKBQ	Barranquilla	8	R	X	X		02L	4D	PA1	X	DC10	3000	2*D	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	RS	SVMI	Caracas						20R		NINST		DC10	190							L								X		X			X		X			
		SVVA	Valencia																																				
SVMG	MARGARITA/Intl Del Caribe Gral. Santiago	SVMI	Caracas	9	R	X	X		09	4E	PA1	X	B747	3180	2*	XD	X		X		L	X			X			X	X	X	X	X	X	X	X	X	X		
	Marino	TTPP	Port of Spain						27		NINST		B747	320							L								X		X			X		X			
	RS	TGPY	Saint Georges																																				

City/Aerodrome/Use Ville/Aérodrome/Vocation Ciudad/Aeródromo/Uso	Alternate aerodromes Aérodromes de dégagement Aeródromos de alternativa	RFF	ATS				Physical characteristics Caractéristiques physiques Características físicas					Radio aids Aides radio Radioayudas				Lighting aids Aides lumineuses Ayudas luminosas										Marking aids Marques Señalamiento								RVR		
			APP	TWR	ATIS	AFIS	Rwy no. Piste no Pista núm.	RC CR	Rwy type Type de piste Tipo de pista	TWY	Runway length/ Pavement strength Longueur de la piste/Résistance de la chaussée Longitud de pista/ Resistencia del pavimento	ILS	VOR	NDB /L	GNSS	PA	SA	VA	RWY	CLL	TDZ	TE	TC	STB	B	DES	CLM	THR	TDZ	SST	AMG	TWY	HLD	TDZ	MID	END
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SVJC PARAGUANA/Josefa Camejo Intl RS	SVMI Caracas SVMC Maracaibo SVVA Valencia	6	X	X			09 27	4C	NPA NINST		DC9 2800 DC9 45		XD	X				L L	X			X			X	X X	X	X X		X	X X	X	X X			
SVSA SAN ANTONIO DEL TÁCHIRA/San Antonio del Táchira Intl RS	SKCC Cucuta SVMC Maracaibo SKRG Rionegro SVVA Valencia	7	X	X			16 34	4C	NPA NINST		B727 1850 B727 75		XD	X				L L	X			X			X	X X	X	X X		X	X X	X	X X			
SVVA VALENCIA/Zim Valencia Intl RS	SVMI Caracas SKCC Cucuta SVMC Maracaibo SVSA San Antonio del Táchira	7	X	X			10 28	4C	NINST NPA		B727 2350 B727 76			X				L L	X			X			X	X X	X	X X		X	X X	X	X X			

APPENDIX F

TERMS OF REFERENCE AND WORK PROGRAMME FOR THE SAM REGION PBN IMPLEMENTATION GROUP (SAM/PBN/IG)

1. TERMS OF REFERENCE

Coordinate SAM PBN Implementation Project in the en-route, terminal, and approach flight phases, taking into account the performance-based navigation (PBN) concept, according to the ICAO Strategic Objectives, the Aviation System Block Upgrades methodology (B0-APTA, B0-FRTO, B0-CCO, B0-CDO) and the goals established by the Bogota Declaration.

2. WORK PROGRAMME

a) Evaluate and perform the changes deemed necessary in the PBN Implementation Project, in the portion related to En-Route Operations, with a view to optimising the ATS route structure.

b) Develop the tasks of the PBN implementation Project in the portion related to en-route operations assigned to the SAM/PBN/IG.

c) Evaluate, insert and harmonize the activities of SAM PBN Project related toPBN Implementation in the TMA selected by SAM States.
Note: Implementation by SAM States.

d) Evaluate, insert and harmonize the activities of the Implementation Project related to PBN Implementation for approach operations.
Note: Implementation by SAM States.

e) Propose workshops and meetings as necessary for the coordination and harmonization of PBN implementation.

f) Propose the hiring of experts as necessary, for the development of specific tasks of high complexity for the PBN implementation, mainly for en-route operations and its interrelation with operations in major South American TMA.

g) Follow-up of PBN implementation for en-route, TMA and approach operations to ensure its intra and inter-regional harmonisation.

h) In coordination with the ICAO NACC Regional Office in Mexico, consider the necessary activities to ensure harmonisation of PBN implementation in the CAR and SAM Regions, in accordance with GREPECAS PBN Programme.

3. COMPOSITION

Argentina, Bolivia, Brazil, Chile, Colombia, French Guiana, Guyana, Ecuador, Panama, Paraguay, Peru, Suriname, Uruguay, Venezuela and IATA.

4. RAPPORTEUR

Julio de Souza Pereira, IATA

APPENDIX G / APÉNDICE G

LIST OF CONTACTS FOR OPERATIONAL PBN FOCAL POINTS

LISTA DE CONTACTOS PARA PUNTOS FOCALES PBN

State/ Estado	**PBN FOCAL POINTS PUNTOS FOCALES PBN**
ARGENTINA*	Carlos Omar Torres Administración Nacional de Aeronáutica Civil (ANAC) Jefe Departamento Programación Técnica Tel: +54 11 5941-3000, Ext. 69193 E-mail: ctorres@anac.gov.ar Víctor Marcelo de Virgilio Jefe del Departamento Gestión del Espacio Aéreo Tel.: +5411 4317-6000, Ext 15130/14105 E-mail: dsna@faa.mil.ar
BOLIVIA (Plurinational State of) / **BOLIVIA (Estado Plurinacional de)***	Luis Benjamín Rojas Santa Cruz Dirección General de Aeronáutica Civil (DGAC-BOLIVIA) Especialista Planificación de Espacios Aéreos y Procedimientos de Vuelo Tel.: +591 4 4221696 Cel.: +591 72035429 E-mail: lrojas@dgac.gob.bo
BRAZIL / BRASIL*	Luiz Antonio dos Santos Jefe ATM Departamento de Control del Espacio Aéreo (DECEA) Av. General Justo, 160 – Centro Rio de Janeiro 20.021-130, Brasil Tel: +55 21 2101-6088 E-mail: luizantoniolas@decea.gov.br Marcelo Marques Lobo Jefe de Sección del Espacio Aéreo Departamento de Control del Espacio Aéreo (DECEA) Av. General Justo, 160 – Centro Rio de Janeiro 20.021-130, Brasil Tel: +55 21 2101-6752 E-mail: lobomml@decea.gov.br

State/ Estado	PBN FOCAL POINTS PUNTOS FOCALES PBN
CHILE*	Alfonso De La Vega Encargado Sección Navegación Aérea Dirección General Aeronáutica Civil (DGAC) Miguel Claro 1314 Providencia, Santiago, Chile Tel: +56 2 439-2952 E-mail: adelavega@dgac.gob.cl Hector Ibarra Martínez ATC Planificador ATM Dirección General Aeronáutica Civil (DGAC) Miguel Claro 1314 Providencia, Santiago, Chile Tel: +56 2 228364020 E-mail: hibarra@dgac.gob.cl Marco Abarca Daza ATC Diseñador de Procedimientos Dirección General Aeronáutica Civil (DGAC) Miguel Claro 1314 Providencia, Santiago, Chile Tel: +56 2 22904718 E-mail: mabarca@dgac.gob.cl
COLOMBIA*	Medardo Arcesio Figueroa Guerrero Jefe Grupo de Procedimientos ATM Edificio CNA – Centro Nacional de Aeronavegación Av. El Dorado No. 112-09 Bogotá, Colombia Tel: +57 1 296-2545 E-mail: medardo.figueroa@aerocivil.gov.co
ECUADOR*	Marcelo Valencia Taco Tel: +593-2-2947400, Ext. 4084 E-mail: marcelo_valencia@aviacioncivil.gob.ec Vicente Navarrete Sarasti Tel: +593-2-2947400, Ext. 4086 E-mail: vicente.navarrete@aviacioncivil.gob.ec

State/ Estado	PBN FOCAL POINTS PUNTOS FOCALES PBN
FR. GUIANA / GUYANA FRANCESA	Philippe Rondel E-mail: philippe.rondel@aviation-civile.gouv.fr
GUYANA	Chaitrani Heeralal E-mail: dans@gcaa-gy.org
PANAMÁ*	Ana Teresa Montenegro de De León Jefe Planificación de Espacio Aéreo Autoridad Aeronática Civil Edif. N° 646 Av. Demetrio Korsi Calle Héctor Conte Bermúdez Albrook, Panamá Tel: +507 315-9834 E-mail: anadeleon@aeronautica.gob.pa
PARAGUAY*	José Luis Chávez Gerente de Tráfico Aéreo Dirección Nacional de Aeronáutica Civil Aeropuerto Internacional Silvio Pettirossi Tel: +59521 6882346 E-mail: atm_gnna@dinac.gov.py

State/ Estado	PBN FOCAL POINTS PUNTOS FOCALES PBN
PERÚ*	Sady Orlando Beaumont Valdez Inspector Navegación Aérea Dirección General de Aeronáutica Civil (DGAC) Ministerio de Transportes y Comunicaciones Jirón Zorritos 1203 Lima, Perú Tel: +51 1 615-7880 E-mail: sbeaumont@mtc.gob.pe Tomás Ben-Hur Macedo Cisneros Experto PANS-OPS en el Área de Normas y Procedimientos Controlador de Tránsito Aéreo CORPAC S.A. Callao, Perú Tel: +511 414-1442 E-mail: tmacedo@corpac.gob.pe
SURINAME	Tjiettrawatie Akloe Controlador de Tráfico Aéreo Suriname Civil Aviation Department Coesewijnestraat # 1 Zorg en Hoop, Paramaribo Suriname Tel: +597 875 4741 E-mail: cheetra@hotmail.com

State/ Estado	**PBN FOCAL POINTS PUNTOS FOCALES PBN**
URUGUAY*	Rosanna Barú Jefa Dpto. Servicios Aeronáuticos División Navegación Aérea - DINACIA Tel: +5982604 0408 int. 4461 Cel: +598 99204 199 E-mail: rbaru@dinacia.gub.uy rocbb17@gmail.com Miguel Ángel Miraballes Alonzo Instructor/Asesor Técnico - DINACIA Diag 9 E "C" y "D" Sol y Luna, Parque del Plata Canelones, Uruguay Tel: +5984 375-2405 Cel: +598 96323872 E-mail: doblemaik@gmail.com
VENEZUELA (Bolivarian Republic of) / **VENEZUELA (República Bolivariana de)***	Omar Enrique Linares Planificador de Espacios Aéreos Instituto Nacional de Aviación Civil - INAC Aeropuerto Internacional Simón Bolívar Edificio ATC, piso 1, Oficina AIS Maiquetía, Vargas República Bolivariana de Venezuela Tel: +58 212 355-2898 E-mail: o.linares@inac.gob.ve ollinaresomar2@gmail.com Pablo Rattia Rodríguez Planificador de Espacios Aéreos Instituto Nacional de Aviación Civil - INAC Aeropuerto Internacional Simón Bolívar Edificio ATC, piso 1, Oficina AIS Maiquetía, Vargas República Bolivariana de Venezuela Tel: +58 426 531-0616 E-mail: p.rattia@inac.gob.ve

** Updated SAM/IG/15 / Actualizados en la SAM/IG/15*

APPENDIX H

PBN IMPLEMENTATION PLAN

MODEL

PBN Implementation Plan
State XX

Table of Contents

1. Objective

This PBN Implementation Plan has the following objectives:

a) Provide a high-level strategy for PBN implementation in (indicate STATE and/or ANSP). This strategy is based on PBN, area navigation (RNAV), and required navigation performance (RNP) concepts to be applied in aircraft operations in all flight phases: en-route (oceanic and continental), TMA (SIDs and STARs), and IFR approach, in accordance with implementation objectives set forth in ICAO Assembly Resolution A37-11, and based on the Bogota Declaration formulated at the Thirteenth Meeting of Civil Aviation Authorities of the SAM Region.

b) Avoid unnecessarily imposing the requirement of carrying multiple equipment units on board or having multiple ground equipment.

c) Avoid the need for multiple aircraft and operator approvals for intra- and inter-regional navigation.

2. Background

Resolution A37-11: The global performance-based navigation goals require States to develop a PBN implementation plan, as a matter of urgency, with a view to:

a) implementing RNAV and RNP operations (where required) for en-route and terminal areas, in accordance with the established deadlines;

b) implementing by 2016 approach procedures (Baro-VNAV and/or augmented GNSS) with vertical guidance (APV), including minima for LNAV only, for all instrument flight runway ends, whether as main approach or in support of precision approach, with the following intermediate milestones: 30% by 2010 and 70% by 2014; and

c) implementing direct LNAV procedures only, as an exception to b) above, for instrument flight runways at aerodromes lacking local altimeter facilities and where there are no aircraft properly equipped for APV operations with a maximum certificated take-off mass of 5 700 kg or more.

Pursuant to Resolution A37-11, SAM States have signed the Bogota Declaration. Out of the 15 goals established in said declaration, 5 are directly related and 3 are indirectly related to PBN implementation. These goals are:

Indirectly related

- Accidents – Reduce the SAM regional accident rate gap by 50% with respect to the global accident rate.
- Runway excursions – Reduce runway excursions by 20% with respect to the average rate of the Region (2007 – 2012).
- ATFM - 100% of area control centres (ACCs) providing air traffic flow management (ATFM) services.

Directly related

- Performance-based navigation (PBN) terminal – Compliance with goals established in ICAO Assembly Resolution A37-11 regarding approach procedures with vertical guidance (APV).
- En-route PBN
  - 60% of international aerodromes with PBN standard instrument departures (SIDs) / standard instrument arrivals (STARs).
  - 60% of routes/airspaces with PBN.
- CDO - 40% of international aerodromes / terminal control areas (TMAs) with continuous descent operations (CDO).
- CCO - 40% of international aerodromes / TMAs with continuous climb operations (CCO).
- Estimation of fuel savings / reduction of $C0_2$ emissions based on the ICAO fuel savings estimation tool (IFSET) - Reach 40,000 tonnes of regional CO_2 emission reduction per year in en-route PBN implementation.

Thus, PBN implementation is assigned high priority within the ATM Work Programme of the South American Regional Office and of (indicate the State and/or ANSP).

3. Introduction

(AT THE DISCRETION OF THE STATE)

The success of PBN implementation will depend on effective participation by the ATM community to ensure that the operational requirements of the various airspace users, as well as those of service providers are met.

4. Strategic Objectives

4.1 En-route operations

The implementation of PBN for en-route operations in continental airspace within the jurisdiction of (INDICATE THE STATE) will be done in accordance with the SAM regional strategy to meet the following strategic objectives:

a) Safety – The implementation of RNAV-5 has enabled formal and harmonised use of RNAV in new and existing RNAV routes, and created the necessary conditions for a complete restructuring of the route network. Consequently, it will be possible to develop a less complicated route network, reducing the controller workload and thus, increasing safety.

b) Capacity – Taking into account reduced airspace complexity and the resulting reduction in controller workload, there will be an increase in ATC capacity of sectors, allowing a larger number of aircraft to fly at the same time.

c) Efficiency – The implementation of RNAV-5 will increase operational efficiency, since it will permit:

- Airspace management improvements through the repositioning of intersections.
- Better use of available airspace through a route structure that allows for the establishment of:
  - More direct routes (double and parallel, if necessary) to accommodate more air traffic.
  - “Bypass” routes for aircraft overflying highly dense TMAs.
  - Alternate or contingency routes.
  - Optimum in-flight holding positions.
  - Optimised feeder routes.
- Reduction of distances flown, resulting in fuel savings.
- Reduction in the number of navigation radio aids.

d) Environmental protection – As a result of increased efficiency and fuel savings, there will be a reduction of harmful gas emissions into the atmosphere.

4.2 Terminal control areas (SIDs and STARs) and approach

The implementation of RNP1 and/or RNAV1 at the main TMAs, and of RNP APCH with Baro-VNAV at all thresholds used for IFR and/or RNP AR APCH operations where operational benefits (safety, efficiency, and access) can be obtained will mainly satisfy the following strategic objectives:

a) Safety – The implementation of RNP1 and/or RNAV-1 at the TMAs will permit segregation of arrival and departure paths, avoiding conflicts between aircraft. Use of RNP APCH with APV/Baro-VNAV and/or RNP AR ACPH will reduce the risk of controlled flight into terrain (CFIT).

b) Capacity – Use of RNAV-1 and/or RNP1 SIDs/STARs will permit reduced use of radar vectors and, thus, a reduction in airspace complexity and controller workload, increasing ATC capacity of sectors and allowing a larger number of aircraft to fly at the same time.

c) Efficiency – The implementation of RNP1 and/or RNAV-1 will improve efficiency, since the establishment of well-defined departure and arrival points will permit the restructuring of the routes arriving to/departing from the TMA, reducing flight time. STAR and approach interaction will create the conditions for the establishment of optimum arrival paths, from the en-route phase to the final approach. Likewise, RNP1 and RNAV-1 navigation precision will make aircraft paths more predictable, facilitating aircraft separation and reducing the need for air traffic controller intervention in case of aircraft deviation from the foreseen paths. STAR and approach integration will also improve predictability.

d) Environmental protection – Improved efficiency and fuel savings will reduce the emission of harmful gases into the atmosphere. Furthermore, the use of CDO/CCO will help reduce aeronautical noise.

e) Access – The implementation of RNAV (GNSS) approach with Baro-VNAV and/or RNP AR APCH at airports lacking ILS or whose terrain/obstacles result in high meteorological operational minima, will improve aerodrome access under adverse meteorological conditions.

5. Implementation

5.1 En-route operations

En-route PBN implementation is dealt with at regional level, taking into account that the main traffic flows stradding two or more States.

The regional PBN implementation strategy for en-route operations is based on the route network version concept, taking into account that airspace structure changes resulting from air traffic growth, traffic demand displacement from one Region or airport to another, and available technology, amongst other aspects. The use of route network versions reflects the need for periodic, comprehensive reviews to make sure that the best possible airspace structure is always available within the context of an integrated development concept. Route network versions are the result of a broader route network analysis based on traffic and fleet navigation capacity statistics, seeking the elimination of routes not being used and the exclusion or reduced use of “conventional” routes in a given airspace volume where most users have the capability of conducting RNAV-5 operations.

Furthermore, SAM route network versions must seek a complete route network restructuring through full integration of ATS routes, control sectors, TMAs, etc., using the flexible use of airspace concept. Likewise, the use of specific airspace modelling and fast-time ATC simulation tools should be assessed.

5.2 Complete redesign of terminal areas

5.2.1 TMA XX

5.2.1.1 Preliminary operational requirements

5.2.1.2 Tentative date of implementation

5.2.2 TMA YY

5.2.2.1 Preliminary operational requirements

5.2.2.2 Tentative date of implementation

5.2.3 TMA ZZ

5.2.3.1 Preliminary operational requirements

5.2.3.2 Tentative date of implementation

5.3 Implementation of arrivals and departures, using CDO and CCO

The purpose of the PBN SID and STAR implementation programme is to publish these instrument procedures for all thresholds that operate IFR, with the use of CDO and CCO techniques.

Plans for, and the status of, implementation of PBN arrivals and departures, with or without the use of CDO and CCO techniques, are shown in **Appendix A** (example: BOLIVIA), and will be updated and delivered to the SAM Regional Office on 31 December each year.

5.4 PBN approach

The purpose of the Aerodrome Approach Implementation Programme is to publish RNAV (GNSS) approach procedures for all thresholds that operate IFR, with the possibility of using vertical navigation (LNAV/VNAV) by using Baro-VNAV. Furthermore, ILS approach procedures will be published for airports with ILS equipment to facilitate arrival and approach interface.

Plans for, and the status of, implementation of PBN approach procedures are shown in **Appendix A** (example: BOLIVIA), which will be updated and delivered to the SAM Regional Office on 31 December each year.

5.5 Fuel savings and reduction of CO_2 emissions

Fuel savings and the reduction of CO_2 emissions to be achieved through PBN implementation will be calculated using the IFSET tool, with a view to determining the efficiency of such implementation. The aforementioned calculation will be part of the complete redesign of the main TMAs and of the implementation of SIDs, STARs, and APV approach procedures. These calculations of fuel savings and CO_2 emission reduction will be delivered to the SAM Regional Office on 31 December each year.

Calculations of actual fuel savings and reduction of CO_2 emissions will be performed during the post-implementation phase, using tools that retrieve data from Flight Operations Quality Assurance and/or other means that could provide actual information on fuel savings. Once these data are available, they will be delivered to the SAM Regional Office.

Appendix A

Status of implementation of PBN SIDs, STARs, and approach procedures

DATA COLLECTION DATE: 10 OCTOBER 2014										
STATE	**CAR/SAM ANP INTERNATIONAL AIRPORTS**	**IFR thresholds**	**APV IAP**	**LNAV IAP**	**RNPAR IAP**	**PBN SID**	**PBN STAR**	**CCO SIC**	**CDO STAR**	**OBS**
BOLIVIA	**BOLIVIA (5 AIRPORTS)**									
	SLCB COCHABAMBA	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(3)
	SLLP LA PAZ									
	SLVR SANTA CRUZ									
	SLTJ TARIJA									
	SLTR TRINIDAD									

Note: The cited AIRAC dates are tentative, based on the capability of publishing instrument procedures.

(1) Insert the direction of thresholds that have IFR operations or that are capable of supporting them.
(2) Insert "yes" if the airport threshold already has the instrument procedure indicated in the title of the column (APV IAP, LNAV IAP, RNAV AR IAP, PBN SID or PBN STAR). Insert the tentative AIRAC date of implementation for the type of procedure, if not yet implemented.
(3) Insert any relevant remarks. If applicable, provide summarised information on the reason whey the threshold does not support IFR operations.

APPENDIX I

PBN IMPLEMENTATION PLAN

ARGENTINA

(Spanish only)

Plan de Implantación PBN

ARGENTINA

Índice

1. Objetivo

El presente Plan de Implantación PBN tiene los siguientes objetivos:

a) Proporcionar una estrategia de alto nivel para la implantación de la PBN en Argentina. Esta estrategia se basa en los conceptos PBN, Navegación de Área (RNAV) y Performance Requerida de la Navegación (RNP), que serán aplicados a las operaciones de aeronaves en todas las fases de vuelo:

Ruta (Oceánico y continental),

TMA (SID y STAR) y

Aproximación IFR,

De acuerdo con los objetivos de implantación previstos en la resolución A37-11 de la 37ª Asamblea de la OACI y con base en la Declaración de Bogotá, establecida en la Decimotercera Reunión de Autoridades de Aviación Civil de la Región SAM.

b) Evitar imponer innecesariamente el mandato por equipos múltiples a bordo o sistemas múltiples en tierra.

c) Evitar la necesidad de aprobaciones múltiples de aeronaves y operadores para la navegación intra e inter-regionales.

2. Antecedentes

La ANAC tomo la Resolución A37-11 de la OACI en la cual se tratan las Metas mundiales de Navegación Basada en la performance, la cual requiere que los Estados perfeccionen sus Planes de Implantación de la PBN con carácter urgente a fin de lograr lo siguiente:

a) **Implantación de operaciones RNAV y RNP**, donde según los estudios se considere que se requiere tanto para áreas en ruta o terminales de acuerdo con los plazos y los hitos intermedios establecidos;

b) **Implantación para 2016 de procedimientos de aproximación con guía vertical (APV) (Baro-VNAV y/o GNSS aumentado)**, incluidos los mínimos para LNAV únicamente, para todos los extremos de pistas de vuelo por instrumentos, ya sea como aproximación principal o como apoyo para aproximaciones de precisión, con los hitos intermedios siguientes: 30% para 2010 y 70% para 2014, de los cuales Argentina según Plan nacional de Navegación Aérea tomo las siguientes fechas: 30% para **2015** y 70% para **2017**; y

c) **Implantación de procedimientos directos LNAV** únicamente, como excepción de b) anterior, para las pistas de vuelo por instrumentos en aeródromos en donde no hay instalaciones de altímetro local disponibles y donde no hay aeronaves adecuadamente equipadas para operaciones APV con una masa máxima certificada de despegue de 5700 kg o más, Argentina también adopto esta postura para ciertos aeródromos que según el análisis costo/beneficio, no ameriten que se cumpla con el inciso b).

Como consecuencia de la Resolución A37-11, la ANAC como representante del Estado Argentino firmó la Declaración de Bogotá. De las 15 metas establecidas en la mencionada declaración, la ANAC ha considerado que podrán ser cumplidas, con alguna diferencia en los tiempos de implantación, dándose prioridad a las 5 que tienen relación directa y las 3 tienen relación indirecta con la implementación de la PBN. Debido a lo antes mencionado, el detalle según su relación de las metas tomadas con prioridad es el siguiente:

Relación Indirecta

- ✓ **Accidentes** - Reducir la brecha (GAP) de la tasa de accidentes de la Región SAM en un 50% con relación a la tasa mundial de accidentes.

- **Excursiones en pista** - Reducir en 20% la tasa de excursiones de pista con relación a la tasa promedio de la Región (2007 – 2012).
- **ATFM** – La ANAC preparara su planificación estratégica considerando que para **2017** deberá contar con el 100% de centros de control de área (ACC´s) proporcionando el servicio de gestión de la afluencia del tránsito aéreo (ATFM).

Relación Directa

- **Navegación Basada en Performance (PBN) Terminal** - La ANAC desarrollará sus proyectos de PBN a nivel de planificación estratégica considerando que para **2016** deberá haber cumplimentado las metas establecidas en la Resolución A37-11 de la Asamblea de la OACI en relación a los procedimientos de aproximación con guía vertical (APV).

- **PBN en ruta -** La ANAC desarrollará sus proyectos de PBN en rutas nacionales e internacionales a nivel de planificación estratégica considerando que para **2016** deberá haber cumplimentado:

  - 60% de aeródromos internacionales con Salida normalizada por instrumentos (SID) / llegada normalizada por instrumentos (STAR) PBN.

  - 60% de rutas/espacios aéreos con PBN.

- CDO - 40% de aeródromos internacionales / áreas de control terminal (TMA) con operación de descenso continuo (CDO). Plan de Implantación PBN – Estado XX

- CCO - 40% de aeródromos internacionales / TMA’s con operación de ascenso continuo (CCO).

- Un estimado de ahorro en combustible / reducción en emisiones de C0 2 con base en la herramienta de la OACI para la estimación de ahorro de combustible (IFSET) - del 2% anual (según lo expresado en la Res. 37/19) lo que permitirá alcanzar a nivel regional 40,000 Toneladas de reducción de emisiones CO 2 anuales en la implantación de la PBN en ruta.

De esa manera, considerando que la implementación PBN tiene una alta prioridad en el Programa de Trabajo ATM de la Oficina Regional Sudamericana y de Argentina.

3. Introducción

El continuo crecimiento del flujo de tránsito aéreo y las previsiones de aumento de la demanda muestran que la red de rutas ATS actuales resulta claramente ineficaz al momento de gestionar la capacidad disponible de espacio aéreo y satisfacer las expectativas de los usuarios en términos de mayor flexibilidad operacional, puntualidad y reducción de costes a los operadores. De igual modo, el sistema de rutas tampoco permite explotar las nuevas tecnologías de equipos de navegación aérea.

El criterio convencional usado para el Diseño de Procedimientos Instrumentales y Rutas e incluso el criterio RNAV básico que ha sido implementado hasta ahora, funcionan sobre la base de considerar el equipamiento básico y promedio que una aeronave debería poseer.

Al efecto de lograr un avance uniforme en la implementación de los planes nacionales, los estados junto a la industria y la oficina regional OACI CAR/SAM elaboraron una hoja de Ruta PBN, consiguiendo Planes de Navegación Aérea y los Planes Regionales CNS/ATM como principal herramienta en la que se basa el desarrollo de la planificación actual de los Grupos Regionales de Planificación e Implantación (PIRGs), para el caso de Argentina el GREPECAS.

Teniendo en consideración el constante desarrollo a nivel regional, las Autoridades de Aviación Civil de Sudamérica, en su décimo tercera reunión celebrada en Bogotá, Colombia, del 4 al 6 de diciembre de 2013 convocada por la Oficina Regional Sudamericana de la Organización de Aviación Civil Internacional (OACI) acordaron la armonización de normas y procedimientos a nivel regional a fin de facilitar un ambiente colaborativo entre los Estados a la vez que garantizando el incremento de los niveles de seguridad de las operaciones aéreas en la región.

Finalmente, con la intención de contar con una planificación detallada de la navegación aérea a nivel Estado, se consideró conveniente la preparación de un Plan Nacional de Implantación PBN para la Argentina, en el cual se proporciona una guía y dirección apropiadas a quienes pueden ser afectados, tales como: Reguladores, Proveedor(es) de servicios de navegación aérea, Empresas Aéreas, Aviación General, Organismos de Gestión aeroportuaria, etc.

A nivel nacional, como hecho significativo, podemos mencionar algunos avances en el ámbito de la planificación:

- ✓ A partir de la Resolución ANAC 029/2014 se determina la necesidad y conveniencia de efectuar el rediseño de la estructura de trayectorias de entrada y salida de aeronaves dentro del Área de Control Terminal (TMA) BAIRES, cuya implantación se realizará en etapas que guarden relación con los parámetros aceptables de seguridad operacional.

- ✓ Considerando la magnitud de la tarea, se conforma el equipo de especialistas denominado “Equipo de Trabajo PBN” a los efectos de la modernización del espacio aéreo argentino, mediante procedimientos de Navegación Basado en la Performance (PBN). (Resolución 961/2014)
- ✓ Se designa al Sr. Carlos Omar TORRES como coordinador del Equipo de Trabajo para la modernización del espacio aéreo argentino mediante procedimiento de Navegación Aérea Basada en la Performance (Resolución 025/2015).

Esta Hoja de Ruta proporciona el camino planificado de la navegación y deberá ser uno de los sistemas principales de apoyo a la gestión de tránsito aéreo y contendrá un detalle de las aplicaciones RNAV y RNP que habrán de ser implantadas a corto y mediano plazos.

La implantación de la PBN en la Republica Argentina será basada en los siguientes principios:

a) Continuar aplicando procedimientos de navegación convencionales durante el período de transición y hasta **2016**, para posibilitar el vuelo de usuarios que no estén equipados con RNAV y/o RNP;

b) Utilizar simulaciones tiempo real y aceleradas y herramientas de modelación del espacio aéreo, que permitan reconocer las aplicaciones de navegación compatibles con el desarrollo del espacio aéreo.

c) Cada proyecto que tenga por objeto Implementar conceptos RNAV y/o RNP en el espacio aéreo deberán ser justificados a través de la confección de análisis costo-beneficio;

d) Realizar análisis de riesgo al efecto de asegurar que en todo momento se mantengan o aumenten los niveles aceptables de seguridad operacional;

e) Esté como todo plan que involucre desarrollos y proyectos para la navegación aérea deberá ser tratado como “Documento Vivo” y necesita ser actualizado periódicamente, reflejando el avance de cada uno de ellos, incluyendo los nuevos requerimientos operacionales que deban ser requeridos para mantener actualizado el plan.

Finalmente la función directa de los organismos estatales que regulan o prestan los Servicios de Navegación Aérea de garantizar que todo plan atienda los requerimientos operacionales de los diversos usuarios del espacio aéreo, lo cual a su vez será la base que permita alcanzar el éxito en la implantación PBN se desarrolle tanto a nivel Nacional como Regional.

4. Objetivos Estratégicos

4.1 Operaciones en Ruta

La implementación PBN para operaciones en Ruta en el espacio aéreo continental bajo jurisdicción de la Republica Argentina será realizada en conformidad con las directrices de la oficina regional SAM y atenderá a los siguientes objetivos estratégicos:

a) **Seguridad Operacional** – La aplicación de la RNAV-5 ha permitido una formalización y armonización del empleo de la RNAV en las rutas RNAV nuevas y existentes, así como las condiciones necesarias para una completa reestructuración de la red de rutas. De esa forma, será posible desarrollar una red de rutas menos compleja, reduciendo la carga de trabajo del controlador y, en consecuencia, aumentando la seguridad operacional.

b) **Capacidad –** Teniendo en cuenta la reducción de la complejidad del espacio aéreo y la consecuente disminución de la carga de trabajo del controlador, habrá un aumento de la capacidad ATC de los sectores, permitiendo el vuelo de una mayor número de aeronaves.

c) **Eficiencia** – La aplicación de la RNAV-5 llevará a una mejor eficiencia operacional, teniendo en cuenta que permitirá:

- ✓ Mejoras en la gestión del espacio aéreo, a través del re-posicionamiento de las intersecciones.
- ✓ Mejor empleo del espacio aéreo disponible, por medio de una estructura de rutas que permita el establecimiento de:

  - Rutas más directas (dobles y paralelas, si necesario) para acomodar un mayor flujo de tránsito aéreo.
  - Ruta de “bypass” para aeronaves que sobrevuelan TMA de alta densidad de tránsito aéreo.
  - Rutas alternativas o de contingencias.
  - Establecimiento de posiciones óptimas de esperas en vuelo.
  - Rutas optimizadas de alimentación.

- ✓ Reducción en las distancias voladas, resultando en economía de combustible.
- ✓ Reducción del número de radio-ayudas a la navegación.

d) **Protección al Medio Ambiente** – En consecuencia del incremento en la eficiencia y del ahorro de combustible, habrá una reducción en la emisión de gases nocivos en la atmósfera.

4.2 Áreas de Control Terminal (SID y STAR) y Aproximación

La implantación de la RNP1 y/o RNAV1 en las principales TMA y de la RNP APCH con Baro-VNAV en todos los umbrales utilizados para operación IFR y/o RNP AR APCH donde se obtenga beneficios operacionales (seguridad operacional, eficiencia y acceso) atenderá, principalmente, a los siguientes Objetivos Estratégicos:

a) **Seguridad Operacional** – La aplicación de la RNP1 y/o RNAV-1 en las TMA permitirá la separación entre trayectorias de llegada y salida, evitando los conflictos entre aeronaves. El empleo de la RNP APCH con APV/Baro-VNAV y/o RNP AR ACPH reducirá el riesgo del “Collision Flight into Terrain” (CFIT).

b) **Capacidad** – El empleo de SID/STAR RNAV-1 y/o RNP1 permitirá la reducción de la utilización de vectores radares y, en consecuencia, la reducción de la complejidad del espacio aéreo y disminución de la carga de trabajo del controlador, proporcionando un aumento de la capacidad ATC de los sectores y permitiendo el vuelo de un mayor número de aeronaves.

c) **Eficiencia** – La aplicación de la RNP1 y/o RNAV-1 llevará a una eficiencia operacional mejorada, teniendo en cuenta que el establecimiento de puntos de llegada y salida bien definidos permitirá la reestructuración de la red de rutas que llegan/salen

de la TMA, reduciendo el tiempo de vuelo. La interacción entre STAR y Aproximación ofrecerá condiciones para el establecimiento de trayectorias óptimas de llegada desde la fase en ruta hasta la aproximación final. Además, la precisión de la navegación RNP1 e RNAV-1 tornará las trayectorias de las aeronaves más previsibles, facilitando la separación entre aeronaves y reduciendo la necesidad de intervención del controlador de tránsito aéreo para eventuales salidas de las aeronaves de sus trayectorias esperadas. La previsibilidad también será incrementada por la integración entre STAR y aproximaciones.

d) **Protección al Medio Ambiente –** En consecuencia del incremento en la eficiencia y del ahorro de combustible, habrá una reducción en la emisión de gases nocivos en la atmósfera. Además, la aplicación del CDO/CCO contribuirá para reducción del ruido aeronáutico.

e) **Acceso –** La implantación de procedimiento de aproximación RNAV (GNSS) con Baro-VNAV y/o RNP AR APCH, en aeropuertos que no dispongan de ILS o cuyo terreno/obstáculos lleven a mínimos meteorológicos operacionales elevados, permitirá una mejoría en el acceso a los aeródromos, en condiciones meteorológicas adversas.

5. Implementación

5.1 Operaciones en Ruta

La implementación PBN en ruta será tratada:

a- A nivel Regional, teniendo en cuenta que los principales flujos de tránsito aéreo abarcan dos o más Estados.
b- A nivel nacional mediante un trabajo en conjunto con los usuarios y prestadores de servicios ATS, del cual se desprenderá la necesidad de implementar la PBN en que espacios y por ende en que rutas.

La estrategia de implementación PBN Nacional y Regional para operaciones en rutas se basará en el concepto de versiones de la red de rutas, teniendo en cuenta que la estructura del espacio aéreo es cambiante, en función del crecimiento del movimiento de tránsito aéreo, del desplazamiento de la demanda de tránsito aéreo de una Región o aeropuerto a otro, y de la tecnología disponible, entre otros aspectos.

El empleo de versiones de la red de rutas refleja la necesidad de una revisión periódica de manera integrada, a fin de garantizar siempre la mejor estructura del espacio aéreo posible, dentro de un concepto de desarrollo integrado.

Las versiones de red de rutas son constituidas por un análisis más amplio, basado en datos estadísticos de movimiento de tránsito aéreo y de capacidad de navegación de la flota, buscándose la eliminación de las rutas que no son utilizadas, así como la exclusión o reducción del empleo de las rutas "convencionales" de un volumen de espacio aéreo a ser determinado, donde la significativa mayoría de usuarios esté capacitada para operaciones RNAV-5.

Cada nueva versión de red de rutas deberá buscar la reestructuración completa, por medio de la integración completa entre las rutas ATS, sectores de control, TMA, etc., con el empleo del Concepto de Uso Flexible del Espacio Aéreo (FUA). Se debería, aún, evaluar la aplicación de herramientas específicas de "airspace modeling" y de simulación ATC en tiempo acelerado.

5.2 Operaciones en Ruta Oceánica y continental remota

En mediano plazo (hasta 2020) está prevista la implantación de la RNP4, para tal fin se está trabajando para evaluar las capacidades de navegación de la flota, al efecto de iniciar un proceso de aprobación de aeronaves y operadores. La aplicación de la RNP 4, en conjunto con las aplicaciones ADS-C/CPDLC, que se prevén implantar en el corto plazo, permitirán la implantación de la separación horizontal de 30 NM. Actualmente no se cuenta con el porcentaje de aeronaves que podrían ser conectadas al sistema ADS-C/CPDLC del Centro de Control de Area Ezeiza y del Centro de Control de Area Comodoro Rivadavia, desde que los usuarios equipados se conecten, efectivamente, al sistema de tierra se dispondrá de una herramienta que permitirá aplicar esta aplicación de navegación.

Teniendo en cuenta que el Corredor AFI/SAM es un espacio aéreo homogéneo, la aplicación de la RNP 4 dependerá de la participación de usuarios, Proveedores de Servicios de Navegación Aérea, y Reguladores involucrados, quienes por medio de una planificación adecuada deberán analizar los costos y beneficio que brindará contar con esta aplicación de navegación y que mejorías aportarían en la prestación de los Servicios de Tránsito Aéreo en el Atlántico Sur.

5.2 Rediseño completo de Áreas Terminales

5.2.1 TMA BAIRES

5.2.1.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA BAIRES, se organizará y gestionará de modo que se dé cabida .a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.1.2 Fecha Tentativa de Implantación

Marzo de 2017

5.2.2 TMA RIO GALLEGOS

5.2.2.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA RIO GALLEGOS, se organizará y gestionará de modo que se dé cabida a tomos los usurarlos actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;

3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor mas costo y mayor eficiencia económica;

5.2.2.2 Fecha Tentativa de Implementación

Agosto 2015

5.2.3 TMA RESISTENCIA

5.2.3.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA RESISTENCIA, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.3.2 Fecha Tentativa de Implementación

Setiembre 2015

5.2.4 TMA EL CALAFATE

5.2.4.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA EL CALAFATE, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.4.2 Fecha Tentativa de implementación

Octubre 2015

5.2.5 TMA CATARATAS DEL IGUAZU

5.2.5.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA CATARATAS DEL IGUAZU, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;

6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.5.2 Fecha Tentativa de implementación

Noviembre 2015

Nota: Sujeto a coordinación con la Republica Federativa del Brasil. (TMA FOZ)

5.2.6 TMA COMODORO RIVADAVIA

5.2.6.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA COMODORO RIVADAVIA, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.6.2 Fecha Tentativa de implementación

Diciembre 2015

5.2.7 TMA NEUQUÉN

5.2.7.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA NEUQUÉN, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.7.2 Fecha Tentativa de implementación

Marzo 2016

5.2.8 TMA TUCUMAN

5.2.8.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA TUCUMAN, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;

6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.8.2 Fecha Tentativa de implementación

Abril 2016

5.2.10 TMA SALTA

5.2.10.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA SALTA, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.10.2 Fecha Tentativa de implementación

Mayo 2016

5.2.11 TMA BARILOCHE

5.2.11.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA BARILOCHE, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.11.2 Fecha Tentativa de implementación

Junio 2016

5.2.12 TMA MENDOZA

5.2.12.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA MENDOZA, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;

6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.12.2 Fecha Tentativa de implementación

Julio 2016

5.2.13 TMA USHUAIA

5.2.13.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA USHUAIA, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.13.2 Fecha Tentativa de implementación

Agosto 2016

5.2.14 TMA CORDOBA

5.2.14.1 Requisitos Operacionales Preliminares

El espacio aéreo de la TMA CORDOBA, se organizará y gestionará de modo que se dé cabida a todos los usuarios actuales y previstos del espacio aéreo, tales como aeronaves civiles y militares, mediante la estructuración del espacio aéreo bajo el concepto PBN se obtendrán beneficios como:

1- La Navegación Basada en la Performance (PBN), que comprende la Navegación de Área (RNAV) y la Performance de Navegación Requerida (RNP), soluciona las limitaciones utilizando las capacidades existentes de navegación de las aeronaves;
2- Incrementar los niveles de seguridad operacional;
3- Uso más eficiente del espacio aéreo mediante el empleo de trayectorias directas;
4- Proporcionar operaciones CCO/CDO (ascenso y descenso continuos);
5- Reducción del impacto medioambiental, mediante la reducción de gases contaminantes (C02) y ruido en zonas pobladas, los beneficios de protección al medio ambiente serán medidos periódicamente según los resultados de implementación;
6- Racionalización de la infraestructura de radio ayudas convencionales, lo que se traduciría en menor costo y mayor eficiencia económica;

5.2.14.2 Fecha Tentativa de implementación

Setiembre 2016

5.3 Implementación de Salidas y Llegadas, con aplicación de CDO y CCO

El Programa de Implantación de SID y STAR PBN tiene como objetivo desarrollar y publicar procedimientos instrumentales para aquellas pistas que se analicen como prioritarias, llegando en el mediano plazo a todos los umbrales que operan IFR, con la aplicación de las técnicas CDO y CCO.

Según lo acordado con la Oficina Regional SAM se enviará semestralmente, el 30 de junio y 31 de diciembre de cada año; el estado y la planificación de implementación de salidas y llegadas PBN, con y sin la aplicación de la técnica CDO y CCO, mediante el **Apéndice A** al presente plan, el cual será actualizado y remitidos como se establece en este párrafo.

5.4 Aproximación PBN

El Programa de Implantación de Aproximación por Aeródromo tiene como objetivo desarrollar y publicar procedimientos de aproximación RNAV (GNSS) para aquellas pistas que se analicen como prioritarias, llegando en el mediano plazo a todos los umbrales que operan IFR, con la posibilidad de empleo de la navegación vertical (LNAV/VNAV), por medio de la utilización de

Baro-VNAV. Además, en los aeropuertos que poseen equipos ILS, serán publicados procedimientos de aproximación RNAV/ILS, para facilitar la interfaz entre la llegada y la aproximación.

El estado y la planificación de implementación de procedimientos de aproximación PBN se adjunta como **Apéndice A** al presente plan y será actualizado y enviado a la Oficina Regional SAM, semestralmente, el 30 de junio y 31 de diciembre de cada año.

5.5 Ahorro de combustible y reducción de emisión de CO 2

Serán realizados cálculos estimados de ahorro de combustible y reducción de emisión de CO 2 que serán alcanzados por la implementación de la PBN, con utilización de la herramienta IFSET, con miras a indicar la eficiencia de dicha implementación. El mencionado cálculo será realizado en los rediseños completo de las principales TMA, así como en la implementación de SID, STAR y procedimientos de aproximación APV. Esos estimados de ahorro de combustible y reducción de emisión de CO 2 serán enviados a la Oficina Regional SAM, semestralmente, el 30 de junio y 31 de diciembre de cada año.

Durante la fase post-implementación, serán realizados cálculos de ahorro real de combustible y reducción de emisión de CO 2 , basados en herramientas que extraen data del “Flight Operations Quality Assurance” y/u otros medios que puedan brindar informaciones reales de consumo de combustible. Esos datos serán enviados a la Oficina Regional SAM cuando estén disponibles.

6. Formatos de Informes de Navegación Aérea (ANRF)

6.1 En concordancia con el PNNA 2014 esté apéndice incluye los **Formatos de Informes de Navegación Aérea (ANRF)**, que competen al desarrollo de las Áreas de Mejoramiento de la Eficiencia (PIA):

a) Optimización de la capacidad y vuelos flexibles mediante una ATM nacional colaborativa; y

b) Trayectorias de vuelo eficientes mediante operaciones basadas en las trayectorias.

6.2 Los ANRF que contienen este Apéndice describen las Aéreas de Mejoramiento de la Eficiencia (PIA) con los respectivos módulos considerados del Bloque 0 del ASBU; los cuales han sido adoptados para la Republica Argentina y por ende serán desarrollados por la ANAC.

6.3 Se adopta el formato estándar para cada uno de los módulos considerados, de tal forma que la ANAC pueda realizar el monitoreo de la implantación de los mismos. El formato adoptado es el que se adjunta en este apéndice.

6.4 El conjunto de módulos de cada bloque se agrupan para proporcionar objetivos operacionales y de eficiencia en el entorno en el que se aplican, dando, así, una visión de alto nivel ejecutivo de la evolución prevista. Las PIA permiten comparar fácilmente los programas en curso.

Apéndice A

Estado de implementación de SID, STAR y procedimientos de aproximación PBN

FECHA DE RECOLECCIÓN DE DATOS Abril 2015											
ESTADO	**AEROPUERTOS INTERNACIONALES ANP CAR/SAM**	**Umbrales IFR**	**Umbrales VFR**	**IAP APV**	**IAP LNAV**	**IAP RNPAR**	**SID PBN**	**STAR PBN**	**SID CCO**	**STAR CDO**	**OBS**
ARGENTINA	ARGENTINA (XX AEROPUERTOS)	(1)	(2)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(4)
	Comodoro Rivadavia	25	07	x	x			x	x	x	Entrada en vigencia 30-4-15
	El Calafate	25 07		x	x		x	x	x	x	Entrada en vigencia 30-4-15
	Rio Gallegos	25 07		x	x		x	x	x	x	Fecha prevista Ago-2015
	Resistencia	03 21		x	x		x	x	x	x	Fecha prevista Set-2015
	Cataratas del Iguazú	13 31		x	x		x	x	x	x	Fecha prevista Nov-2015
	Neuquén	27 09		x	x		x	x	x	x	Fecha prevista Marzo 2016
	Tucumán	02 20		x	x		x	x	x	x	Fecha prevista Abril-2016
	Salta	02 20		x	x		x	x	x	x	Fecha prevista Mayo-2016
	Bariloche	29 11		x	x		x	x	x	x	Fecha prevista Junio-2016
	Mendoza	18 36		x	x		x	x	x	x	Fecha prevista Julio-2016
	Ushuaia	25 07		x	x		x	x	x	x	Fecha prevista Agosto-2016
	Aeroparque	13 31		x	x		x	x	x	x	Fecha prevista Setiembre-2016
	Ezeiza	11 35 29	17	x	x		x	x	x	x	Fecha prevista Octubre-2016
	Cordoba	18 23	36 05	x	x		x	x	x	x	Fecha prevista Noviembre 2016

Nota: Las fechas AIRAC indicadas son tentativas, basadas en la capacidad de publicación de procedimientos instrumentales.

(1) Insertar la orientación de los umbrales que poseen o tienen condiciones de soportar operaciones IFR

(2) Insertar la orientación de los umbrales que poseen solamente operaciones VFR o no tienen condiciones de soportar operaciones IFR.

(3) Insertar “si” en caso del umbral de ese aeropuerto ya contar con el procedimiento instrumental indicado en el título de la columna (IAP APV, IAP LNAV, IAP RNAV AR, SID PBN o STAR PBN). Insertar la fecha AIRAC tentativa de implementación del tipo de procedimiento, caso el procedimiento no esté todavía implantado.

(4) Insertar las observaciones juzgadas pertinentes. Si fuera el caso, insertar información resumida de la razón por la cual el umbral no soporta operaciones IFR.

Agenda Item 3: Implementation of the Air Traffic Flow Management (ATFM)

3.1 Under this Agenda Item, the Meeting analysed the following working papers:

a) WP/08 - *Follow-up to the status of implementation of ATFM* (presented by the Secretariat);
b) WP/09 - *2015 Copa América in Chile* (presented by the Secretariat);
c) WP/21 - *Monitoring the ATFM implementation in the Peruvian State* (presented by Peru);
d) WP/23 - *Reduction and harmonization of the Longitudinal Separation Minima*
e) *in the SAM FIR's boundaries* (presented by IATA);
a) IP/04 - *Collaborative decision for routes (CDM-routes*); (presented by Brazil); and
b) IP/07 - *Runway Capacity Calculation Methodology Workshop* (presented by Argentina).

Follow-up to the status of implementation of ATFM

3.2 At the RAAC/13 meeting (Colombia, December 2013), the Civil Aviation Authorities of the Region, through the Bogota Declaration, undertook to meet the goal of having at least one FMU or FMP at the ACCs by no later than 2016. Accordingly, utmost efforts need to be made for timely compliance with this goal.

3.3 The Meeting noted that Guyana, Suriname and Uruguay had not yet reported their runway and ATC sector capacity calculations. The progress made in 2015 is 7% with respect to 2014 since Panama had made the runway capacity calculations. Peru, Ecuador and Chile updated their runway capacity calculations, taking into account changes in many related factors. The level of implementation reached is shown in the following table:

Percentage of States that have performed runway and ATC sector capacity calculations

2014 71%	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**
	YES	YES	YES	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO	YES
2015 78%	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**
	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	NO	NO	YES

3.4 Regarding the implementation of flow management units or positions, there has been no progress in the implementation of flow management units since 2013. The Secretariat encouraged the States that had not yet implemented such FMU units or FMP position to make necessary efforts to comply with the objective assumed under the Bogota Declaration. The level of implementation reached is shown in the following table:

Percentage of States that have implemented ATFM at flow management units (FMU) or flow management positions (FMP)

2012 14%	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**
	NO	NO	**YES**	NO	**YES**	NO	N/D	NO	NO	NO	NO	NO	NO	NO
2013 36%	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**
	NO	NO	**YES**	**YES**	**YES**	NO	N/D	NO	NO	**YES**	NO	NO	NO	**YES**

3.5 Out of the 100 international airports that exist in the SAM Region, ATFM services are provided at 45 airports (27 in Brazil, 8 in Colombia, 1 in Chile, 2 in Paraguay and 7 in Venezuela), accounting for 45% of all regional airports. This percentage does not include airports in States that are in the process of implementation. See the following chart

Total airports	Airports with ATFM service	% of airports with ATFM service
100	45	**45%**

Replication of ATFM courses at national level

3.6 The Meeting recognised that the Project RLA/06/901 has invested in numerous occasions in the training of experts of States participating in the Project, and courses have not been replicated as expected or required.

3.7 The theoretical/practical course on ATFM procedures was conducted on 17-28 November 2014, in Rio de Janeiro. The course was addressed to air traffic controllers, supervisors and/or ATFM personnel, who had participated in training courses on ATFM, CDM, airport and ATC sector capacity calculation and/or had been involved in ATFM implementation and development processes in their State, especially those related to the attainment of the goal of the Bogota Declaration established at the RAAC/13 meeting (December 2013): "*100% of area control centres (ACCs) providing air traffic flow management (ATFM) services)*".

3.8 The objective of the course was to support the training of experts of the Region in traffic analysis, implementation of measures, civil/military coordination processes, and exemption procedures. The event contemplated, *inter alia*, the following aspects

a) airspace monitoring processes;
b) air traffic demand analysis;
c) ATFM standards and procedures of an FMU/FMP:
d) implementation of preliminary ATFM measures;
e) implementation of TMI;
f) ATFM messaging;
g) conduction of international teleconferences;
h) coordination of special events;
i) civil/military coordination processes; and
j) ATFM exemption procedures.

3.9 For this course, it was deemed advisable for the participants to have an expected labour horizon in the Administration of at least 5 years after receiving training, to ensure the transmission of their knowledge to other experts, thus ensuring optimum management of ATFM processes. Sixteen experts of the following States attended the course: Argentina, Chile, Ecuador, Paraguay, Peru and Uruguay, as well as an ICAO ATM/SAR Regional Officer.

3.10 The States did not submit to this Meeting, through their experts, their plans for replicating training as requested by the SAM/IG/14 meeting in order to train experts in their States, training plans, and the effective implementation of training courses by the dates established in the ATFM Action Plan. Several States mentioned that they are preparing the courses but that they have not as yet been replicated.

ATFM focal points

3.11 Regarding ATFM experts designated as ATFM focal points by the States, the Meeting reviewed and updated the information contained in **Appendix A** to this part of the report.

ATFM action plan and work programme

3.12 The Meeting analysed the ATFM Action Plan shown in **Appendix B** to this part of the report and revised the terms of reference and work programme of the ATFM Group shown in **Appendix C** to this part of the report.

ATFM monthly executive summary

3.13 No State in the SAM Region sent its monthly executive summary to the ATFM focal points and the SAM Regional Office.

3.14 The Secretariat recalled that this information is necessary if the States wised to identify the problems affecting efficiency and reduced the capacity of the airspaces under consideration.

Follow-up to data provided in the ATFM survey

3.15 The SAM/IG/14 meeting analysed the ATFM survey circulated among the States and deemed it advisable to update the information provided therein in order to monitor the level of ATFM implementation in the Region. The corresponding table appears in **Appendix D** to this part of the report and eliminated a question that had not been well formulated.

2015 Copa America in Chile

3.16 The Meeting took note of the information disclosed by the Secretariat regarding a possible increase in the demand foreseen for the Copa America to be held in the Republic of Chile from 11 June to 4 July 2015.

3.17 The Meeting recognised that extraordinary events that can generate greater demand than regular require of a perfect coordination between the domestic and international air traffic units. Such coordination allows the maximum performance of ATS, ATFM, air operations and airspace management safety, thus reducing the impact of increased demand during the event period.

3.18 The preparation of these events may involve the need to establish a basic Action Plan with the necessary measures for proper flow management. It is the magnitude of the event and its impact which determines the need of a specific Action Plan for same, including *inter alia*: strategy of preventive and corrective maintenance of navigation and communication equipment; strengthening of operational and human resources and maintenance, daily operational reports to air traffic controllers, etc.

3.19 According to the available information, the cities of Antofagasta, Viña del Mar, Valparaiso, Rancagua, La Serena, Santiago, Temuco, and Concepcion will be the venues for the competition, beginning on 11 June and ending on 4 July 2015.

3.20 The Meeting expressed its concern regarding the apron capacity at the La Serena Airport and was of the opinion that it would be convenient to count with information about the ATFM measures foreseen in case of overflow, aerodrome capacity of airports serving as venues, maximum length of stay at apron position in the airports considered, as well as compliance requirements for executive aviation.

3.21 The Meeting took note that the States of the Region should take appropriate provisions to avoid, as far as possible, the adoption of unilateral flow restriction measures, mainly those based on time, without considering the possibility of vertical separation as, for instance, the acceptance of the transfer of only one aircraft every 10 minutes, regardless of flight level.

3.22 Also, the Secretariat recommended disseminating to all States the AIP Supplement No. 06/2015 available at the Chile DGAC web site, on the planned ATFM measures to manage the event.

Monitoring the ATFM implementation in the Peruvian State

3.23 The Meeting took note that the Peruvian State has developed a series of activities to count with an FMU by the established deadline in the Bogota Declaration and continue with the Action Plan for ATFM implementation.

3.24 The Peruvian delegation informed the Meeting that according to studies carried out, projected increase in demand would lead to a work overload in ATC units, mainly the ACC and Lima TWR, in the absence of a management unit - FMU to mitigate an imbalance between capacity and demand. This would have a detrimental effect since it would generate delays and resulting losses to the industry and users.

3.25 According to capacity calculations made for platform, runway and ATC sectors in Lima and Cusco, there is a tendency for congestion -even to saturation- of traffic levels at certain hours, which requires of due actions to improve the airport infrastructure, in order to be able to satisfy the projected demand.

3.26 In this sense, the Peruvian State developed an Action Plan for ATFM implementation in the Lima FIR and is undertaking a series of activities to achieve the goal to have at least one FMU in Lima ACC by 2016. The detailed Action Plan for ATFM implementation appears in **Appendix E** to this part of the report.

Reduction and harmonization of the Longitudinal Separation Minima in the SAM FIR's boundaries

3.27 Under this item, the Meeting analysed the proposal presented by IATA, seeking to obtain a greater operational efficiency through the reduction of longitudinal separation, mainly in the FIR boundaries, in order to ensure better air traffic flow.

3.28 The Meeting recognised that abrupt increase in separation, usually from a radar separation to a conventional separation of 10 minutes and/or 80 NM, on the FIR boundaries, which is typically adopted in the Letters of Operational Agreement, cause operational problems for users and ATCO. Information on the increases of longitudinal separation in some portions of the SAM Region is presented in the **Appendix F** to this part of the report. This information needs to be verified by experts from SAM States to consider their optimisation.

3.29 The Meeting recalled that the radar separation within limits of FIRs depends on four main aspects:

a) Radar coverage.

b) Radar coverage *Overlap.*

c) Ability to transfer and maintain radar identification of the aircraft.

d) Direct VHF communication.

3.30 In the SAM Region, regarding the radar coverage and the corresponding *overlap*, it is observed that there is a sufficient surveillance infrastructure in significant portions of the South American airspace. The surveillance infrastructure is detailed in **Appendix G** to this part of the report.

3.31 The Meeting took note that the transfer and maintenance of aircraft identification must be made in accordance with paragraph 8.6.3 of Doc. 4444. While one of the mechanisms of transfer is the application of automated systems, there are 7 other applicable methods, and some of them can be used immediately, without need for new equipment or systems. These methods of immediate application would be:

a) Notification of the aircraft's discrete SSR code or aircraft address.

b) Designation of the position indication by reference to, or in terms of bearing and distance from, a geographical position or navigational facility accurately indicated on both situation displays or expressed with markings and distance from such position, together with the track of the observed position indication if the route of the aircraft is not known to both controllers.

c) Where applicable, issuance of an instruction to the aircraft by the transferring controller to change SSR code and the observation of the change by the accepting controller.

d) Issuance of an instruction to the aircraft by the transferring controller to squawk/transmit IDENT and observation of this response by the accepting controller.

3.32 The Meeting acknowledged the reduction of longitudinal separation, either in a conventional or radar operational environment is expected to increase efficiency of operations in the SAM Region.

3.33 Taking into consideration that the reduction of longitudinal separation from 10 minutes or 80 NM directly to a separation of 20 NM in a conventional environment could represent a significant impact on the operational procedures currently applied, the Meeting agreed it would be convenient analysing a gradual reduction in a first phase, considering a reduction of the longitudinal separation of 40 NM.

3.34 **Appendix H** presents a draft Action Plan to be considered by the Meeting, in order to progress in the reduction and harmonization of longitudinal separation on the South American FIRs boundaries.

3.35 On this item, the Meeting took note of the reductions of separation applied in the Region by some States as is the case of Panama and CENAMER, Panama and Colombia, Peru towards Ecuador, the coordination agreement between Uruguay and Argentina, as well as other States applying reduction of longitudinal separation at a national level.

3.36 After a thorough analysis, the Meeting considered that the implementation of a reduction of longitudinal separation could be gradual and that it was advisable that this reduction be applied regionally to increase airspace efficiency and capacity.

3.37 The Meeting also considered that since the longitudinal reduction procedures were established in the PANS ATM DOC 4444, they could be implemented as the Letters of Operational Agreement between different adjacent FIRs were reviewed.

3.38 The Meeting was of the opinion that this implementation be part of ATFM Implementation Plan and in that sense understood appropriate to include this activity in the GREPECAS ATFM Project and the corresponding ATFM Action Plan.

3.39 Based on the above, the Meeting formulated the following conclusion:

Conclusion SAM/IG/15-4: Reduction of the longitudinal separation between aircraft in the SAM airspace

That, taking into account the operational benefits to be gained from reducing the longitudinal separation of aircraft in the SAM airspace, States:

a) investigate the possibility of reducing the longitudinal separation of aircraft at 40 NM between adjacent FIRs using the Mach number technique;

b) their application be included in the Letters of Operational Agreement; and

c) the Secretariat include this implementation in the GREPECAS ATFM Project and its Action Plan.

Collaborative decision for routes (CDM-ROUTES)

3.40 The Meeting took note that in 2011, the Brazil CGNA began its adjustment work of all preferential routes in the Brazilian airspace. The aim of this work was to identify the problems and find possible solutions. The studies showed a table with all the routes and adjustments as a result of the Collaborative Decision for the implementation of routes.

Purpose of the CDM-ROUTES concept

3.41 This is the adjustment of the route network with the use of Collaborative Decision Making among all stakeholders (ATC, airlines, DECEA, and CGNA) to optimize the flow of air traffic, taking into account the needs of airspace users and air traffic control (see sample invitation in **Figure 1**). This concept's main contribution is to reduce the operating costs of airlines, reducing CO_2 emissions, optimizing routes, while maintaining safety levels.

Figure 1 - Invitation for airlines

Using the CDM-ROUTES concept

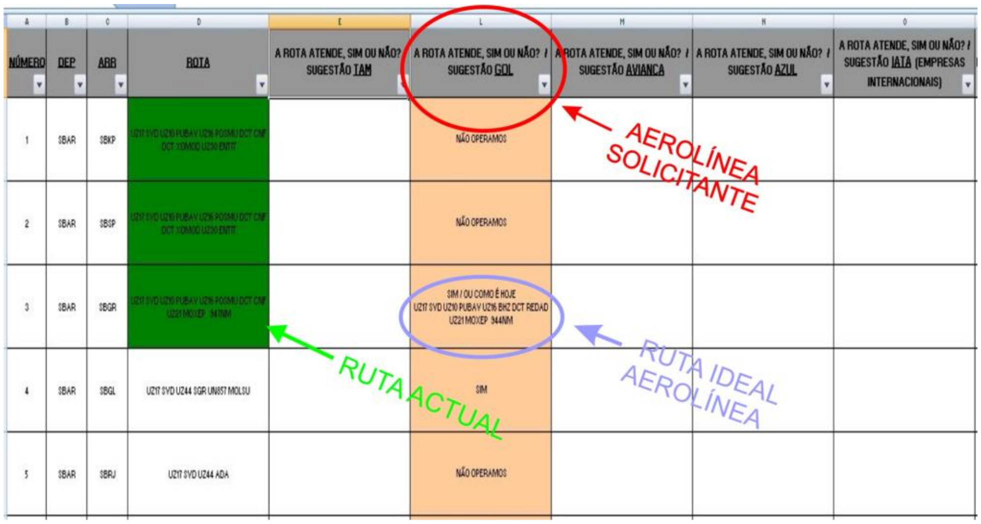
3.42 The CDM-ROUTES concept may be used provided that it displays one or more of the following situations:

- Using a new routes network;
- Reduction of ATC capacity;
- Problems with FIR/TMA sector balance;
- Increased number of ATFM measures;
- Use of a new Air Traffic;
- Increased demand in major events (e.g. 2014 FIFA World Cup).

CDM- ROUTES concept structure

3.43 **Sending routes table for airlines**: in this phase, a table with the routes network used in the airspace is used, to make it possible for airlines to make their analysis and to make their adjustments or new routes proposals. (see **Figure 2**).

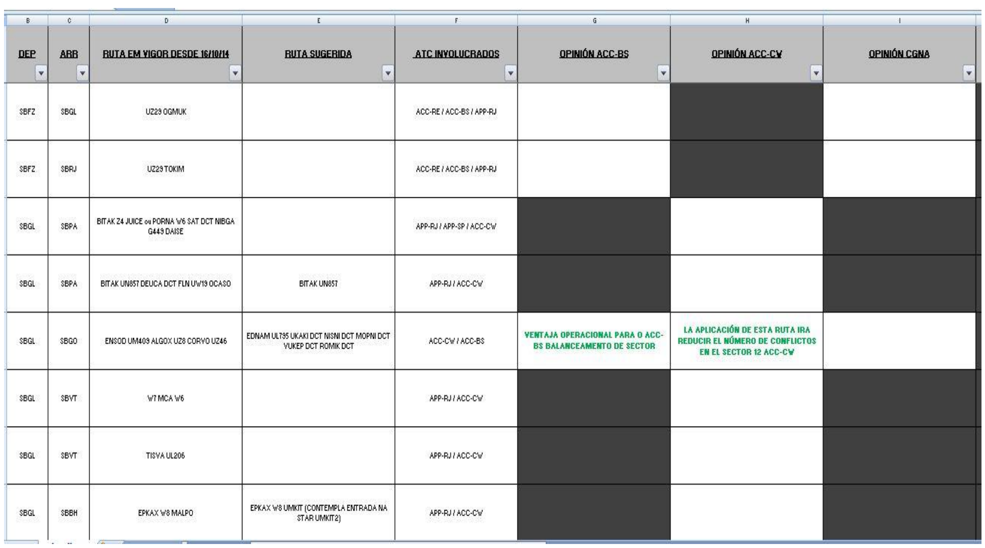
Figure 2 - Sending routes table for airlines



NÚMERO	DEP	ARR	ROTA	A ROTA ATENDE, SIM OU NÃO? / SUGESTÃO TAM	A ROTA ATENDE, SIM OU NÃO? / SUGESTÃO GOL	A ROTA ATENDE, SIM OU NÃO? / SUGESTÃO AVIANCA	A ROTA ATENDE, SIM OU NÃO? / SUGESTÃO AZUL	A ROTA ATENDE, SIM OU NÃO? / SUGESTÃO IATA (EMPRESAS INTERNACIONAIS)
1	SBAR	SBKP	UZ17 SVD UZ10 PUBAV UZ16 POSMU DCT CNF DCT XOMOD UZ30 ENTIT		NÃO OPERAMOS			
2	SBAR	SBSP	UZ17 SVD UZ10 PUBAV UZ16 POSMU DCT CNF DCT XOMOD UZ30 ENTIT		NÃO OPERAMOS			
3	SBAR	SBGR	UZ17 SVD UZ10 PUBAV UZ16 POSMU DCT CNF UZ21 MOXEP 347NM		SIM / OU COMO É HOJE UZ17 SVD UZ10 PUBAV UZ16 BHZ DCT REDAD UZ21 MOXEP 344NM			
4	SBAR	SBGL	UZ17 SVD UZ44 SGR UN857 MOLSU		SIM			
5	SBAR	SBRJ	UZ17 SVD UZ44 ADA		NÃO OPERAMOS			

3.44 **Routes analysis by ATC:** In this phase, the tables with the proposals that have been submitted by the airlines are sent to the appropriate ATC. They should do an analysis and describe the reasons, where appropriate, to deny approval of the proposed routes, plus submit new proposals. (see **Figure 3**).

Figure 3 - Routes analysis by ATC



DEP	ARR	RUTA EM VIGOR DESDE 16/10/14	RUTA SUGERIDA	ATC INVOLUCRADOS	OPINIÓN ACC-BS	OPINIÓN ACC-CW	OPINIÓN CGNA
SBFZ	SBGL	UZ29 OGMUK		ACC-RE / ACC-BS / APP-RJ			
SBFZ	SBRJ	UZ29 TOKIM		ACC-RE / ACC-BS / APP-RJ			
SBGL	SBPA	BITAK Z4 JUICE ou PORNA W6 SAT DCT NIBGA G449 DAISE		APP-RJ / APP-SP / ACC-CW			
SBGL	SBPA	BITAK UN857 DEUCA DCT FLN UW19 OCASO	BITAK UN857	APP-RJ / ACC-CW			
SBGL	SBGO	ENSOD UM409 ALGOX UZ8 CORVO UZ46	EDNAM UL795 UKAKI DCT NISNI DCT MOPNI DCT VUKEP DCT ROMIK DCT	ACC-CW / ACC-BS	VENTAJA OPERACIONAL PARA O ACC-BS BALANCEAMENTO DE SECTOR	LA APLICACIÓN DE ESTA RUTA IRA REDUCIR EL NÚMERO DE CONFLICTOS EN EL SECTOR 12 ACC-CW	
SBGL	SBVT	W7 MCA W6		APP-RJ / ACC-CW			
SBGL	SBVT	TISVA UL206		APP-RJ / ACC-CW			
SBGL	SBBH	EPKAX W8 MALPO	EPKAX W8 UMKIT (CONTEMPLA ENTRADA NA STAR UMKIT2)	APP-RJ / ACC-CW			

3.45 **Routes analysis by CGNA:** In this phase, the routing table has been filled by companies and studied by ATC, will be sent to CGNA where the flow and airspace sectors analysis will be made. (see **Figure 4**).

Figure 4 - Routes analysis by CGNA

DEP	ARR	RUTA EM VIGOR DESDE 16/10/14	RUTA SUGERIDA	ATC INVOLUCRADOS	OPINIÓN ACC-BS	OPINIÓN ACC-CV	OPINIÓN CGNA
SBFZ	SBGL	UZ35 OGIVUK		ACC-RE / ACC-BS / APP-RJ			
SBFZ	SBRJ	UZ29 TOKIM		ACC-RE / ACC-BS / APP-RJ			
SBGL	SBFA	BITAK Z4 JLICE ou PORNA W6 SAT DCT NIBGA G449 DANE		APP-RJ , APP-SP / ACC-CV			
SBGL	SBFA	BITAK UN857 DEUCA DCT FLN UW19 OCASC	BITAK UN857	APP-RJ / ACC-CW			
SBGL	SBGO	EVSOD UM403 ALGOX UZ6 CDFYO UZ46	EDNAM UL795 UKAKI DCT NISNI DCT MCPNI DCT VUKEP DCT RCMK DCT	ACC-CW / ACC-BS	VENTAJA OPERACIONAL PARA O ACC-BS BALANCEAMENTO DE SECTOR	LA APLICACIÓN DE ESTA RUTA IRA REDUCIR EL NÚMERO DE CONFLICTOS EN EL SECTOR 12 ACC-CW	INFORME TAAM MOSTRÓ UNA REDUCCIÓN DE SATURACIÓN DEL SECTOR 16 FIR BS
SBGL	SBVT	W1 MCA V6		APP-RJ / ACC-CW			
SBGL	SBVT	TISVA LL206		APP-RJ / ACC-CW			

3.46 **Simulation**: route data shall be imported into TAAM (*simulation tool in accelerated time*), where the following reports will be prepared:

a) distances from the proposed routes;
b) fuel consumption;
c) airspace sectors.

3.47 Adjustment workshop/meeting: at this stage, all stakeholders make an analysis of the table proposed; such table is studied and adjusted in the CDM process. (see **Figure 5**).

Figure 5 - Collaborative Decision

3.48 The Meeting considered that the CDM-ROUTES concept makes it easy to implement optimized routes, with benefits for all concerned with more direct routes, avoiding sectors with higher demand and flow problems. Also, airlines will benefit from a reduction of fuel consumption and reduced CO_2 emissions.

APPENDIX A/ APÉNDICE A

LIST OF CONTACTS FOR OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS

LISTA DE CONTACTOS PARA PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
ARGENTINA*	Héctor Luis Sánchez Jefe de Departamento Registro y Estadísticas Dirección Proyectos de Navegación Aérea Administración Nacional de Aviación Civil (ANAC) Tel: +54 11 5941-3000, Ext. 69773 E-mail: hsanchez@anac.gov.ar	Víctor Marcelo de Virgilio Jefe del Departamento Gestión del Espacio Aéreo Tel.: +5411 5789 8400, Ext 68454 E-mail: dsna@faa.mil.ar
BOLIVIA (Plurinational State of) / **BOLIVIA (Estado Plurinacional de)***	ATCO Daniel Bustamante Leyton Dirección General de Aeronáutica Civil (DGAC) Inspector ATM/SAR Cel.: +59 1 7220-1865 E-mail: dbustamante@dgac.gob.bo	ATCO. Marco Sergio Barrios Barzola Supervisor ACC La Paz Jefe Navegación Aérea Reg. La Paz Tel/Fax: +591 2 281-0203 (ACC/La Paz) Tel/Fax: +591 2 282-1717 (Nav. Aérea) Tel: +591 2 223-8339 (Home/domicilio) Cel.: +591 7 052-3884 E-mail: mbarrios@aasana.bo masebarbar@hotmail.com

State/ Estado	**STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO**	**OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS**
BRAZIL / BRASIL*	TCel Luiz Roberto Barbosa Medeiros Centro de Gerenciamento e Navegação Aérea – CGNA Chefe Geral Tel.: +55 21 2101-6531 Cel.: +55 21 99499-1658 E-mail: medeiros@cgna.gov.br Cap José Airton Patricio Centro de Gerenciamento e Navegação Aérea – CGNA Oficial ATM Tel.: +55 21 2101-6448 Cel.: +55 21 98554-4425 E-mail: patriciojap@cgna.gov.br	Gerente Nacional – GNAC Tel.: +55 21 2101-6409 E-mail: gnac@cgna.gov.br Gerente Nacional de Fluxo – GNAF Tel.: +55 21 2101-6546 E-mail: grt@cgna.gov.br Gerencias Regionais – GER Tel.: +55 21 9949-6492 / +55 21 2101 98554 3598 E-mail: gr1@cgna.gov.br / gr2@cgna.gov.br
CHILE*	Jorge Caro Gálvez Dirección General de Aeronáutica Civil Dirección de Aeródromos y Servicios Aeronáuticos (DASA) Subdepartamento de Servicios de Tránsito Oficina ATFM Tel.: +56 2 2836-4022 E-mail: jcarog@dgac.gob.cl Patricio Zelada Ulloa FMP ACC Santiago Tel.: +56 2 22836-4017 Cel.: +56 9158-1865 E-mail: pzelada@dgac.gob.cl	Supervisor ATC de turno ACC Santiago Cel.: +56 9 158-1865

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
COLOMBIA*	Mauricio José Corredor Monroy Unidad Administrativa Especial de Aeronáutica Civil (UAEAC) Jefe Grupo ATFCM Tel.: + 57 1 296-2628 E-mail: mauricio.corredor@aerocivil.gov.co Skype: mauricio.jose.corredor.monroy	Unidad de Gestión de Afluencia de Tránsito Aéreo y Capacidad – FCMU COL (DE 1100 A 0500 UTC) E-mail: cfmu.dsna@aerocivil.gov.co Please copy to / Favor copiar a: E-mail: cns.fmu@aerocivil.gov.co aga.fmu@aerocivil.gov.co Telefonos: MANAGER: +57 1 296-2656 CNS: +57 1 296-2100 AGA: +57 1 296-2200 DEPARTURE FLOW MANAGEMENT: +571 296-24 06 Celular: MANAGER: +57 317 517-10 46 AGA: +57 317 363- 88 11 CNS: +57 318 330-73 74

State/ Estado	**STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO**	**OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS**
ECUADOR	Marcelo Valencia Taco Responsable ATM Nacional Tel. Ofic.: +593 2 2947400 Ext.: 4084 Móvil: +593 9 79097292 E-mail: marcelo_valencia@aviacioncivil.gob.ec marcelovalencia_qa@hotmail.com *(particular)* mailto:pedro.plaza@dgac.gob.ec	Supervisor Centro de Control: DDI: +593 4 228-2851 REDDIG: 5060/5051/5052/ 5053 Vicente Navarrete Sarasti vicente.navarrete@aviacioncivil.gob.ec Tel.: 5932 294-7400 - Ext. 4086 mailto:pedro.plaza@dgac.gob.ec
FR.GUIANA / GUYANA FRANCESA		
GUYANA		

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
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PARAGUAY*	Lic. Esp. Enrique Espinoza Dirección Nacional de Aeronáutica Civl (DINAC) Gerencia Unidad Central de Tráfico Aéreo – CFMU (Unidad Normativa) Edificio Ministerio de Defensa Nacional, 6to. piso Tel./Fax: +595 21 210-628 Cel.: +595 982 348-350 E-mail: cfmu@dinac.gov.py cfmu.py@gmail.commailto:abethancourt@aeronautica.gob.pa	1-Unidad de Flujo (SGAS) – FMU SGAS (Unidad Operativa). Current responsible / Responsable actual de dicha Unidad: ATCO. Sindulfo Ibarrola Tel./Fax: +595 21 758-5110 Cel.: +595 983 35-0815 E-mail: fmu.asu@gmail.com Mariano Roque Alonso-Paraguay Edificio del Nuevo Centro de Control Unificado. 2-Unidad de Flujo (SGES) – FMU SGES (Unidad Operativa). Current responsable / Responsable actual de dicha Unidad: Lic. ATCO. David Gavilán Tel./Fax: +595 64 420-842 Cel.: +595 983 830-404 E-mail: daga_978@hotmail.com Minga Guazú-Paraguay Aeropuerto Internacional Guaraní. E-mail: mailto:abethancourt@aeronautica.gob.pa

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
PERÚ*	Martha Soto Ansaldi Dirección General de Aeronáutica Civil (DGAC) Inspector de Navegación Aérea Tel.: +51 1 615-7881 Cel.: +51 997367352 E-mail: msoto@mtc.gob.pe	Renzo Gallegos Begazo Coordinador del Centro de Control LIMA - ACC Corporación Peruana de Aeropuertos y Aviación Comercial (CORPAC S.A) Tel.: +51 1 230 1153 E-mail: rgallegos@corpac.gob.pe
SURINAME	Mr. Soeknandan Andre Chief Air Traffic Services Tel.: +59 7 530-433 Cel.: +59 7 7 216-108 Fax: +59 7 491-743 E-mail : atmcnslvd@yahoo.com	Mr. Gaddum R Coordinator ATS Supervisor ATS unit Zanderij Phone Operations : +597 032-5208 Cel: +597 853-1681 E-mail: g.rperez@hotmail.com
URUGUAY*	C.T.A. Luis A. Otheguy Dirección Nacional de Aeronáutica Civil (DINACIA) Director de Tránsito Aéreo (ATM) Tel.: +598 2 604-0408, Int. 5105 Fax: +598 2 604-0408, Int. 5155 Cel: +598 99592113 E-mail: dta@dinacia.gub.uy	ACC Montevideo Tel. directo: +598 260-00619 REDDIG

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
VENEZUELA (Bolivarian Republic of) / **VENEZUELA (República Bolivariana de)***	Maribel Mayora Vallenilla Responsable ATFM Tel: +58 212 303-4532 (13:00 – 21:00 UTC) Cel: +58 416 611-0607 (H24) E-mail: atfm@inac.gob.ve m.mayora@inac.gob.ve Alfredo Dávila Coordinador Area de Trabajo ATS Tel.: + 582 12 355 2898 Cel.: + 584 166 247 667 E-mail: a.davila@inac.gob.ve	Harrynson Salazar Jefe ACC-Maiquetía Tel: +58 212 355-2912 (13:00 – 21:00 UTC) Cel: +58 416 632-6204 (H24) E-mail: Ha.Salazar@inac.gob.ve ACC-Maiquetía Tel: +58 212 355-2216 (H24) Cel: +58 416 623-6427 (H24) E-mail: Maruska Borges Rodríguez Unidad FMU/ATFM/Venezuela ATC/Aeropuerto Int´l. Maiquetía Tel.: +582 12 303-4532 (13:00 – 21:00 UTC) Cel: +584 14 299-3995 (H24) E-mail: ma.borges@inac.gob.ve

* Updated SAM/IG/15 / Actualizados en la SAM/IG/15

APPENDIX B

ACTION PLAN FOR THE IMPLEMENTATION OF ATFM AT SAM AIRPORTS

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
1. Airport demand/capacity (runway capacity) analysis				The ATFM survey provides information on this subject
1.1 Carry out Calculation of Airport and Airspace Capacity of main airports by States. 1. Identify personnel available in each State to carry out calculation of runway capacity. 2. Identify which airports already have calculation of runway capacity. 3. Identify, prioritize and report what airports require calculation of runway capacity. 4. Carry out calculation of runway capacity. 5. Update calculation of runway capacity as necessary. 6. Identify airports exceeding runway capacity.	Sep 2009	SAM/IG/16	States	**VALID** States that have not yet done so are encouraged to submit the required information. Item 4 has to be presented to SAM/IG/14. Peru updated runway capacity calculations regarding Jorge Chavez International Airport (see Appendix A to the Report on Agenda Item 5, SAM/IG/14).
1.2 Notify the airports where periods exist where the demand is greater than existing capacity including simulations, if necessary, by States.	Sep/Oct 2009	SAM/IG/16	States	**VALID** Brazil, Paraguay and Peru presented the data. Assure States that the aim of these tasks is to share information.
1.3 Determine operational factors affecting airport demand and capacity to optimise utilisation of existing capacity, including simulations, is necessary.	Sep/Oct 2009	SAM/IG/16	States	**VALID** Brazil, Paraguay and Peru presented the data.
1.4 Notify airport capacity in terms of aircraft operation in main airports.	SAM/IG/12	SAM/IG/16	States	**VALID** Updated in each SAM/IG.

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
2. Coordination with the ATM community				
2.1 Promote seminars to the ATFM community considering the CDM concept for the implementation of ATFM and initiate corresponding coordination. 1. Consider the implementation of a CDM process in main airports. 2. States will notify airports with this process.	SAM/IG/11	SAM/IG/16	States	**VALID** ATFM operational concept, ATFM manual and ATFM roadmap will be taken into account.
3. Infrastructure and database				
3.2 Establish a data base format to be used for automation.	SAM/IG/11	SAM/IG/17	States	**VALID**
4. Policy, standards, and procedures				
4.7 Provide AIP/AIC published information on ATFM to SAM/IG meetings.	SAM/IG/11		States	**PERMANENT** Information will be presented in each SAM/IG The format of the publication is in Doc 8196
5. Training				
5.1 Establish courses on: a) FMP/FMU training b) Airport CMD training	SAM/IG/13	SAM/IG/15	States Project RLA/06/901	The participation of an AGA and an ATFM expert is expected for the A-CMD course
5.2 Draft ATFM training plans.	SAM/IG/11	SAM/IG/15	States	
5. 3 Train FMP/FMU/ATC personnel for the application of ATFM measures in airports.	SAM/IG/11	SAM/IG/15	States	**VALID**
5.4 Monitor the training of the ATM community.	SAM/IG/11	SAM/IG/15	States	**VALID**

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
6. Final implementation decision				
6.1 Review factors that may affect the implementation decision.			States	**VALID**
6.2 Declare the pre-operational implementation in the defined area.			States	**VALID**
6.3 Declare the final operational implementation in the defined area.			States	**VALID**
7. Monitor system performance				
7.1 Develop performance indicators according to CDM manual.	SAM/IG/11	SAM/IG/16	States	**VALID** States which have implemented ATFM will present an information paper concerning the performance indicators.
7.2 Develop a performance indicators follow-up programme	SAM/IG/11	SAM/IG/16	States	**VALID**
7.3 Develop and implement an ATFM post-implementation follow-up programme at airports.	SAM/IG/13	SAM/IG/16	States	**VALID**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
1. Airspace demand and capacity analysis				**ATFM survey has information on this subject**
1.1 Carry out ATC sectors calculation. 1. Identify and train personnel available in each State to carry out calculation of air space capacity. 2. Identify which sectors already count with calculation of capacity. 3. Identify, prioritize and report what sectors require calculation of capacity. 4. Identify sectors exceeding capacity.	SAM/IG/11	SAM/IG/15	States	**PERMANENT** States that have not yet done so are encouraged to submit the required information. Uruguay trained 30 controllers in runway and ATC sectors calculation. Argentina will present it at SAM/IG/16.
1.2 Carry out the States estimate airspace ATC sector capacity calculation and their terminal areas at the major airports.	Sep 2009	SAM/IG/16	States	**VALID**
1.3 Update, as necessary, the estimate airspace ATC sector capacity calculation and their terminal areas at States' major airports	SAM/IG/14	SAM/IG/15	States	**VALID**
1.4. Identify airspace sectors where demand sometimes exceeds capacity, including simulations by the States, if necessary.	Dec 2014	SAM/IG/16	States	**VALID** Brazil has presented their studies.
1.5 Identify factors affecting airspace demand and capacity in order to optimise the use of existing capacity, including simulations if necessary.	Dec 2014	SAM/IG/16	States	**VALID** Brazil has presented their studies.
1.6 Present conclusions on the existing airspace capacity.	Dec 2014	SAM/IG/16	States	**VALID** Brazil has presented their studies.
2**.** Evaluate improvement of traffic flow by sequencing (B0-RSEQ) in order to allow an optimal application of new airspace concepts based on PBN, mainly using CDO and CCO	SAM/IG/14	SAM/IG/17	SAM/ATFM/IG States	**VALID**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
2.1. Pre-tactic and mainly tactic ATFM measures that guarantee an optimal sequencing of arrivals and departures, avoiding application of radar vectors and holdings.	SAM/IG/14	SAM/IG/16	SAM/ATFM/IG States	**VALID**
3. Coordination with the ATM community				
3.1.Promote seminars to the ATFM community considering the airspace capacity concept for the implementation of ATFM and initiate corresponding coordination.	SAM/IG/11	Permanent	States	**VALID**
4. Infrastructure and database				
~~4.1 The ATFM/IG Group will present the basic requirements for a regional automated system~~.	~~SAM/IG/12~~	~~SAM/IG/13~~	~~ATFM/IG~~	**~~FINALIZED~~** ~~Brazil has already implemented.~~ ~~Colombia presented their preliminary requirements~~
4.2 Coordinate implementation activities with the Automation Group.	SAM/IG/13	SAM/IG/17	ATFM/IG	**VALID** Depends on information of 4.1.
5. Policy, standards, and procedures				
5.1 Develop a regional strategy and framework for the implementation of centralized ATFM units.	2008	2016	Project RLA/06/901	**VALID**
5.2 Develop template/contents for operational agreements between centralized ATFM units for interregional demand/capacity balancing.	2008	2016	Project RLA/06/901	**VALID**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
5.3 Define common elements of situational awareness between FMUs; • common traffic displays; • common weather displays (Internet); • communications (teleconferences, web): • IATA ITOP tool	2008	SAM/IG/16	States	**PERMANENT**
5.5 Apply a national strategy to implement the use of a flexible upper airspace (FUA), on the basis or the Guideline for the Implementation of the Flexible Use of Airspace (FUA) Concept in the South American Region: • evaluate the management processes in the use of the airspace; • improve the current domestic airspace management to adjust dynamic changes to the traffic flows in tactical stages; • introduce improvements to the ground ATS systems and associated procedures for the extension of the FUA with dynamic management processes in the use of the airspace; • dynamically implement ATC sectorization with the aim of providing a better balance between demand and capacity that responds in real time to changing situations in the traffic flows and to accommodate in the short-term the users preferred trajectories.	2008	2016	States	**VALID**
6. Training				
6.1 Train personnel in the sector capacity calculation and subjects related to ATFM for the airspace.	Dec 2014	SAM/IG/16	States	**PERMANENT**
6.2 Prepare plans and ATFM training material	Dec 2014	SAM/IG/15	States	**VALID**
6.3 Conduct training of personnel involved.	Dec 2014	SAM/IG/16	States	**VALID**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
7. Final implementation decision				
7.1 Analyse factors affecting the implementation decision.	N/A		States	**VALID**
7.2 Declare pre-operational implementation in the area defined.	N/A		States	**VALID**
7.3 Declare definitive operational implementation in the area defined.	N/A		States	**VALID**
8. Monitor system performance				
8.1 Draft performance indicators	2010		Project RLA/06/901	**VALID**
8.2 Develop an indicators follow-up programme.	TBD		States	**VALID**

APPENDIX C

TERMS OF REFERENCE AND WORK PROGRAMME FOR THE SAM REGION AIR TRAFFIC FLOW MANAGEMENT IMPLEMENTATION GROUP (SAM/ATFM/IG)

1. TERMS OF REFERENCE

Coordinate the SAM ATFM Implementation according to the ICAO Strategic Objectives, the Aviation System Block Upgrades methodology (B0-RSEQ, B0-NOPS) and the goals established by the Bogota Declaration.

2. WORK PROGRAMME

a) Evaluate and perform the changes as deemed necessary in the SAM ATFM Implementation Project;
b) Evaluate, insert and harmonize the activities of SAM ATFM Project related to ATFM implementation action plans of SAM States;
c) Review existing national plans on ATFM; as well as other ATFM plans in other regions or international organizations;
d) Review ATFM technical and operational aspects;
e) Prepare the necessary ATFM documentation;
f) Evaluate the improvement of traffic flow by sequencing (B0-RSEQ), in order to allow an optimal application of new airspace concepts based on PBN, mainly using CDO and CCO.
g) Follow-up of ATFM implementation in order to ensure its intra and inter-regional harmonisation, as well as among States involved.
h) Establish training requirements with regard to ATFM.
i) In coordination with the ICAO NACC Regional Office in Mexico, consider the necessary activities to ensure harmonization of ATFM implementation in the CAR and SAM Regions, in accordance with GREPECAS ATFM Programme;

3. COMPOSITION

Argentina, Bolivia, Brazil, Chile, Colombia, French Guiana, Guyana, Ecuador, Panama, Paraguay, Peru, Suriname, Uruguay, Venezuela and IATA.

4. RAPPORTEUR

Víctor Marcelo de Virgilio (Argentina)
Mauricio Corredor Monroy (Colombia)

ATFM SURVEY	ARG (ANAC)	ARG (DGCTA)	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	REMARKS
1 . Regarding the SAM ATFM implementation plan, confirm if FMUs/FMPs have been established. If YES, indicate which is the responsible unit. If the answer is NO, indicate what are your plans for ATFM implementation based on regional requirements.	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**NO**			**NO**	**YES**	**NO**		**NO**	**YES**	**Argentina (ANAC)**: Discussions will be held with the air traffic service provider (DGCTA) on the possibility of implementing an FMU. **Argentina (DGCTA)**: They have not been established. The hiring of an ICAO expert has been foreseen for ATFM implementation (initially one FMU). **Brazil**: Brazil has already implemented ATFM (CGNA). **Chile**: On 1 November 2012, the FMP was established at the Santiago ACC, which is the unit responsible for that position. **Colombia:** Yes. Air traffic flow and capacity management units – FCMU COLOMBIA. **Ecuador**: To date, for various reasons, it has not been possible to implement FMU/FMPM units; however, according to the new policy of the Air Navigation Directorate concerning integration and harmonisation with ICAO regional requirements, the project for the creation of a national ATFM unit (FMU) under the administration of DNA will start in the coming months. It will be responsible for conducting a study and analysis to determine runway and ATC sector capacity at the main airports of the country, and for providing training to ATC personnel of the other aerodromes where local flow management units (FMP) need to be implemented. **Panama**: Will implement new tool for SLOT allotment in a FMP. **Paraguay**: Paraguay has a central air traffic flow unit (C.F.M.U.), which will be responsible for implementing the ATFM system in Paraguay. **Peru**: The State is in the process of implementing ATFM through an FMU. **Uruguay**: 3 trained staff. **Venezuela**: Yes, one FMU in Maiquetía

ATFM SURVEY	ARG (ANAC)	ARG (DGCTA)	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	REMARKS
2. Confirm if you have personnel trained in the ATFM implementation plan and if this staff is currently performing the corresponding functions according to the implementation plan.	**YES**	**YES**	**NO**	**YES**	**YES**	**YES**	**NO**			**NO**	**YES**	**YES**		**YES**	**YES**	**Argentina (ANAC):** ANAC has few personnel trained in ATFM and none has received a capacity calculation course. **Argentina (DGCTA)**: Yes, the staff is performing other functions. **Brazil:** Brazil has personnel trained in ATFM, which have been updated since the implementation. **Chile**: We have an ATFM specialist and 6 runway and ATC sector calculation experts. Only 2 persons are currently performing functions related to ATFM implementation. **Colombia**: Yes, although better personnel management is required in this area. **Ecuador**: Ecuador informs that they are proceeding to train personnel. **Panama**: Experienced ATCOs are trained to work on ACC FMP. **Paraguay**: We have personnel trained in ATFM implementation, who are responsible for the regulatory (CFMU) and operational aspects (FMU-SGAS and FMU-SGES) of this activity. **Peru**: We have personnel available, but they do not perform ATFM functions. **Venezuela**: We have personnel trained in the methodology adopted from Brazil, which is now being applied in the Bolivarian Republic of Venezuela.

ATFM SURVEY	**ARG (ANAC)**	**ARG (DGCTA)**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**REMARKS**
3. If NO trained personnel is available, indicate how many persons are available to receive training in the ATFM implementation plan.		**8**	**4**	**-**	**1**	**-**	**4**			**6**	**5**	**7**		**4**	**11**	**Argentina (ANAC)**: ANAC should designate personnel for this function. **Argentina (DGCTA)**: 8 persons are available. **Chile**: Although there is an ATC specialist in ATFM, more are needed, since implementation requires a work team. We currently have 3 persons available for training. **Colombia**: At least five (5) persons are needed. **Ecuador**: For the purpose being sought, it would be advisable to train at least 4 persons. **Paraguay**: Initially, 3 persons. Pending training would include: (1) Advanced course for ATS sector capacity calculation instructors; (1) ATFM management course; (3) runway capacity calculation (airport).
4. How many airports in your State/country have runway capacity calculation? List the main ones. If the answer is NONE, indicate which airports you think require such calculations.	**1**	**1**	**3**	**48**	**8**	**1**	**2**			**1**	**2**	**2**		**0**	**5**	**Argentina (ANAC):** Aeroparque has runway capacity calculation. **Argentina (DGCTA)**: Aeroparque. Capacity calculations are being considered for the aerodromes of Ezeiza, Cordoba, and San Fernando. **Brazil**: Brazil submitted its list at the last SAM/IG meeting, but will send an updated runway capacity calculation list. **Chile**: Currently, we have runway capacity calculations for: SCEL, SCFA, SCCF, SCIE, and SCTE. **Colombia**: Only one. Calculations are required for eleven (11) international and five (5) domestic airports. **Ecuador**: Quito, Guayaquil. **Paraguay**: International airports of “Silvio Pettirossi” in Asunción and “Guaraní” in Minga Guazú. **Peru**: Two airports, only with updated data. **Uruguay**: SUMU, and SULS. **Venezuela:** SVMI, SVMC, SVMG, SVBC, and SVPR

ATFM SURVEY	ARG (ANAC)	ARG (DGCTA)	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	REMARKS
5. How many airports in your State/country have apron capacity calculations? List the main ones. If the answer is NONE, indicate which airports you think require such calculations.	**0**	**0**	**0**	**1**	**0**	**0**	**0**			**0**	**0**	**1**		**0**	**0**	**Brazil:** Apron capacity calculations have been performed for one airport (Guarulhos international airport in São Paulo-SP). This information was provided by GRU- (Guarulhos Airport Administration). **Chile:** We believe that SCEL, SCIE, and Loa de Calama require this calculation. **Colombia**: None. It is required for several airports since airport capacity is not being managed to address growing demand. **Ecuador**: None of the airports in the country has apron capacity calculations. However, I think the airports of Quito, Guayaquil, Nueva Loja, Coca, Shell Mera, Cuenca, and Manta require these calculations. **Panama**: Will request data from Tocumen S.A. **Paraguay**: These calculations have not been performed due to lack of experts (specialists) duly trained for this purpose. Calculations are required for the two international airports mentioned above: “Silvio Pettirossi” in Asuncion and “Guaraní” in Minga Guazú. **Peru**: Cusco 7 C/D and 4 A/B positions. **Uruguay**: SUMU and SULS. **Venezuela**: None. We still do not have personnel duly trained to conduct these calculations, which would be required for the international airport of Maiquetía.
6. Number of operations per hour at the airport considered to be the most important one:																**Chile**: SCEL **Peru:** SPIM.
Runway capacity	**X**	**X**		**SBGR 47**	**SCEL 40**	**70 SKBO**	**29**				**SGAS 23**	**SPJC 32**		**X**	**SVMI 34**	
Apron capacity	**X**	**X**	**X**		**X**		**X**				**X**			**X**	**X**	
ATC sector capacity	**X**	**X**	**10**		**9**	**30 arrivals SKBO**	**X**				**8 (number N)**	**TMA 8**		**X**	**Sector 1 26**	

ATFM SURVEY	ARG (ANAC)	ARG (DGCTA)	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	REMARKS
			Sector 2 FIR BS												**Sector 2 28**	
7. For the airport considered to be the most important one, number of trained personnel capable of providing, in terms of operations per hour, calculations for:																
Runway capacidty	**X**	**20**	**0**	**15**	**15**	**4**	**1**			**2**	**1**	**8**		**20**	**2**	
Apron capacity	**X**	**N/A**	**X**	**X**	**X**		**X**			**X**	**X**	**X**		**X**	**0**	
ATS sector capacity	**X**	**X**	**1**	**13**	**4**	**4**	**1**			**2**	**1**	**8**		**20**	**2**	
8. List the airports in which demand exceeds runway capacity, and indicate the operational factors affecting them.																**Argentina (ANAC)**: We do not have this information. **Argentina (DGCTA)**: We do not have the necessary information. **Brazil**: There are no airports in Brazil that operate above their capacity, since critical airports have been coordinated by CGNA. However, the airport of SBGR sometimes requires ATFM capacity/demand balancing measures, since its aprons and gates are being expanded; however, when the reduction of ATC separation minima proposed for final approach is completed, its capacity will increase. **Chile:** At peak hours, SCEL exceeds its declared capacity (40 acft/h). The factors that cause this imbalance are: airline schedules; operation of CAT A and B aircraft; adverse weather conditions (low visibility-wind); and maintenance of the manoeuvering area. **Colombia**: El Dorado; factors involved: capacity of arrival/departure sectors; fleet mix; runway distribution; DEP parallel approaches.

ATFM SURVEY	ARG (ANAC)	ARG (DGCTA)	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	REMARKS
																Ecuador: Quito airport: routes need to be redefined; ATC sectors and airspaces, in general, need to be improved and optimised; the airport administrator must improve planning, coordination and assignment of aircraft stands. Finally and most importantly, an ATFM unit needs to be implemented to recommend policies for infrastructure and/or equipment improvement and optimisation of available resources to meet the demand of operators without neglecting safety. Airports of Cuenca, Shell Mera, Manta, Coca, and Nueva Loja: demand exceeds runway capacity, since their runway, taxiway, apron, and terminal infrastructure is too small. Likewise, a comprehensive analysis of ATC units and sectors is required in terms of equipment and ATS routes, based on ATFM management criteria. International airport of Guayaquil: as in the case of the airport of the capital city, all ATS routes, airspaces and ATC sectors must be redefined and analysed in a comprehensive manner, based on ATFM, PBN, RNAV/RNP navigation, and other criteria. **Panama**: Will expand taxiway and build South Terminal. **Paraguay**: At present, in the ASU FIR, there are no operational indicators that affect our capacity to meet demand. **Peru:** Operational factors involved: apron management and design affect personnel capacity and skill. **Uruguay**: SULS in summer. Factors: runway capacity, apron capacity, and airport capacity. **Venezuela**: International airport of Maiquetía: Capacity is affected by 45° angles of runway 10/28, departures and arrivals of aircraft of different wing spans, runway threshold displacement.

APPENDIX E

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE FIR LIMA

Description of tasks	Date	State	Responsible (person or organization in charge)	Observations
1. Calculation of runway capacity, airspace capacity and platform				
1.1. Perform calculation of runway capacity of major airport. a) Calculation of runway capacity AIJCH (Lima) b) Calculation of runway capacity AIVA (Cusco)	Jul/2014 Feb/2015	Accomplished Accomplished	DGAC - Peru DGAC - Peru	All calculation results must be updated if a significant increase is observed in demand.
1.2. Perform calculation of airspace capacity. a) ATC sector capacity ACC Lima. b) ATC sector capacity TMA Cusco.	Sep/2014 Feb/2015	Accomplished Accomplished	CORPAC S.A. DGAC - Peru	
1.3. Perform calculation of platform capacity of major airport. a) AIJCH (Lima) platform capacity. b) AIVA (Cusco) platform capacity.	- Feb/2015 Sep/2014	Pending Accomplished	LAP DGAC - Peru	
1.4. Present the findings of the capacity of runways and airspace.	Apr/2015	Accomplished	DGAC/CORPAC	
2. Determination of projected demand				
2.1. Perform studies on airspace demand by users for the next ten years at least.	Oct/2014	Accomplished	DGAC - Peru	LAP and LAN made demand projections until 2040. Studies presented at the ACC Meeting (*Airport Consultive Collaborative*).
2.2. Determine operational factors affecting demand and airport capacity of Lima to optimize the use of existing capacity including simulations if necessary.		Pending	LAP/CORPAC	LAP and CORPAC should work together to optimize capacity issues and platform management.
3. Actions to implement a FMU in ACC				
3.1. Develop an ATFM basic operational concept. a) Development of CONOPS for FIR Lima ATFM b) Development of ATFM manual for FIR Lima		In progress	DGAC - Peru	Deadline for submission of both documents Jun 2015
3.2. Identify constraints which make that capacity is reduced	Sep/2014 Apr/2015	Accomplished	DGAC - Peru	

Description of tasks	Date	State	Responsible (person or organization in charge)	Observations
3.3. Identify and implement methods to assess climate impacts on the system.		Pending	DGAC - Peru	Deadline (Sep 2015)
3.4. Develop a data base for analyzing the demand for arrivals and departures at major airports and airspace, for the increase of it, in the following period: monthly, annual, daily and for hours.		Pending	DGAC - Peru	Deadline (Dec 2015)
3.5. Training of personnel for the implementation of ATFM.				
a) Replicate the courses and workshops for implementation ATFM by staff previously trained by ICAO.		Pending	DGAC - Peru	Deadline for completion of courses Jun 2015
b) Replicate and adapt successful ATFM systems in the Region.		Pending	CORPAC S.A. DGAC - Peru	Deadline (Sep 2016)
3.6. Identify periods when demand exceeds both, current and projected capacity, then balance demand/capacity in all three phases ATFM: strategic, pre-tactical and tactical.		Pending	CORPAC S.A. DGAC - Peru	The deadline for this task will depend on the training given to the staff
3.7. Implementation of the ATFM unit (FMU). a) Radar display. b) Radio communication equipment. (monitoring frequency) c) Communication equipment for coordination with adjacent FIR. d) Coordination NOTAM. e) Meteorology coordination f) Military data link.		Pending	CORPAC S.A. DGAC - Peru	Deadline for the physical implementation of unit (Jul 2016)
3.8. FMU Start of operations a) Pre-operational phase b) Operational phase		Pending	CORPAC S.A. DGAC - Peru	The first phase will be a test stage, and will run for 3 months, beginning Aug 2016
4. CDM Implementation				
4.1. Involve stakeholders.	Oct/2014	Accomplished	DGAC - Peru	A-CDM committee was formed for AIJCH chaired by LAP.
4.2. Appointment of staff to perform this task.	Oct/2014	Accomplished	DGAC - Peru	
4.3. CDM implementation office to conduct daily meetings.				
4.4. Establish CDM dependence with designated and trained personnel, of all involved.				

Description of tasks	Date	State	Responsible (person or organization in charge)	Observations
4.5. Establish rules and procedures for participation in the CDM. 4.6. Implement software that meets the needs of users for participation in the CDM. 4.7. Identify the personnel and operational phone numbers that will serve as point of contact for ATFM issues at each ACC, TMA, TWR, airlines CCO, airports COO, meteorology, military, general aviation and others.		(4.3 - 4.5) Pending (4.6 - 4.7) Pending	CORPAC S.A. CORPAC S.A.	Feb 2016 Feb 2016
5. Post-Operational analysis and System Feedback				
Once the FMU is implemented, staff will be required for analysis and feedback of system continuously to correct possible failures. a) Develop performance indicators according to the CDM manual. b) Monitor performance indicators		Pending	DGAC - Peru CORPAC S.A.	If estimated deadlines are met, the first system feedback will take place in Feb 2017

APPENDIX F - APÉNDICE F

Longitudinal separation in some portions of the SAM Region
Separación longitudinal en algunas porciones de la Región SAM

APPENDIX G – APÉNDICE G

SAM RADAR COVERAGE DIAGRAMS – DIAGRAMAS DE COBERTURA DE RADAR SAM

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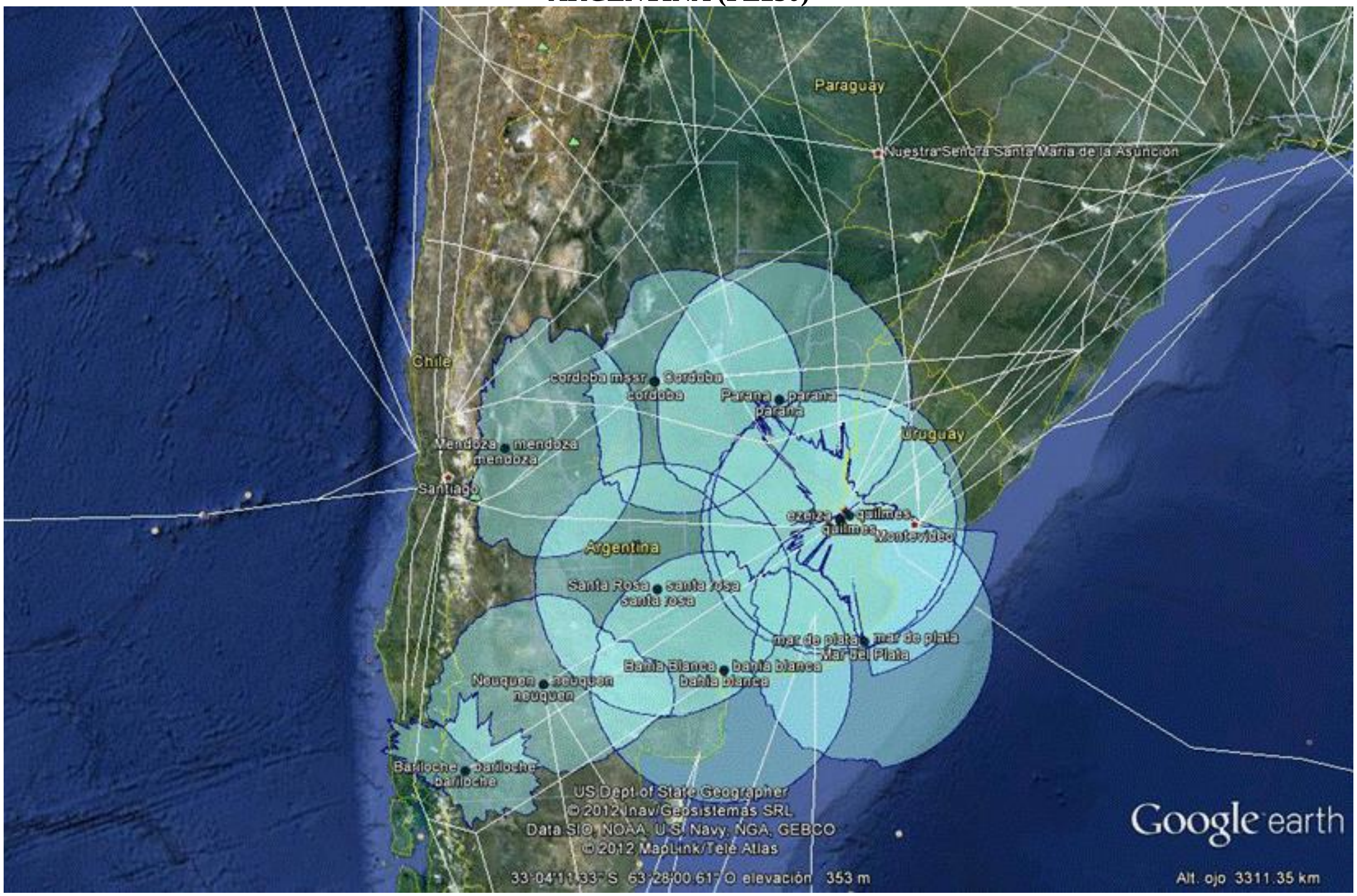
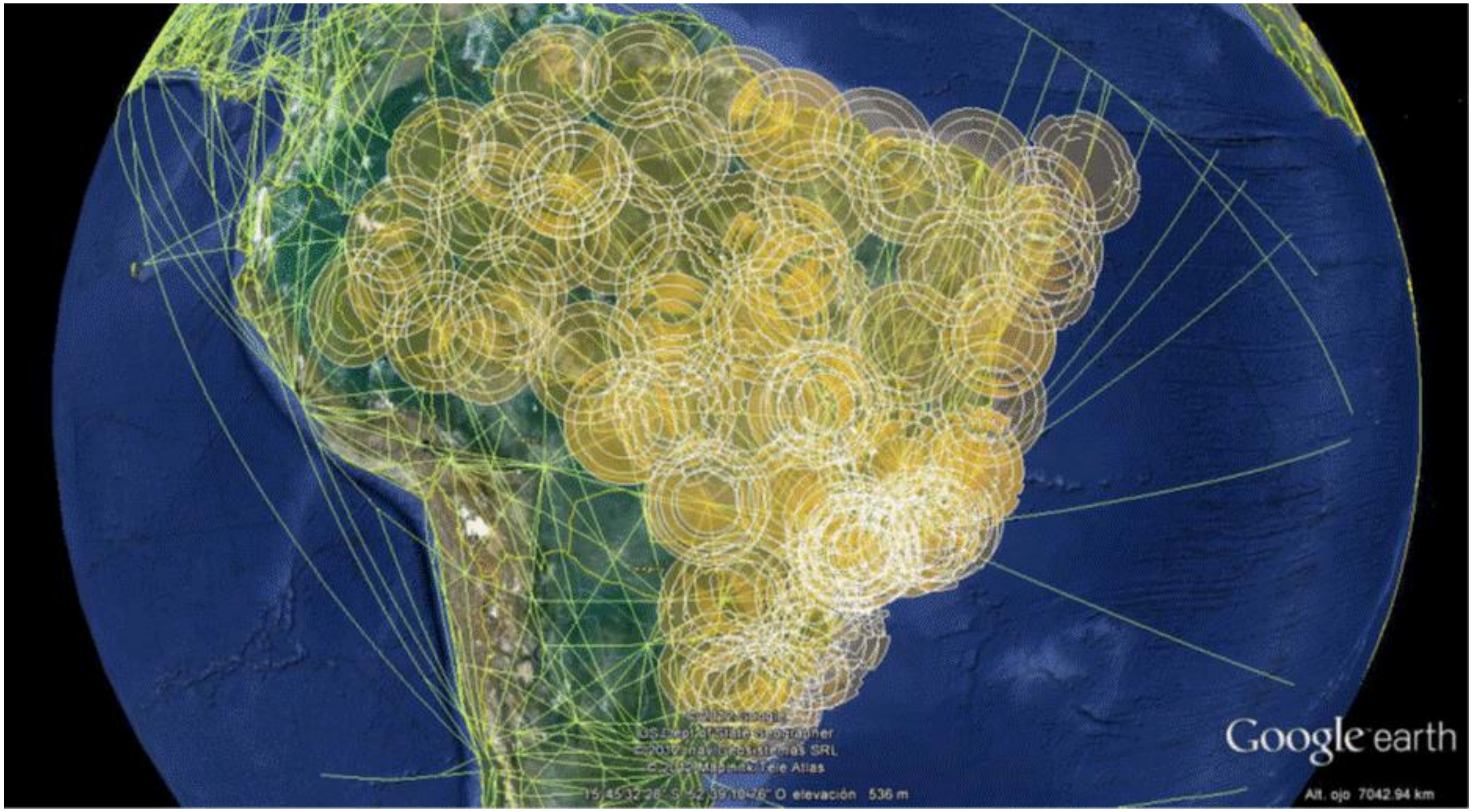
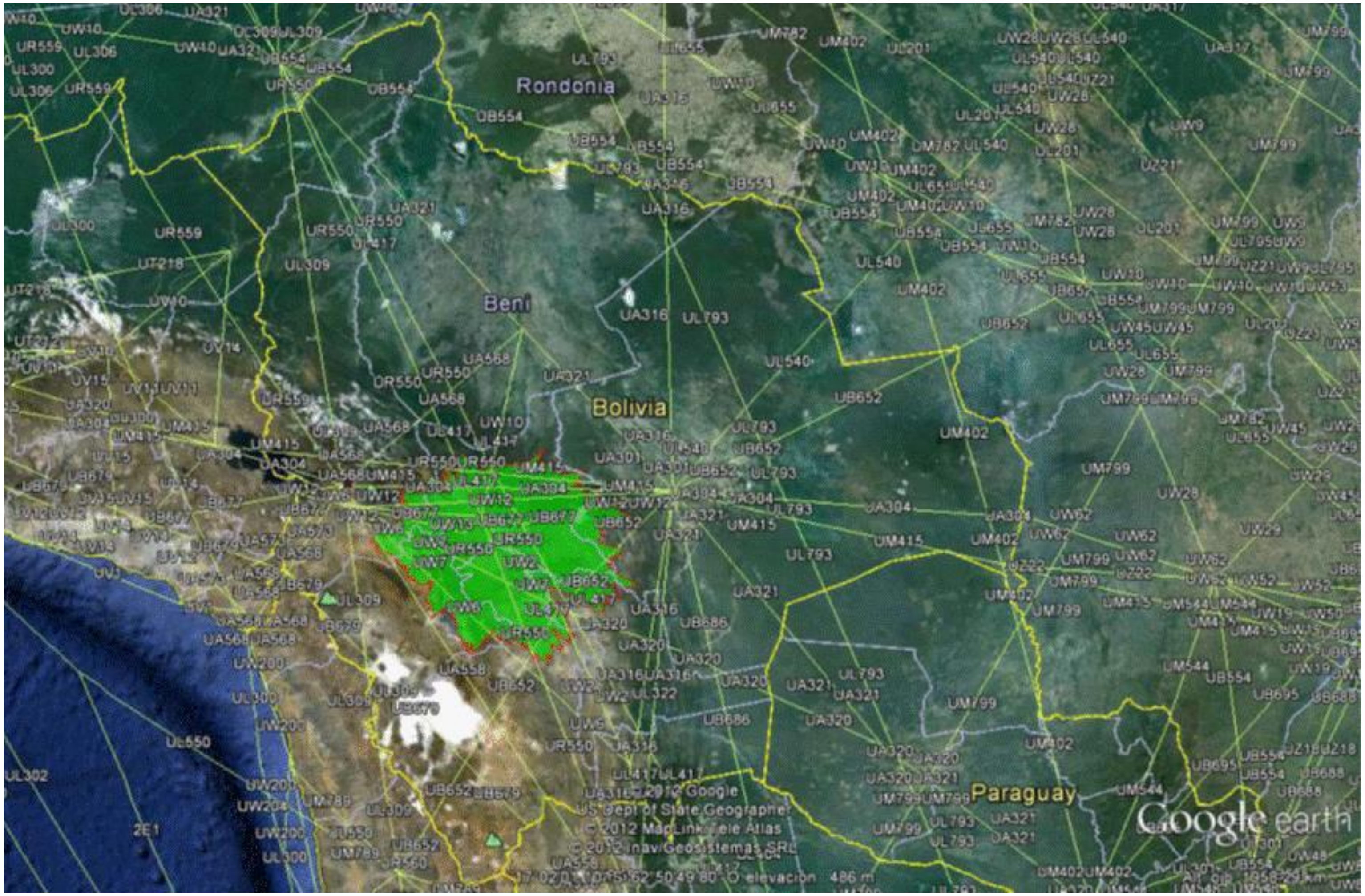


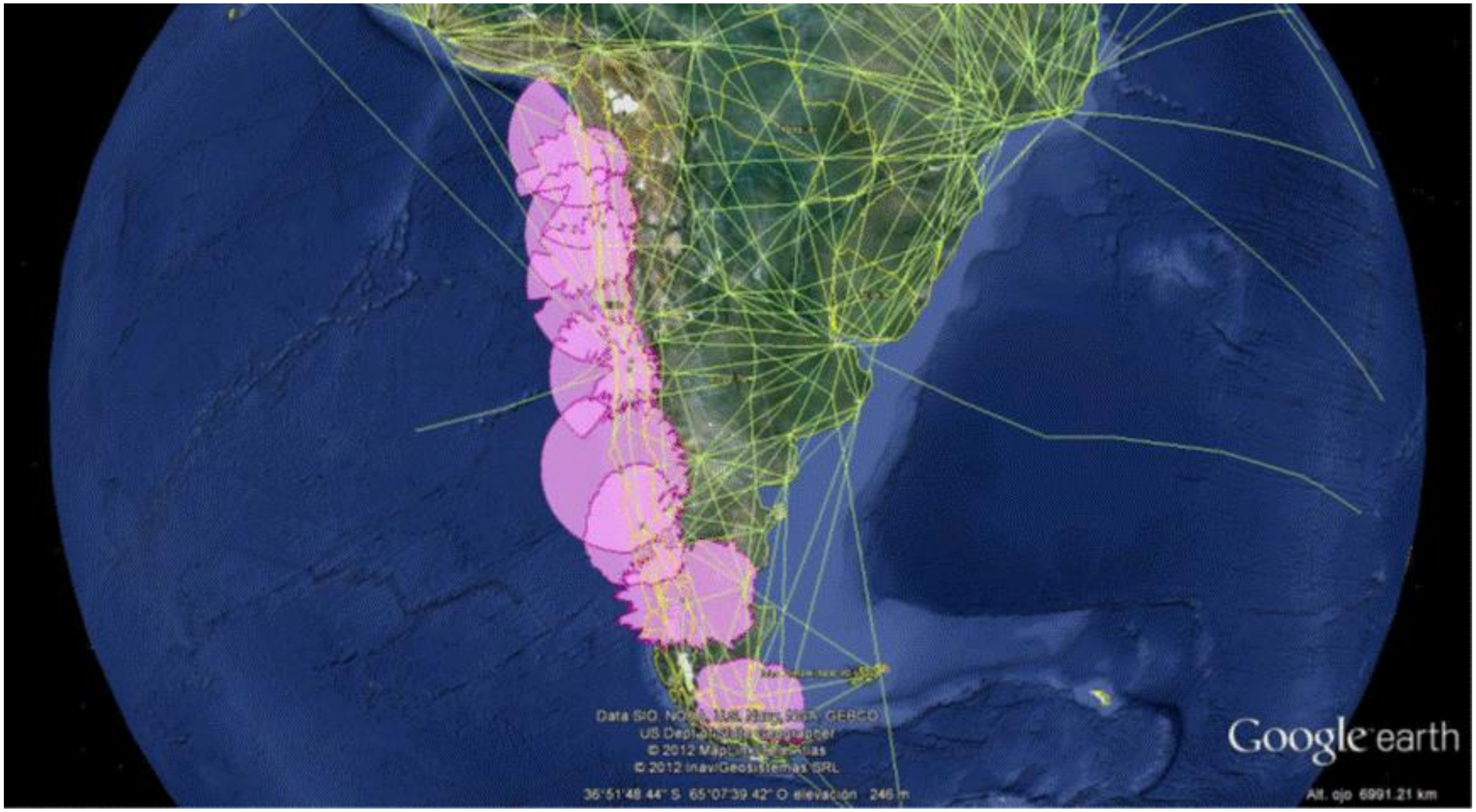
BRAZIL (FL200)



BOLIVIA (FL250)



CHILE (FL250)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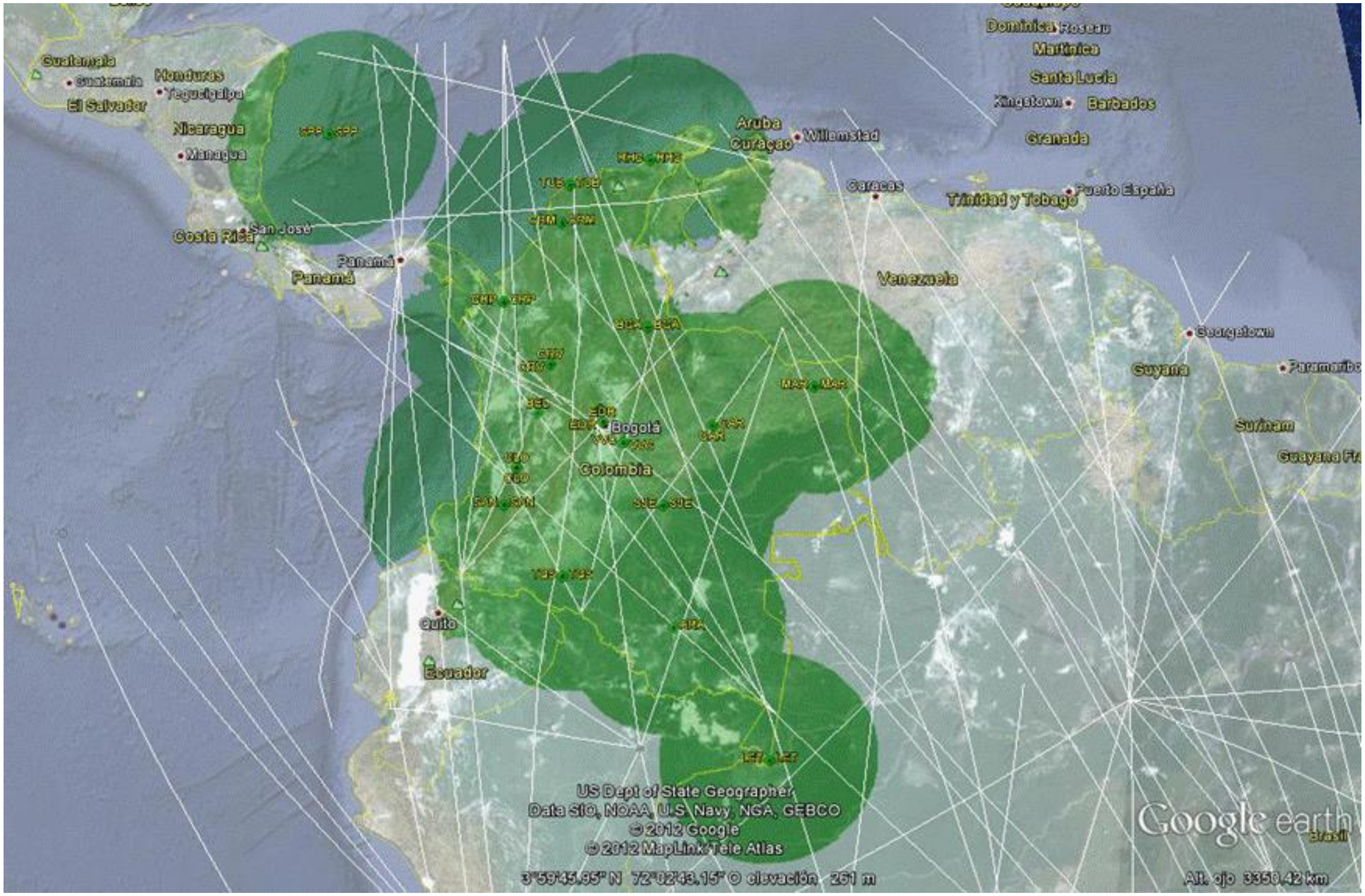
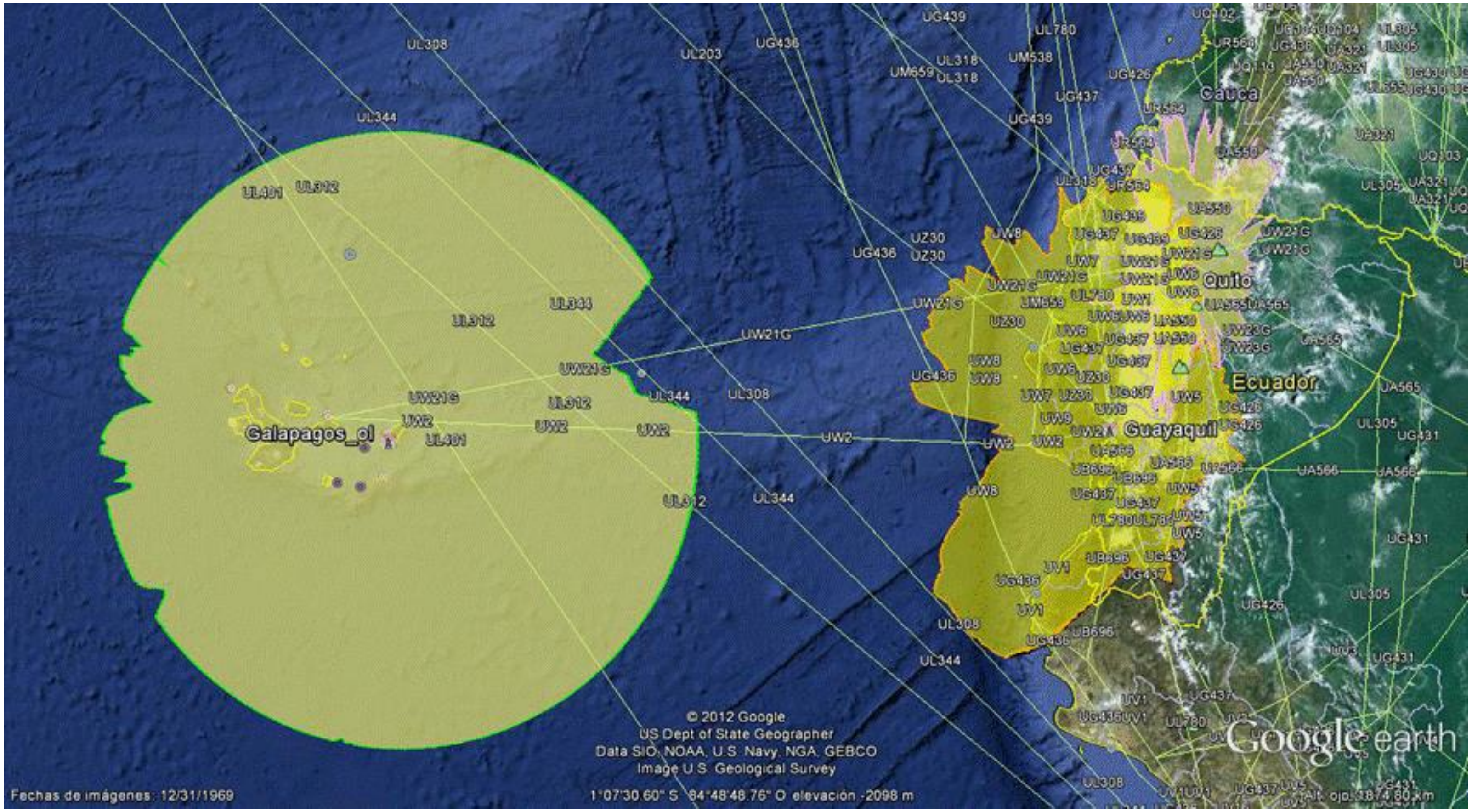
Google earth
Alt. ojo 6991.21 km

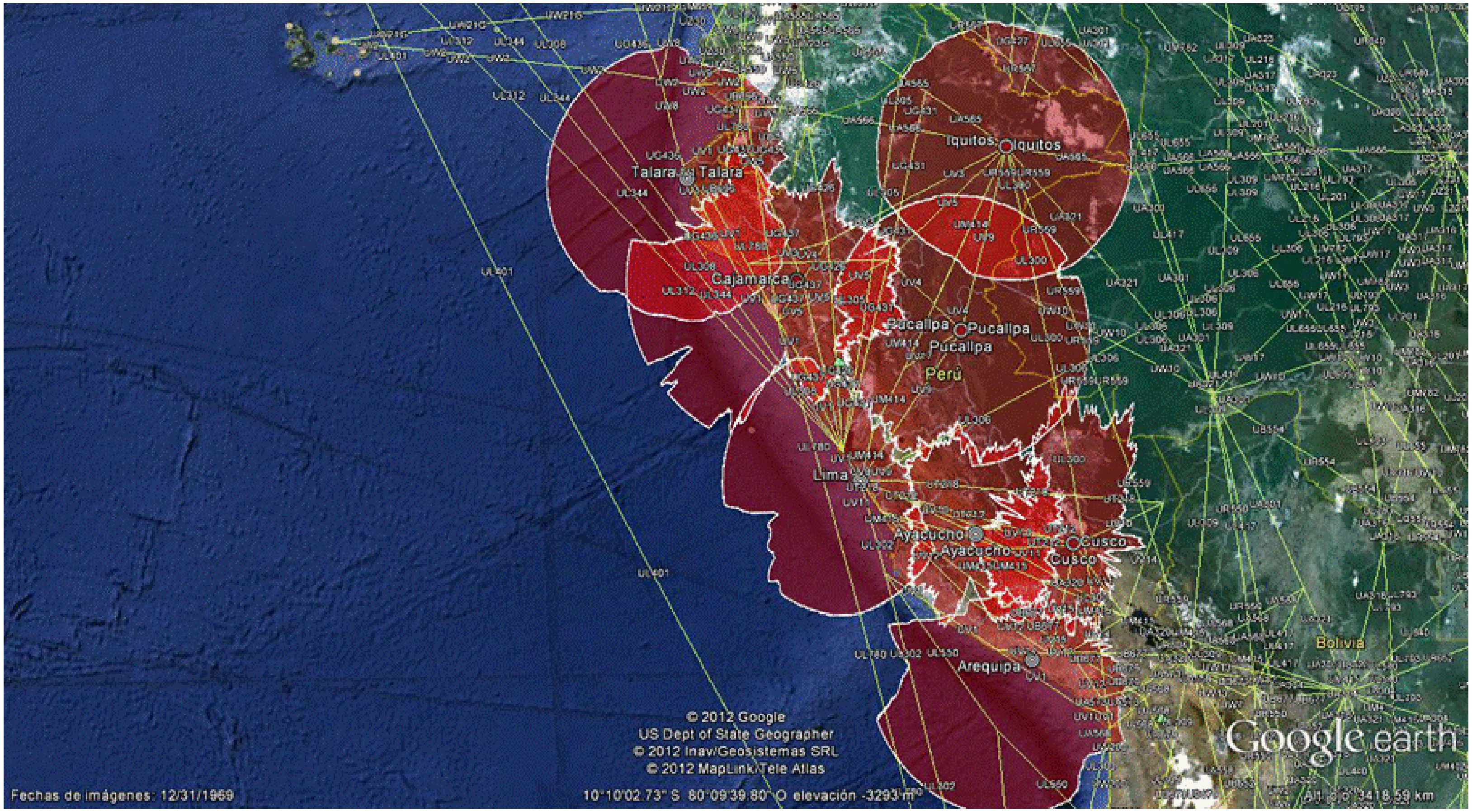
COLOMBIA (FL250)



ECUADOR (FL250)



PERU (FL250)


Iquitos
Talara
Cajamarca
Pucallpa
Perú
Lima
Ayacucho
Cusco
Arequipa
Bolivia
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US Dept of State Geographer
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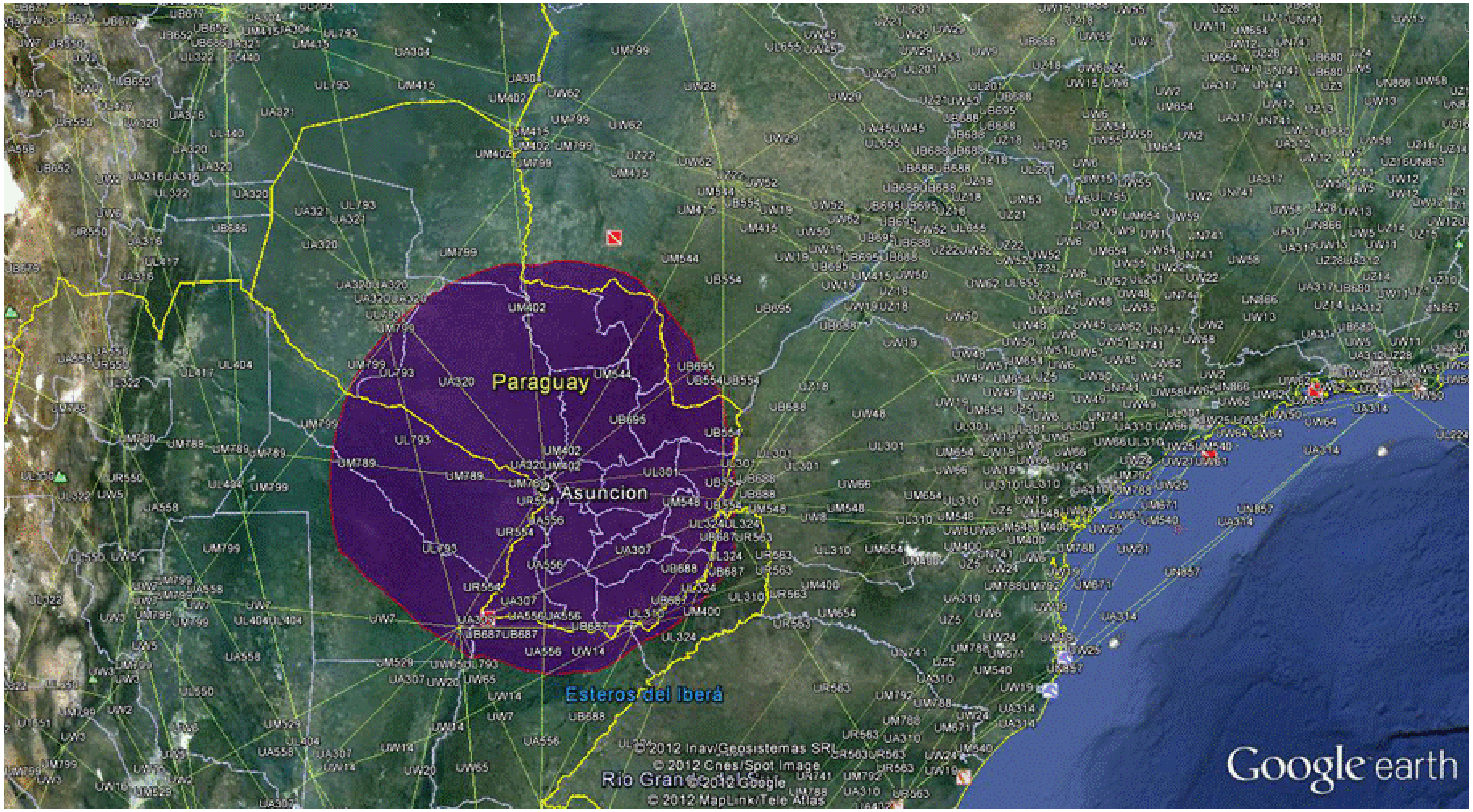
Google earth

PARAGUAY (FL250)



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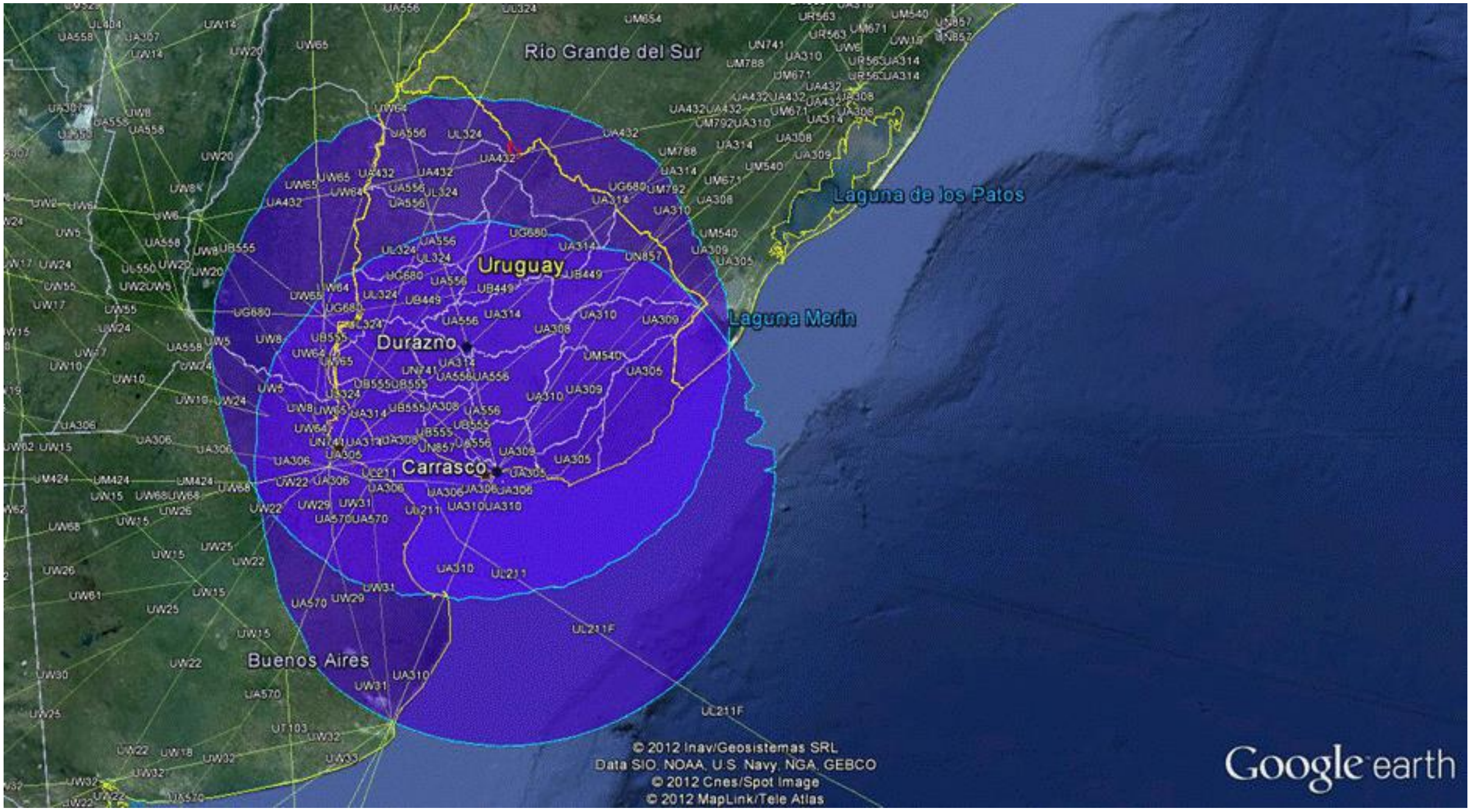
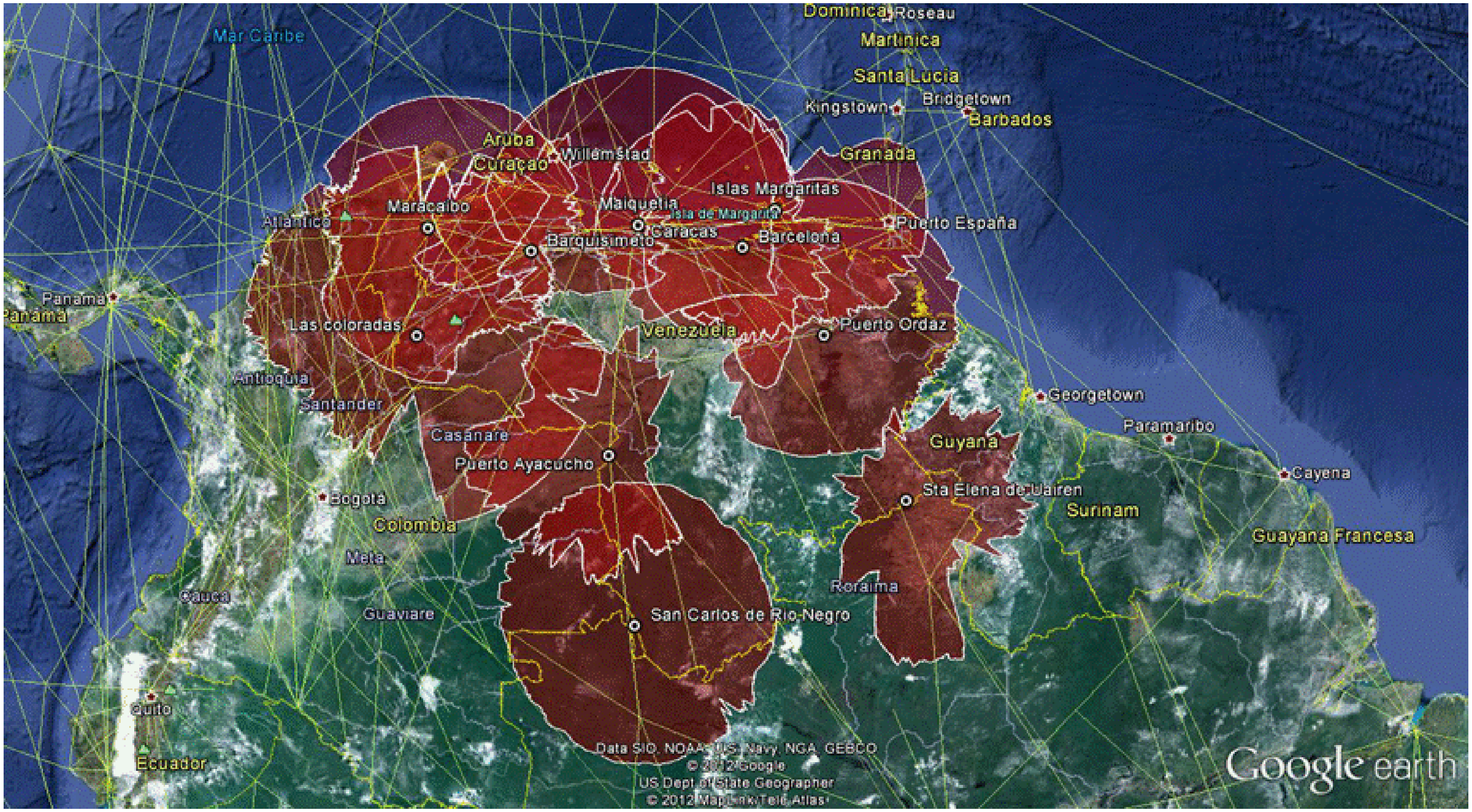


VENEZUELA (FL250)



TOTAL SAM REGION

APPENDIX H

ACTION PLAN

IMPROVEMENT AND HARMONIZATION OF THE LONGITUDINAL SEPARATIONS ACROSS THE FIRs (CONTINENTAL)

a. **Phase 1**: To change the separation methodology used by the ATC in the Region without the implementation of any CNS system.

   i. Gap analysis: no ATM or CNS requirement at this point. Confirm the VHF communication coverage across the FIRs boundaries.

   ii. Action required:
      - change, gradually, from procedural longitudinal separation based on time (10 minutes) or distance (80NM), commonly used on the Region when crossing FIRs)to 20 NM, applying GNSS.
      - Modify/update the Letter of Operational Agreements.

   iii. Improvement: apply procedural longitudinal separation minima based on distance, using distance measuring equipment (DME) and/or GNSS (20NM) – same Mach number.

      1. Requirements: currently available = Direct VHF Comm pilot/ATC and GNSS and/or DME.
      2. Gain: 60NM improvement = FL availability.

b. **Phase 2:** To change the separation standard from procedural to radar (continental).

   i. Gap analysis: CNS analysis to confirm the radar overlap coverage.

   ii. Action required: Modify/update the Letter of Operational Agreements for flights transferring between FIRs with similar surveillance capabilities/coverage.

   iii. Improvement: apply radar transference (10NM) - same Mach number.

Agenda Item 4: **Assessment of operational requirements to determine the implementation of improvements in communications, navigation and surveillance (CNS) capabilities for operations in route and terminal area**

4.1 Under this Agenda Item, the Meeting analysed the following Working Papers:

a) WP/10 - *Progress in the implementation of REDDIG II* (Presented by the Secretariat)
b) WP/11 - Follow-up to the Implementation of the RAIM Availability Prediction Service (Presented by the Secretariat);
c) WP/12 - *Follow-Up to activities of Regional Project RLA/03/902 Augmentation Solution for the Caribbean, Central and South America (SACCSA)* (Presented by the Secretariat);
d) WP/13 - *Follow-up to the Implementation of Project Activities under the Ground-Ground and Ground-Air Applications for SAM Region* (Presented by the Secretariat);
e) WP/16 - *SITA AMHS Interconnection in ICAO SAM Region* (Presented by SITA);
f) WP/17 - *Circular on the use of GNSS as primary means of navigation and start-up of ADS-B implementation in Colombia* (Presented by Colombia);
g) WP/18 - *Follow-Up to the activities for the access to the SITA data link network through the REDDIG II* (Presented by the Secretariat);
h) WP/19 - *Speech communications between ATS adjacent boundary dependencies* (Presented by the Secretariat); and
i) WP/22 - Results of ionosphere impact evaluation on GBAS operation in Brazil (Presented by Brazil).

4.2 The abovementioned working papers addressed the following topics:

- SAM ATN Architecture Project Activities, D1
- ATN Ground-Ground and Ground-Air Applications Project Activities, D2
- Follow-up on the RAIM Availability Prediction Service.
- Results of ionosphere impact evaluation on GBAS operation in Brazil
- Follow-Up to activities of Regional Project RLA/03/902 (SACCSA)

SAM ATN Architecture Project Activities, D1

Progress in the implementation of REDDIG II

4.3 The effective implementation of the REDDIG II began on 15 January 2015 and was completed 17 days later, *i.e.* on 31 January, 2015.

4.4 Prior to such activities, INEO had proceeded with the physical installation of equipment, laying of wiring, and other fixtures necessary in all States involved in the Project.

4.5. The operational installation was made through the following phases, with the particular traits mentioned below:

✓ Migration Preparation.

- ✓ Terrestrial network tests.
- ✓ Completing the installation of the outdoor part.
- ✓ Commissioning of the satellite network.
- ✓ Completion.
- ✓ In addition, in the middle of March, COMSOFT began the installation of the new MEVA III network. On that note, COMSOFT was also in charge of the MEVA III - REDDIG II interconnection node in Maiquetía and Bogota, while the REDDIG Administration was in charge of installing such interconnection at the Tegucigalpa node.

4.6 The following were directly involved in these activities:

a) One INEO representative in each of the nodes and the INEO installer in charge of the operations was at Manaus.
b) The focal points designated by each State and other local technicians.
c) The REDDIG expert in Manaus.
d) Regional Office Secretariat.

4.7 It is important to highlight that, from 13 January 2014 to 3 February 2015, conference calls were held every day, except Sundays, to monitor real-time the progress of the implementation and to adopt measures necessary to make any corrections required.

4.8 The following milestones allowed to effectively follow-up on the activities:

a) <u>Provisional Acceptance Tests (PSAT)</u>: to this end, the document PSAT – NAT – NT 2022-2141167C rev H was used, and in order to accept this phase, focal points signed the corresponding documents. The results of the PSAT tests are published at www1.lima.icao.int/reddig, while a summary with the pending list of activities is presented in **Appendix A** attached hereto.

b) <u>Operation of the REDDIG II post PSAT</u>: according to the contract signed between ICAO and INEO, INEO had forty (40) days to solve all the outstanding activities identified in the PSAT. As of the date hereof, such term has expired; however most of the outstanding activities are still pending. Hence, the last contract milestone (FNAT) will not be signed off by the focal points until all pending issues listed in the PSAT results are lifted.

c) <u>Spare parts of REDDIG II</u>: to store the spare parts of the new network, the Regional Office adapted a special room especially suited for storing spare parts (with appropriate equipment to control moisture, with an anti-static floor and racks, etc.). The list of spare parts can be found in the abovementioned website (www1.lima.icao.int/reddig). REDDIG I spare parts are stored in the same room. Regarding the spare parts of the former network, a letter was sent to the States concerning the intentions of their administrations regarding the equipment and spare parts of the REDDIG I; States were asked to respond no later than 15 May, 2015.

d) <u>MEVA -REDDIG Interconnection</u>: interconnection works performed:

1) In Tegucigalpa, with the intervention of a CORPAC (Peru) specialist, COCESNA, INEO and the REDDIG Administration. The interconnected

services are ATS speech circuits between the CENAMER ACC and ACCs of Guayaquil and Bogota.

2) COMSOFT was responsible for Bogota and Maiquetía. The Interconnection works in Maiquetia were completed at the end of March 2015, while the works in Bogota were completed on 08 May 2015. To date, of the services considered for Maiquetía, the Caracas-Atlanta AFTN is still pending; and, in Bogota, all ATS speech circuits and the Lima-Atlanta AFTN and the Brazil-Atlanta AFTN circuits are still pending. Once the interconnection is implemented, the following services will be available:

- In Maiquetía: direct speech circuits directed and switched with San Juan, Curazao, and Aruba, and two AFTN circuits, with Curazao and Atlanta.
- In Bogotá: three AFTN circuits, two of them with Atlanta (Lima – Atlanta and Brazil – Atlanta) and one in Panamá, plus three hot lines with Jamaica, Curazao and Panamá, and eight ATS switching circuits.

e) <u>Fourth Meeting on the Technical-Operational Implementation of the REDDIG II (RTO/4)</u>: was held in Manaus from 20 to 21 April 2015, the Meeting reviewed the procedures for carrying out the REDDIG II maintenance and operation, the necessary coordination among the staff in each of the nodes and the REDDIG expert in Manaus, failure report procedures, and the procedure for sending and receiving of parts to be repaired, and other issues related to the daily operation of the network.

f) <u>WhatsUp Gold Course</u>: delivered in order to deepen the knowledge on the management system personnel and held after the RTO/4, from 21 to 24 April 2015.

g) In order to coordinate the operation and maintenance of the MEVA III - REDDIG II interconnection and the analysis of the new services to be implemented in the short and medium terms, the first MEVAIII - REDDIG II coordination meeting will be held in Oranjestad, Aruba, from 25 to 26 May 2015. All MEVA III and REDDIG II Member States are invited to attend this meeting, whose invitation letter has already be sent.

Speech communications between ATS adjacent boundary dependencies

4.9 The SAM/IG/14 meeting analysed the current problems in speech communications between adjacent boundary control towers, whether belonging to different TMAs or to the same TMA; and it recognised that there was a broad variety of communication media between them (VHF, private telephony, radio links, satellite links with up to three end-to-end hops), with the various problems derived from them.

4.10 In this respect, the Meeting agreed to encourage SAM States to report the existing ATS speech circuits between adjacent control towers, the means of communication used for this service, and measures being taken (or foreseen to be taken) for enhancing them. The information should have been sent to the South American Regional Office by 15 December 2014 so that it could be reviewed during the SAMIG/15.

4.11 In this regard, the Meeting analysed the results of the assessment presented by Brazil under WP/19 and concurred with the findings which show that most of the circuits have been implemented through REDDIG and the local section up to the boundary dependency, operating regularly.

Appendix B to this Agenda Item includes the list of ATS speech circuits between ATS boundary dependencies.

4.12 The Meeting also agreed that all speech communication ATS adjacent boundary dependencies, agreed upon by virtue of arrangements, whether currently existing or future, must work through:

a) Access by REDDIG, provided that the States involved deem it necessary and that local sections do not add additional satellite hops.
b) Radio link (VHF FM or any other stipulated bilaterally) in all cases, either as a primary or secondary means.
c) International telephony, as a secondary or tertiary means.

4.13 Irrespective of the means selected, in all cases, it is mandatory to record communications. In this regard, the Meeting formulated the following conclusion:

Conclusion SAM/IG/15-05 Requirements for ATS Speech communications between ATS adjacent boundary dependencies

That, SAM States and territories consider the following requirements for all ATS speech services between adjacent ATS dependencies, agreed upon through currently existing or future arrangements:

a) Access by REDDIG, provided that the States involved deem it necessary and that local sections do not add additional satellite hops.

b) Radio link (VHF FM or any other stipulated bilaterally) in all cases, either as a primary or secondary means.

c) International telephony, as a secondary or tertiary means.

d) Recording of all communications regardless of the means used.

Follow-up to the Implementation of Project Activities, D2, under the Ground-Ground and Ground-Air Applications

Ground- ground Applications

Follow-up of the AMHS systems operation interconnection

4.14 The SAM/IG/14 Meeting also took note of the existing active interconnections (Peru – Colombia, Peru – Ecuador, Argentina – Paraguay, Guyana-Surinam), it was necessary to further the initial tests carried out between Peru - Brazil, Peru – Argentina, Brazil – Argentina, and Brazil – Spain.

4.15 With reference to the first three, unfortunately no progress has been achieved with these interconnections, mainly due to the REDDIG II implementation, since this work took up most of the efforts of the technical staff of the States concerned; this was further affected by the inconveniencies experienced by the existing AMHS circuits.

4.16 In this regard, the States concerned reported that they will make their best efforts to comply with the completion of these interconnections stipulated in the Declaration of Bogotá, based on the dates indicated in the AMHS interconnections and requirements table and the implementation dates indicated in **Appendix C** attached hereto.

4.17 In order to adequately monitor the implementation of the AMHS interconnection listed in Appendix C, there will be monthly teleconferences in 2015 as of June. The Meeting expects that concrete and satisfactory results shall be delivered at the SAMIG/16.

4.18 With regard to the Brazil – Spain AHMS network interconnection, Brazil reported it has resumed contacts with Spain and that new testing for starting-up operations will soon be performed.

SITA AMHS Interconnection

4.19 The Meeting was informed that SITA has been operating an AFTN – Type B gateway for over 40 years. The SITA service provides all necessary conversions to enable seamless data exchange between ATS organizations and airlines.

4.20 Also, the Meeting was informed by SITA that, due to the expansion of the AMHS interconnections, such company has begun the AMHS connections with the air navigation area in the EURNAT region which shall replace the current AFTN connections. In addition, the Meeting was informed of the company's intention to coordinate with all SAM Region States in order to agree on like changes, specifically connecting to Peru and Brazil.

4.21 For the SITA AMHS interconnection in an AMHS and AFTN mixed environment, the Subgroup of the AFSG Operations Group for the EUR/NAT Region prepared document AMHS/SITA Type X (Interconnection Architecture), which was adopted by the AFSG/17 Meeting. A copy of the SITA AMHS Interconnection version 1.0 document appears in **Appendix D** attached hereto.

4.22 On this regard, the Meeting agreed to ask the Secretariat to send a formal letter to all States and ANSP in the Region, informing the States about the proposal presented by SITA so that the States can provide their comments no later than 31 August 2015, in such a way that SITA has enough time to propose an interconnection plan at the SAMIG/16. First, Brazil and Peru expressed their interest in analyse SITA proposal, with the intention to stablish a possible future interconnection. On this regard, the Meeting formulated the following conclusion:

Conclusion SAM/IG/15-06 SITA AMHS Interconnection with AMHS Systems installed in the SAM Region

In order to analyse the feasibility of implementing the SITA AMHS interconnection with some AMHS systems installed in the SAM Region based on the SITA AMHS Interconnection version 1.0 document which is presented as Appendix D to this Agenda Item:

a) The Secretariat shall send to all SAM Region States the interconnection document no later than 15 June 2015.

b) The States send their comments and interest in interconnecting their AMHS system with SITA's AMHS by 31 August 31 2015 to the ICAO South American Regional Office.

c) The Secretariat shall send the comments and decisions made by the SITA States at the beginning of September 2015.

d) SITA propose an AMHS interconnection plan with the States that have expressed their interest and to submit to the SAM/IG/16.

Operational integration of international AIDC connections in the SAM Region

4.23 In relation to this activity, the Meeting was informed of the progress of the interconnections that make up a part of the same area, particularly the Pacific coast, as suggested by the SAMIG/14. These activities are addressed in detail in Agenda Item 5.

Ground- Air data link applications
Access to the SITA data link network through ANSP REDDIG

4.24 The SAM/IG/14 Meeting took note with great interest of the proposal of SITA to allow States to use the REDDIG to access SITA's AIRCOM data link network in order to better comply with the high availability requirement for ATC data link services implemented in the South American Region.

4.25 Use of REDDIG by the ANSPs (Air Navigation Service Providers) to access the SITA ACARS service, as proposed by SITA, would replace the current access to the ground network provided by SITA and ANSPs would benefit from those using an extremely safe and reliable network designed for ATC purposes, to access the data link service that is increasingly important in ATC operations.

4.26 Also, would give added value to ANSPs, since they would not have to pay SITA for the current access links from the ground network provided by SITA to SITA's ACARS service.

4.27 Considering that SITA would give support to any ANSP wishing to test the use of REDDIG to Access the ACARS services and working with the REDDIG service provider in order to establish the access without overlooking any of the requirements of either network, the Chile Administration approved last 15 April 2015 the performance of trials to test access to the SITA data link service through the REDDIG node in Santiago; such trials shall start in July 2015, for a three-month period so that the results can be presented at the SAMIG/16.

4.28 In answering ARINC's request that the ground-air data links of ARINC in REDDIG II also be considered, the Meeting reported that ARINC presented at the SAM/IG/16 or at the Nineteenth Coordination Meeting of the RLA / 03/901 (REDDIG) RCC/19 (March 2016), the requirements of required links and the respective technical details.

Follow-up to the Implementation of the RAIM Availability Prediction Service in the SAM Region

4.29 The SAM/IG/14 Meeting decided that the RAIM Availability Prediction System be conducted in two stages: the first phase being an experimental phase for one year period and the second phase, a final operational phase, having formulated to this end, the Conclusion SAM IG/14-15 *Use of the RAIM Availability Prediction Service."*

4.30 On the other hand, the Eighth Meeting of Coordination of project RLA/06/901 formulated Conclusion RCC/8-01 *Expansion of users for the SATDIS* (Web-based RAIM Availability Prediction Service), where ICAO shall ask that the RAIM service provider about the possibility of generating different access categories, such as temporary allocations and free access, and once the reply is received, such answer will be reported to the Member States.

4.31 This Meeting took note of the different activities performed by each State in connection with this service, as described under Appendices B and C to WP/11.

4.32 Furthermore and in order to support the States in the process of disseminating this service, they designed a procedure in order to generate a user account and password for each of the members as well as the AIC of Brazil as presented in **Appendices E and F** to this Agenda Item.

4.33 The Meeting took note that the on 12 March 2015 a conference call was held with the service provider (DWI), where it was asked for a solution to access the SATDIS freely. The company submitted a proposal, which was circulated to the States, it was not approved, so the Meeting decided not to accept it and that those States wishing to use the free access, can make use of the procedure reflected in the Appendix E mentioned above, or any other solution deemed appropriate.

Results of ionosphere impact evaluation on GBAS operation in Brazil

4.34 The Meeting took note of the activities performed by Brazil in its investigation on the ionosphere impact on GBAS operation.

4.35 In this regard, such activities can be summarised as follows:

a) In June 2011, a Honeywell SmartPath GBAS SLS-4000, configured with the threat model developed by Stanford University, was installed at Rio de Janeiro International (SBGL, intense ionosphere activity) for mid-latitudes.
b) From the beginning, the availability was lower than the one required so it was necessary to disable the internal monitors in order to collect date continuously.
c) In order to measure the real impact, they carried out a joint task for which they used together station SLS-4000 and more than 110 L1 and L2 GPS stations installed in Brazil.
d) Data was collected during maximum solar activity periods, although this was the lowest in the last 100 years.
e) From the results obtained, Brazil concluded that, to date, the SLS-4000 station may not be used fully for CAT I operations in low-latitude regions, hence ICEA (Airspace Control Institute) will continue researching in collaboration with the FAA and Honeywell, seeking to develop a threat model capable of supporting the behaviour of the ionosphere at low latitudes.
f) At SAMIG/16, a session shall be scheduled in order to report on the progress of the research mentioned above.

Follow-Up to activities of Regional Project RLA/03/902 SACCSA

4.36 The Meeting took note that the SACCSA Project (Satellite-based Augmentation Solution for the Caribbean, Central and South America) completed its activities after ten (10) years.

4.37 Over the years, the most important milestones were:

a) Ionospheric studies for CAR/SAM Regions.
b) Ionospheric algorithms were defined in order to implement SACCSA.
c) A complete design of the SBAS solution for SACCSA, applicable to the CAR/SAM region.
d) SBAS approaches in Havana, Tegucigalpa, Bogota, Cartagena de Indias, and San Andres were performed.
e) A real-time platform where SACCSA services are being analysed using different tools.
f) A real SBAS signal in the CAR/SAM region with SACCSA algorithms was issued, using the GMV magicSBAS platform and the Inmarsat Geostationary satellite.

4.38 During the project closing meeting (RCC/10), member States proceeded to the evaluation of the Project and concluded that through the project the viability of a SBAS for CAR/SAM Region had been proved for the CAR/SAM Region and that in order to complete all project remaining work packages, it was necessary to consider giving continuity to the implementation of the test-bed, financial viability, and cost benefit analysis.

4.39 An executive summary of the project closure, the activities carried out by the project, and final considerations are presented as **Appendix G** attached hereto. More information about the project is available at the following WEB site www.rlasaccsa.com.

4.40 The Meeting concluded that, since there was no cost-effective and that the development of the PBN agreed in the Bogota Declaration did not consider SBAS in the short term, it is not pertinent to carry out any Test-bed yet.

APPENDIX A

SUMMARY OF COMMENTS MADE BY THE FOCAL POINT DURING THE PSAT

STATE	NODE	PSAT DATE	COMMENTS
Argentina	Ezeiza	2/2/15	• Pending to amend circuit diagrams • Poor quality on terrestrial IP telephony and satellite network • Pending BER tests AFTN circuits • False Alarms in serial ports CISCO IA • Low levels of transmission SKywan A and B • Emergency Number GBB dedicated router (Fig 46 communicates with Manaus with the number 73601 and not the number indicated in the table in Figure 46 • Loss of packets in the terrestrial networks of Manaus, Recife, Guyana, Paraguay and Suriname. • Access to the website of LEVEL 3 for service management is not supplied • Two RJ45 connectors damaged Patch Panel
Bolivia	La Paz	2/2/15	• No comments
Brazil	Curitiba	2/2/15	• No comments
	Manaus	5/2/15	• Lima Manaus AFTN circuit does not work • Slope of circuit diagrams update • The loss of packets in the terrestrial network are above what specifies the SLA LEVEL 3 • Testing in administrative circuits, switched ATS and AFTN made in one chain in terrestrial network • IP Teleconference does not work according to the technical specifications limited to 10 users • Image quality unimproved slope aspect from the FAT • Administrative Canal with Ecuador does not operate • Observation slope from the FAT: In case of failure of the central

STATE	NODE	PSAT DATE	COMMENTS
			server in Manaus NMS backup server Ezeiza should assume all functions of the central server with all the powers of monitoring and control over all seasons • Pending BER tests on AFTN channels • Pending SAT TEST LOOP VER • Testing pending ATS oral circuits, administrative AFTN in one strand of the satellite network
	Recife	30/1/15	• Loss of packets in the terrestrial network LEVEL 3 with all nodes • Pending BER tests AFTN • False alarm NMS (IBUC) and RX 1 + 1
Chile	Santiago	1/2/15	• Damaged Screen GPS Watch • NMS: refresh state changes very slowly • Image quality is not improved slope aspect from the FAT • IBUC WEB: The indication of voltage does not correspond to the actual value • Pending update diagrams • AFTN circuit with Lima inoperative • Pending BER test AFTN
Colombia	Bogota	1/2/15	• Oral ATS Circuit Bogota Panama does not work • AMHS circuit with Peru does not work
Ecuador	Quito	1/2/15	• Administrative Voice Circuits inoperative • Loss of packets in the terrestrial network Level 3 with Manaus, Recife, Guyana and Uruguay • Pending BER AFTN tests • Test Tx switch (7.1.1) failed • VoIP teleconference poor quality • False alarm operation of the serial interfaces and E1 • Pending voice circuit test between Guayaquil and CENAMER
French Guyana	Cayenne	2/2/15 pending INEO signature	• The power connector on the IP phone does not work • Incorrect diagrams of circuits (WVG)

STATE	NODE	PSAT DATE	COMMENTS
			• Difficulty reading the IP address of WVG • Error in the LAN interface does not work • Modem B is not going green when turned on • Rear problem with AFTN circuit Manaus
Guyana	Georgetown	5/2/15 pending INEO signature	• No indication of status on one of the switches in the MAP VIEW • You cannot make setting in voice interfaces
Paraguay	Asuncion	2/2/15	• Audible alarm UPS in battery mode, almost inaudible • Do not have the antivirus that is specified in Document SDD REDDIG II Scope of Supply Rev. F • The breaker Q5 presents a false contact so they must be changed • Administrative line IP was not configured • The graphical representation of the computers on the nodes in the NMS has not been improved, as had been observed in the FAT • When testing redundancy Chapter 7 Pag. 70/125 of the PSAT, the IBUCs not indicate faults and do not switch automatically • The serial port 0/0/0 of GBB router has a fault where lost packets at reception, so Card 2-Port Async / Sync Serial WAN Interface Card must be replaced • Pending updating circuit diagrams • Loss of packets in the terrestrial network LEVEL 3 with Bolivia, Recife (very high), Colombia, French Guiana, Guyana and Uruguay
Peru	Lima	3/2/15	• AFTN circuit with inoperative Manaus and Santiago • Chain MODEM inoperative 1070 • The graphical representation of the computers on the nodes in the NMS has not been improved, as it was observed in the FAT

STATE	NODE	PSAT DATE	COMMENTS
			• Pending updating circuit diagrams • Loss of packets in the terrestrial network Level 3 with Manaus, Argentina, Colombia, Guyana and Venezuela • ATS number d does not match • Test of satellite chain A not performed due to failure in chain A MODEM • Pending BER Test • Pending testing equipment failures (Section 7.3) • Errors dial plan administrative circuits • Unsatisfactory quality IP voice teleconference
Suriname	Paramaribo		• Loss of packets in the terrestrial network Level 3 with Argentina, Manaus, Recife (very high), Chile, Colombia, Ecuador, Guyana and Uruguay • Pending BER tests • IP Teleconference only with ten users
Trinidad &Tobago	Piarco	4 /2/15 pending INEO signature	• NMS: refresh state changes very slowly • Image quality unimproved slope aspect from the FAT • IP Teleconference only works with 11 users does not comply with the technical specifications of the REDDIG • No automatic switching on IBUC in case of failure only when power is switched off • Loss of packets in the terrestrial network LEVEL 3 Curitiba and Ecuador.
Uruguay	Montevideo	2/2/15	• Pending renovation plans with circuit diagrams • Unit 1070 B chain does not turn green light even when operating well • Pending change Feed Horn • NMS: refresh state changes very slowly • Image quality is not improved slope aspect from the FAT

STATE	NODE	PSAT DATE	COMMENTS
			• Foul install antivirus in the NMS • The NMS has incorrect information • Pending BER tests • The supplied software for VPN remote version is not according to the manual shipped for installation can not be installed as suggested by INEO. • Loss of packets in the terrestrial network LEVEL 3 with Bolivia, French Guyana, Suriname, Trinidad & Tobago and Venezuela
Venezuela	Maiquetía	31/1/2015	• The automatic switching is observed in the RSS

- END -

APPENDIX B

LIST OF ATS SPEECH CIRCUITS BETWEEN ATS BOUNDARY DEPENDENCIES IN THE SAM REGION

STATE	FROM	TO	COMMUNICATION MEAN	TABLE CNS 1 C FASID
Argentina	Aeroparque TWR	Colonia (Uruguay) TWR	Via REDDIG	X
Posadas (Argentina) and Encarnacion (Paraguay)	Catarrata TWR	Foz de Iguazu (Brazil)	Via REDDIG	No
	Paso de los Libres TWR	Uruguaiana (Brazil) TWR	Vía REDDIG	No
	Posada TWR	Encarnacion (Paraguay) TWR	To be implemented	No
Bolivia	Puerto Suarez TWR	Curumba (Brazil) TWR	Vía REDDIG (Pending Bolivia's side)	No
	Guayaramirin TWR	Guajaramirim (Brasil) AFIS	Radio VHF	No
Brazil	Tabatinga AFIS	Amazonas (Colombia) APP	Radio VHF Vía REDDIG	X
	Foz de Iguazu TWR	Catarrata (Argentina) TWR	Via REDDIG	No
	Uruguaiana AFIS	Paso de los Libres (Argentina) TWR	Via REDDIG	No
	Corumba APP/AFIS	Puerto Suarez (Bolivia) TWR	Via REDDIG (Pending Bolivia's side)	No
	Guajaramirim AFIS	Guayaramirín (Bolivia) AFIS	Radio VHF	No
Chile	Arica TWR	Tacna (Peru)TWR	Radio VHF (153.05Mhz) Via REDDIG	No
Colombia	Andes APP	Tulcan (Ecuador) TWR	Red VSAT Colombia	X
	Cúcuta TWR	San Antonio Táchira (Venezuela) TWR	Radio	X
	Leticia TWR	Iquitos (Perú) TWR	Via REDDIG	No
Ecuador	Tulcán TWR	Andes (Colombia) APP	Red VSAT Colombia	X
	Santa Rosa TWR	Piura (Peru)	Telephone	No
	Santa Rosa TWR	Tumbes (Peru) TWR	Telephone	No
French Guyana				
Guyana				
Panama				
Paraguay	Guarani TWR	Foz de Iquazu	Vía REDDIG	No

STATE	FROM	TO	COMMUNICATION MEAN	TABLE CNS 1 C FASID
	Encarnación TWR	Posada (Argentina)	To be determined	No
Peru	Piura (TWR)	Santa Rosa T Santa Rosa TWR (Ecuador)	Telephone	No
	Tumbes TWR Iquitos TWR	Santa Rosa (Ecuador) TWR	Telephone Telephone	No No
	Iquitos TWR	Leticia (Colombia) TWR	Via REDDIG	No
Suriname				
Uruguay	Colonia TWR	Aeroparque (Argentina)TWR	ATS speech circuit REDDIG	X
Venezuela	Josefa Camejo (TWR)	Aruba (APP)	MEVA/REDDIG interconnection	X
	San Antonio del Tachira TWR	Cucuta TWR	Radio	X

APPENDIX C

AMHS INTERCONNECTION REQUIREMENT AND DATE OF IMPLEMENTATION

STATE	AMHS INTERCONNECTION REQUIREMENT/	DATE OF IMPLEMENTATION/	REMARKS
Argentina	Bolivia	Mar 2016	
	Brazil	Dec 2015	Operational implementation pending.
	Chile	TBD	Reported by Chile delegate during SAM/IG/13 Meeting. It will be implemented under the considerations of the Declaration of Bogota (Dec 2016).
	Paraguay	Mar 2012	Implemented
	Peru	Jul 2015	
	Uruguay	Dec 2015	
Bolivia	Argentina	Mar 2016	
	Brazil	Apr 2016	
	Peru	May 2016	
Brazil	Argentina	Dec 2015	Operational implementation pending
	Bolivia	Apr 2016	
	Colombia	Dec 2015	
	Guyana	Mar 2016	
	French Guiana	TBD	AMHS implementation pending.
	Paraguay	Dec 2015	
	Peru	Jul 2015	
	Suriname	Mar 2016	
	Uruguay	Dec 2015	
	Venezuela	Dec 2015	Reschedule date of implementation
Chile	Argentina	TBD	Reported by Chile delegate during SAM/IG/13 Meeting. It will be implemented under the considerations of the Declaration of Bogota (Dec 2016).
	Peru	TBD	Reported by Chile delegate during SAM/IG/13 Meeting. It will be implemented under the considerations of the Declaration of Bogota (Dec 2016).
Colombia	Brazil	Dec 2015	
	Ecuador	Dec 2015	
	Panama	Dec 2015	
	Peru	Sep 2010	Implemented

STATE	AMHS INTERCONNECTION REQUIREMENT/	DATE OF IMPLEMENTATION/	REMARKS
	Venezuela	Jun 2016	
Ecuador	Colombia	Dec 2015	
	Peru	Jul 2012	Implemented
	Venezuela	May 2016	
French Guiana (France)	Brazil	TBD	AMHS implementation pending
	Venezuela	TBD	AMHS implementation pending
Guyana	Brazil	Mar 2016	
	Suriname	Jun 2011	Implemented
	Venezuela	Dec 2016	
Panama	Colombia	Dec 2015	
Paraguay	Argentina	Mar 2012	Implemented
	Brazil	Dec 2015	
Peru	Argentina	Jul 2015	
	Bolivia	May 2016	
	Brazil	Jul 2014	Operacional implementation pending.
	Chile	TBD	Reported by Chile delegate during SAM/IG/13 Meeting. It will be implemented under the considerations of the Declaration of Bogota (Dec 2016). Chile signed a MOU for the implementation of the AMHS interconnection with Peru.
	Colombia	Sep 2010	Implemented
	Ecuador	Jul 2012	Implemented
	Venezuela	Dec 2016	
Suriname	Brazil	Dec 2016	
	Guyana	Jun 2011	Implemented
	Venezuela	Jun 2016	
Uruguay	Argentina	Dec 2015	
	Brazil	Dec 2015	
Venezuela	Brazil	Dec 2015	
	Colombia	Jun 2016	
	Ecuador	May 2016	
	Guyana	Dec 2016	
	French Guiana	TBD	AMHS implementation pending.
	Peru	Jun 2016	
	Suriname	Jun 2016	

APPENDIX D / APÉNDICE D

AMHS / SITA Type X Interconnection Architecture

AMHS / SITA Type X Interconnection Architecture

SITA Type X Gateway in a mixed AFTN/AMHS environment	
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Scope of the Document

This document has been developed by a Subgroup of the AFSG Operations Group in order to fulfil Task 26 “Study operational issues and potential solutions for the operation of a SITA Type-X gateway in a mixed AFTN/AMHS environment” assigned by the 16th Meeting of the ICAO EUR Aeronautical Fixed Service Group (AFSG).

It provides a description of the current and future gateway architecture and analyses the different communication scenarios and potential solutions for the required address conversion.

Finally, a preferred solution is proposed and a list of resulting requirements is provided in order to ensure further communication between the AFTN/AMHS and the SITA Network based on modern communication protocols.

In April 2013 the document was approved by AFSG/17 and the AFSG Operations Group was tasked to support and monitor the implementation and propose updates to the document as needed.

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References

ICAO Documentation

[1] ICAO Annex 10 – Aeronautical Telecommunications, Volume II and Volume III

[2] ICAO Doc 9880-AN/466: Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols, Part II – Ground-Ground Applications - Air Traffic Services Message Handling Services (ATSMHS), First Edition – 2010

[3] ICAO Doc 9880-AN/466: Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols, Part III – Upper Layer Communications Service (ULCS) and Internet Communications Service (ICS), , First Edition – 2010

[4] ICAO Doc 9880-AN/466: Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols, Part IV – Directory Services, Security and Systems Management, First Edition – 2010

[5] ICAO Doc 9896-AN/469: Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols, First Edition – 2010

[6] ICAO Doc 7910, Location Indicators

[7] ICAO Doc 8585, Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services

[8] EUR Doc 020 – EUR AMHS Manual, including Appendices A - G

[9] EUR Doc 021 – ATS Messaging Management Manual

[10] EUR Doc 027 (Provisional) – IP Infrastructure Test Guidelines for EUR AMHS

[11] Air Transport & Travel Industry, “TypeX Messaging Specification”, (System Communications & Reference Volume7), v2.0 First Publication - Sept 2009

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1 Introduction

1.1 Purpose of the document

1.1.1 The purpose of the document is to "Study operational issues and potential solutions for the operation of a SITA Type-X gateway in a mixed AFTN/AMHS environment" as it was assigned by the 16th Meeting of the ICAO EUR Aeronautical Fixed Service Group (AFSG) to the AFSG Operations Group.

1.1.2 This document will provide information about the current and future gateway architecture, discuss the different communication scenarios and consider potential solutions for the required address conversion.

1.1.3 The target of the document is to provide a baseline for the selection and promotion of the most appropriate solution in order to ensure future communication between the AFTN/AMHS and the SITA Network based on modern communication protocols.

1.1.4 The document has been updated with additional information and requirements resulting from the initial actual implementations of interconnection between the AMHS and SITA networks.

1.2 Document Structure

1.2.1 *Chapter* 1 presents the purpose and the structure of the document.

1.2.2 *Chapter* 2 contains a description of today's communication environment between AFTN and SITA Network.

1.2.3 *Chapter* 3 describes the future communication environment between AMHS and SITA Type X Network.

1.2.4 *Chapter* 4 discusses the options how the representation of the SITA Type X user by its AFTN address could be defined in order to ensure a seamless communication in a mixed AFTN/AMHS environment.

1.2.5 *Chapter* 5 contains the communication requirements for the AMHS/SITA Type X Gateway from the view point of AMHS.

1.2.6 *Chapter* 6 lists the requirements concerning Underlying IP Infrastructure between the AMHS in EUR and the AMHS/SITA Type X Gateway.

1.2.7 *Chapter* 7 describes the migration scenarios from the current AFTN/SITA Type B network interconnections to the future target architecture of interconnected AMHS and SITA Type X networks.

1.2.8 *Chapter* 8 contains the road map for the interconnection between AMHS and the SITA Type X network.

1.2.9 *Chapter* 9 describes the structure of the implemented AMHS/SITA Type X Gateway extended by an AFTN/AMHS Gateway (MTCU and AFTN component) and lists resulting requirements for the implementation and testing.

1.2.10 Attachment A provides the following tables:

- A.1 Conversion Table AFTN to SITA Type B addresses (IX Table)
- A.2 Conversion table SITA to AFTN addresses (XA Table)
- A.3 List of AFTN addresses for AFTN origin validationA.3 List of AFTN addresses for AFTN origin validation
- A.4 SITA User addresses for AMHS Interoperability Testing

2 Present Communication architecture between AFTN and SITA

2.1 Overview

2.1.1 SITA has been operating AFTN/SITA Type B Gateways for over 40 years. The gateways are currently connected via low and medium speed connections to AFTN COM Centres in several States.

2.1.2 These inter-connections allow SITA customers to communicate with the AFS Network (AFTN/CIDIN) using the message type of their network. The AFTN/SITA Type B Gateway provides the necessary message conversion to enable seamless data exchange between both networks.

2.1.3 Currently SITA operates 32 AFTN/SITA Type B Gateway connections. 15 gateway connections are provided in Europe.

2.1.4 Approximately forty thousand messages are exchanged between SITA and the AFS network on a daily basis.

	Received by SITA from AFTN	Transmitted by SITA to AFTN	Total
Worldwide	18,883	16,394	35,277
EUR/NAT Region	12,803	7,089	19,892
One typical AFTN/SITA Type B Gateway connection in EUR	3,788	3,242	7,030

Table 1: Average traffic exchanged between AFTN and SITA network

2.1.5 Globally approximately 1400 SITA addresses, including their allocated AFTN addresses, are configured in the AFTN/SITA Type B Gateways. These pair entries are used for the address translation SITA to AFTN and vice versa in the gateways for the messages sent to and/or received from the AFTN.

2.1.6 An AFTN address table was implemented in the AFTN/SITA Type B Gateways which should provide AFTN originator validation for messages issued by SITA customers. The usage of this function is currently not sufficient.

2.2 European AFTN/SITA Type B Gateway connections in 2012

2.2.1 The AFTN/SITA Type B Gateway connections in the EUR/NAT Region are provided with COM Centres in:

- Belgium
- Denmark
- France (2)
- Germany
- Greece
- The Netherlands (2)
- Portugal
- Russian Federation (2)
- Switzerland (2)
- Ukraine (2)

2.2.2 The SITA customers with their dedicated AFTN addresses which are served by the AFTN/SITA Type B Gateways are listed in Attachment A, A.3.

2.2.3 The AFTN/SITA Type B Gateways and their respective connections (X.25, low speed) are reaching the end of their lifetime.

2.3 Function of the AFTN/SITA Type B Gateway

2.3.1 A typical interconnection of AFTN and SITA Network by an AFTN/SITA Type B Gateway is shown in Figure 1.

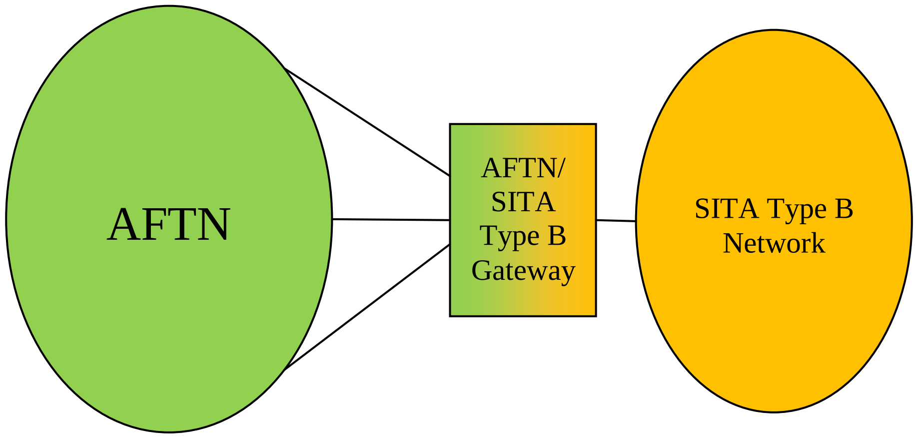

Figure 1: Typical interconnection of AFTN and SITA Network by an AFTN/SITA Type B Gateway

2.3.2 Within the SITA Type B Network the SITA users transmit and receive messages in IATA Type B format.

2.3.3 Within the AFTN the AFS users transmit and receive messages in AFTN format.

2.3.4 The AFTN/SITA Type B Gateways allow SITA users to communicate to the AFTN and convert the messages into the correct format for the respective network.

2.3.5 The function of the AFTN/SITA Type B Gateway is the conversion of addresses and message header from AFTN to SITA Type B and vice versa.

2.4 Message conversion in the AFTN/SITA Type B Gateway

2.4.1 Outgoing conversion methods (from AFTN/SITA Type B Gateway to AFTN)

2.4.1.1 Envelope method

2.4.1.1.1 A SITA customer creates a message which is intended to be sent to an AFS user in AFTN format. This message is sent to the AFTN/SITA Type B Gateway directly by means of a SITA Type B message-envelope. The embedded AFTN message is formally the “text” of the SITA Type B message.

2.4.1.1.2 The AFTN/SITA Type B Gateway strips the SITA Type B envelope before the embedded AFTN message is transmitted from the SITA side to AFTN.

2.4.1.1.3 The embedded AFTN message is routed to the “most appropriate” AFTN/SITA Type B Gateway connection. This means that the routing is performed according the “Routing on Origin” principle to the “nearest” COM Centre related to the AFTN originator address of the embedded AFTN message.

2.4.1.1.4 The following example illustrates the “envelope method”:

Message generated by a~~n~~ SITA customer:

QU HDQYFXS .ZRHKKAF 220834	SITA Type B header with HDQYFXS as AFTN/SITA Type B Gateway address
FF LSSSYFYX 220834 LSAZAFRK text =	Embedded AFTN Message

Message sent to AFTN:

FF LSSSYFYX 220834 LSAZAFRK text	AFTN Message

Example 1: "Conversion" of a message from SITA network to AFTN

Note.– The appropriate Heading and Ending parts of the AFTN message are not shown in the examples.

2.4.1.1.5 In case of Example 1 the "most appropriate" AFTN/SITA Type B Gateway is the gateway in Geneva; the AFTN originator address belongs to LSAZ – Zurich Area, ICAO Nationality Letter: LS, Switzerland.

2.4.1.1.6 The relation between the AFTN originator address of the embedded AFTN message and the origin in the SITA Type B header is not checked (no consistency check). This is under the responsibility of the SITA customer itself.

2.4.1.1.7 However, the gateway checks the syntax of AFTN addresses and compares on SITA Type B site the addresses with specific lists in terms of address and access validity (which should mean~~s~~ that the address is allowed as an originator indicator).

2.4.1.2 Message conversion method

2.4.1.2.1 A SITA customer creates a message which is intended to be sent to an AFS user in AFTN format. In the SITA network this message is routed to an AFTN/SITA Type B Gateway because the SITA Type B address is known as an AFS user outside the SITA Type B network.

2.4.1.2.2 In this case a mapping table (XA Table – mapping SITA to AFTN addresses, see Attachment A, A.2) is used in the AFTN/SITA Type B Gateway to derive the related AFTN Destination addresses. As Originator address, the AFTN address of the respective gateway is used. The AFTN/SITA Type B Gateway creates the AFTN message header and attaches the SITA Type B message as message text.

2.4.1.2.3 A typical message looks like:

Message generated by a~~n~~ SITA customer:

QN ATLXTNW .JAOXTXS 123456 FREE TEXT	SITA Type B header with ATLXTNW as Destination address routed to the AFTN/SITA Type B Gateway plus message text (FREE TEXT)

Message sent to AFTN:

GG KATLNMAZ 123456 WSSSSITX	AFTN Message header

QN ATLXTNW .JAOXTXS 123456 FREE TEXT	attached SITA Message

Example 2: Message conversion from SITA to AFTN

Note.– The appropriate Heading and Ending parts of the AFTN message are not shown in the examples.

2.4.2 Incoming conversion methods (from AFTN to AFTN/SITA Type B Gateway)

2.4.2.1 Envelope method

2.4.2.1.1 A message received from AFTN will be embedded into a SITA Type B envelope by the AFTN/SITA Type B Gateway.

2.4.2.1.2 The SITA address line is deduced from the ICAO priority and the AFTN Destination Address(es) found in the incoming AFTN message.

2.4.2.1.3 The SITA origin line is composed of:

- the SITA Service Address of the AFTN/SITA Type B Gateway connection from where the message has been received,
- the date/time group corresponding to the reception time of the AFTN message, and
- the information “AFTN” to indicate origin of the message.

Message received from AFTN:

GG LFPSSITE 100525 LOOOYFYX text	AFTN Message

Note.– The appropriate Heading and Ending parts of the AFTN message are not shown in the examples.

Message sent to an airline (SITA customer):

QN PARAEXS .PARYFXS 100530/AFTN	generated SITA Type B header
GG LFPSSITE 100525 LOOOYFYX text =	Embedded AFTN Message

Example 3: “Conversion” of a message from AFTN to SITA network

2.4.2.1.4 The AFTN Destination Addresses are converted by means of the IX Table (mapping AFTN to SITA addresses) (see Attachment A, A.1).

2.4.2.1.5 AFTN Destination Addresses which cannot be converted are intercepted as unknown AFTN addresses. The related AFTN COM Centre is informed by an AFTN SVC “ADS UNKNOWN” in order to make corrections or purge.

2.4.2.2 Message conversion method

2.4.2.2.1 In the direction from AFTN to SITA this method is not applied in the AFTN/SITA Type B Gateway.

2.5 Communication scenarios

2.5.1 Introduction

2.5.1.1 The following communication scenarios describe the typical message flows in the current AFTN/SITA Type B environment.

2.5.1.2 The descriptions should help to identify future potential communication requirements.

2.5.1.3 In the scenarios the following communication partners are involved:

- SITA Type B user: The Operations manager of Lufthansa in Frankfurt. His SITA Type B address is FRA2OLH.
- AFTN (AFS) user: The Operator in Tower Heathrow. Its AFTN Address is EGLLZTZX.

2.5.1.4 A fictive message exchange between both communication partners is the base of the following scenarios:

2.5.2 Scenario from SITA to AFTN

2.5.2.1 Message flow

2.5.2.1.1 The SITA Type B user wishes to send a message from his SITA Terminal to the Tower in Heathrow in order to inform them about an event which is not related to IFPS. Figure 2 shows the expected message flow.

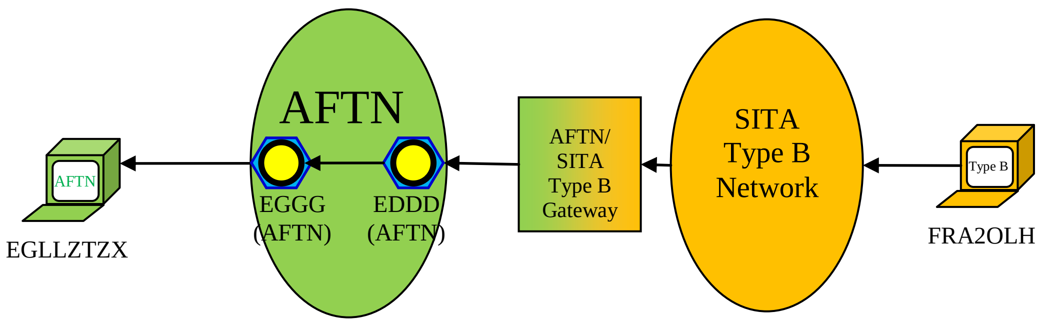

Figure 2: Message flow from a SITA Type B to an AFTN Terminal

2.5.2.2 Generation of the message

2.5.2.2.1 The following message is generated by the Operations manager of Lufthansa in Frankfurt:

QU HDQYFXS .FRA2OLH 220944	SITA Type B header
GG EGLLZTZX 220944 EDDFDLHO PLEASE CONFIRM THE FOLLOWING TEXT text =	Embedded AFTN Message

Example 4: Embedded AFTN message

2.5.2.2.2 The message is routed within the SITA Type B network to the AFTN/SITA Type B Gateway.

2.5.2.3 Conversion of the message in the AFTN/SITA Type B Gateway

2.5.2.3.1 The AFTN/SITA Type B Gateway removes the SITA envelope, identifies the appropriate Gateway connection following the principle "Routing by Originator" and finally sends the following AFTN message to the COM Centre Frankfurt:

GG EGLLZTZX 220944 EDDFDLHO PLEASE CONFIRM THE FOLLOWING TEXT text	AFTN Message

Example 5: Converted AFTN message

Note.– The appropriate Heading and Ending parts of the AFTN message are not shown in the examples.

2.5.2.4 Switching of the AFTN message by COM Centres EDDD and EGGG

2.5.2.4.1 The COM Centre Frankfurt receives the above message and delivers it via the AFS (COM Centre London) finally to the AFTN Terminal of the Tower of Heathrow EGLLZTZX.

2.5.3 Scenario from AFTN to SITA

2.5.3.1 Message flow

2.5.3.1.1 Due to the content of the AFTN message received, the Operator in the Heathrow Tower will send back to the origin the requested confirmation. Figure 3 shows the expected message flow.

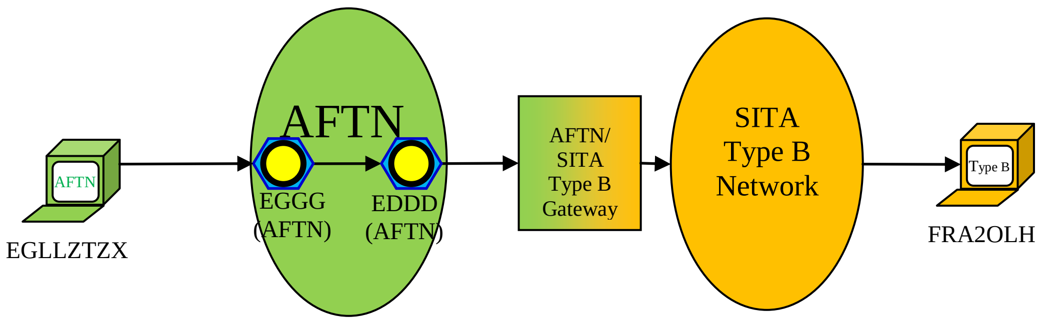

Figure 3: Message flow from an AFTN to a SITA Type B terminal

2.5.3.2 Generation of the message

2.5.3.2.1 The Operator in the Heathrow Tower generates the following AFTN message:

ZCZC ... GG EDDFDLHO 220954 EGLLZTZX CONFIRM RECEPTION OF YR 220944 EDDFDLHO BRGDS EGLLZTZX NNNN	AFTN Message

Example 6: Generated reply AFTN message

2.5.3.3 Switching of the AFTN message by the COM Centre EGGG and EDDD

2.5.3.3.1 The COM Centre Frankfurt receives the above message via the AFS (COM Centre London) from the AFTN Terminal of the Tower of Heathrow EGLLZTZX.

2.5.3.3.2 Due to the fact that the COM Centre Frankfurt knows the AFTN address EDDFDLHO as a SITA Type B user, the above message is routed to the AFTN/SITA Type B Gateway interconnected with Frankfurt.

2.5.3.3.3 Within the AFTN Routing Table of COM Centre Frankfurt approximately 15 different AFTN Addresses for SITA Type B users are currently configured and routed to the AFTN/SITA Type B Gateway.

2.5.3.4 Conversion of the message in the AFTN/SITA Type B Gateway

2.5.3.4.1 The AFTN/SITA Type B Gateway derives the necessary attributes for the SITA envelope from the AFTN message and generates the respective SITA Type B message.

2.5.3.4.2 The AFTN address EDDFDLHO is known in the Gateway and the equivalent SITA Type B address FRA2OLH is derived (table oriented address conversion, see IX Table Attachment A, A.1).

2.5.3.4.3 The SITA Type B network will deliver the message to the addressed SITA Type B user.

2.5.3.4.4 The addressed SITA Type B user receives the following SITA Type B message:

QN FRA2OLH .FRAYFXS 220956/AFTN	}	SITA Type B header
FF EDDFDLHO 220954 EGLLZTZX CONFIRM RECEPTION OF YR 220944 EDDFDLHO BRGDS EGLLZTZX =	}	embedded AFTN Message

Example 7: Embedded AFTN message (Reply)

2.5.3.5 Address conversion principle in the AFTN/SITA Type B Gateway

2.5.3.5.1 In the AFTN/SITA Type B Gateway the following address conversion principle within message conversion from AFTN to SITA Type B is used:

AFTN Address (8 letter)	**into**	**SITA Type B address (7 letter)**
Location indicator (4 letter, position 1-4**)**	→	**IATA Location code** (3 letter, position 1-3**)**
Three letter designator (3 letter, position 5-7)	→	**IATA Airline code** (2 letter, position 6-7)
Filler letter "X" or letter representing a department or division within the organization addressed (1 letter, position 8)	→	**Department code** (2 letter, position 4-5)

Table 2: Address conversion principle AFTN into SITA Type B

2.5.3.5.2 The address conversion tables for both directions of the AFTN/SITA Type B Gateway as of December 2012 are provided in Attachment A.

2.5.4 Remarks regarding the message flow in the communication scenarios

2.5.4.1 For the message flow from AFTN to SITA, the AFTN COM Centres with interconnection to a SITA Type B Gateway have configured in their AFTN Routing Tables only the AFTN addresses of those SITA Type B users which are served locally.

2.5.4.2 AFTN addresses for SITA Type B users served by other COM Centres are not known and therefore not configured. Today, there is no specific indication in an AFTN address identifying a SITA Type B user in the AFTN.

2.5.4.3 For handling of exceptional cases, some COM Centres agreed special procedures bilaterally with adjacent COM Centres to ensure a coordinated routing of AFTN addresses for “other local” SITA Type B users.

2.6 Other European AFTN/SITA connections

Besides the AFTN/SITA Type B Gateways operated by SITA, two other kinds of interconnection between AFTN and SITA exist:

- AFTN connections to dedicated systems on SITA sites; and

- AFTN/SITA Type B Gateways operated by ANSPs or Organisations

2.6.1 AFTN connections to dedicated systems on SITA sites

2.6.1.1 As an example for this kind of AFTN connections, the AFTN low speed connection between the UK message switch of COM Centre London and the SITA MET data servers is mentioned. On this connection circa 40,000 messages are transmitted daily.

2.6.1.2 The AFTN addresses used for sending data to the SITA MET system are UK addresses configured in the COM Centre London to be routed to SITA. ~~These addresses represent SITA users, which have to be taken into account in exceptional situations as well as if this connection is migrated to AMHS.~~

2.6.1.3 Currently no other connection of this kind exists in Europe. A second one is established to the COM Centre operated by NAV Canada.

2.6.1.4 Even if such connections are separated from the current Type B messaging environment and not used for exchanges between SITA Type B users and AFS users, it is extremely important to be aware of any AFTN links that are in place~~, regardless of whether they are connected directly to systems or via gateways~~.

2.6.1.5 Due to the global nature of the interconnections between AFS and SITA these connections have to be known and taken into account in the planning of any future migration.

2.6.2 Non-SITA AFTN/SITA Type B Gateways

2.6.2.1 Additionally to the AFTN/SITA Type B Gateways operated by SITA as mentioned in the previous Sections 2.1 to 2.5, a number of AFTN/SITA Type B Gateways are operated under the responsibility of ANSPs, Organisations and/or State COM Centres.

2.6.2.2 The functions of these gateways are identical to the functions described in Section 2.3.

2.6.2.3 These Gateways are connected directly to the SITA Type B messaging environment using the SITA Type B messaging format.

2.6.2.4 The AFTN routing to the Gateway is a local matter and transparent for the international network. The AFTN addresses used for the message exchange (AFTN addresses representing SITA users and the AFTN addresses of AFS users) are locally known and configured.

2.6.2.5 The number of existing Gateways in Europe and worldwide is not documented at the AFS side. However, due to the global nature of the interconnections between AFS and SITA these gateway connections have to be respected in the planning of any future migration.

2.6.2.6 A special case is the Access Node to the SITA Type B network operated by EUROCONTROL, Network Manager (NM).

2.6.2.7 Currently it is ensured that between the both networks, AFTN and SITA Type B, no interconnection is established. The concerned applications (IFPS[1] and ATFMS[2]) are operating independently with the separated networks.

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[1] Integrated Initial Flight Plan Processing System

[2] Advanced Tactical Flow Management System

2.6.2.8 This separation shall be continued from the AFS point of view when the AFTN/CIDIN communication of the EUROCONTROL, Network Manager (NM) applications is migrating to AMHS.

3 Description of future architecture

3.1 Evolution of the SITA messaging environment

3.1.1 The evolution of the SITA messaging environment is based on the IATA Type X Messaging Specification [11], which is a messaging standard based on XML and Web service technologies ratified by IATA in September 2009.

3.1.2 IATA Type X standard supports message delivery between SITA Type X users.

3.1.3 The communication between SITA Type X users and users outside of the Type X environment is ensured via dedicated Type X Gateways. In case of AMHS, the dedicated gateway is called for the purpose of this document "AMHS/SITA Type X Gateway".

3.1.4 All addresses in the Type X Messaging environment (Destination and Originator addresses) are of ***TXM_Address*** type composed of three elements according to [11], 4.5:

- One TypeX_address,
- Zero or one ***SubAddress,***
- Zero or one FreeFormName.

3.1.5 The ***TypeX_address*** is the logical address of a specific user. The ***SubAddress*** is specified for nodes that are not addressable directly by a Type X address (the ***SubAddress*** carries the actual originator or receiver address in its own messaging environment). The ***FreeFormName*** associates an optional name. ([11], 4.5)

3.1.6 In the context of AMHS only the ***TypeX_address*** is relevant which consists of:

- one ***City*** field to identify a city code (or location code),
- one ***Department*** field to identify a department code,
- one ***Airline*** field to identify an airline or more generally an organisation code,
- ***Auxiliary*** field (to identify an organisation using a shared airline code).
  This field is not used for AMHS communication.

3.1.7 The relevant fields of the Type X address itself consists of:

- City Code: on 3 or 4 alphabetic characters (IATA or ICAO code)
- Department Code: on 1 to 3 alphanumeric characters
- Airline Code on 2 or 3 alphanumeric characters (IATA or ICAO code)

3.1.8 Type X City, Department and Airline codes correspond to the current Type B address city, department and airline codes, keeping the possibility to increase each field by 1 character. ([11], 14.1)

3.1.9 A Type X Address (***TypeX_address***) is defined in XML as:

<TYPEX_Address>

<Airline>airlinecode</Airline>
<City>citycode</City>
<Department>departmentcode</Department>

</TYPEX_Address>

3.1.10 From the above Type X Address (***TypeX_address***) other address elements are derived to ensure an optimal routing of the messages in the Type X environment (e.g. the Type X gateway address used in the transport header for identifying the target Type X node). The full address of the end user is composed of the Type X gateway address completed by the end user address in its own messaging environment. (see [11], 14.1)

3.1.11 The routing of the message is performed according to the Type X gateway address up to the gateway. (see 4.3 and 4.4 of [11])

3.1.12 In the context of communication to and from AMHS, the Type X addresses always represents AFTN Addresses both as Destination and as Originator. Therefore in a message sent to AMHS the originator address consists of the Type X address representing the AFTN address of the SITA user, which could be the same as used today in the SITA Type B environment.

3.1.13 To ensure the correct routing within the SITA Type X network, all Type X addresses with 4 letters in the address attribute “City” (ICAO code) are listed in tables in which for the full qualified AFTN address the corresponding target Type X node (Type X gateway address) is assigned. Such a target Type X node (Type X gateway address) can be either the AMHS/SITA Type X Gateway (if AFS users are addressed) or the Type X node serving the SITA user.

3.1.14 More comprehensive details could be found in [11].

3.2 AMHS/SITA Type X Gateway

3.2.1 The AMHS/SITA Type X Gateway is the “bridge” between AMHS and the SITA Type X messaging environment. The typical interconnection between the existing and future networks is shown in Figure 4.

3.2.2 The AMHS/SITA Type X Gateway can be connected to an AMHS COM Centre which also provides, during the transition, AFTN/AMHS Gateway services for AFTN/CIDIN users. In such a configuration the AMHS/SITA Type X Gateway is not only connected to the AMHS - it is connected to an AFTN/AMHS Gateway as well.

3.2.3 SITA plans to establish two AMHS/SITA Type X Gateways with one connection to Europe and one to Asia (see Figure 4).

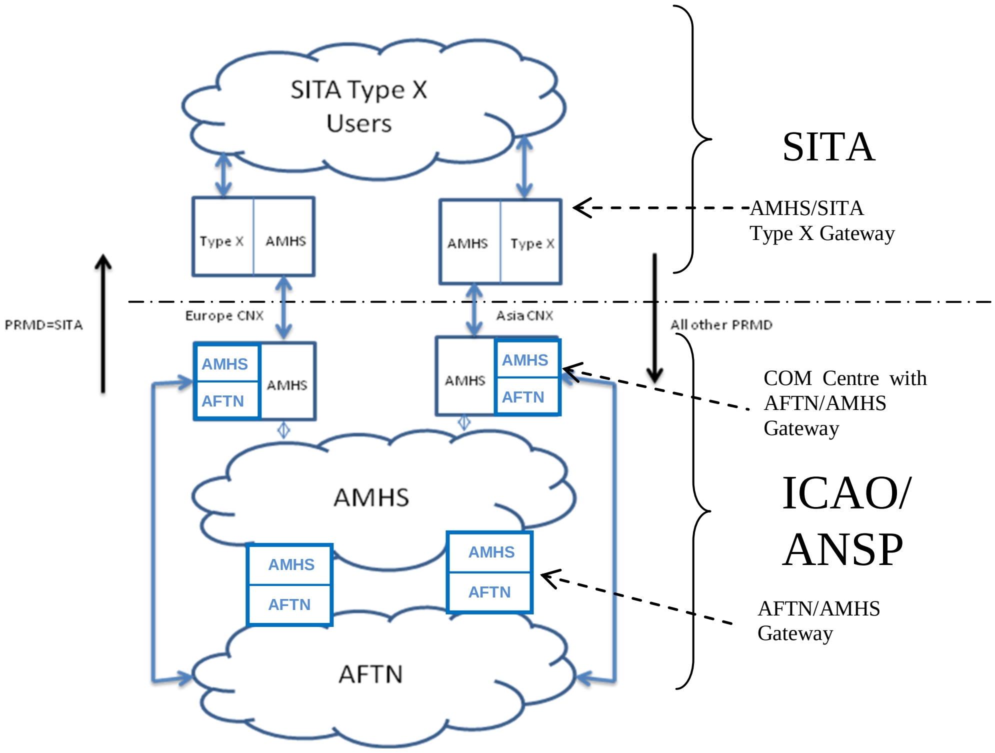

Figure 4: Planned interconnections between AFTN, AMHS and SITA Type X Network

3.3 Message and address conversion in the AMHS/SITA Type X Gateway

3.3.1 The move to the new communication environment at SITA side (Type X) requires interconnection to AMHS in the near future to enable continued support of data exchange between ATS Organizations using AMHS and SITA customers using Type X communication.

3.3.2 The guiding principle should be to provide address transparency to both kind of users (AMHS and SITA Type X).

3.3.3 An AMHS user within the AMHS network should be able to address a SITA Type X user using its AMHS address (SITA Type X users are being seen as AMHS user with PRMD=SITA).

3.3.4 A SITA Type X user within the SITA Type X network should be able to address an AMHS user using the corresponding Type X address (AMHS users are being seen in the SITA Type X environment as SITA Type X users in principle, with an ICAO code in the Type X address element "City". All Type X address elements are derived from the AFTN address within the O/R address – either common-name or organisational-unit-name-1 depending on the addressing scheme).

3.3.5 The AMHS originator address of a SITA Type X user will be created in the AMHS/SITA Type X Gateway. In accordance with the addressing scheme declared by SITA, the generic resulting O/R address representing the SITA Management Domain (PRMD=SITA) will look like:

CAAS: /C=XX/A=ICAO/P= SITA/O= TYPE-X/OU1=<LOC1>/CN=<AFTNADDR>

Where <AFTNADDR> – AFTN address representing the SITA Type X user and
<LOC1> – first four letters of the <AFTNADDR>

3.3.6 The AMHS/SITA Type X Gateway supports the conversion of message delivery reports which could be mapped to equivalent AMHS delivery reports and vice versa, facilitating end to end delivery assurance and tracking in an interconnected environment.

3.4 Communication scenarios in a mixed AFTN/AMHS environment

3.4.1 Introduction

3.4.1.1 The following communication scenarios describe typical expected message flows between a SITA Type X Gateway and two different AFS environments:

1. a pure AMHS communication environment,
2. a mixed AFTN/AMHS communication environment.

3.4.1.2 Resulting potential requirements for future communication will be summarised in Chapter 5.

3.4.1.3 In the scenarios following communication partners are involved:

- SITA Type X user: The Station manager of Air France in Paris Charles de Gaulle airport. His SITA Type X address in XML format (TypeX_address – Type X Address) is:
  <Airline>AFR</Airline>
  <City>LFPG</City>
  <Department>X</Department>
  which is equivalent to the AFTN address LFPGAFRX representing the SITA user in the AFTN environment.

- Direct AMHS User: The Operator of Tower in Madrid
  His AMHS O/R address is /C=XX/A=ICAO/P=SPAIN /O=LECM/OU1=LEMA/CN=LEMAZTZX.
  His AFTN Address is LEMAZTZX.

- AFTN (AFS) user: The Operator of Tower in Ibiza. His AFTN Address is LEIBZTZX.
  His indirect AMHS user address (O/R address) is:
  /C=XX/A=ICAO/P=SPAIN /O=LECM/OU1=LEIB/CN=LEIBZTZX.

3.4.1.4 A fictive message exchange among them is the base of the following scenarios:

3.4.2 Scenario from SITA Type X to AMHS

3.4.2.1 Message flow

3.4.2.1.1 The SITA Type X user wishes to send a message from its SITA Type X Terminal to the Direct AMHS User in order to inform him about a special event which requires an active answer.

3.4.2.1.2 Figure 5 shows the Message flow from a SITA Type X terminal to an AMHS User Agent (UA) via the involved network elements. The switching nodes within the AMHS are the MTAs (Message transfer agents) while at SITA side Type X nodes are used.

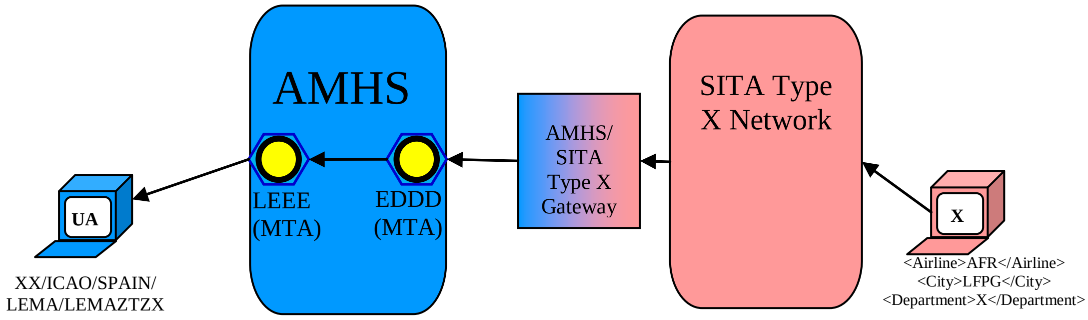

Figure 5: Message flow from a SITA Type X terminal to an AMHS UA

3.4.2.2 Generation of the message

3.4.2.2.1 The following message is generated by the Station manager of Air France in Paris Charles de Gaulle airport (SITA Type X user).

<Airline>AFR</Airline> <City>LFPG</City> <Department>X</Department>	SITA Type X Originator address
<Airline>ZTZ</Airline> <City>LEMA</City> <Department>X</Department>	SITA Type X Destination Address
PLEASE CONFIRM THE FOLLOWING TEXT text =	Message text

Example 8: Type X message

Note.– In this example only a part of the Type X message schema is shown. For the full Type X message schema see [11].

3.4.2.2.2 The SITA Type X Destination Address (***TypeX_address***) defines the targeted receiver.

3.4.2.2.3 In this example the SITA Type X message is routed within the SITA Type X network to the AMHS/SITA Type X Gateway, due to the ICAO code in the Type X address attribute "City" and the resulting mapping of the full Type X address.

3.4.2.3 Conversion of the message in the AMHS/SITA Type X Gateway

3.4.2.3.1 The AMHS/SITA Type X Gateway converts the Type X message and its attributes into an AMHS (X.400) message.

3.4.2.3.2 The following main AMHS attributes / X.400 message elements form the AMHS Message:

/C=XX/A=ICAO/P=SPAIN/O=LECM/OU1=LEMA/CN=LEMAZTZX	- X.400 Recipient address
/C=XX/A=ICAO/P=SITA/O=TYPE-X/OU1=LFPG/CN=LFPGAFRX	- X.400 Originator address
GG	- Message Priority
220944	- Filing time
PLEASE CONFIRM THE FOLLOWING TEXT text	} Message text

Example 9: Main attributes of an AMHS message

Note.– LFPGAFRX represents the AFTN address of the SITA Type X user.

3.4.2.3.3 The converted message (AMHS) is sent from the AMHS/SITA Type X Gateway MTA to the MTA of the adjacent COM Centre; in this scenario MTA-EDDD-1.

Note.– The AMHS/SITA Type X Gateway needs to include an MTA in order to be able to communicate with AMHS COM Centres.

3.4.2.4 Switching of the AMHS message by the MTA of the involved COM Centres EDDD and LEEE

Note.– In AMHS a COM Centre will be represented technically by its MTA.

3.4.2.4.1 The MTA-EDDD-1will receive the above message and forward the message to MTA-LEEE-1 (PRMD=SPAIN) which will deliver the message to the User Agent (UA) of the Madrid Tower – /C=XX/A=ICAO/P=SPAIN/O=LECM/OU1=LEMA/CN=LEMAZTZX.

3.4.3 Scenario from SITA to AFTN via AMHS

3.4.3.1 Message flow

3.4.3.1.1 Assume that the above SITA Type X user (Station manager of Air France in Paris Charles de Gaulle airport) has addressed the Tower of Ibiza equipped with an AFTN Terminal (LEIBZTZX) instead of the Direct AMHS User "Madrid Tower". Figure 6 shows the expected message flow.

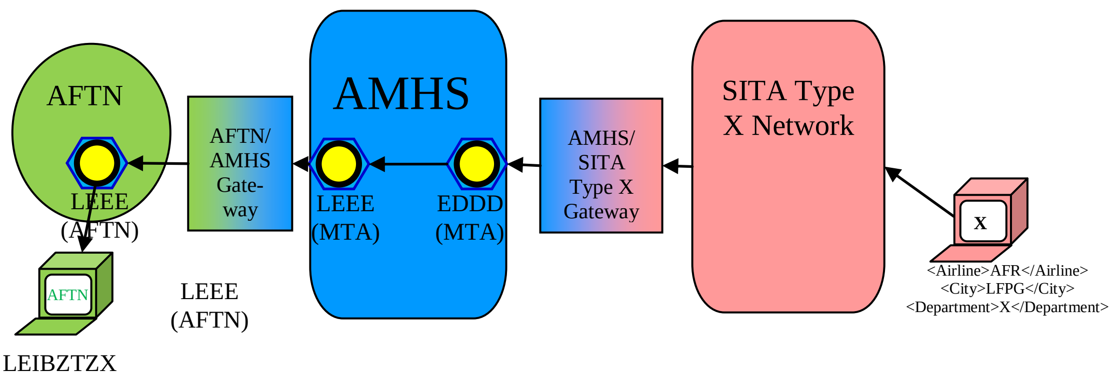

Figure 6: Example for a Message flow from SITA Type X to AFTN via AMHS

3.4.3.1.2 In this case, the message flow is the same till MTA-LEEE-1 as described in the previous flow, but the MTA-LEEE-1 will route the message to the MTCU of the AFTN/AMHS Gateway of COM Centre LEEE.

3.4.3.2 Conversion of the message in the AFTN/AMHS Gateway

3.4.3.2.1 The AFTN/AMHS Gateway of COM Centre LEEE converts the message to an AFTN message using the described AMHS message attributes:

/C=XX/A=ICAO/P=SPAIN/O=LECM/OU1=LEIB/CN=LEIBZTZX	- X.400 Recipient address
/C=XX/A=ICAO/P=SITA/O=TYPE-X/OU1=LFPG/CN=LFPGAFRX	- X.400 Originator address
GG	- Message Priority
220944	- Filing time
PLEASE CONFIRM THE FOLLOWING TEXT text	} Message text

Example 10: Main attributes of the AMHS message to "Ibiza Tower"

3.4.3.2.2 The following AFTN message is generated by the AFTN/AMHS Gateway of COM Centre LEEE:

ZCZC GG LEIBZTZX 220944 LFPGAFRX PLEASE CONFIRM THE FOLLOWING TEXT text NNNN	} AFTN Message

Example 11: Converted AFTN message to "Ibiza Tower"

3.4.3.2.3 The AFTN part of the COM Centre LEEE receiving the above message from the AFTN/AMHS Gateway forwards it to the AFTN Terminal of the Tower of Ibiza LEIBZTZX.

3.4.4 Scenario from AMHS to SITA

3.4.4.1 Message flow

3.4.4.1.1 Due to the content of the AMHS message received, the Operator in the Madrid Tower sends back to the originator the requested confirmation. Figure 7 shows the expected message flow.

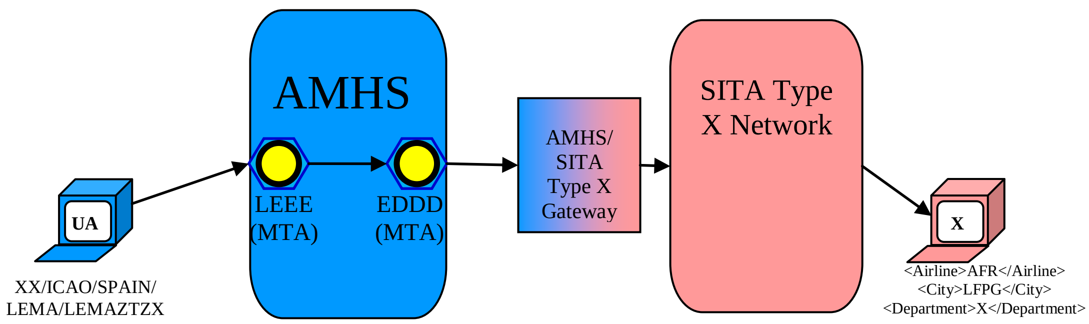

Figure 7: Example for a Message flow from SITA Type X to AMHS

3.4.4.2 Generation of the message from a UA

3.4.4.2.1 The Operator in the Madrid Tower creates an AMHS message with following AMHS/X.400 attributes at his User Agent (UA):

/C=XX/A=ICAO/P=SITA/O=TYPE-X/OU1=LFPG/CN=LFPGAFRX	- X.400 Recipient address
/C=XX/A=ICAO/P=SPAIN/O=LECM/OU1=LEMA/CN=LEMAZTZX	- X.400 Originator address
GG	- Message Priority
220954	- Filing time
CONFIRM RECEPTION OF YR 220944 LFPGAFRX BRGDS LEMAZTZX	} Message text

Example 12: Main attributes of the AMHS message from UA

3.4.4.2.2 The User Agent (UA) submits the AMHS message to MTA-LEEE-1.

3.4.4.3 Switching of the AMHS message by the COM Centre MTAs (LEEE, EDDD)

3.4.4.3.1 The MTA-LEEE-1 routes PRMD=SITA to MTA-EDDD-1while MTA-EDDD-1 routes PRMD=SITA to the MTA of the AMHS/SITA Type X Gateway.

3.4.4.3.2 In the X.400 Routing Tables of all MTAs a routing entry for PRMD=SITA is provided. This is also valid for each other PRMD name.

3.4.4.4 Conversion of the message in the AMHS/SITA Type X Gateway

3.4.4.4.1 The AMHS/SITA Type X Gateway derives all necessary information for the SITA Type X message from the AMHS message attributes.

3.4.4.4.2 The addressed SITA Type X user receives the following SITA Type X message:

<Airline>ZTZ</Airline> <City>LEMA</City> <Department>X</Department>	} SITA Type X Originator address
<Airline>AFR</Airline> <City>LFPG</City> <Department>X</Department>	} SITA Type X Recipient address
CONFIRM RECEPTION OF YR 220944 LFPGAFRX BRGDS LEMAZTZX =	} Message text

Example 13: Converted Type X message

3.4.4.5 Address conversion principle in the AMHS/SITA Type X Gateway

3.4.4.5.1 In the AMHS/SITA Type X Gateway following mapping for the address conversion from AMHS to SITA Type X is used:

AFTN address **(example: LEMAZTZX)**	→	**SITA Type X address (8 letter)**

Location indicator (4 letters)	→	<City>LEMA</City>
Three letter designator (3 letters)	→	<Airline>ZTZ</Airline>
Filler letter "X" or letter representing a department or division within the organization addressed (1 letter)	→	<Department>X</Department>

Table 3: Address conversion principle AMHS into SITA Type X

3.4.4.5.2 In the AMHS/SITA Type X Gateway the validity and access rights of the converted addresses are checked using the table based approach.

3.4.5 Scenario from AFTN via AMHS to SITA

3.4.5.1 Message flow

3.4.5.1.1 Different to the above scenario, the Tower of Ibiza (Indirect AMHS User) replies to the message provided in 3.4.3 from its AFTN Terminal (LEIBZTZX). Figure 8 shows the expected message flow.

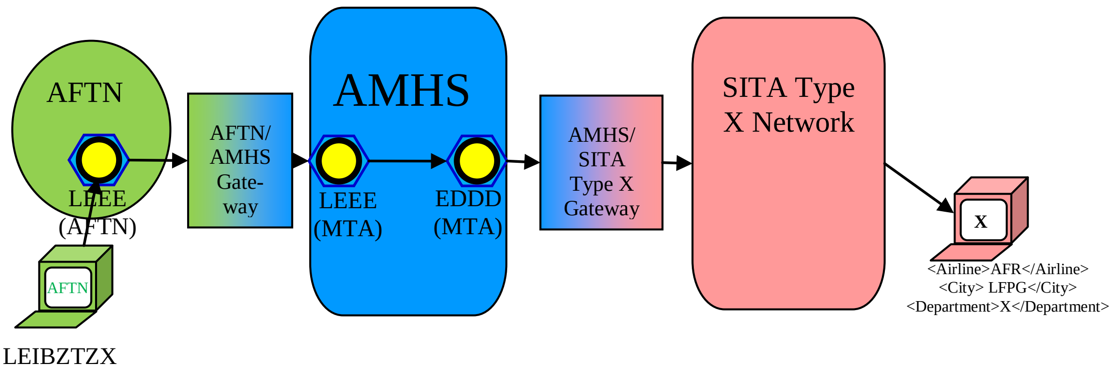

Figure 8: Example for a Message flow from AFTN to SITA Type X via AMHS

3.4.5.2 Generation of the message from an AFTN terminal

3.4.5.2.1 The Tower Operator of Ibiza (Indirect AMHS User) creates from its AFTN Terminal following responding AFTN message:

ZCZC ... GG LFPGAFRX 220954 LEIBZTZX CONFIRM RECEPTION OF YR 220944 LFPGAFRX BRGDS LEIBZTZX NNNN	AFTN Message

Example 14: Generated AFTN message from "Ibiza Tower"

3.4.5.3 Switching of the AFTN message by the COM Centre serving LEIBZTZX

3.4.5.3.1 The AFTN part of the COM Centre in Madrid receiving the above message from the AFTN Terminal of the Tower of Ibiza LEIBZTZX forwards the message to the AFTN/AMHS Gateway.

3.4.5.3.2 **Attention:** The above AFTN message with Destination Address LFPGAFRX is only routed to the AFTN/AMHS Gateway in Madrid, if a full qualified entry for LFPGAFRX in the AFTN Routing Table exists pointing to the AFTN/AMHS Gateway. In all other cases the message will be routed in accordance with the routing of the Nationality Letters LF to the COM Centre of France in Bordeaux.

3.4.5.4 Message conversion in the AFTN/AMHS Gateway

3.4.5.4.1 The AFTN/AMHS Gateway converts the AFTN message into an AMHS message with following AMHS message attributes:

/C=XX/A=ICAO/P=SITA/O=TYPE-X/OU1=LOC1/CN=LFPGAFRX	- X.400 Recipient address
/C=XX/A=ICAO/P=SPAIN/O=LECM/OU1=LEIB/CN=LEIBZTZX	- X.400 Originator address
GG	- Message Priority
220954	- Filing time
CONFIRM RECEPTION OF YR 220944 LFPGAFRX BRGDS LEIBZTZX	} Message text

Example 15: Main attributes of the AMHS message from "Ibiza Tower"

3.4.5.4.2 **Attention:** The address conversion of the AFTN Address "LFPGAFRX" into an O/R address of PRMD=SITA is only possible if the AFTN/AMHS Gateway is able to identify this address as an address representing a SITA Type X user. Otherwise this address would be converted into a "national" (French) O/R address and routed accordingly. In that case the message would never reach the AMHS/SITA Type X Gateway and so never reach the intended SITA Type X user.

3.4.5.5 Switching of the AMHS message by the involved COM Centre MTAs

3.4.5.5.1 In the positive case that the AFTN/AMHS Gateway has converted the AFTN message correctly in an AMHS message, the MTA-LEEE-1 routes PRMD=SITA to MTA-EDDD-1 while MTA-EDDD-1 routes PRMD=SITA to the MTA of the AMHS/SITA Type X Gateway.

3.4.5.6 Conversion of the message in the AMHS/SITA Type X Gateway

3.4.5.6.1 The message is converted as described in 3.4.4.4 and finally delivered to the addressed SITA Type X user.

3.5 Transitional aspects from SITA Type B to SITA Type X

3.5.1 With the evolution of the SITA messaging environment by creating the SITA Type X network, a Type B/Type X Gateway is in operation on SITA side in order to ensure the reachability of former Type B users migrated to Type X capabilities.

3.5.2 There are two migration scenarios in the SITA messaging environment:

- migration of the end users from Type B to Type X capabilities; and
- migration from AFTN Type B to AMHS Type X gateways.

3.5.3 The Type B/Type X Gateway will be used during both migration scenarios on SITA side which is seen as a longer process.

3.5.4 From the view point of the AFS (either AFTN or AMHS) the Type B/Type X Gateway ensures that a SITA user remains reachable independent of an AFTN/SITA Type B Gateway or an AMHS/SITA Type X Gateway being used for communication.

3.5.5 This configuration matter is under the responsibility of SITA and will be ensured in line with the progress of the different migration scenarios.

4 Representation of SITA Type X users by their AFTN addresses

4.1 Introduction

4.1.1 In a mixed AFTN/AMHS environment it is essential – as described in 3.4.5.3.2 (AFTN Routing) and 3.4.5.4.2 (Address Conversion) – that all AFTN addresses representing SITA Type X users can be identified as such.

4.1.2 In the following Section the options will be discussed how an AFTN Address could be identified to represent a SITA Type X user. Two principle options are seen:

- Table based identification of SITA Type X users
- Use of a unique first letter in the AFTN address for SITA Type X users

4.2 Discussion of the options

4.2.1 Option 1: Table based identification of SITA Type X users in AFTN

4.2.1.1 Principle

4.2.1.1.1 All SITA Type X users are listed with their AFTN addresses and O/R addresses (PRMD=SITA) in a special table.

4.2.1.1.2 This table will be used in:

- AFTN COM Centres to configure the exceptional AFTN Routing for all AFTN addresses representing SITA Type X users, and
- AFTN/AMHS gateways to configure the respective User address look-up table.

4.2.1.2 Exceptional routing of AFTN addresses representing SITA Type X users

4.2.1.2.1 In the AFS all messages with AFTN addresses representing SITA Type X users have to be routed towards the nearest AMHS island with a AMHS/SITA Type X connection (either in Europe or in Asia).

4.2.1.2.2 In order to fulfil this AFTN Routing requirement, certain AFTN COM Centres need additional entries in their AFTN Routing table for SITA Type X users. These entries are required in the AFTN COM Centre to ensure that the messages addressed to SITA are forwarded to an AFTN/AMHS Gateway.

4.2.1.2.3 The exceptional AFTN Routing must be configured in the following categories of AFTN COM Centres:

a) AFTN COM Centres of States with AFTN addresses of SITA users;

b) COM Centres with AFTN/AMHS Gateways;

c) AFTN COM Centres which are in the routing path between an AFTN COM Centre corresponding to case a) above, and the nearest COM Centre corresponding to case b) above.

4.2.1.2.4 In an environment with few AFTN/AMHS Gateways, it could be needed to configure the exceptional routing in all AFTN Centres. Conversely, category c) is not required, if all COM Centres of category a) above either include an AFTN/AMHS Gateway or are adjacent to a COM Centre with an AFTN/AMHS Gateway.

4.2.1.3 Address conversion of AFTN addresses representing SITA Type X users

4.2.1.3.1 In the table based option the table mentioned in 4.2.1 provides the mapping of AFTN addresses of SITA Type X users to the O/R address with PRMD=SITA.

4.2.1.3.2 In the AFTN/AMHS Gateways the table based address conversion is done by means of the User address look-up table.

4.2.1.3.3 The mapping of AFTN addresses of SITA Type X users to the PRMD=SITA can only ensure that those messages are routed correctly to the AMHS/SITA Type X Gateway within the AMHS network.

4.2.1.3.4 As an example, if not contained in the User address look-up table, the AFTN address LFPSSITN would be converted in the AFTN/AMHS gateway according to standard conversion rule for French AFTN addresses to :
/C=XX/A=ICAO/P=FRANCE/O=LFFF/OU1=LFPS/CN=LFPSSITN.

4.2.1.3.5 However LFPSSITN is actually an AFTN address associated with a SITA Type X user so that it shall be routed to the AMHS/SITA Type X Gateway. Therefore, considering the above SITA – AMHS addressing scheme, LFPSSITN must be converted to /C=XX/A=ICAO/P=SITA/O=TYPE-X/OU1=LFPS/CN=LFPSSITN by use of the respective User address look-up table entry.

4.2.1.3.6 The same User address look-up table entries must be configured in all AFTN/AMHS gateways worldwide.

4.2.1.4 Pros

- No change of AFTN addresses representing SITA Type X users is required; all current SITA users can maintain their AFTN addresses.
- The principle of the address conversion option is described in the AMHS documentation (Doc 9880) and implemented in the AFTN/AMHS Gateways.
- This option is aligned with a fully transitioned AMHS solution.
- No update of any ICAO documentation (i.e. Doc 9880, Doc 7910) is required.
- This option is a solution which could be introduced quickly and without any risk.
- In a later stage, the big amount of information used in the User address look-up tables could be provided automatically via the European Directory Service (EDS), if available.

4.2.1.5 Cons

- The option will require the maintenance of a large User address look-up table in each AMHS COM Centre operating an AFTN/AMHS Gateway.

- Those AMHS COM Centres have to configure in their AFTN Routing tables the exceptional routing for all AFTN addresses present in the User address look-up table in direction to their MTCU.

- Other AFTN COM Centres may also have to configure an exceptional routing but in direction to a COM Centre nearby or related to an AFTN/AMHS Gateway to ensure that SITA Type X user related AFTN addresses are finally routed to a Gateway correctly.

- The EDS is not yet available.

4.2.2 Option 2: Use of a unique first letter in the AFTN address for SITA Type X users

4.2.2.1 Principle

4.2.2.1.1 The AFTN Address representing a SITA Type X will start with a unique first letter, e.g. “X” which means de facto the allocation of an AFS Routing Area “X”.

4.2.2.1.2 The AFTN addresses with a unique first letter have the following structure:

AFTN Address (8 letter)	**derived from**	**SITA Type X address (7 letter)**
“X” first letter of Location indicator		
2nd-4th letter of Location indicator	←	IATA Airport code (3 letter)
Three letter designator (3 letter)	←	ICAO Airline code (3 letter)
Filler letter "X" or letter representing a department or division within the organization addressed (1 letter)	←	Department code (1 letter)

Table 4: AFTN address structure of a SITA Type X user in option 2

4.2.2.1.3 The AFTN Address representing a SITA Type X could be assigned easily in the AMHS/SITA Type X Gateway as follows:

SITA Type X user	SITA Type X address	Assigned AFTN address
Operations manager of Lufthansa in Frankfurt	<Airline>DLH</Airline> <City>FRA</City> <Department>O</Department>	XFRADLHO
Station manager of Air France in Paris Charles de Gaulle airport	<Airline>AFR</Airline> <City>CDG</City> <Department>T</Department>	XCDGAFRT

Table 5: SITA Type X and AFTN addresses of SITA Type X users in option 2

4.2.2.2 Routing of AFTN addresses representing SITA Type X users

4.2.2.2.1 All AFTN addresses representing SITA Type X users can be routed towards the nearest AMHS island with an AMHS/SITA Type X connection by the routing indicator “X”.

4.2.2.2.2 In order to fulfil this AFTN routing requirement in all AFTN COM Centres only one additional entry (X for routing to the next AFTN/AMHS Gateway) is required.

4.2.2.3 Address conversion of AFTN addresses representing SITA Type X users

4.2.2.3.1 In the AFTN/AMHS Gateway the address conversion would be done as for other AFTN addresses.

4.2.2.3.2 Only one additional entry needs to be inserted into the MD Look-up table and in the CAAS table. No entries are required in the **User address look-up table.**

4.2.2.3.3 All SITA Type X users communicating with the AFTN are identified by the AFTN address starting with “X”. The address conversion is done with one general rule in the AFTN/AMHS Gateway. All AFTN addresses belonging to the AFS Routing Area “X” are converted to /C=XX/A=ICAO/P=SITA/O=TYPE-X/OU1= .../CN=... with the Location indicator in OU1 and the AFTN address in CN.

AFTN address	O/R address
XFRADLHO	/C=XX/A=ICAO/P=SITA/O=TYPE-X/OU1=XFRA/CN=XFRADLHO

Example 16: Conversion of XFRADLHO into O/R address

4.2.2.4 Pros

- The AFTN/AMHS address conversion could be employed for either XF or CAAS addressing as it is done for all other AFTN addresses.
- Each user from outside the AFTN and reachable via a dedicated Gateway is uniquely (one-to-one) identified within the AFTN.
- The routing tables in all AFTN COM Centres worldwide require only one additional entry (to route ‘X’...).

- Traditional AFTN routing could be employed, no exceptional routing entries required.

4.2.2.5 Cons

- A general change of all AFTN addresses for SITA users (currently used and locally known AFTN addresses become invalid).
- This option needs to be discussed in ICAO level. It has to be taken into account that this option has already been rejected by ICAO once.
- An update of Doc 7910 is required to introduce the new AFS Routing Area (the SITA “locations” are listed yet – IATA code) and to introduce the resulting new AFTN address structure.
- The institutional changes could take too much time with unknown result and might not meet the time constrains for the replacement of X.25, low speed lines and other equipment.

4.3 Proposed solution

4.3.1 First conclusions

4.3.1.1 The option to use of a unique first letter in the AFTN address for SITA Type X users (allocation of a Routing area) seems to be too complicated to meet the time constrains mentioned above.

4.3.1.2 Especially the administrative problems in ICAO level are not calculable.

4.3.1.3 Therefore the Group discussed another approach based in principle on option 1 in order to limit the drawbacks to all COM Centres worldwide.

4.3.2 Principle of the proposed solution

4.3.2.1 The table based approach (use of User address look-up table) is the preferred option but with a number of slight modifications to the plan initially presented by SITA.

4.3.2.2 **First**, the current topology of the interconnections between AFTN and SITA should remain in the first phase of the migration to AMHS. That means that the migration from the AFTN/SITA Type B Gateways to the AMHS/SITA Type X Gateways should be done step by step, starting with the most needed replacement of an existing AFTN/SITA Type B Gateway connection by an AMHS/SITA Type X one.

4.3.2.3 The advantage of such an approach is that in this stage only one COM Centre is involved and an urgent need could be satisfied. Only minor drawbacks to others could occur.

4.3.2.4 Due to the fact that most of the EUR COM Centres today serving a SITA Type B Gateway have proven AMHS capabilities, such a replacement could be continued.

4.3.2.5 One precondition is that the AFTN/SITA Type B Gateways and the AMHS/SITA Type X Gateways can operate in parallel for a longer time during which the possible target topology could be defined.

4.3.2.6 **Second,** the former planned two AMHS/SITA Type X connections have to be expanded to a larger number so that all ICAO Regions are served sufficiently and independently. It has to be clarified how many Regional interconnections AMHS/SITA Type X will be required.

4.3.2.7 Multiple inter-Regional connections would allow limiting the exceptional routing to Regional level. In consequence, not all SITA Type X user AFTN addresses have to be configured everywhere (not in all AFTN COM Centres worldwide).

4.3.2.8 The target topology should be discussed on Regional level. So the potential AFTN routing issues remain under Regional responsibility. On Regional level it could be decided how many connections would be sufficient.

4.3.2.9 In parallel to the stepwise replacement of the AFTN/SITA Type B Gateways, the target architecture could be discussed between the Regions not affecting the deployment of the AMHS/SITA Type X rollout. This global coordination should be seen as an optimisation process.

4.3.2.10 **Third,** SITA had chosen to use a CAAS addressing scheme. In this sense the request for allocation of a PRMD named SITA under the ADMD of ICAO was made at ICAO HQ level. However, if the table based approach is used for identifying of SITA Type X users in AFTN, the selection of the addressing scheme CAAS or XF has no relevance.

4.3.2.11 It doesn't really matter in the User address look-up table, if the corresponding O/R address for a SITA Type X user is in accordance with XF or CAAS. Within the AMHS the routing will be performed by the PRMD=SITA only. No other attribute has routing relevance.

4.3.2.12 In the User address look-up table more attributes have to be maintained correctly if the CAAS addressing scheme is used in the future. The XF addressing scheme needs the minimum required attributes only:

<u>XF:</u> /C=XX/A=ICAO/P=SITA/O=AFTN/OU1=<AFTNADDR>

Where <AFTNADDR> – AFTN address representing the SITA Type X user

4.3.2.13 **Therefore,** it is recommended that the XF schema shall be used for the O/R addresses of the SITA Type X users. The User address look-up table entries can be created easier compared to CAAS.

4.3.2.14 Once address mapping information became available through Directory services such as the European Directory Service (EDS), a Directory-based solution would ease distribution of address mapping information.

5 Communication requirements for the AMHS/SITA Type X Gateway

5.1 Technical requirements

5.1.1 Requirement 1: The AMHS/SITA Type X Gateway shall be interconnected to AMHS COM Centres by use of the X.400 Message Transfer Protocol (P1) over IPv4 or IPv6.

5.1.2 Requirement 2: Based on the requirements for long-term logging at the AFTN/AMHS Gateway, the AMHS/SITA Type X Gateway shall perform traffic logging as per ICAO Doc 9880, Part II, section 4.3.1.

5.1.3 Requirement 3: Before the AMHS/SITA Type X Gateway will be interconnected to an AMHS COM Centre in the EUR Region, the gateway system shall pass an AMHS Conformance Tests based on the EUR AMHS Manual, Appendix D provisions.

5.1.4 Requirement 4: Any further operational testing shall be based on the AMHS Interoperability and AMHS Pre-operational Tests laid down in the EUR AMHS Manual, Appendices E and F.

5.2 Operational requirements

5.2.1 Requirement 5: At minimum two AMHS/SITA Type X Gateway operators (main and backup) shall participate in AMC (ATS Messaging Managements Centre) Operations. They will be registered in AMC as External COM Operators.

5.2.2 Requirement 6: SITA has to ensure that qualified Operators are nominated as External COM Operator participating and acting actively in order to ensure an up-to-date data base in the AMC and resulting in the AMHS/SITA Type X Gateways.

5.2.3 Requirement 7: The address conversion in the AMHS/SITA Type X Gateway shall be based on the actual AMHS Address Managements Tables provided by the AMC on regular basis (AIRAC cycle). Later on, the Address Management data should be downloaded from EDS (European Directory Service) when operational.

5.3 Specific operational requirements

5.3.1 Requirement 8: The AMHS/SITA Type X Gateways shall ensure that only those SITA Type X users communicate with the AMHS which are registered, trained and published as indirect AMHS users.

5.3.2 Requirement 9: The AMHS/SITA Type X Gateways shall ensure that each generated AMHS message~~s~~ contains as originator address only those SITA Type X users addresses listed in the User address look-up table. All messages with SITA Type X users addresses not listed in the User address look-up table shall be suppressed and never reach the AMHS.

5.3.3 Requirement 10: The responsible AMHS/SITA Type X Gateway operator shall maintain the User address look-up table in the AMC with all SITA Type X users allowed to communicate with AMHS containing their SITA Type X address as AFTN address and the corresponding O/R address with PRMD=SITA.

5.3.4 Requirement 11: The responsible AMHS/SITA Type X Gateway operator shall maintain the User Capabilities of the SITA Type X users communicating with AMHS via the AMHS/SITA Type X Gateways in the AMC (AMHS User Capabilities Table).

5.3.5 Requirement 12: The responsible AMHS/SITA Type X Gateway operator shall ensure that the tables in the AMHS/SITA Type X Gateways are consistent with the tables maintained in AMC at any time of operations.

5.3.6 Requirement 13: For this purpose, the AMHS/SITA Type X Gateways shall support the “versioning” of the operational tables as provided by AMC and later on by EDS.

6 Requirements concerning Underlying IP Infrastructure

6.1 Requirement 14: The IPv4 connection between an AMHS/SITA Type X Gateway and an AMHS COM Centre shall be redundant. That means that such an IP connection will not be interrupted by single hardware faults. Any SPOFs (single point of failure) have to be avoided.

6.2 Requirement 15: The final acceptance tests of the IP infrastructure between an AMHS/SITA Type X Gateway and an AMHS COM Centre have to be performed in line with the principles laid down in provisional EUR Doc 027 – IP Infrastructure Test Guidelines for EUR AMHS.

6.3 Requirement 16: Especially the recovery time after single outages of one component of a redundant connection (router, firewall or others) shall be measured and should be in a range of 10 seconds.

6.4 Requirement 17: The dimensioning of the connection (bandwidth) has to be done based on the real traffic figures. Potential growing of the traffic as well as additional bandwidth for recover scenarios has to be taken into account.

7 Migration scenario

7.1 Precondition for the start of the migration is completion of the AMHS/SITA Type X Gateway specification and the successful implementation documented by the Acceptance Tests and the AMHS Conformance Tests.

7.2 The migration should be started by defined pilot connections in close cooperation with the foreseen first COM Centre(s) in the EUR Region.

7.3 It is recommended to agree on a schedule of the required steps as there are:

- Completion and test of the IP infrastructure;
- Planning of the AMHS Interoperability Tests;
- Coordination of the Operational procedures between the AMHS COM Centres and the SITA Type X Gateways;
- Planning of the Pre-operational Tests;
- Date of operation.

7.4 In parallel the SITA Type X Gateway operators shall setup the required tables in the AMC as there are:

- User address look-up table, and
- AMHS user Capabilities Table.

7.5 From the very beginning the complete tables shall be maintained by the SITA Type X Gateway operators (not tailored or shortened tables) in order to ensure the setup of the required AFTN/AMHS Gateway tables and the X.400 and AFTN routing tables in the COM Centres worldwide.

7.6 If the pilot implementation is finished successfully the next connections should be replaced.

7.7 In line with the discussions with the other ICAO Regions and their results the replacement of AFTN/SITA Type B Gateway connections by AMHS/SITA Type X Gateway connections should be performed.

7.8 The AMC Operator will assist and monitor the progress in cooperation with the assigned SITA Type X Gateway Operator.

7.9 The AFSG Operations Group will monitor the migration and offer support.

8 Road map

8.1 The replacement of the current AFTN/SITA Type B connections by AMHS/SITA Type X ones has become very urgent in the last months due to the announced decommissioning of low speed links by the telecom providers in several European States by end of 2014.

8.2 A further driving factor is the need to be prepared for XML based information exchange such as digital NOTAMs (AIXM), Flight plans (FIXM) and meteorological messages (WXXM).

8.3 The following road map coordinated with SITA should be envisaged in order to meet the above mentioned communication requirements:

Adoption of the AMHS/SITA Type X concept by AFSG/17	2013 April
Completion of AMHS/SITA Type X Gateway Specification	2013
Definition of the pilot replacements of AFTN/SITA Type B by AMHS/SITA Type X connections in EUR	2013
Definition of the target topology	2013
Discussion of the AMHS/SITA Type X concept with other ICAO Regions	2013
Factory Acceptance testing including AMHS Conformance Tests	2013
First AMHS Interoperability Test in the EUR Region	2014
Completion of the Operational procedures (Cooperation of the AMHS COM Centres and SITA Type X Gateways)	2014
Initial data entry in AMC (User address look-up table)	2014
Definition of the replacements of AFTN/SITA Type B by AMHS/SITA Type X connections in other ICAO Regions	2014

First Pre-operational Tests in the EUR Region	2014
Date of operation in the EUR Region	2014/2015
Continued replacement of AFTN/SITA Type B by AMHS/SITA Type X connections in EUR and other ICAO Regions	2015

9 AMHS/SITA Type X Gateway implementation

9.1 Structure of the AMHS/SITA Type X Gateway

9.1.1 Mid 2014 the AMHS/SITA Type X Gateway was implemented in Atlanta and the first AMHS Interoperability Test were planned between Switzerland and SITA as well as Germany and SITA.

9.1.2 Due to the urgent need to replace the low speed AFTN connection of the SITA Type B Gateway and the delayed transition of SITA Type B users towards SITA Type X, an AFTN/AMHS Gateway component was added to the AMHS/SITA Type X Gateway. Figure 9 shows the initial AMHS connections and the structure of the AMHS/SITA Type X Gateway extended by an AFTN/AMHS Gateway (MTCU and AFTN component).

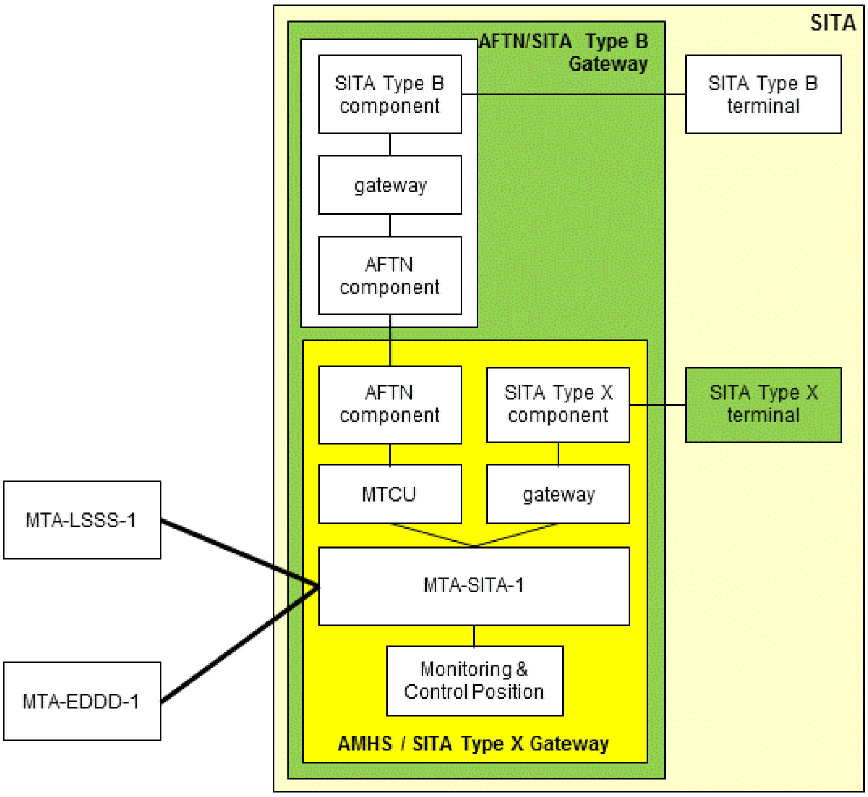

Figure 9: Extended structure of the AMHS/SITA Type X Gateway

9.2 Additional operational requirements

9.2.1 Due to the deviation from the former approved concept the Requirement 3 (see 5.1.3) has to be extended in such a way that both Gateways (MTCU to Type B and “gateway” to Type X) shall pass AMHS Conformance Tests based on the EUR AMHS Manual, Appendix D.

9.2.2 The AMHS Interoperability Tests (IOT) have to be extended as well in order to cover the new structure of the AMHS/SITA Type X Gateway. The recommended IOT address space for the AMHS/SITA Type X Gateway is provided in A.4.

9.2.3 The priority mapping form SITA Type X towards AMHS shall be performed as follows:

SITA Type X Priority	**X.400 Priority**	**Priority in ATS Message Header (option 1)**	**Priority in ATS Message Header(option 2)**
0	urgent	SS	SS
1	normal	DD	FF
2	normal	FF	FF
3	non-urgent	GG	GG
Without priority	non-urgent	KK	GG

9.2.4 The use of priorities shall be in line with the provisions of Annex 10, Volume II especially for:

Message category	*Priority indicator*
distress messages (*see* 4.4.1.1.1 [1])	SS
urgency messages (*see* 4.4.1.1.2 [1])	DD
flight safety messages (*see* 4.4.1.1.3 [1])	FF
meteorological messages (*see* 4.4.1.1.4 [1])	GG
flight regularity messages (*see* 4.4.1.1.5 [1])	GG
aeronautical information services messages (*see* 4.4.1.1.6 [1])	GG
aeronautical administrative messages (*see* 4.4.1.1.7 [1])	KK
service messages (see 4.4.1.1.9 [1])	(as appropriate)

9.3 Checking of originator address of incoming messages

9.3.1 According to 5.3.2 the AMHS/SITA Type X Gateways shall ensure that each generated AMHS message contains as originator address one of the SITA Type X users addresses listed in the User address look-up table. All messages with SITA Type X users addresses not listed in the User address look-up table shall be suppressed and never reach the AMHS.

9.3.2 In order to ensure that the above requirement is fulfilled during daily operations each SITA interconnected COM Centre shall check the originator addresses of messages on the incoming X.400 P1 connection.

9.3.3 Only messages with originator addresses of SITA Users agreed and listed in the User address look-up table of AMC shall be accepted and routed into the AMHS; all other messages shall be refused by an NDR with supplementary information “originator not listed”.

Attachment A

A.1 Conversion Table AFTN to SITA Type B addresses (IX Table)

Publication suspended

A.2 Conversion table SITA to AFTN addresses (XA Table)

Publication suspended

A.3 List of AFTN addresses for AFTN origin validation

Publication suspended

A.4 SITA User addresses for AMHS Interoperability Testing

The following addresses have to be provided in the AMHS User Lookup Table of the systems involved in AMHS Interoperability Testing in order to ensure a correct address conversion of the SITA User addresses to PRMD=SITA.

AFTN Address	User short name	O/R Address
KATLDLED	ATLDLLO	XX/ICAO/SITA/AFTN/KATLDLED
KATLDLRE	ATLDLRE	XX/ICAO/SITA/AFTN/KATLDLRE
KATLMHSA	ATLTAXS	XX/ICAO/SITA/AFTN/KATLMHSA
KATLMHSB	ATLTBXS	XX/ICAO/SITA/AFTN/KATLMHSB
KATLMHSC	ATLTCXS	XX/ICAO/SITA/AFTN/KATLMHSC
KATLMHSD	ATLTDXS	XX/ICAO/SITA/AFTN/KATLMHSD
KATLMHSE	ATLTEXS	XX/ICAO/SITA/AFTN/KATLMHSE
KATLMHSF	ATLTFXS	XX/ICAO/SITA/AFTN/KATLMHSF
KATLMHSG	ATLTGXS	XX/ICAO/SITA/AFTN/KATLMHSG
KATLMHSH	ATLTHXS	XX/ICAO/SITA/AFTN/KATLMHSH
KATLMHSI	ATLTIXS	XX/ICAO/SITA/AFTN/KATLMHSI
KATLMHSJ	ATLTJXS	XX/ICAO/SITA/AFTN/KATLMHSJ
KATLMHSK	ATLTKXS	XX/ICAO/SITA/AFTN/KATLMHSK
KATLMHSL	ATLTLXS	XX/ICAO/SITA/AFTN/KATLMHSL
KATLMHSM	ATLTMXS	XX/ICAO/SITA/AFTN/KATLMHSM
KATLMHSN	ATLTNXS	XX/ICAO/SITA/AFTN/KATLMHSN
KATLMHSO	ATLTOXS	XX/ICAO/SITA/AFTN/KATLMHSO

AFTN Address	User short name	O/R Address
KATLMHSP	ATLTPXS	XX/ICAO/SITA/AFTN/KATLMHSP
KATLMHSQ	ATLTQXS	XX/ICAO/SITA/AFTN/KATLMHSQ
KATLMHSR	ATLTRXS	XX/ICAO/SITA/AFTN/KATLMHSR
KATLMHSS	ATLTSXS	XX/ICAO/SITA/AFTN/KATLMHSS
KATLMHST	ATLTTXS	XX/ICAO/SITA/AFTN/KATLMHST
KATLMHSU	ATLTUXS	XX/ICAO/SITA/AFTN/KATLMHSU
KATLMHSV	ATLTVXS	XX/ICAO/SITA/AFTN/KATLMHSV
KATLMHSW	ATLTWXS	XX/ICAO/SITA/AFTN/KATLMHSW
KATLMHSX	ATLTXXS	XX/ICAO/SITA/AFTN/KATLMHSX
KATLMHSY	ATLTYXS	XX/ICAO/SITA/AFTN/KATLMHSY
KAXSMHSA	ATLXAXS	XX/ICAO/SITA/AFTN/KAXSMHSA
KAXSMHSB	ATLXBXS	XX/ICAO/SITA/AFTN/KAXSMHSB
KAXSMHSC	ATLXCXS	XX/ICAO/SITA/AFTN/KAXSMHSC
KAXSMHSD	ATLXDXS	XX/ICAO/SITA/AFTN/KAXSMHSD
KAXSMHSE	ATLXEXS	XX/ICAO/SITA/AFTN/KAXSMHSE
KAXSMHSF	ATLXFXS	XX/ICAO/SITA/AFTN/KAXSMHSF
KAXSMHSG	ATLXGXS	XX/ICAO/SITA/AFTN/KAXSMHSG
KAXSMHSH	ATLXHXS	XX/ICAO/SITA/AFTN/KAXSMHSH
KAXSMHSI	ATLXIXS	XX/ICAO/SITA/AFTN/KAXSMHSI
KAXSMHSJ	ATLXJXS	XX/ICAO/SITA/AFTN/KAXSMHSJ
KAXSMHSK	ATLXKXS	XX/ICAO/SITA/AFTN/KAXSMHSK
KAXSMHSL	ATLXLXS	XX/ICAO/SITA/AFTN/KAXSMHSL
KAXSMHSM	ATLXMXS	XX/ICAO/SITA/AFTN/KAXSMHSM
KAXSMHSN	ATLXNXS	XX/ICAO/SITA/AFTN/KAXSMHSN
KAXSMHSO	ATLXOXS	XX/ICAO/SITA/AFTN/KAXSMHSO
KAXSMHSP	ATLXPXS	XX/ICAO/SITA/AFTN/KAXSMHSP
KAXSMHSQ	ATLXQXS	XX/ICAO/SITA/AFTN/KAXSMHSQ
KAXSMHSR	ATLXRXS	XX/ICAO/SITA/AFTN/KAXSMHSR
KAXSMHSS	ATLXSXS	XX/ICAO/SITA/AFTN/KAXSMHSS
KAXSMHST	ATLXTXS	XX/ICAO/SITA/AFTN/KAXSMHST
KAXSMHSU	ATLXUXS	XX/ICAO/SITA/AFTN/KAXSMHSU
KAXSMHSV	ATLXVXS	XX/ICAO/SITA/AFTN/KAXSMHSV
KAXSMHSW	ATLXWXS	XX/ICAO/SITA/AFTN/KAXSMHSW
KAXSMHSX	ATLXXXS	XX/ICAO/SITA/AFTN/KAXSMHSX
KAXSMHSY	ATLXYXS	XX/ICAO/SITA/AFTN/KAXSMHSY
ETTTSITA	BERTAXS	XX/ICAO/SITA/AFTN/ETTTSITA
ETTTSITB	BERTBXS	XX/ICAO/SITA/AFTN/ETTTSITB
ETTTSITC	BERTCXS	XX/ICAO/SITA/AFTN/ETTTSITC

AFTN Address	User short name	O/R Address
ETTTSITD	BERTDXS	XX/ICAO/SITA/AFTN/ETTTSITD
ETTTSITE	BERTEXS	XX/ICAO/SITA/AFTN/ETTTSITE
ETTTSITF	BERTFXS	XX/ICAO/SITA/AFTN/ETTTSITF
ETTTSITG	BERTGXS	XX/ICAO/SITA/AFTN/ETTTSITG
ETTTSITH	BERTHXS	XX/ICAO/SITA/AFTN/ETTTSITH
ETTTSITI	BERTIXS	XX/ICAO/SITA/AFTN/ETTTSITI
ETTTSITJ	BERTJXS	XX/ICAO/SITA/AFTN/ETTTSITJ
ETTTSITK	BERTKXS	XX/ICAO/SITA/AFTN/ETTTSITK
ETTTSITL	BERTLXS	XX/ICAO/SITA/AFTN/ETTTSITL
ETTTSITM	BERTMXS	XX/ICAO/SITA/AFTN/ETTTSITM
ETTTSITN	BERTNXS	XX/ICAO/SITA/AFTN/ETTTSITN
ETTTSITO	BERTOXS	XX/ICAO/SITA/AFTN/ETTTSITO
ETTTSITP	BERTPXS	XX/ICAO/SITA/AFTN/ETTTSITP
ETTTSITQ	BERTQXS	XX/ICAO/SITA/AFTN/ETTTSITQ
ETTTSITR	BERTRXS	XX/ICAO/SITA/AFTN/ETTTSITR
ETTTSITS	BERTSXS	XX/ICAO/SITA/AFTN/ETTTSITS
ETTTSITT	BERTTXS	XX/ICAO/SITA/AFTN/ETTTSITT
ETTTSITU	BERTUXS	XX/ICAO/SITA/AFTN/ETTTSITU
ETTTSITV	BERTVXS	XX/ICAO/SITA/AFTN/ETTTSITV
ETTTSITW	BERTWXS	XX/ICAO/SITA/AFTN/ETTTSITW
ETTTSITX	BERTXXS	XX/ICAO/SITA/AFTN/ETTTSITX
ETTTSITY	BERTYXS	XX/ICAO/SITA/AFTN/ETTTSITY
LSTTSITA	GVATAXS	XX/ICAO/SITA/AFTN/LSTTSITA
LSTTSITB	GVATBXS	XX/ICAO/SITA/AFTN/LSTTSITB
LSTTSITC	GVATCXS	XX/ICAO/SITA/AFTN/LSTTSITC
LSTTSITD	GVATDXS	XX/ICAO/SITA/AFTN/LSTTSITD
LSTTSITE	GVATEXS	XX/ICAO/SITA/AFTN/LSTTSITE
LSTTSITF	GVATFXS	XX/ICAO/SITA/AFTN/LSTTSITF
LSTTSITG	GVATGXS	XX/ICAO/SITA/AFTN/LSTTSITG
LSTTSITH	GVATHXS	XX/ICAO/SITA/AFTN/LSTTSITH
LSTTSITI	GVATIXS	XX/ICAO/SITA/AFTN/LSTTSITI
LSTTSITJ	GVATJXS	XX/ICAO/SITA/AFTN/LSTTSITJ
LSTTSITK	GVATKXS	XX/ICAO/SITA/AFTN/LSTTSITK
LSTTSITL	GVATLXS	XX/ICAO/SITA/AFTN/LSTTSITL
LSTTSITM	GVATMXS	XX/ICAO/SITA/AFTN/LSTTSITM
LSTTSITN	GVATNXS	XX/ICAO/SITA/AFTN/LSTTSITN
LSTTSITO	GVATOXS	XX/ICAO/SITA/AFTN/LSTTSITO
LSTTSITP	GVATPXS	XX/ICAO/SITA/AFTN/LSTTSITP

AFTN Address	User short name	O/R Address
LSTTSITQ	GVATQXS	XX/ICAO/SITA/AFTN/LSTTSITQ
LSTTSITR	GVATRXS	XX/ICAO/SITA/AFTN/LSTTSITR
LSTTSITS	GVATSXS	XX/ICAO/SITA/AFTN/LSTTSITS
LSTTSITT	GVATTXS	XX/ICAO/SITA/AFTN/LSTTSITT
LSTTSITU	GVATUXS	XX/ICAO/SITA/AFTN/LSTTSITU
LSTTSITV	GVATVXS	XX/ICAO/SITA/AFTN/LSTTSITV
LSTTSITW	GVATWXS	XX/ICAO/SITA/AFTN/LSTTSITW
LSTTSITX	GVATXXS	XX/ICAO/SITA/AFTN/LSTTSITX
LSTTSITY	GVATYXS	XX/ICAO/SITA/AFTN/LSTTSITY

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APPENDIX E

SUGGESTED PROCEDURE TO GENERATE A SINGLE ACCOUNT BY STATE FOR MASSIVE ACCESS

Each focal point of the SATDIS that has the SATDIS Administrator role should generate a user name to be applied at national level. The name of this user name could be the full or abbreviated country name; for example, the focal point of Argentina could generate a user name called ARGENTINA or ARGT.

To create this user name, the focal point as administrator, should follow the procedure described in the operating manual, section 10.2.2 *creating new users*. The steps would be as follows:

1 Select Administration
2 Select User
3 Select Add

4 Select "Add" and fill de application "**user data**". Since these data correspond to the same focal point, put a different name and surname from yours, as your name is of the administrator. You could fill fictitious name and surname. For example for Argentina could place:

Name: Administration
Surname: ANAC
E-mail: Fill a different e-mail from that registered as administrator; if necessary generate a new e-mail address or use any you can access.
User name: Fill as user name, the name of the country or an abbreviation; for example for Argentina, it can be fill Argentina or an abbreviation ARGENT to easy remember.

5 In **Funtions** box, select **user** and press the arrow to move the Word "*user*" to the next box.

6 In "***Tools and Permission"*** box select at least **User Data Permission and User Tool Permission.** Use arrows to move to the next box.

7 Press "Save".

8 A password will be send to the selected e-mail address. Once the password is received, it must be changed quickly. It can be used RAIM in capital letters as password (suggestion only).

9 In this manner the user name and password will have been generated to be used for free access by users.

Argentina would have then:
User name: **Argentina**
Password: **RAIM**

The other focal points of States might have for example:

Bolivia
User name: **Bolivia**
Password: **RAIM**

Brazil
User name: **Brazil**
Password: **RAIM**

And so on.

APPENDIX F

MODEL OF AIC

RAIM AVAILABILITY PREDICTION SERVICE

PREPARED BY BRAZIL

BRASIL

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PREVISÃO DE DISPONIBILIDADE RAIM

1 DISPOSIÇÕES PRELIMINARES

1.1 FINALIDADE

Esta Circular de Informação Aeronáutica (AIC) tem por finalidade divulgar o SATDIS SAM, ferramenta para acesso ao serviço de previsão da disponibilidade RAIM (*Receiver Autonomous Integrity Monitoring)* na Região SAM, informação indispensável aos usuários ou operadores de aeronaves que intencionam realizar operação em rota ou aproximação baseadas em performance – PBN.

1.2 ÂMBITO

Esta AIC (Circular de Informação Aeronáutica) se aplica a todos os usuários do SISCEAB (Sistema de Controle do Espaço Aéreo Brasileiro) que intencionem realizar operações PBN no espaço aéreo brasileiro.

2 DISPOSIÇÕES GERAIS

Ao estabelecer o conceito navegação por performance, a ICAO especificou requisitos que devem ser cumpridos para realizar uma operação PBN em termos de integridade, disponibilidade, precisão, continuidade, disponibilidade e funcionalidades necessárias para a operação proposta por um conceito de espaço aéreo.

Com os avanços tecnológicos e possibilidades dos novos sistemas de bordo, um novo conceito de navegação, além daquele baseado em sensor específico para determinado auxílio, surgiu e vem sendo amplamente empregado em rota, nas aproximações e saídas dos aeroportos, os procedimentos de navegação por performance, operação PBN. Para o emprego dos mesmos, estabeleceu-se não apenas os requisitos técnicos para os auxílios existentes na época eram suficientes, mas outros que devem ser preenchidos e são inerentes a aeronave, piloto e procedimentos para realizar a operação segura dentro de cada performance.

No que tange performance de integridade, estabeleceu-se que as aeronaves, para realizar operações mais precisas como a RNP, deveriam dispor a bordo de equipamento que indicasse a integridade dos sinais utilizados na operação e que estes estivessem dentro de padrões pré-estabelecidos. Com surgimento de meios, que permitem uma previsão do cenário da arquitetura dos satélites GPS com antecipação, impeliu a ICAO, a partir de 2013, a proporcionar orientações, através do DOC 9613 Manual PBN, recomendando a que todos os usuários ou operadores que desejem realizar operações de voo RNP devam assegurar-se da previsão de integridade dos sinais utilizados na navegação antes mesmo de iniciar o seu vôo.

Em vista disto, recomenda-se ao operador ou usuário de aeronave, antes de realizar esse tipo de operação, que realize um serviço de pré-voo com o intuito de assegurar-se da disponibilidade dos sinais dos satélites GPS para a operação pretendida estará OK e a integridade não irá se reduzir a ponto de comprometer a operação PBN prevista.

O serviço de predição de RAIM se diferencia do sistema monitoramento de integridade de bordo da aeronave, pois este é inerente à aviônica da aeronave e se trata de integridade em tempo real no momento que a aeronave executa a operação, enquanto, a predição de RAIM provida pelo SATDIS refere a um prognóstico da arquitetura dos satélites com 48 horas de antecipação. Permitindo que usuário planeje seus voos e dependendo do “status” degradado dos sinais poderá, inclusive, realizar uma mudança ou atraso de rota ou cancelamento da operação em determinada localidade.

De acordo com o DOC 9613, caso se constate através de predição, uma contínua perda de detecção dos satélites por mais de cinco (05) minutos a operação para RNP 1, RNP 2, RNP 5 deveria ser revisada (atrasada a decolagem ou planejado outro tipo de procedimento).

A ferramenta não é garantia de que haverá um cenário da operação desejada tal qual previsto na fase de pré-voo. É uma ferramenta para avaliar a expectativa para encontrar condições para operar RNP, por isso o usuário deverá estar ciente que o RAIM ou disponibilidade do GPS poderá ser perdida em voo e deverá prever procedimentos alternativos, caso isso ocorra.

Com o intuito de incentivar os usuários a utilizarem serviço de predição RAIM, o DECEA, em associação com o escritório da ICAO em Lima, disponibilizará, até 15 de dezembro de 2015, o serviço de predição do SATDIS SAM, que poderá ser utilizado para todas rotas e aeródromos do espaço aéreo brasileiro bem como toda a região SAM.

Após este período, será estudada pelo DECEA a forma de divulgar tais informações de forma reduzida, provavelmente se restringirá apenas as fases de aproximação e será através de NOTAM. De todas as maneiras, recomenda-se a que todos os usuários façam suas ações no sentido de adquirir tais informações com um provedor deste serviço como a DWI.

2.1 USO DO SERVIÇO DE PREDIÇÃO RAIM PARA OPERAÇÃO RNAV

Embora as aeronaves operando RNAV não tenham a mesma performance em termos requisitos de RAIM a bordo para alertar quando a aeronave não se encontra dentro dos limites de segurança, o serviço de predição deve ser incentivado o seu uso pelo operador ou usuário, pois possibilitará ter uma visão do cenário em que irá executar sua operação no futuro.

2.2 ACESSO AO SISTEMA

Até 15 de dezembro de 2015, o serviço de predição de RAIM, SATDIS SAM estará disponível aos usuários em tempo integral, no *site* www.aisweb.aer.mil.br, no link SATDIS.

No site estará disponível um manual com instruções necessárias para o usuário consultar a disponibilidade dos satélites para suportar a sua operação na fase de rota ou na fase de aproximação PBN.

2.3 FERRAMENTAS

As principais informações que poderão ser extraídas do SATDIS para suportar uma operação aérea são Estado da Constelação, Rota e aeródromos.

a) Estado da Constelação

A ferramenta Estado da Constelação apresenta uma visão da constelação de satélites GPS com base no último almanaque e no NANUs (Aviso Consultivo para os usuários da navegação), emitidos pela Guarda Costeira dos EUA. É apresentado o número de satélites operacionais da constelação GPS com informações atualizadas referentes ao momento da visualização. O almanaque usado e os NANUs existentes que afetam a disponibilidade de satélites durante o período de tempo solicitado também são exibidos. Esta ferramenta fornece o estado da constelação GPS para as próximas de 72 horas (as horas são em UTC).

b) Rota e aeródromo

O usuário poderá utilizar realizar consulta de predição de rota (ferramentas > rota) ou de aproximação (ferramentas > aeródromos) para isso deverá previamente inserir os requisitos de performance como tipo de operação(RNP1, RNP APCH), ângulo de mascaramento, recomenda-se utilizar um valor acima de cinco graus, pois valores inferiores pode resultar em um cenário que comprometerá a operação planejada.

3 DISPOSIÇÕES FINAIS

3.1 A aprovação desta AIC foi publicada no Boletim Interno do DECEA Nº XX, de "dd mmm yyyy" .

3.2 Esta AIC cancela a AIC NXX / YY, de "dd mmm yyyy".

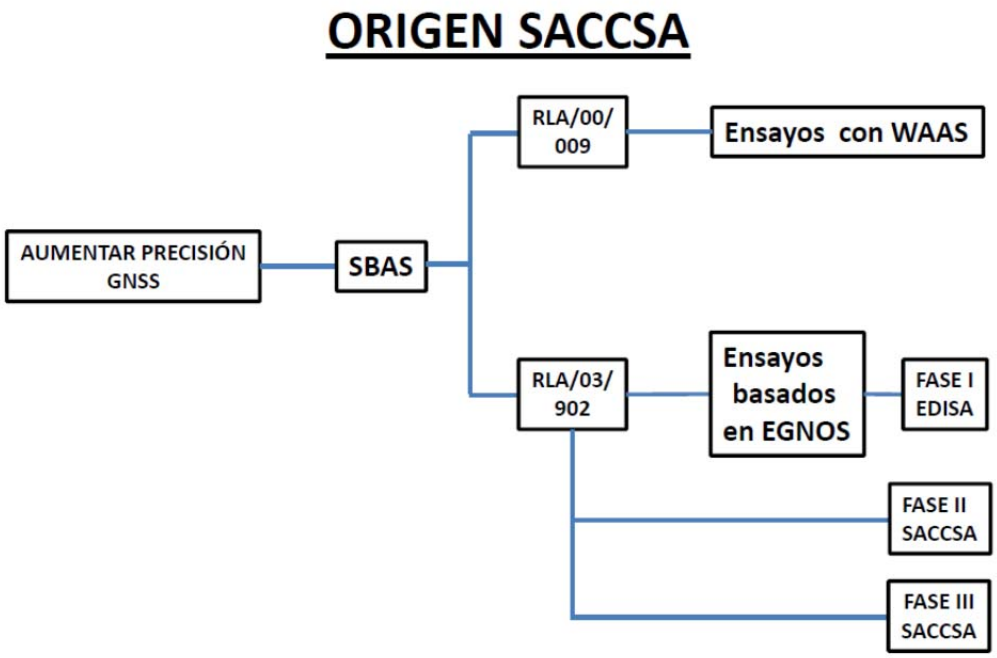
ANEXO XX

"Clique e digite"

APPENDIX G

EXECUTIVE SUMMARY ON THE CLOSURE OF TECHNICAL COOPERATION PROJECT RLA/03/902 - SACCSA (AUGMENTATION SOLUTION FOR THE CARIBBEAN, CENTRAL AND SOUTH AMERICA)

1. Background



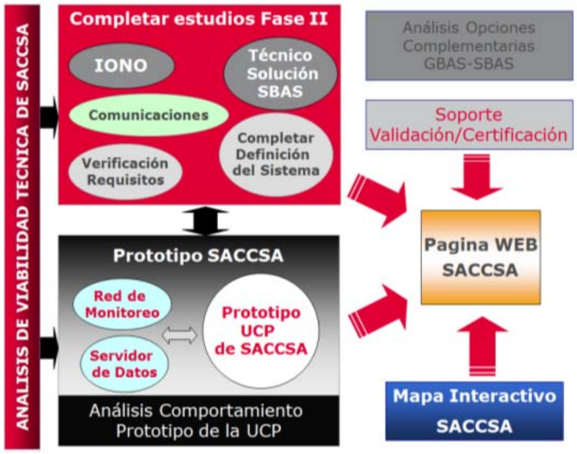
Based on trials conducted in the CAR/SAM Regions with WAAS (Wide Area Aumentation System) and EGNOS (European Geostationary Navigation Overlay Service) augmentation systems, it was determined that the extension of these systems was not feasible due to the particular ionospheric behaviour experienced in these regions. Accordingly, it was suggested that an SBAS system called “Augmentation solution for the Caribbean, Central and South America” – SACCSA be developed, with algorithms adapted to the needs of the CAR/SAM Regions.

Through the ICAO Technical Cooperation Bureau, project RLA/03/902 was launched with the participation of some CAR/SAM member States and AENA (Aeropuertos Españoles y Navegación Aérea) (currently ENAIRE) as contributor and Technical Coordinator of the project. This project has been developed in three phases, through which its technical feasibility has been demonstrated.

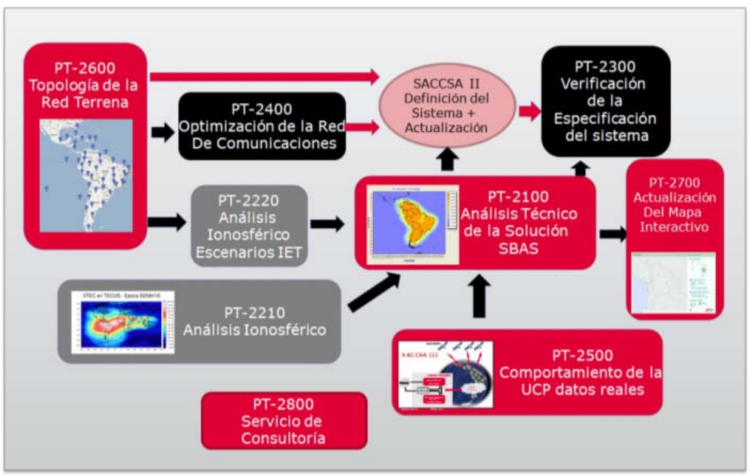
2. Purpose of the Project

The purpose of Project RLA/03/902 is to provide the technical, financial, operational and institutional studies related to the implementation of a satellite-based augmentation system (SBAS) for the CAR/SAM Regions.

To this end, several activities were proposed, as shown in the figure below:



These activities were carried out as work packages, as illustrated in the following figure:



3. SACCSA Participants

ICAO
ENAIRE (formerly AENA)
U.A.E. de Aeronáutica Civil Colombia
COCESNA
Autoridad Aeronáutica Civil de Panamá
Trinidad and Tobago Civil Aviation Authority
Instituto Nacional de Aeronáutica Civil de Venezuela

It should be noted that Cuba, Bolivia, Argentina, Guatemala and Costa Rica participated during phases I and II.

4. Project Development

a) PHASE I: EDISA

Project RLA/03/902 was initiated as a result of the launching of the EDISA Programme by the European Union, whose objective was to show the feasibility of implementing an SBAS system in the CAR/SAM Regions. To that end, three reference stations were installed in Havana, Tegucigalpa and Bogota, and an SBAS navigation message was generated based on the EGNOS test signal. At the same time, a series of flights were planned for receiving and analysing said signal, which were conducted at Havana, Tegucigalpa, Bogota, Cartagena de Indias and San Andrés. The trials demonstrated that it was possible to have an SBAS system in the CAR/SAM Regions, but that it had to be independent and autonomous from other SBAS systems (EGNOS or WAAS), since the need for ionospheric models and specific algorithms made it unfeasible to extend the coverage of existing systems. Subsequently, the FAA endorsed this decision with respect to WAAS.

b) PHASE II

Based on these conclusions, the so-called PHASE II was launched, where the system to be defined received the name of SACCSA (Augmentation Solution for the Caribbean, Central and South America). Its purpose was to perform the necessary studies and developments to confirm the feasibility of implementing an SBAS system in the CAR/SAM Regions, and develop the necessary algorithms to resolve problems in the ionosphere and conduct in-depth studies thereof. Furthermore, the different elements of the system were defined and work was done on financial, cost-benefit and operational issues, based on the following work packages:

PT 1000: Information on users and service providers.
PT 2000: Analysis of SACCSA services.
PT 3000: Study of an SBAS for the CAR/SAM Regions.
PT 4000: Ionospheric analyses.
PT 5000: SACCSA specifications.
PT 7000: Management/Operation.
PT 8000: Human resources and training.
PT 9000: Economic and financial feasibility.
PT 10000: Planning of project phases.

c) PHASE III

Based on the promising results of PHASE II, it was decided to launch PHASE III, in which the necessary adjustments and simulations would be carried out to define the system for its subsequent development and deployment, minimising risks and, thus, reducing development and implementation costs. Given the complexity of the tasks, a competitive international bidding process was established for this phase, in which the contract was awarded to a consortium led by GMV. This phase consisted of the following work packages:

PT 1000: Monitoring network and control thereof.
PT 2000: Completion of PHASE II studies.
PT 3000: SACCSA UCP prototype.
PT 4000: Definition of activities in support of system validation and certification.
PT 5000: Analysis of other supplementary options.

PT 6000: Website.

5. Project Management

The different phases have been financed through direct contributions by the States and in-kind contributions by States and enterprises.

Phase I was mainly funded by the European Union and the European Space Agency for a total of 178,052 USD, of which 35,000 USD were provided by Cuba, 35,000 USD by COCESNA, 35,000 USD by Colombia and 27,237 USD by AENA. This phase meant a total investment of 178,052 USD, to which we should add the in-kind contribution equivalent to 26,220 USD by AENA. The total for this phase was 207,272 USD.

PHASE II was financed by the participating States, at a rate of 25,000 USD by each State, and an extraordinary contribution by AENA for 464,760 USD. This Phase meant an investment of 589,760 USD. In this phase, AENA made an in-kind contribution for 306,498 USD, raising the total to 896,258 USD.

In Phase III, a contribution of 75,000 USD was set for each participating State, in addition to an additional fee of US$ 27,500, agreed at the eighth coordination meeting of the project (RCC8). AENA made an extraordinary contribution of 841,216 USD. In-kind contributions to date reach 163,444 USD from AENA and 310,000 USD from GMV. Accordingly, contributions for this phase total 1,687,955 USD so far.
The following table summarises monetary and in-kind contributions and executed funds:

FASE	I-EDISA	FASE II	FASE III	TOTAL
Aportación cada Estado participantes	$ 35,000.00	$ 25,000.00	$ 102,500.00	**$ 162,500.00**
Aportación AENA	$ 27,237.00	$ 464,760.00	$ 841,216.00	$ 1,333,213.00
Total dinerario aportado al proyecto hasta la fecha				$ 2,265,974.00
Aportación en especie AENA	$ 26,220.00	$ 306,498.00	$ 163,444.00	$ 496,162.00
Aportación en especie GMV			$ 310,000.00	$ 310,000.00
Total aportado en especie				**$ 806,162.00**
Total dineraria ejecutado hasta la fecha				**$ 2,116,336.00**
Total dineraria + especie ejecutado hasta la fecha				**$ 2,922,498.00**

6. Study of an SBAS solution for the CAR/SAM Regions

a) Description and results of work packages

In general, work packages were hired to establish the technical feasibility and operational benefits of an SBAS systems for the CAR/SAM Regions, including an analysis of SACCSA services, a study of an SBAS system for the CAR/SAM Regions, system design and architecture, ionospheric analyses, SACCSA specifications, management/operation, monitoring network and control thereof, SACCSA UCP prototype, definition of activities in support of system validation and certification, analysis of areas with poor service.

The services provided by the system prototype in the CAR/SAM Regions showed that APV-I procedures could be achieved, even after analysing scenarios degraded by solar disturbances. This was demonstrated by GMV from October 2012 in San Carlos de Bariloche, Argentina, to 12 February 2015, during the Workshop held at the premises of the *Centro de Estudios Aeronáuticos de la Aeronáutica Civil* in Bogota, Colombia.

The States that have participated in the three phases have contributed a total of US$ 162,500, totalling $2,922,498.00 in both money and in kind. This represents a ratio of 1:18 between payments made by the State to the project and total money and in-kind contributions executed to date by the project.

b) Project assessment and comments by Project members

- At the project closing meeting, Colombia, Spain, Panama, Trinidad and Tobago, and COCESNA made an assessment of the project, completing a survey on management indicators and project results (see attachment).
- Based on the assessment of the Project, the States felt that Project objectives had been met in all cases, highlighting the following:

    - The main achievement of the project was the confirmation that an SBAS system for the CAR/SAM Regions was feasible.
    - It was felt that more CAR/SAM States should have participated in order to complete all work packages.
    - The proposal was made to continue conducting the test-bed, the financial feasibility study and the cost-benefit analysis.
    - The results should be protected under intellectual property of the States and should not be used for commercial purposes and/or other developments by the contractor.
    - The significant contributions (both monetary and in-kind) made by AENA and Project members States were highlighted and acknowledged.

- It was also noted that the participants (financial institutions) should be aware of the terms of reference, contracts and all relevant information on the hiring of firms for the execution of this type of projects.
  Finally, mention was made of the need to disseminate the results of the project and to invite other countries of the Region to participate so as to strengthen the SBAS.

c) Final considerations

- Definitive closure of Project RLA/03/902 GNSS/SBAS – SACCSA
- Technological (hardware and software) evolution not related to ionospheric correction in the existing SBAS/WAAS and EGNOS systems, leading to the implementation of an operational SBAS in the Region or in the States that may deem it advisable.
- Based on this study, each State or group of States could consider the implementation of an SBAS system for the Region, after completing certain tasks required for validating and confirming its feasibility, namely:

    - ✓ Test bed
    - ✓ Cost-benefit analysis
    - ✓ Financial feasibility study

- Take into account the recommendation of the multiconstellation (GPS+GLONASS) and multifrequency (dual frequency) to minimise the impact of solar activity on the ionosphere and on SBAS signals, through the implementation of the aforementioned project, as proposed by GMV.

- Consider the possibility that ICAO through its technical cooperation projects undertake future action and activities for the implementation of an SBAS for the Region or for the States that deem it advisable.

Agenda Item 5: Operational implementation of new ATM automated systems and integration of the existing systems

5.1 Under this agenda item, the Meeting analysed the following papers:

a) WP/14 – *Follow-up to the implementation of AIDC interconnection in the SAM Region* (presented by the Secretariat);
b) WP/15- *Follow-Up to the implementation activities of project Improve ATM Situational Awareness* (presented by the Secretariat); and
c) WP/24 - *Implementation of AIDC Protocol in Brazil* (presented by Brazil).

Follow-up to the implementation of AIDC interconnection

5.2 The Meeting was informed that the Eighth Meeting of the Coordination Committee of Project RLA/06/901 (RCC/8) upon analysing conclusion *SAM/IG/14-16 Approval of the 2015 Plan of Activities for AIDC implementation* proceed to approved it.

5.3 In this sense the Meeting took note that from 6 April to 1 May 2015 were conducted the initial activities for the implementation of the AIDC consisting in delivery of practical courses to air controllers, on AIDC operation and automated system databases as well as the implementation of the AIDC interconnection between the following ACCs:

- Bogotá Lima
- Bogotá Guayaquil
- Guayaquil Lima
- Lima Santiago

5.4 This activities were possible thanks to the work of three ATM automation experts from Argentina, Colombia and Peru, with broad experience in the programming of ACC automated system databases and in AIDC operation in their respective countries.

5.5 The Meeting was informed that as a result of the activities, practical courses on AIDC and automated system databases in AIDC were conducted in Chile, Colombia, Ecuador and Peru, providing training to 16 air controllers of the ACC Santiago and two technicians in charge of the maintenance of the automated system of the DGAC of Chile, 44 controllers from the ACC Lima, 31 controllers form the ACC of Guayaquil and 35 controllers of the ACC Bogotá.

5.6 Course participants received theoretical information on AIDC, ICAO documents, the ASIA/PAC AIDC ICD, the SAM AIDC implementation guide, and manufacturers' manuals. The participants also conducted practical exercises on AIDC operations in the automated systems installed at the Santiago, Bogotá, Guayaquil, and Lima ACCs, and exercises on database configuration for AIDC.

5.7 In addition to training activities, the automation experts, with the support of the local technical and operational personnel, successfully completed the AIDC interconnection tests between the Lima and Guayaquil ACCs, between the Bogota and Guayaquil ACCs, between the Bogota and Lima ACCs, and between the Santiago and Lima ACCs.

5.8 During AIDC tests, the minimum set of AIDC messages contemplated in the SAM AIDC implementation guide was used. The AIDC interconnection was implemented through the existing AMHS and AFTN circuits, using the new South American digital network, REDDIG II. More information on AIDC activities and on the recommendations emanating from the tests performed is shown in **Appendix A** to this Agenda Item.

5.9 Based on the positive results of AIDC tests, at this moment the AIDC operation between the ACCs Lima and Guayaquil, ACCs Bogota and Guayaquil and ACCs Bogota and Lima is being applied on a pre-operational basis, except for the Santiago and Lima ACCs, which require completion of some of the actions described in Appendix A.

5.10 An Ad-hoc group was created with the aim to determining the activities necessary to migrate from the pre-operational phase of the AIDC existing interconnections to the operational phase as well as to analyze the implementation of other AIDC interconnections.

5.11 In support of the work of the ad-hoc group for the definition of implementation requirements for the AIDC operational phase, **Appendix B** of this Agenda Item contains an analysis of AIDC technical and operational requirements, carried out by automation experts based on the results of the missions and the SAM AIDC implementation guide.

5.12 The Ad-hoc group determined that the following activities should be carried out to migrate from the AIDC pre-operational phase to the operational phase between Colombia, Ecuador and Peru:

a) After studying the advisability of the use of AIDC messages and the positive results of the tests, the Meeting determined that the States of Colombia, Peru and Ecuador must use the minimum set of AIDC messages proposed in the guidance for the AIDC implementation in the SAM Region.

b) In order to conclude the pre-operational phase, Colombia, Peru and Ecuador should continue with the AIDC training and familiarization program for the staff of controllers, AIM officers and supporting staff, with a special emphasis to ARO/AIS staff regarding the importance of continuing the entirety route proposed in the Flight Plan.

c) Since certain systems replies automatically to some AIDC messages and in view of the convenience that in some others this action be manually performed by air traffic Control units, it was agreed that the pre-operational and operational tests AIDC coordination will be performed in full and not partial way with AIDC messages of the minimum set and both manual and automatic response actions to some messages will be made.

d) Given the convenience of using EST and CPL messages for some States, it was approved that for Peru, Colombia and Ecuador and including Panama, priority to the EST message will be given, and that according to internal agreements, other States use the CPL message, pending Chile and Brazil reporting with which of these messages will continue its tests.

Mensajes Obligatorios	
Mensaje	**Significado**
ABI	Advanced Boundary Information
CPL	Current Flight Plan
EST	Coordination Estimate
PAC	Preliminary Activate
MAC	Coordination Cancellation
CDN	Coordination Negotiation
ACP	Acceptance
REJ	Rejection
TOC	Transfer of Control
AOC	Acceptance of Control
LAM	Logical Acknowledgement Message
LRM	Logical Rejection Message

e) For tests between ACCs Colombia, Peru and Ecuador, the reply to EST message will be manually sending the ACP message. For tests with Panama ACP message will be made automatically by Panama.

Example of the messages sequence:

ABI automatically generated
PAC automatically generated
EST automatically generated
CPL if used, will be automatically generated
ACP manually generated by the Control
TOC manually generated by the Control
AOC manually generated by the Control
LAM and **LRM** messages are automatically generated

f) Due to the importance generated by TOC and AOC messages in AIDC coordination, it was established that once the transferring unit generates a TOC message in a point or moment specified in the MoU and that when the accepting unit assumes this transfer through an AOC message, is considered that from that moment assumes the responsibility and control of the transferred aircraft.

g) For specific configurations of each State in the use of dispatch time and receipt of AIDC messages, The Meeting agreed that through the MoUs, each State will propose what best fits for best results. The timetable of activities is shown in Appendix C.

h) In order to conclude the pre-operational phase in Peru, Ecuador and Colombia, 2 August 2015 has been set as deadline. The operational phases starting from August 3 will continue, thus while the pre-operational phase ends, tests will continue being carried out.

i) It is proposed to officially begin with the operational phase on 3 August. For that date, the recommendations of the SAM/IG/15 Ad-hoc group should be implemented in the corresponding LOAs.

Conclusion SAM/IG/15-07 Activities to migrate from the AIDC pre-operational to the operational phase between ACCs Colombia, Ecuador and Peru

That, Colombia, Ecuador and Peru carry out the activities referred to in paragraph 5.12 of this agenda item for the migration from the AIDC pre-operational phase to the operational, between the ACC Bogota and the ACC Guayaquil, the ACC Bogota with the ACC Lima and the ACC Lima with the ACC Guayaquil, in order to begin with the operational phase on 3 August 2015.

5.13 The Meeting recalled that the SAM Region States are committed through the Declaration of Bogotá in the operational implementation of AIDC through the Declaration of Bogotá, therefore the importance that aeronautical authorities maintain staff appointed for this work (focal points) by assigning them the time needed to perform the required functions within the specified time, as well as keep staff updated on the issue, in order to achieve the objectives to reach the operational phase. In this regard the following conclusion was formulated:

Conclusion SAM/IG/15-08 Provision of facilities for the staff in charge of the operational implementation of the AIDC by the aeronautical authorities of the States

That the Aeronautical Authorities of the SAM Region States involved in the implementation of the AIDC systems interconnection, in order to comply with the requirements of the Bogota Declaration in this regard, provide the necessary facilities for the staff designated for the implementation of this activity, specially the focal points, could carry out the work within the time specified in the schedules of activities listed in Appendix C of this agenda item.

5.14 The Meeting analyzed the timetable of AIDC implementation activities in the SAM Region and proceeded to updating it. The timetable of AIDC implementation activities in the SAM Region for the period 2015-2016 is shown in Appendix C of this agenda item. From the activities highlights the AIDC operational implementation between the ACC of Bogota, Lima and Guayaquil, the new AIDC interconnections between Bogota ACC and Panama ACC, between Ezeiza ACC and Santiago ACC, and between the Montevideo and Resistencia ACCs and the Asunción ACC, along with an AIDC course for the Panama AAC controllers.

5.15 For the implementation of the AIDC implementation tests between the ACCs of Bogota and Panamá as well as the AIDC course for the ACC Panama controllers, the representative of Thales attending the meeting informed that he will be participating in the tests and course in Panama.

5.16 The Meeting proceeded with the review of the list of focal points for coordinating AIDC activities which is shown in **Appendix D** to this Agenda Item.

5.17 The Meeting took note that as a result of the studies performed, the Brazilian Administration identified the necessity to make improvements in its automated system of air traffic control, used in its Control Centers (ACC and APP), through project SAGITARIO, which includes new functions and a new man machine interface (IHM).

5.18 The new system was developed by Atech and is operational in ACCs Brasilia, Curitiba, Amazonic and Recife and the APP Brasilia, Rio de Janeiro, Belo Horizonte, Curitiba and Porto Alegre. It is scheduled to implement the ACC Atlantic in 2016, and the implementation in other AAP (of up to 21 APPs sites) until 2018.

5.19 It was informed that the SAGITARIO system has the ability to provide “handoff” capacity through protocols Doc.4444, OLDI and AIDC. Nowadays the national ACCs use messages from Doc. 4444 protocol to make the “handoff”.

5.20 Also the Meeting was informed that in order to meet the Bogotá Declaration, the Brazilian Administration decided to adopt the use of AIDC protocol in their ACC until the end of 2015. The interconnection between automated systems of neighbors’ countries will be accomplished during 2016 as stated by the aforementioned declaration.

5.21 In order to verify the technical feasibility of the AIDC interconnection with the automated system of ATECH Sagitario, the Meeting considered to undertake testing of Exchange System AIRCON 2100 of INDRA in Colombia by the first week of September 2015. Coordination of testing would be done through the focal points of Brazil and Colombia, indicated in Appendix D.

Follow-Up to the implementation activities of project Improve ATM Situational Awareness in the SAM Region

5.22 It was recalled that the SAM/IG/14 Meeting considered proceeding on 2015 with the development of a Guideline on technical/operational considerations for multilateration (MLAT) implementation as well as a *Guideline on technical considerations in support of ATFM implementation.*

5.23 The Meeting was informed that the Eighth Coordination Committee Meeting of Project RLA/06/901 (RCC/8) approved carrying out a mission of one week in the ICAO South American Office for the development of the Guideline on technical/operational considerations for the implementation of a multilateration system (MLAT).

5.24 The Meeting took note that with the approval of the RCC/8 Meeting the development of the Guidance it was in charged to a professional from Ecuador with wide experience in the installation, maintenance and operation of surveillance systems.

5.25 The Meeting took also knowledge that the guidance for the implementation of MLAT was based on the experience gained in Ecuador in the installation of a multilateration system at Catamayo Airport.

5.26 The meeting noted that works for the development of the guidance of multilateration concluded on 24 April 2015 and that it is intended to provide basic information about an overview of aeronautical surveillance systems for the air traffic control (ATC), in particular the multilateration system and (MLAT) and considerations for its implementation. The guidance consists of three parts, the first presents an overview of surveillance matters, the second describes the characteristics of the MLAT system and the third presents technical and operational considerations for the implementation of multilateration system. **Appendix E** of this agenda item presents the initial version of the Guideline on technical/operational considerations for multilateration.

5.27 With the analysis of the guidance, the Meeting considered that it should be circulated by the Secretariat to the States and Territories of the SAM Region for review, approval and presentation at the Sixteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/16) – Regional Project RLA/06/901 to be held in Lima in October 2015, being formulated the following conclusion:

Conclusion SAM/IG/15-09 Review and approval of the Guideline on technical/operational considerations for multilateration (MLAT) implementation

In order to proceed with the review and approval of the Guidance with technical/operational considerations for the multilateration implementation (MLAT):

a) The Secretariat proceed to send the Guidance to all States and Territories of SAM Region not later than 30 June 2015.

b) SAM Region States and territories review the guidance and send comments to ICAO SAM Office by 14 August 2015.

c) The SAM/IG/16 meeting approves the revised guidance so that it can serve as reference to interested States in implementing a multilateration system.

5.28 With reference to the development of the *Guideline with technical considerations to support the ATFN implementation*, the Meeting deems it be presented in the SAM/IG/17 Meeting (May 2016) with the previous approval of the Ninth Coordination Committee Meeting of project RLA/06/901 of a week mission of an expert in Lima, Peru, in April 2016.

5.29 With the development of the Guidance with technical/operational considerations for the multilateration implementation (MLAT), the Meeting proceeded to amend the activities of the C2 Project ATM Situational Awareness in SAM Region which is presented as **Appendix F** to this Agenda Item.

5.30 The Meeting took note that in order to inform on the current status of automated systems in ATS units, advanced systems of surveillance (ADS-B and Multilateration) at regional and global levels and submit the plans of regional and global implementation of the same, will carry out a workshop of implementation automation ATM, ADS-B and Multilateration (ASBU ASUR FICE and BO SNET) from 22 to 25 September 2015 in Panama City. For this event, the Eighth Coordination Committee Meeting of project RLA/06/901 approved a fellowship for each Member State of the project.

5.31 The Meeting was informed on the ADS-B implementation plans in SAM Region. On this Respect, Argentina stated that is foreseeing the installation of three ADS-B complementing the surveillance of the Ezeiza-Santiago route and four ADS-B stations to complement the surveillance of the Ezeiza-Salta route.

5.32 Colombia also reported that they have acquired 13 ADS-B stations; 7 are already installed and by the end of 2015 it is expected to have installed the other 6. Additionally, it was reported that the Aeronautical community is aware of the implementation plan and that the Aeronautical Regulations of Colombia (RAC) will be modified to include the command to install ADS-B Out equipment with deadline on January 1 2020.

5.33 Paraguay informed the installation of six ADS-B stations in the following locations: Asuncion, Ciudad del Este, San Juan, Concepcion, Mariscal Estigarribia and Bahia Negra.

5.34 Brazil reported that has scheduled the installation of a multilateration system in Vitoria. Colombia informed that multilateration is already installed in Barranquilla y Bogota and Ecuador in Latagunga and Catamayo.

APPENDIX A

DESCRIPTION OF AIDC ACTIVITIES IN CHILE, PERU, ECUADOR, AND COLOMBIA

MISSION TO CHILE FROM 6 TO 10 APRIL 2015

On 6-10 April 2015, the Practical Course on ATS Interfacility Data Communication (AIDC) Operations was conducted at the premises of the Santiago ACC for air traffic controllers. The course was conducted by Mr. Rubén Silva of Argentina, with the support of Messrs. Mauricio Ferrer of Colombia and Jorge Merino of Peru.

Training was provided to 16 air traffic controllers and 2 aeronautical technicians on the use of AIDC for coordination between control centres using data link, and to the administrators of automated systems on database configuration. The list of participants is **attached** to this Appendix.

Results of AIDC tests between SCEL and SPIM

The automated systems (AIDC) of the SPIM and SCEL ACCs were successfully connected through the AFTN circuit between the two locations, using the new REDDIG II network as the means of communication. The following AFTN addresses were used to establish communication between the two locations:

- SCELZRZY (Santiago ACC)
- SPIMAIDC (Lima ACC)

The automated systems that were interconnected were the THALES TOPSKY installed at the Santiago ACC and the INDRA Aircon 2100 installed at the Lima ACC.

The AIDC coordination tests conducted in the SPIM-SCEL direction were successful in general terms, since messages arrive complete and are accepted and processed by the TOPSKY system in Santiago de Chile. The following difficulties were observed:

1. The Aircon 2100 system in Lima does not include FPL Box 18 in the ABI message. Consequently, when the FPL does not exist in the addressee and is created based on the ABI, the FPL in the TOPSKY system must be manually corrected by the controller, inserting the data corresponding to aircraft equipage in Box 18 (PBN, NAV), so that it may be processed by the system.

2. There were cases in which the FPL was transmitted with an incomplete route beyond the point following COP in the Lima FIR. The ABI message thus transmitted is processed and creates the FPL in the TOPSKY system. However, it goes to the erroneous message queue and requires manual intervention of the controller for FPL processing.

AIDC coordination tests in the SCEL-SPIM direction were not successful. It was found that the TOPSKY system in Santiago de Chile has the following issues concerning AIDC:

1. When the routes defined in box 15 of the FPL do not explicitly contain the corresponding COP, the ABI message is transmitted with a format error (error in box 15), where the name of the COP and the corresponding route appear with no spacing in the text of the message.

2. *The* CRC generated by this system is not compatible with the other systems (does not use the XModem method). This generates rejection (LRM) by the Aircon 2100 system in Lima due to invalid CRC (error code 61). Consequently, messages are not processed.

3. As to the reception of AIDC messages, the TOPSKY system generates a massive message rejection problem (LRM) due to message sequence error (error code 65) when, for some reason, system hot reset is required and the numeric sequence of messages is interrupted and restarted. This prevents subsequent AIDC coordination, requiring a cold start of the TOPSKY system to solve the problem.

4. The FPL is not activated with the reception of an EST message or with the transmission of the corresponding ACP. FPL activation occurs with the reception of a TOC message.

5. The transmission of ACP messages is automatic, with no possibility of configuring it for manual operation. It is recommended that the controller generate ACP messages manually through the AIDC dialogue.

6. The TOPSKY system makes it very difficult for the controller to view pending coordination and respond to AIDC messages.

Recommendations following AIDC tests between SCEL and SPIM

1. ABI messages should contain information on FPL field 18, since some automated systems like the Thales TOPSKY validate the FPLs that have been created on the basis of the ABI message taking into account the data contained in this field (for instance, aircraft equipage resulting from the new structure of the flight plan effective since 2012).

2. Automated systems should stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65). These LRMs were eliminated in the PAN NAT/APAC ICD v1.0 of September 2014.

3. The ARO/AIS offices of the region must transmit the FPLs with the complete and correct route, from beginning to end, in order to avoid processing issues in the automated systems of adjacent control centres and beyond, as applicable.

ANNEX

LIST OF PARTICIPANTS – AIDC COURSE - SANTIAGO DE CHILE

Technical area:

1. Mr. Pedro Pastrian
2. Mr. Christian Vergara

Operational area (ATCOs)

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8. Mr. Felipe Bañados
9. Mr. Rigoberto Pacheco
10. Mr. Enrique Valenzuela
11. Mr. Eduardo Meneses
12. Mr. Manuel Alvarez
13. Mr. Carlos Araya
14. Mr. Luis Jerez
15. Mrs. Ursula Garrido
16. Mrs. Marcela Vasquez

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17. Rubén Silva

Supporting instructor

18. Mauricio Ferrer
19. Jorge Merino

MISSION TO PERU – 13 TO 17 APRIL 2015

On 13-17 April 2015, the Practical Course on ATS Interfacility Data Communication (AIDC) Operations was conducted at the premises of the Lima ACC for air traffic controllers. The course was conducted by Mr. Rubén Silva of Argentina, with the support of Messrs. Mauricio Ferrer of Colombia and Jorge Merino of Peru.

Training was provided to 44 air traffic controllers on the use of AIDC for coordination between control centres using data link, and to the administrators of automated systems on database configuration. The list of participants is **attached** to this Appendix.

Results of AIDC tests

The systems of SPIM / SCEL / SEGU / SKBO were successfully connected using the following AIDC addresses:

- SCELZRZY (Santiago ACC)
- SPIMAIDC (Lima ACC)
- SEFGAIDC (Guayaquil ACC)
- SKEDAIDC (Bogota ACC)

AIDC interaction between Lima-Guayaquil and Lima-Bogota was achieved using the existing AMHS circuits between the aforementioned locations through REDDIG II. The interconnected automated systems are Indra AIRCON 2100.

Recommendations of the AIDC Mission to Peru

1. The training provided to air traffic controllers will serve as guidance on the use of AIDC for coordination between automated control centres.

2. Database administrators must follow the recommendations made during the training for proper configuration of their systems.

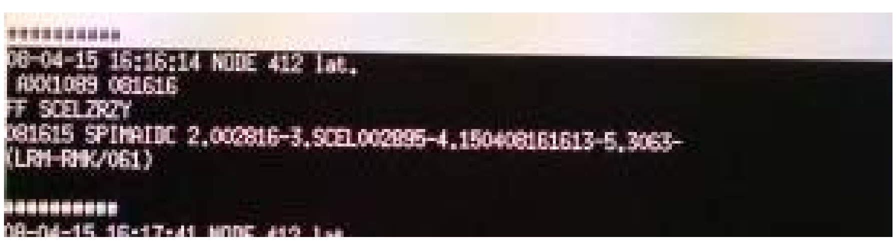
3. ABI messages should contain information in the FPL field 18, since some automated systems validate FPLs that have been created based on the ABI message taking into account the information contained in this field (for instance, aircraft equipage resulting from the new flight plan structure effective since 2012).

4. Automated systems should stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65). These LRMs were eliminated in the PAN NAT/APAC ICD v1.0 of September 2014.

5. The AIRCON 2100 system in Lima has a physical configuration (console distribution) whereby the executive controller only has an SDD terminal and the planner only has an FDD terminal in the same UCS. This particular configuration generates a work overload for the executive controller, since AIDC coordination, just like other activities, cannot be done from the planner/assistant position.

6. The AIRCON 2100 simulator version of Lima cannot emulate an AIDC coordination environment; it can only exchange OLDI messages. This limits the possibility of using it to train personnel in the use of AIDC.

7. It has been noted that when AIDC messages are routed via Caracas, the OHI field is deleted. Consequently, these messages are received at destination without the corresponding AIDC header. Accordingly, the receiving system generates LRMs, preventing automatic coordination.



8. The ARO/AIS offices of the region must transmit the FPLs with the complete and correct route, from beginning to end, in order to avoid processing issues in the automated systems of adjacent control centres and beyond, as applicable.

9. The direct connection with Bogota was achieved on the last day of the mission, which made it difficult to conduct some of the tests. However, it was possible to verify the connection and the dialogue that now exists between the two control centres.

ANNEX
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MISSION TO ECUADOR - 20 TO 24 APRIL 2015

On 20-24 April 2015, the Practical Course on ATS Interfacility Data Communication (AIDC) Operations was conducted at the premises of the Guayaquil ACC for air traffic controllers. The course was conducted by Mr. Rubén Silva of Argentina, with the support of Messrs. Mauricio Ferrer of Colombia and Jorge Merino of Peru.

Training was provided to 31 air traffic controllers on the use of AIDC for coordination between control centres using data link, and to the administrators of automated systems on database configuration. The list of participants is **attached** to this Appendix.

Results of AIDC tests

1. The systems of SPIM / SEGU / SKBO were successfully connected using the following AIDC addresses:

    - SPIMAIDC (Lima ACC)
    - SEFGAIDC (Guayaquil ACC)
    - SKEDAIDC (Bogota ACC)

2. The Guayaquil AIRCON 2100 database was configured in terms of time, distance, and coordination point (COPs) parameters, with a view to continuing with the pre-operational tests between this ACC and the Lima and Bogota ACCs.

3. Proper AIDC communication was verified in both directions between the SEGU control centre and the adjacent SPIM and SKBO centres.

4. The AIDC interaction between Guayaquil and Bogota was through the AFTN circuit between the two locations, using the REDDIG II. The interconnected automated systems are Indra AIRCON 2100.

Recommendations of the AIDC mission to Ecuador

1. ABI messages should contain information in the FPL field 18, since some automated systems validate the FPLs that have been created based on the ABI message taking into account the information contained in this field (for instance, aircraft equipage resulting from the new flight plan structure effective since 2012).

2. Automated systems should stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65). These LRMs were eliminated in the PAN NAT/APAC ICD v1.0 of September 2014.

3. The ARO/AIS offices of the region must transmit the FPLs with the complete and correct route, from beginning to end, in order to avoid processing issues in the automated systems of adjacent control centres and beyond, as applicable.

ANNEX

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Supporting Instructor

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MISSION TO COLOMBIA - 27 APRIL TO 1 MAY 2015

From 27 April to 1 May 2015, the Practical Course on ATS Interfacility Data Communication (AIDC) Operations was conducted at the premises of the Bogota ACC for air traffic controllers. The course was conducted by Mr. Rubén Silva of Argentina, with the support of Mr. Mauricio Ferrer of Colombia.

The training was provided to 35 air traffic controllers on the use of AIDC for coordination between control centres using data link, and to the administrators of automated systems on database configuration. The list of participants is **attached** to this Appendix.

Results of AIDC tests

1. The system of SKBO was successfully connected with SEGU and SPIM. The following AFTN addresses were used:

    - SPIMAIDC (Lima ACC)
    - SEFGAIDC (Guayaquil ACC)
    - SKEDAIDC (Bogota ACC)

2. In addition to the tests with Ecuador and Peru, tests with Panama were also conducted, in which failures were observed in the SKBO/MPTO connection. It was noted that this failure was caused by the REDDIG II - MEVA III integration, which routed messages via MPTO/KATL/SVCS/SKBO. As already stated, the problems in the OHI field are generated by Caracas. This will be solved once the REDDIG II MEVA III interconnection is operative.

Recommendations of the AIDC Mission to Colombia

1. ABI messages should contain information on FPL field 18, since some automated systems validate the FPLs that have been created based on the ABI message taking into account the data contained in this field and Amendment 1 to Appendix 2 to Doc 4444.

2. Automated systems should stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65). These LRMs were eliminated in the PAN NAT/APAC ICD v1.0 of September 2014.

3. It has been noted that when AIDC messages are routed via Caracas, the OHI field is deleted. Consequently, these messages are received at destination without the corresponding AIDC header. Accordingly, the receiving system generates LRMs, preventing automatic coordination.

4. The ARO/AIS offices of the region must transmit the FPLs with the complete and correct route, from beginning to end, in order to avoid processing issues in the automated systems of adjacent control centres and beyond, as applicable.

5. It was noted that Colombia had a series of V-SAT stations that should be re-established through bilateral COLOMBIA-ECUADOR and COLOMBIA-PANAMA agreements, in order to have a backup system of its own in case of failure of the main ones.

ANNEX

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APPENDIX B

ANALYSIS OF AIDC TECHNICAL AND OPERATIONAL REQUIREMENTS

Part 1. BACKGROUND

1.1 Conclusion GREPECAS/15/36.

1.2 AIDC course in Montevideo, Uruguay (December 2013).

1.3 Regional coordination teleconferences for AIDC implementation in the SAM Region (2013-2015).

1.4 Conclusion GREPECAS/17/9 and proposal of adoption of a global ICD based on joint NAT/APAC inter-regional work (July 2014).

1.5 Decision AIDC/TF/2/3 to compare existing ICDs in order to arrive at a global consolidated ICD through an ICAO document.

1.6 Technical/operational assistance missions and AIDC courses conducted at the Santiago, Lima, Guayaquil, and Bogota ACCs (April-May 2015).

Part 2. REFERENCE DOCUMENTS

2.1 *Document 4444 ATM/501 – Air Traffic Management – Fourteenth Edition*

2.2 *Guide for AIDC Implementation through the Interconnection of Adjacent Automated Centres – v7.0 – April 2013.*

2.3 *Aircon2100 (Indra) – Manual de Usuario AIDC – Edición 01 – Mayo 2013.*

2.4 *Pan Regional (NAT and APAC) Interface Control Document for ATS Interfacility Data Communications (PAN AIDC ICD) – v1.0 – September 2014.*

Part 3. ANALYSIS

3.1 It has been noted that the automated systems of the region involved in this project are capable of using AIDC as a means of coordination. However, there are still some discrepancies among manufacturers, and different versions within the same manufacturer. Depending on each particular case, these discrepancies may hinder AIDC interconnection between automated systems of countries with different systems.

3.2 It has been deemed necessary for the man-machine interface of automated control centres to be as friendly as possible, so that the use of AIDC as primary means of coordination may facilitate the task of ATS personnel, reducing workload and the occurrence of operational errors.

3.3 According to the AIDC User Manual of Indra, a manufacturer of automated systems used in most countries of the region, the internal architecture of AIDC is mainly based on the APAC ICD v.3.0 (September 2007).

3.4 Indra's Aircon2100 system includes the following AIDC messages: ABI, PAC, MAC, EST, CPL, CDN, ACP, REJ, TOC, AOC, LAM, and LRM.

Part 4. TECHNICAL AND OPERATIONAL REQUIREMENTS

4.1 The internal architecture of automated systems should be based on the PAN AIDC ICD (NAT/APAC) v.1.0, for everything related to AIDC, in the absence of a more updated global or regional ICD.

4.2 Automated control centres should have an appropriate architecture and ergonomic characteristics that allow ATS personnel (executive and planner ATCO) to work in an organised manner.

4.3 The ARO/AIS offices of the region shall transmit FPLs with the complete route, from beginning to end, in order to avoid processing problems in adjacent control centres.

4.4 ABI messages should contain the information of FPL field 18 (NAT/APAC ICD), since some automated systems validate the FPLs that have been created based on an ABI message taking into account the data contained in this field. Likewise, EMG (Emergency) and MIS (Miscellaneous) messages contemplated in the PAN AIDC ICD (NAT/APAC) use the RMK field of box 18 as means of transport.

4.5 It is recommended that automated systems stop generating LRMs resulting from message sequence number error (error codes 63, 64, and 65), since they are of no use for processing AIDC messages.

4.6 The method for calculating the CRC contained in the AIDC message header should be CRC-CCITT (XModem), in order to avoid interoperability problems between systems from different manufacturers.

4.7 All AFTN and AMHS messaging applications of the region should guarantee message contents integrity, including the OHI (Optional Header Information) section, with the respective ODFs (Optional Data Field), since this section contains the header of AIDC messages, which is indispensable for correct processing.

4.8 Automated systems should process all the messages listed in the PAN NAT/APAC ICD v1.0.

4.9 The minimum set of messages that should be used in the region is shown in the following table:

Mandatory messages	
Message	**Meaning**
ABI	Advanced Boundary Information
CPL	Current Flight Plan
EST	Coordination Estimate
PAC	Preliminary Activate
MAC	Coordination Cancellation
CDN	Coordination Negotiation
ACP	Acceptance
REJ	Rejection
TOC	Transfer of Control
AOC	Acceptance of Control
LAM	Logical Acknowledgement Message
LRM	Logical Rejection Message

4.10 In a subsequent implementation stage, automated systems should add the following messages to the minimum set of messages:

Messages available for optional use	
Message	**Meaning**
PCM	Profile Confirmation Message
PCA	Profile Confirmation Acceptance
TRU	Track Update
EMG	Emergency
MIS	Miscellaneous
ASM	Application Status Monitor
FAN	FANS Application Message
FCN	FANS Completion Notification
ADS	Surveillance ADS-C Data Transfer

APPENDIX C

PLAN OF ACTIVITIES FOR INITIAL AIDC IMPLEMENTATION

	Start	End	Responsible party	Status
1. **Establishment of initial activities for completing the technical implementation of AIDC**	**10/10/2014**	**16/10/2014**	**ICAO**	**Completed** The initial plan of activities for AIDC implementation is scheduled for 2015. The plan of activities contemplates the conduction of AIDC courses for air traffic controllers working at ACCs and the operational implementation of AIDC between adjacent ACCs. These activities will be conducted in Chile, Colombia, Ecuador and Peru. Interconnection tests between the Lima and Bogota ACCs were added to the list shown in paragraph 1.1.1.
1.1 Based on the results of AIDC tests conducted from February 2014 to June 2014, the technical documentation of the automated systems installed in the Region, and the SAM AIDC implementation guide, develop: 1.1.1 Plan of activities to complete technical feasibility tests for AIDC interconnection between: Santiago ACC - Lima ACC Guayaquil ACC - Lima ACC Bogota ACC - Guayaquil ACC 1.1.2 Contents of AIDC course for ATS controllers and programmers of AIDC automated system databases, to be conducted in Chile, Colombia, Ecuador and Peru.	10/10	16/10	ICAO	
2. Review of activities at the SAM/IG/14 meeting	**09/10**	**13/11**	**ICAO and SAM/IG**	**Completed** The SAM/14 reviewed and approved the plan of activities for AIDC implementation
2.1 Submission of the plan of activities and contents of the AIDC course at the SAM/IG/14 meeting	09/10	13/11	ICAO	
2.2 Review and approval for submission at the Eighth Coordination Meeting of Project RLA/06/901	09/10	13/11	SAM/IG	

	Start	End	Responsible party	Status
3. Approval of activities by the RCC/8 meeting	**25/02/15**	**27/02/15**	**RLA/06/901 member States**	**Completed** The RCC/8 meeting held in Lima on 25-27 February 2015 approved the activities for initial implementation of AIDC interconnection in Chile, Colombia, Ecuador and Peru.
3.1 Submission of activities, with their respective cost, for approval.	25/02/15	27/02/15	RLA/06/901 member States	
4. Search and selection of experts	**24/11/14**	**28/01/15**	**ICAO**	**Completed** For the performance of the initial activities, three SAM experts with experience in database programming and operation of ACC automated systems were selected: **Rubén Silva of Argentina, Mauricio Ferrer of Colombia, and Jorge Merino of Peru**.
4.1 Search and selection of 4 experts from SAM States participating in Project RLA/06/901, with experience in the installation, operation and programming of AIDC databases, to perform the activities listed in item 1.	24/11/14	28/01/15	ICAO	
5. Missions to complete AIDC interconnection between States that started tests during the first semester of 2014	**06/04/15**	**01/05/15**	**3 automation experts ICAO**	**Completed** Missions were conducted for training purposes and to complete tests for AIDC interconnection and operation **Chile 6/4 to 10/4 2015** **Peru 13/4 to 17/4 2015** **Ecuador 20/4 to 24/4 2015** **Colombia 27/4 to 1/5/2015**
5.1 Mission to Santiago de Chile	13/04/15	17/04/15	3 automation experts ICAO	**Completed** Implementation of AIDC activities at the Santiago ACC

	Start	End	Responsible party	Status
				• AIDC practical course • AIDC interconnection tests between: *Santiago ACC and Lima ACC*
5.1.1 Complete AIDC technical implementation between the Santiago and Lima ACCs	13/04/15	17/04/15	3 automation experts ICAO	Two-way communication was established in the AIDC interconnection tests between the Thales Topssky system of the Santiago ACC and the INDRA Aircon 2100 of the Lima ACC. For the operational interconnection, certain actions need to be taken as listed in Appendix B to this working paper. The practical course on AIDC and database programming was conducted, providing training to 16 controllers of the Santiago ACC and 2 aeronautical technicians.
5.1.2 Conduct AIDC course for ATS personnel of the Santiago ACC	13/04/15	17/04/15		
5.2 Mission to Lima:	13/04/15	17/04/15	3 automation experts	**Completed** Implementation of AIDC activities in the Lima ACC • AIDC practical course • AIDC interconnection tests between: *Lima ACC - Santiago ACC* *Lima ACC - Guayaquil ACC* *Lima ACC - Bogota ACC*

	Start	End	Responsible party	Status
5.2.1 Conduct AIDC course for ATS personnel of the Lima ACC	13/04/15	17/04/15	3 Automation experts ICAO	The practical course on AIDC and database programming was conducted, providing training to 44 controllers of the Lima ACC.
5.2.2 Complete AIDC tests between the Lima ACC and the Guayaquil ACC	13/04/15	17/04/15		AIDC tests between the Lima and Guayaquil ACCs were successfully conducted.
5.2.3 Complete AIDC tests between the Lima ACC and the Bogota ACC	13/04/15	17/04/15		AIDC tests between the Lima and Bogota ACCs were successfully conducted.
5.3 Mission to Guayaquil	20/04/15	24/04/15	3 Automation experts of the SAM Region	**Completed** Implementation of AIDC activities at the Guayaquil ACC • Practical course on AIDC • AIDC interconnection tests and pre-operational implementation: Guayaquil ACC - Lima ACC Guayaquil ACC- Bogota ACC
5.3.1 Complete AIDC technical implementation between the Guayaquil ACC and the Lima ACC	20/04/15	24/04/15	3 automation experts of the SAM Region	AIDC technical interconnection was completed, currently in the pre-operational phase.
5.3.2 Complete AIDC technical implementation between the Guayaquil ACC and the Bogota ACC	20/04/15	24/04/15		AIDC technical interconnection was completed, currently in the pre-operational phase
5.3.2 Conduct AIDC course for ATS personnel of the Guayaquil ACC	20/04/15	24/04/15		The practical course on AIDC and database programming was conducted, providing

	Start	End	Responsible party	Status
				training to 31 controllers of the Guayaquil ACC.
5.4 ***Mission to Bogota***	**27/04/15**	**01/05/15**	**3 automation experts**	**Completed** Implementation of AIDC activities in the Bogota ACC • Practical course on AIDC • AIDC interconnection tests and pre-operational implementation: *Guayaquil ACC - Lima ACC* *Guayaquil ACC - Bogota ACC*
5.4.1 Complete AIDC technical implementation between the Bogota ACC and the Guayaquil ACC	27/04/15	01/05/15	3 automation experts of the SAM Region	The AIDC technical interconnection was completed, currently in pre-operational phase
5.4.2 Complete AIDC technical implementation between the Bogota ACC and the Lima ACC	27/04/15	01/05/15		The AIDC technical interconnection was completed, currently in pre-operational phase
5.6.2 Conduct AIDC course for ATS personnel of the Bogota ACC	13/04/15	17/04/15		The practical course on AIDC and database programming was conducted, providing training to 35 controllers of the Bogota ACC.
6. First meeting of the AIDC operational implementation working group during the SAMIG/15 meeting	**11/05/15**	**15/05/15**	**RLA/06/90 member States**	
6.1 It is proposed that, as a matter of priority, the SAM/IG/15 meeting do the follow-up of AIDC implementation. Accordingly, the AIDC operational implementation working group will hold its first meeting.	11/05/15	15/05/15	RLA/06/901 member States	**In progress** As a result of AIDC technical implementation, the SAM/IG/15 established a

	Start	End	Responsible party	Status
				group of activities to migrate from the pre-operational phase to the operational between the ACC Bogota, Guayaquil and Lima. Additionally the AIDC messages to be used were defined.
7- AIDC operational implementation	**18/05/15**	**31/12/15**	Involved States	
7.1 Definition of the parameters of the AIDC database for the to AID operational interconnection between Colombia, Ecuador and Peru	25/05/15	29/5715	Involved States	
7.2 Amend letter of operational agreement to include the AIDC for the coordination between the ACC Lima with AAC Bogota, ACC Bogota with ACC Guayaquil and ACC Lima with ACC Guayaquil	15/06/15	30/06/15	Involved States	
7.3 Teleconferences to coordinate and follow-up the migration from the AIDC pre-operational phase to the operational for Colombia, Ecuador and Peru		03/06/15 12/06/15 24/06/15 15/07/15 15/08/15 16/09/15 02/10/15	Involved States ICAO	
7.4 Complete courses for the ACC Lima and Guayaquil, Bogotá ATS staff as well as staff ARO/AIS	18/05/15	30/09/15	Involved States	
7.5 Start of AIDC operational implementation Guayaquil ACC - Lima ACC	18/05/15	31/12/15 03/08/15	States involved	Updating of letter of operational agreement, to include AIDC messages to be used.

	Start	End	Responsible party	Status
Bogota ACC - Guayaquil ACC Lima ACC - Bogota ACC Lima ACC – Santiago ACC*		03/08/15 03/08/15		Establishment of a pre-operational period, completing training for the rest of ATS personnel. Operational implementation. *AIDC operational implementation between Chile and Peru to take place between Antofagasta and the Lima ACCs once the automated system in Antofagasta is operative.
8. Other AIDC implementations **Bogota ACC - Panama ACC** **Ezeiza ACC - Santiago ACC** **Ezeiza ACC - Montevideo ACC** **Resistencia ACC - Asunción ACC**	**18/05/15**	**30/06/16**	States involved	AIDC course – Panama, 22 to 26 June 22 2015. AIDC interconnection tests between Bogota and Panama, June 2015. Pre-operational phase 29 June to 30 September. AIDC tests between Ezeiza and Santiago, May-June 2015. AIDC tests between Ezeiza and Montevideo August 2015. Pre-operational September-November 2015. Operational December 2015. AIDC course – Paraguay, April 2016.

	Start	End	Responsible party	Status
				AIDC tests Ezeiza Asuncion June 2016. AIDC tests between Resistencia and Asunción – June 2016.
9. Workshop on implementation of ATM automation, ADS B, and multilateration	**21/09/15**	**24/09/15**	ICAO	CAR/SAM workshop The implementation of inter-regional AIDC interconnections will be analysed at this workshop (1 scholarship per State is required).
10. Second meeting of the AIDC operational implementation working group during SAMIG/16	**19/10/15**	**23/10/15**	ICAO	
10.1 It is proposed, as a matter of priority, the SAM/IG/16 meeting do the follow-up of AIDC implementation. Accordingly, the second meeting of the AIDC operational implementation working group will be held.	**19/10/15**	**23/10/15**	ICAO	Follow-up of operational implementation and programming of activities for operational implementation in 2016.

NATIONAL FOCAL POINTS/PUNTOS FOCALES NACIONALES
IMPLEMENTATION OF INTERCONNECTION OF AUTOMATED SYSTEMS/IMPLANTACIÓN INTERCONEXIÓN SISTEMAS AUTOMATIZADOS

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APPENDIX E

Guideline on technical/operational considerations for multilateration (MLAT) implementation (ASBU B0-ASUR)

(Under translation process)

APPENDIX F

<table>
<tr><th>SAM Region</th><th>PROJECT DESCRIPTION (PD)</th><th colspan="2">PD N° C2</th></tr>
<tr><th>Programme</th><th>Project Title</th><th>Starting Date</th><th>Ending Date</th></tr>
<tr><td>ATM Automation and Situational Awareness
(Programme Coordinator:
Onofrio Smarrelli)</td><td>Improve ATM Situational Awareness in the SAM Region

Project Coordinator: Paulo Vila (Peru)
Contributing experts: José Rubira, Marcos Vidal and Jorge Otiniano (Peru); Javier Vittor (Argentina), Ivan Salas (Ecuador)</td><td>October 2011</td><td>October 2015</td></tr>
<tr><td>Objective</td><td colspan="3">Develop guidelines supporting the implementation of improvements in the situational awareness of ATS units in the South American Region</td></tr>
<tr><td>Scope</td><td colspan="3">Guidelines supporting the implementation of various applications, such as common traffic visualization, common meteorological conditions visualization and communications in general
• Analysis of the current surveillance infrastructure and identification of necessary improvements to support en route and terminal airspaces, airspace classification, PBN and ATFM
• Implementation of ADS-B, ADS-c and/or MLAT surveillance systems at selected airspaces
• Minimum common electronic information and data bases required in support of decision-making process and alert systems towards an interoperable situational awareness among centralized ATFM units
• Implement flight plan data process systems (new FPL format) and data communications tools among ACC´s
• Implement advanced automation support tools to contribute towards the sharing of aeronautical information</td></tr>
<tr><td>Metrics</td><td colspan="3">Drafting of following documents:
• Regional surveillance strategy for the implementation of systems in support of improvement of situational awareness – revised
• Evaluation of the surveillance systems coverage in the SAM Region - completed
• Guideline on technical/operational considerations for ADS-B implementation – completed
• Guideline on technical/operational considerations for MLAT implementation - completed
• Guideline on technical considerations in support of ATFM implementation – completed
• Guideline for the presentation of MET products in graphic fomat - completed</td></tr>
<tr><td>Strategy</td><td colspan="3">• All tasks will be conducted by experts nominated by States and organizations of the SAM Region members of the Project Improve ATM situational awareness in the SAM Region, under management of the project coordinator. Communications among project members, as well as between the project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet.
• Once studies are completed, the results will be submitted to the ICAO programme coordinator as a final consolidated document for its analysis, review, approval and presentation at the GREPECAS PPRC</td></tr>
</table>

Goals	• Regional surveillance strategy for the implementation of systems in support to situational awareness improvement for July 2012 (completed) • Evaluation of SAM surveillance systems coverage for October 2012 (completed) • Guideline on technical/operational considerations for ADS-B implementation for June 2012 (completed) • Guideline for the drafting of SIGMET in graphic format (March 2013) (completed) • Guideline for technical/operational considerations for MLAT implementation for March 2015 (completed) • Guideline for technical considerations in support of ATFM implementation • Action plan for ADS-B implementation in the SAM Region (November 2014)
Justification	• Improve situational awareness has been identified as a great support for ATM, contributing in the increase of safety and in flight efficiency • In addition, a close relationship with the other programmes and their respective projects is necessary, with the aim of collecting the operational requirements demanded by the mentioned applications and their respective tentative implementation dates • This project contributes to the implementation of modules B0 ASUR, B0 SURV, B0 NOPS and B0 AMET of the *Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)*
Related Projects	• Air Navigation Systems in Support of PBN • Automation • ATFM • ATN Ground-ground and Air-ground Applications

Project Deliverables	Relationship with Performance Based Regional Plan aligned with ASBU	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Evaluation of surveillance infrastructure and identification of surveillance systems improvements					
Evaluation of current surveillance systems coverage in the SAM Region	PFF SAM CNS 04 B0 ASUR	Paulo Vila (Peru)		October 2012	Presented as Appendix to the Guideline on technical/operational considerations for ADS-B implementation.
Drafting of regional plan for ADS-B and MLAT implementation					
Guideline on technical/ operational considerations for ADS-B implementation	PFF SAM CNS 04 B0 SURF B0 ASUR	José Rubira (Peru) Marco Vidal (Peru)		October 2012	The Guideline includes comments from Brazil, Chile and Guyana, presented through SAM/IG/11-WP/06. The Meeting approved the Guide. Peru will later include considerations to determine the values recommended for NIC, SIL and NAC for operational application.
Guideline on technical/ operational considerations for MLAT implementation	PFF SAM CNS 04 B0 SURF B0 ASUR	Ivan Salas (Ecuador)		March 2015	The Guideline will be presented in the Fifteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/15) for initial review and subsequent circulation among Region States for their final review and approval.

1 ***Gray***: *Activity has not started*
Green: *Activity has or will deliver planned milestone as scheduled*
Yellow: *Activity is behind schedule on milestone, but still within acceptable parameters to deliver milestone on time*
Red: *Activity has failed to deliver milestone on time, mitigation measures need to be identified and implemented*

Project Deliverables	Relationship with Performance Based Regional Plan aligned with ASBU	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Guideline on technical considerations in support of ATFM implementation	PFF SAM ATM 05 B0 NOPS	Pending designation		October 2015	The guideline will base itself on the CAR/SAM ATFM Manual approved through GREPECAS Conclusion 16/35. The ATFM Guide is being awaited for in order to define the operational requirements enabling the drafting of this Guideline.
Guideline for the presentation of MET products in graphical format	PFF SAM MET 03 B0 AMET	Jorge Otiniano (Peru)		2013	The document was delivered to the Secretariat (MET) for its review by the corresponding meteorology specialists.
Action plan for regional ADS-B implementation	B0 ASUR	Paulo Vila (Peru)		October 2014	The action plan for the regional implementation of the ADS B was presented in the Fourteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/14) Lima, Peru, November 2014.
Resources necessary	Experts in the carrying out of the deliverables				

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Agenda Item 6: Other business

6.1 Nil.