SAM/IG/8

INTERNATIONAL CIVIL AVIATION ORGANIZATION
South American Office

Regional Project RLA/06/901

Eighth Workshop/Meeting of the SAM Implementation Group

(SAM/IG/8)

FINAL REPORT

Lima, Peru, 10 to 14 October 2011

INDEX

HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Eighth Workshop/Meeting of the SAM Implementation Group (SAM/IG/8) was held at the premises of the ICAO South American Regional Office in Lima, Peru, from 10 to 14 October 2011, under the auspices of Regional Project RLA/06/901.

ii-2 OPENING CEREMONY AND OTHER MATTERS

Mr. Franklin Hoyer, Regional Director of the ICAO South American Office, greeted the participants for the continuous support provided to activities developed at regional scale by the South American Office, as well as to the civil aviation authorities and national and private organizations of the ICAO South American Region for the continuous support to the activities of the SAM Implementation Group. He highlighted the importance of Regional Project RLA/06/901, which hosts these events, as well as the new GREPECAS methodology based on results through programmes and projects, and the relevant works of this work has carried out during the past years, and especially during 2011. He finally highlighted the importance of issues to be dealt with in the agenda of the Eighth Workshop/Meeting, and emphasized that the teamwork shown by the Implementation Group is essential to execute the projects that have been adopted by the Region.

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

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

Mr. Iván De León, delegate from Panama was unanimously elected as Chairman of the Meeting. Also, Mr. Paulo Vila, delegate from Peru, was elected as Vice-Chairman.

Mr. Celso Figueiredo, RO/ATM/SAR, SAM Office, Lima, acted as Secretary, assisted by Mr. Onofrio Smarrelli, RO/CNS, Roberto Arca, RO/ATM/SAR/AIM, from the Lima Office, and Mr. Jorge Fernández, ATM/SAR Expert by the ICAO Regional Office in Lima. Likewise, the Secretariat had the support of Messrs. Julio de Souza Pereira Andrés Prado, Juárez Franklin Gouveia, Obdulio Gouarnalusse, Alessander de Andrade Santoro y Jorge Wilson de Avila, PBN, OPS/AIR, ATFM, CNS, AUTO and FPL, respectively, to analyse de different agenda items.

ii-4 WORKING LANGUAGES

The working language of the Meeting was Spanish, with simultaneous interpretation in English, 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

Agenda Item 2: Optimization of the ATS routes

Agenda Item 3: Implementation of performance-based navigation (PBN) in the SAM Region

Agenda Item 4: Standards and procedures for performance-based navigation operations approval

Agenda Item 5: Air Traffic Flow Management Implementation (ATFM) in the SAM Region

Agenda Item 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

Agenda Item 7: Operational implementation of new ATM automated systems and integration of the existing systems

Agenda Item 8: Implementation of the new flight plan format

Agenda Item 9: Other business

ii-6 **ATTENDANCE**

The meeting was attended by 54 participants from 11 States of the SAM Region Argentina, Bolivia, Brazil, Chile, Colombia, Guyana, Panama, Paraguay, Perú, Suriname, Uruguay and Venezuela, one State from the NACC Region, United States, 1 International Organization, IATA, and three International Companies, ARINC, Boeing, and METRON Aviation. The list of participants is shown in page iii-1.

ii.7 LIST OF CONCLUSIONS

Agenda Item 1: Follow up to Conclusions and Decisions adopted by SAM/IG Meetings

Review of the status of compliance withthe conclusions formulated by SAM/IG meetings and pending activities

1.1 The meeting analysed the conclusions as well as a series of activities originated by previous SAMIG meetings, oriented towards the implementation of different functions that will enable the Region to evolve in a sustainable manner towards the application of the global ATM operational concept.

1.2 The information attached in **Appendix A** to this part of the report has been updated and reviewed by the Meeting and shows the status of compliance of conclusions as well as the pending activities, formulated by the SAMIG meetings.

1.3 The list of conclusions and actions comprises:

a) Tasks to develop and/or the corresponding conclusion in the areas under analysis;

b) Specific tasks which will lead to compliance of the main task;

c) Expected results in each task;

d) Finalization dates;

e) Responsible persons for its execution;

f) Supporting members for each task; and

g) Status of implementation of the same, and when necessary, for a better understanding, an explanatory comment on the status of implementation is included.

1.4 On the other hand, States completed during the Meeting the chart shown in **Appendix B** to this part of the report, showing the tasks in charge of the States, in order to make a follow-up of the same.

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							
1-1	That States examine: a) Impact of RNAV routes implementation in t he airspace b) Aircraft fleet c) Air traffic services, and d) Establish pertinent coordination so as to enable integrated, harmonious and timely implementation of more direct RNAV routes.	• Analyse airspace • Evaluate national and international fleet • Evaluate ATS • Coordinate with authorities involved • Coordinate with adjacent States, if necessary	• Adequate information will be available to execute PBN action plan. • A new ATS routes network will be available, based on RNAV with necessary PBN values, so as to respond to current requirements of airspace users	SAM/IG/7	States	RO/ATM RO/AIM	**COMPLETED**
1-2	Route RNAV VOR CRR/VOR FNO (UM 661)	• Coordinate the implementation. • Issue AIC. • Train personnel. • Amend CAR/SAM ANP	Route implemented	TBD Information from Brazil is pending	States Secretariat	RO/ATM RO/AIM	**COMPLETED**
1-3	UM 662 Guayaquil – Madrid	• Coordinate the implementation. • Issue AIC. • Train personnel. • Amend CAR/SAM ANP	Route implemented	Agreement with FAV Venezuela is pending SAM/ ATSRO/4	States Secretariat	RO/ATM RO/AIM	**VALID** (see SAM/IG/5, Agenda Item 2) The enquiry was reiterated to Venezuela

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
1-4	UM 527 Lima – Madrid	• Coordinate the implementation. • Issue AIC. • Train personnel. • Amend CAR/SAM ANP	Route implemented	Implementation agreement on 24 September 2009	States Secretariat	RO/ATM RO/AIM	**COMPLETED** 24/09/09
1-5	Santiago-Miami	• Coordinate the implementation. • Issue AIC. • Train personnel. • Amend CAR/SAM ANP	Route implemented	Finalise coordination with States involved and IATA	States IATA Secretariat	RO/ATM RO/AIM	**COMPLETED** SAM/IG/5 Appendix A to Agenda Item 2, was modified. An analysis will continue within the SAM ATS routes network optimization programme.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2. Optimisation of ATS routes in the SAM Region							
2-1	**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. (Action adopted in SAM/IG/2) Optimize the airspace structure, reorganizing the red or implementing new routes based on strategic objectives of the airspace, taking into consideration "airspace modelling", ATC simulations (accelerated time and/or real time), life trials, etc.	See action plan from the ATS routes network optimisation programme (Appendix B, Attachment 1 to SAM/IG/3 Meeting Report on Agenda Item 2)	Optimised ATS routes network	As per action plan	States RLA/06/901 IATA Regional Office	RO/ATM RO/AIM	**COMPLETED** Conclusion and action adopted in SAM/IG/2 are oriented towards achieving the same results. The Action plan was updated (see Appendix B on Agenda item 2 of SAM/IG/4.
2-2	Prepare the preliminary evaluation of airspace safety	• Collect necessary data. • Carry out safety assessment applying the methodology adopted.	PBN will be implemented showing that agreed safety levels will be kept or maintained	SAM/IG/6	CARSAMMA	RO/ATM	**COMPLETED** The SAMRA Workshop was carried out with the assistance of an expert.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2-3	Flexibility in special use airspace.	• ANSPs will Establish coordination mechanism with military authorities • Discuss matters such as location, altitudes, and VALIDity periods of special use airspaces.	Obtain the efficient use of the airspace in terms coordinated and agreed between civil and military authorities, contemplating the benefit of all users	SAM/IG/8	States	N/A	**COMPLETED** The SAM civil/military seminar/ workshop was carried out from 16 to 19 August 2011.
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.	SAM/IG/9	States	N/A	**VALID** Check fuel savings estimate chart. 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 optimisation programme of the action plan.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2-6	**Conclusion SAM/IG/3-2 Data Collection** That SAM States: a) collect data on all flights carried out in the SAM Region upper airspace (FL 245 or above) in national and international routes in the period **1-31 July 2009** and send them to the SAM Regional Office before **30 September 2009.** b) use a sample consistent with the **form and the instructions for completing the form**, contained in **Attachment 2 to Appendix B** to this part of the report, using the EXCEL format.	• The Secretariat should send a letter to States • States should collect information as agreed. • States should send information to the Regional Office. • Information received must be assessed	A data base containing: • movement in ATS routes per FIR • movement between pairs of cities, • peak hours • movement in TMA • FL most used • air operators and type of aircraft used.	SAM/IG/5	Regional Office States RLA/06/901	RO/ATM RO/AIM CARSAMMA	**COMPLETED** Letter LT 2/3A.13-LN 3/24.6.1-SA364 dated 8 June 2009 Except for French Guyana and Suriname, all States replied this survey.
2-7	Determine entry/exit points of main TMAs in the SAM Region	• States shall determine entry/exit points of main TMAs • Shall present information at SAM/IG/4	Adequate information will be available to prepare Version 1 of ATS routes network	SAM/IG/4	States	RO/ATM	**COMPLETED** States informed that they will not carry out changes in their TMA.
2-8	Determine and obtain necessary tools for the development of Version 1 of routes network (aeronautical charts, specific software)	Evaluate necessary tools	Basic elements will be available for the development of Version 1 of ATS routes network.	SAM/IG/6	SAM PBN RLA/06/901	RO/ATM	**COMPLETED** The ATSRO/2 was held in August 2010. Proposal for amendment was presented in WP/06.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2-9	Interphase between ATS routes network of the CAR and SAM Regions	Evaluate interphase options in the ATS routes network in the CAR and SAM Regions	Develop Version 1 of ATS routes network to respond to users requirements	SAM/IG/5	SAM PBN TF Regional Office	RO/ATM	**COMPLETED**
2-10	Carry out a detailed study of the ATS routes network, with a view to prepare Version 1 of routes network (ref 2.2.2 of the Action plan of the ATS routes optimization programme of the SAM Region.	Carry out a workshop among SAM experts, in order to review and VALIDate the study of item 2.2.5 of the action plan of the ATS routes optimization programme of the SAM Region.	Initial draft of proposal Version 1 of routes network ready	March 2010	RLA/06/901 Regional Office IATA	RO/ATM	**COMPLETED**
2-11	Prepare safety assessment required applying a qualitative methodology through the use of SMS (Ref 2.2.3 of the Action Plan – Programme for optimisation of the ATS Routes Network of the SAM Region)	Carry out safety assessment	Version 1 of ATS routes network will be implemented; demonstrating that agreed safety level will be maintained or improved.	October 2010	RLA/06/901	RO/ATM CARSAMMA	**COMPLETED** Safety plans for RNAV5 and ATSRO are presented in WP/13 and 03, respectively.
2-12	**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 31/01/10	Data base COMPLETED	The list of contacts will be available to coordinate ATS routes network optimisation.	SAM/IG/5	States	RO/ATM	**COMPLETED**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2-13	**Ref para. 2.1 of SAM/IG/5 Report** The meeting noted the status of implementation of RNAV routes as approved by the First SAM Workshop on ATS Routes Network Optimisation (SAM ATSRO/1), as well as other routes that were reviewed and agreed to implement during bilateral or multilateral meetings**.**	Deliver information to process ANP amendment.	ANP amendment with Version 01 of the ATS routes network processed.	August 2010	States	RO/ATM	**COMPLETED** The meeting was carried out as programmed and the amendment is being processed to circulate it among States and international organizations (See 2-8).
2-14	**Ref Para. 2.7 SAM/IG/5 Report** Also, the meeting agreed that the routes that have not been included in Version 01, will be part of Version 01, to be dealt with during the Second SAM Workshop on ATS Routes Network Optimisation (SAM ATSRO/2).	Routes not agreed on time will be incorporated into Version 02 of the routes network	Version 01 of the ATS routes network finalised. Version 02 of the routes network in process of revision	August 2010	States	RO/AIM RO/ATM	**COMPLETED** ATS routes network that were not coordinated or that required further coordination were transferred to Version 02 of the ATS routes network.
2-15	**Ref Para. 2.8 SAM/IG/5 Report** The following routes be implemented in advance, since these routes have been coordinated for several years. UM661: UM532, UM403, Lima/Miami, UM662; UM400.	Implement route as agreed	Implemented routes	August 2010	States	RO/AIM RO/ATM	**COMPLETED** Mentioned routes were implemented or incorporated in Version 01.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2-16	**Ref Para. 2.10 SAM/IG/5 Report** Coordination for ATS routes should be carried out in a bilateral or multilateral manner among involved; the use of e-mails is recommended for the exchange of information and other communication tools, such as Skype or similar, among focal points.	Previously coordinate ATS routes trajectory among parties involved.	ATS routes presented to implement, realign or eliminate are duly coordinated and ready to be introduced in the respective amendments.	2012	States and Focal points	RO/AIM RO/ATM	**COMPLETED** The process of coordination of Phase 1 was COMPLETED and Version 01 of the ATS routes network was implemented in March 2011
2-17	**Ref. para. 2.13 SAM/IG/5 Report.** Update letters of operational agreement (LOAs) and ATS Contingency Plans	Review and coordinate with adjacent States and contingency plans	LOAs agreed before the implementation of new ATS routes, contingency plans duly updated	2012	States and Focal points	RO/AIM RO/ATM	**COMPLETED.** The process was made during implementation of Version 01 of the ATS Routes network.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2-18	**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.	Implement ulterior actions as required	Safe implementation of Version 01 of the ATS routes network.	March 2011	States	RO/ATM	**COMPLETED**
2-19	**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.	See ATS routes network optimisation programme (version 02 SAM/IG/7)	Version 02 ATS routes network optimisation	As per action plan	States RLA/06/901 IATA Regional Office	RO/ATM RO/AIM	**VALID**

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							
3-1	**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.	• Shall facilitate implementation at a regional level • Each State should comply with the actions agreed in the PBN Roadmap	States will have a National en-route, TMA and APP PBN implementation Plan.	SAM/IG/3	States	N/A	**COMPLETED.** States adopted the PBN roadmap.
3-2	**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.	Execution of the action plan	RNAV 5 implemented in the SAM Region	20 October 2011	PBN focal points of the States.	RO/ATM	**VALID**
3-3	**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** to this part of the Report.	Prepare action plans for PBN implementation in TMA and approach	Action plans accompanying regional implementation	SAM/IG/7	PBN focal points of the States	RO/ATM	**COMPLETED** States have received the action plan models for TMA and approach, except for 4 States of the Region have prepared their national implementation plans

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-4	Evaluate regulations for the use of GNSS, and if such were the case, proceed to its publication	Review information available.	All SAM States with regulations for the use of GNSS available	SAM/IG/3	Secretariat	RO/CNS	**COMPLETED**
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.	Prepare national PBN plans	All SAM States will have a PBN implementation plan aligned with the regional PBN plan	SAM/IG/9	States	RO/ATM	**VALID** 10 States in the SAM Region presented their national PBN plan for its harmonization. States that have updated their plans will send them fo the Regional Office. It is expected that the 4 remaining States (Ecuador, French Guiana, Panama and Suriname) send their national plans as soon as possible. The Secretariat must encourage their submission

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-6	**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 August 2009.	• States must carry out this survey. • Secretariat should upload Form of SAM/IG/2 Appendix 2 on Agenda item 2.	Fleet navigation capacity flying in the SAM Region	It was re-programmed and unified the date for delivery of literals a), b) and c) until 31 July 2009	Focal points designated by States RO	RO/ATM RLA/99/901 RO/FLS	**SUPERSEDED by Conclusion SAM/IG/4-3).**
3-7	Analyse aircraft fleet navigation capacity	Prepare data base	Aircraft fleet capacity analysed	SAM/IG/4	RLA/99/901	RO/ATM RLA/99/901 RO/FLS	**COMPLETED** Regarding a) Pending b) and c).
3-8	Collect air traffic data to understand air traffic flows in a specific airspace.	States shall collect air traffic flow data	States will have a clear view of the type of traffic operating in a specific airspace	SAM/IG/4	States PBN focal points	RO/ATM RO/AIM	**COMPLETED**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-9	Analyse communications, navigation means and surveillance (VOR, DME) ground to attend navigation specifications and reverse navigation	Prepare a CNS data base (geographical DME DME coverage to support RNAV5)	Navigation specification and reverse navigation mode	SAM/IG/6	RLA/06/901	RO/CNS and SAM States (Brazil, Peru)	**COMPLETED** CNS task. Geographical DME DME coverage to support RNAV5 was COMPLETED. Information is presented in WP/16. In addition, a VOR/DME data base was created, which was presented at SAM/IG/5 meeting
3-10	Design procedures training - RNP Approach with required authorization (AR)	Prepare SIP to have FAA instructors	Experts from States duly qualified in RNP, APCH AR matters	SAM/IG/4	Regional Office SIP RLA/06/901	Brazil/Chile RO/ATM	**COMPLETED.** RNAV/RNP courses were dictated: RNAV/RNP and ARNP AR APCH. Brazil and Chile provided the instructors. Support was obtained from a SIP and from Regional Project RLA/06/901 for the participation of the students. Also, the APV Baro VNAV was provided.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-11	**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 situations within the airspace under their jurisdiction.	• Prepare AIC • Publish AIC	Aeronautical community duly informed on States plans for RNAV 5 implementation.	SAM/IG/7	States	RO/ATM RO/AIM	**COMPLETED** at 23 October 2009. French Guyana, Guyana, Panama, Suriname had not implemented yet. In postponing the implementation for 22 September 2011, States **must publish a new AIC before 18 November 2010**
3-12	**Ref. para. 3.9 of SAM/IG/5 Report** Develop an AIP Supplement model containing applicable standards and procedures, including the corresponding flight contingencies	Request RLA/06/901 to estimate hiring of an expert for the preparation of the SUPP AIP Model	SUPP AIP Model available to be used as reference by SAM States	SAM/IG/6	RLA/06/901	RO/ATM RO/AIM	**COMPLETED** SUPP AIP Model was prepared and submitted for consideration of the meeting through WP/08.
3-14	**Ref. 3.11 of SAM/IG/5 Report.** Develop a training and documentation programme for air traffic controllers and AIS operators	Request RLA/06/901 to estimate hiring of an expert for the preparation of the Amendment to Doc 7030.	Regional documentation duly approved	SAM/IG/6	RLA/06/901	RO/ATM	**COMPLETED** Amendment to Doc 7030, SUPPS was prepared and has been circulated among States and submitted to the consideration of the meeting through WP/08.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-15	**Conclusion SAM/IG/5 - 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.	States should provide training required to staff in order to prepare them for implementation.	States and personnel trained for RNAV5 implementation in the dates agreed	22 September 2011	States	Focal points	**COMPLETED**
3-16	**Ref. 3.15 of SAM/IG/5 Report.** That the RLA/06/901 develops a post-implementation monitoring programme for en-route operations.	Develop a monitoring programme and pertinent forms to collect lateral deviation information.	Monitoring programme and corresponding forms available to be used by States.	SAM/IG/6	CARSAMMA	RO/ATM	**COMPLETED** See WP/04.
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/10	States	RO/ATM	**VALID** Some States introduced CDO in their national plans.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-18	**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.	Assess and apply ulterior measures	Safe implementation of RNAV5	October 2011	States	RO/ATM	**VALID** States assessed ulterior actions and an analysis was made and is shown in **Appendix B** of Agenda Item 3.
3-19	**Para3.9 SAM/IG/6** To coordinate planning and implementation needs with air navigation service providers, users, aircraft operators and military authorities.	Coordinate with air navigation service providers, regulatory bodies, users, aircraft operators and military authorities.	Safe RNAV5 implementation	October 2011	States	RO/ATM	**VALID**
3-20	Para 3.10 SAM/IG/6 To published national regulations to implement RNAV5 navigation specification.	Carry out publications	Safe RNAV5 implementation	September 2011	States	RO/ATM	**COMPLETED**
3-21	Para 3.11 SAM/IG/6 Establish and maintain updated an approved an aircraft operators registry	Submit the information to CARSAMMA as aircraft and operators are approved	Safe RNAV5 implementation	Permanent	States	RO/ATM	**VALID** It is considered a permanent task.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-22	Para 3.11 SAM/IG/6 Establish and maintain updated an approved an aircraft operators registry	Carry out approvals	Safe RNAV5 implementation	First Phase September 2011	States	RO/ATM	**SUPERSEDED (see Conclusion SAM/IG/6-3)** States should implement procedures to keep data base updated.
3-23	**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.	• Use Forms CMA F5 and CMA F6. • Taking into consideration that some listings contain all data foreseen in such form, and in such cases, the meeting concluded that the submission of the corresponding F5 forms is not necessary. In cases in which the lists do not contain information foreseen in Form F5, States should send them to CARSAMMA.	Safe RNAV5 implementation	First Phase September 2011	States	RO/ATM	**VALID** States should implement procedures to keep data base updated.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-24	**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.	Publish amendment in AIP	Safe RNAV5 implementation	September 2011	States	RO/ATM	**SUPERSEDED by Conclusion SAMIG/7-3** ENR 3.3 Table was modified and the new version was submitted for the consideration of States for its application.
3-25	**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.	Collect information of lateral deviations and send it to CARSAMMA	Safe RNAV5 implementation	SAMIG/10	States	RO/ATM/	**VALID**
3-26	**Conclusion SAM/IG/6-6 Publication of an AIC/NOTAM announcing the postponement of the RNAV5 implementation date in the SAM Region** That SAM States take the corresponding action in order to publish an AIC/NOTAM announcing the postponement of the RNAV5 implementation date in the SAM Region for 22 September 2011.	Publish AIC/NOTAM	ATM Community, duly informed	December 2010	States	RO/ATM	**COMPLETED** States published the postponement

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-27	**Para. 3.41 SAM/IG/6** Carry out at least once a month a TELCON through the use of the SAM Office's GO TO MEETING tool	Carry out virtual meetings	Appropriate follow-up for RNAV5 implementation	October 2010	States Task Rapporteur PBN Implemen-tation	RO/ATM	**VALID** So far, 13 RNAV5 TELCONs have been carried out. Information on the result is presented at t he SAM/IG/7. Information on the result was presented at the SAM/IG/7 meeting This task is included in the RNAV5 action plan.
3-28	**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.	Adequate compliance of the action plan for RNAV5 implementation.	RNAV5 implementation.	20 October 2011	States	RO/ATM	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-29	**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.	• prepare and control publication of AIP supplement • prepare tables ENR 3.3, as per approved model, and publish them.	Supplement AIP and tables ENR 3.3 published	22 September 2011	States	RO/ATM RO/AIM	**COMPLETED**
3-30	**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.	Prepare and publish Trigger NOTAM, as per approved model	Trigger NOTAM published	13 October 2011	States	RO/ATM RO/AIM	**COMPLETED**

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							
4-1	Analyse aircraft approval requirements and operators (pilots, dispatchers, and maintenance personnel) as established in PBN manual, and develop necessary documentation. Note: See Agenda Item 3, SAM/IG/2 and SAM/IG/3 Agenda Item 4.	Develop LAR with regard to PBN approvals	Guidelines at States disposal	SAM/IG/3 SAM/IG/4	Regional Project RLA/06/901	RO/ATM RLA/99/901 RO/FLS	**COMPLETED** In charge of RLA/99/901. CAs were completed on RNAV 10, RNAV 5, RNAV 1 and 2, Basic RNP 1, RNP APCH, RNP AR APCH and APV Baro VNAV. A new working plan has been established for the development of the CA on RNP4, RNP2 and RNP1, in progress.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
4-2	**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**.	Develop the procedures related to aircraft and users approval regarding RNP, APCH, RNP AR APCH and APV/Baro-VNAV operations	National regulation ready for approval of aircraft and users	SAM/IG/4	States Regional Project RLA/06/901	RO/ATM RLA/99/901 RO/FLS	**SUPERSEDED by Conclusion SAM/IG/4-2**
4-3	**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	Publish Advisory circulars for aircraft and operators approval	Advisory circulars and Work Aids used for aircraft approval	SAM/IG/5	State	N/A	**COMPLETED**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	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 b) that job aids of aforesaid circulars be incorporated into Inspector's manuals of Operations and airworthiness.						
4-4	**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) that each State is responsible for providing data and, as time passes, updates or further details on the submitted data should be made;	Complete data collection on PBN fleet capacity in SAM	Data base available	SAM/IG/7	States	N/A	**VALID** See Conclusion SAM/IG/2-3. Data base has been modified since beginning. No additional information has been received by States.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	c) to facilitate the updating of data, the file of the survey of each state 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.						
4-5	**Ref Para. 3.8 of SAM/IG/5 Report.** Establish and keep up to date a record of approved aircraft and operators	• Contact CARSAMMA to verify if it is possible to have available a PBN data base. • Review and present form for PBN approval and cancellation of approval	Data base coordinated with CARSAMMA Form for PBN approval and cancellation of approval implemented	SAM/IG/6	CARSAMMA Secretariat	RO/ATM Expert RLA/99/901	**COMPLETED** The form was evaluated and sent to States for its use through LT 11/30.2-SA455 dated 8 July 2010 (See WP/18).

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
4-6	**Conclusion SAM/IG/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.	States must provide seminars to operators	Operators trained to comply with necessary tasks for RNAV5 implementation	October 2011	States	Focal points	**COMPLETED** States initiated their guidance programme to operators, task to be maintained active. Note: general aviation does not participate in these events.
4-7	**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.	States collect data in the indicated date	Data collected and analysed	SAM/IG/6	States	RO/ATM	**COMPLETED**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
4-8	**Conclusion SAM/IG/4-5 Prediction Program for the FDE Availability** That: a) Progress be made in the study and application of the tool AUGUR (EUROCONTROL) by the States of the region. b) Considering that AUGUR tool (EUROCONTROL), incorporates the Airports and Navaids in the SAM, it is suggested that through the Regional Office of ICAO, make contact with EUROCONTROL in order to establish the feasibility of extending the validity of calculating prediction made with the AUGUR tool for the different stages of flights, in the SAM Region. c) to establish the feasibility of extending the validity of calculating prediction made with the AUGUR tool for the different stages of flights, in the SAM Region trough the ICAO Regional Office, establish contact with the FAA, in order to receive guidance on the procedures for approval of a prediction program for the FDE availability and the procedures used by their operators when performing operations such as RNAV based in GNSS out of	• That ICAO contact Eurocontrol, FAA and other organizations in order to evaluate application of forecast FDE tools and related procedures • Evaluate the possibility to lead a forecast development programme for FDE availability	Information related with FDE availability available Regional forecasting FDE availability programme	SAM/IG/8	Regional Office	RO/CNS	**COMPLETED** The Meeting took note of two proposals from the industry, as well as of an initial study made by Colombia. As to the proposals from the industry, the Meeting considered that DWIs was the more appropriate and regarding Colombia's, it considered that they should complete the study by mid-November. RCC/5 meeting will analyze the most appropriate proposal for its carrying out. .

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	United States; and d) ICAO Regional Office evaluate the possibility to lead a development process for development of an availability forecasting FDE programme for the SAM Region for its use in all flight phases.						
4-9	**Conclusion SAM/IG/5-6 Application of national standards for approval of operators and aircraft for PBN operations** That the Secretariat, through their official channels, encourage those States to publish national standards for approval of operators and aircrafts for PBN operations and, in particular, for RNAV 5 navigation specification, as well as to send to the ICAO Regional Office, details on the potential capacity of their fleets, if still not done.	States must publish national standards for approval of operators and aircraft for PBN operations and send this information to the Regional Office	National standards published for its application	SAM/IG/7	States	RO/ATM	**COMPLETED** States are completing the publication process of the corresponding national regulations

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
4-10	**Para 4.20 SAM/IG/5 Report** Course for aircraft and operators approval during 2010.	Airspace users prepared for aircraft and operators approval in PBN issues	Airspace users duly prepared for PBN approval and operators and aircraft	SAM/IG/6	RLA/99/901	RO/ATM	**COMPLETED** Courses were provided at a regional and national level in PBN approval.
4-11	**Para 4.9 SAM/IG/6** 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 with	SAM/IG/9	RLA/99/901	RO/FS	**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.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-1	**Conclusion SAM/IG/2-6 ATFM Roadmap** That, a) the ATFM Roadmap in **Appendix B** to this part of the Report be adopted, with the aim of providing orientation to the ATFM community with regard to ATFM applications to be implemented in the short and medium term in the SAM Region; and b) the ICAO Secretariat send the ATFM Roadmap to the GREPECAS ATFM Task Force for the analysis and actions deemed pertinent.	States must adopt ATFM Roadmap sheet and inform on the intentions to national aeronautical community	Aeronautical Community in knowledge of regional and national activities related to ATFM ATFM roadmap shall be presented to the ATFM/5 Meeting	SAM/IG/3	States ATFM Focal points ATFM Rapporteur	ATFM Rapporteur/ RO/ATM RO/AIM	**COMPLETED**
5-2	Carry out the tasks to be developed by Regional Project RLA/06/901. See SAM/IG/3 Report	Hire experts through Regional Project RLA/06/901	Tasks identified by the meeting to be executed by Regional Project RLA/06/901 carried out.	SAM/IG/4	RLA/06/901 Experts	RO/ATM RO/FLS	**COMPLETED**
5-3	Publish initial AIC ATFM using the model prepared by SAMIG	States publish AIC	Community informed on States plans regarding ATFM		States	RO/ATM	**COMPLETED** Except for Suriname.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-4	ATFM Manual – First Part	Continue developing ATFM manual	States will have a manual for its harmonized application in the SAM Region	SAM/IG/4	RLA/06/901 Expert	RO/ATM RO/AIM	**COMPLETED** (SAM/IG/4-WP/10)
5-5	**Conclusion SAM/IG/3-5 Runway capacity of an international airport and ATC associated sector** SAM States are encouraged to carry out at least an exercise to determine the runway capacity of an international airport and ATC sector, associated or another one selected for each State, to present the results to the SAM/IG/4 Meeting, providing the following information: a) Amount of personnel trained for the exercise b) Methodology applied c) Result of the exercise, providing the declared capacity for each runway and ATC selected sector. d) Identification of problems found in the methodology applied.	Carry out estimate capacity in an airport and its associated ATC sector	States shall put into practice the course dictated on this matter and shall obtain the necessary experience to evaluate capacity at a national level.	SAM/IG/8	States	RO/ATM	**VALID** Bolivia, Brazil, Colombia, Paraguay, Peru and Venezuela presented its preliminary exercise. A second course on airport capacity and ATC sectors was dictated in Brazil from 21 to 25 March 2011.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-6	Guidance document for the application of a common methodology for the estimation of airport capacity and ATC sectors for the SAM Region	Prepare a guidance document for the application of a common methodology for the estimation of airport capacity and ATC sectors for the SAM Region	States will have a guide for the application of a common methodology for the estimation of airport capacity and ATC sectors for the SAM Region	SAM/IG/4	RLA/06/901 Expert	JF/AO	**COMPLETED** (SAM/IG/4-WP/05)
5-7	**Conclusion SAM/IG/4-5 Guidance for the application of a common methodology for calculating airport and ATC sector capacity** The Guidance for the application of a common methodology for calculating airport and ATC sector capacity, shown in Appendix C to this part of the report, which recommends that SAM States apply the Brazilian methodology for calculating airport and ATC sector capacity, is approved.	Use of guidelines for application of a common methodology for calculating airport and ATC sector capacity.	Calculating airport and ATC sectors capacity carried out	SAM/IG/6	States	ATFM/WG	**COMPLETED** Guidelines were approved. SAM States have guidelines to carry out the corresponding calculation.
5-8	**Para 5.4 SAM/IG/5 Report** Development of the second part of ATFM Manual for the SAM Region	Prepare second part of ATFM Manual	ATFM Manual improved	SAM/IG/6	RLA/06/901	RO/ATM	**COMPLETED** With the assistance of Colombia and RLA/06/901 the ATFM manual was revised.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-9	**Para 5.4 SAM/IG/5 Report** ATFM course	Carry out second ATFM course	Personnel from AAC trained in ATFM	SAM/IG/6	RLA/06/901	RO/ATM	**COMPLETED** Course was dictated in November 2010.
5-10	**Para 5.4 SAM/IG/5 Report** Workshop related with Collaboration in decision making oriented towards ATFM	Carry out CDM workshop	Personnel from AAC trained in CDM concept	SAM/IG/6	RLA/06/901	RO/ATM	**COMPLETED** The course was dictated in November 2010.
5-11	**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.	Implement ATFM tele-conferences	Coordination between FMU/FMP carried out	SAM/IG/8	States	RO/ATM	**VALID** States maintain web conferences due to communication problems in TELCONs held. The use of SKYPE is planned.
5-12	**Para. 5.28 of SAM/IG/5 Report** The Secretariat is requested to consider in year 2011, under Project RLA/06/901, the inclusion of the Course Runway Capacity Calculation and ATC Sector, to be held in the first semester.	Request RLA/06/901 to carry out a new course on runway capacity and ATC sectors for the first semester of 2011	AAC personnel trained to carry out a runway capacity and ATC sectors	SAM/IG/8	Secretariat RLA/06/901	RO/ATM	**COMPLETED** The course was dictated in March 2011.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5.13	**Para. 5.4 SAM/IG/6** Present an ATFM Manual during the CNS/ATM/SG/2 Meeting for analysis and approval	Present ATFM Manual to the CNS/ATM/SG/2	Manual approved for its application in the CAR and SAM Regions	June 2011	RO/ATM	RO/CNS	**COMPLETED** The manual was presented to the CNS/ ATM/SG/2 and its application in the CAR and SAM Regions was approved.
5.14	**Para. 5.5 SAM/IG/6** Inclusion of ATFM messages exchange in the ATFM Manual	Once the analysis is concluded, include procedures for its revision to the SAM/IG/7 Meeting	Procedures for ATFM Messages exchange included in the Manual	SAM/IG/7	ATM Implementation Group	RO/ATM	**COMPLETED** It was agreed at SAM/IG/7 to establish a MOU between States for ATFM messages exchange and the MOU should be handled as attachments to the ATFM Manual
5-15	**Conclusion SAM/IG/6-7 Manual on Collaborative Decision-Making (CDM) for ATFM** That SAM States adopt the Manual on Collaborative Decision-Making (CDM) for ATFM shown in **Appendix B** to this part of the report.	Adopt CDM Manual	States will apply CDM in the Region in a harmonised manner	September 2011	States	RO/ATM	**COMPLETED** CDM Manual was presented in the CNS/ATM/SG/2 Meeting and its use was also approved for CAR States.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
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 t he SAM Region	December 2012	States	RO/ATM	**VALID**
5-17	That Secretariat consider the inclusion in Regional Project RLA/06/901 for the last week of October 2011, a runway capacity and ATC sectors course in Lima.	Plan the runway capacity and ATC sectors course in Lima.	Course carried out in Lima, from 24 to 28 October 2011	28 October 2011	Regional Project RLA/06/901	RO/ATM RO/AGA	**VALID**
5-18	Message exchange in the ATFM manual be prepared as a MOU among States to be included in the ATFM Manual	Preparation of MOU for ATFM messages exchange among States	MOU prepared and approved.	SAM/IG/9	States Regional Project RLA/06/901	RO/ATM RO/CNS	**VALID**
5-19	Preliminary exercise on runway capacity and ATC sectors. The remaining States are encouraged to present their studies for SAM/IG/8	Carry out a preliminary study on runway capacity and ATC sectors	Present studies on exercises carried out	SAM/IG/8	States	RO/ATM	**VALID**

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							
6-1	**SAM/IG/1-5 - Adoption of Action Plan Models for the improvement of communications and surveillance systems for en-route and terminal area operations** When carrying out activities for the improvement of communications and surveillance systems for en-route and terminal area operations, the action plan models are to be taken into account for the improvement of ground-air, ground-ground communications and surveillance systems being presented as Appendices D, F and I to the report of this agenda item.	Action plans for the improvement of CNS systems	Improvement of the communications, navigation and surveillance systems	Jun 2010	SAM States/ Territories and ICAO SAM Regional Office	RO/CNS	**COMPLETED** States, upon elaborating their national action plans, took under consideration the action plans for the improvement of communications, navigation and surveillance systems.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-2	**SAM/IG/4-7 - Drafting of pending Action Plans for the Improvement of CNS Systems to meet Short- and Medium-Term Operational Requirements for En Route and Terminal Area Operations** That the aeronautical administrations of Colombia, French Guiana and Panama draft their respective action plans for the improvement of CNS systems, following the model action plan presented at the SAM/IG/3 meeting (Appendix A to agenda item 6) and send them to the ICAO SAM Regional Office no later than 30 November 2009.	National action plan for the improvement of CNS systems	National action plan for CNS improvements	30 Nov 2009	SAM States/ Territory	RO/CNS RLA/06/901 project CNS experts	**COMPLETED** All SAM States, with the exception of French Guiana (France) and Panama, have elaborated their action plans for the improvement of CNS systems. The action plans have been published in this Regional Office's website.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-3	**SAM/IG/4-8 - Updating of the Action Plans for the improvement of CNS Systems to meet Short- and Medium-Term Operational Requirements for En Route and Terminal Area Operations** That SAM States, with the aim of keeping updated the Action Plans for the improvement of CNS Systems to meet Short- and Medium-Term Operational Requirements for En Route and Terminal Area Operations, present their updated versions twice a year, if any, in the dates corresponding to the holding of SAM/IG meetings.	Updating of the national plans for the improvement of CNS systems	Updating of the action plans for SAM CNS national improvements updated	Continuous	SAM States/ Territory ICAO SAM Regional Office	RO/CNS	**VALID** During SAM/IG/8 meeting, updated information was received from Brazil and Guyana on CNS improvement plans
6-4	**SAM/IG/4-10 - AMHS interconnection between Argentina-Chile, Argentina-Peru, Brazil-Colombia, Brazil-Peru, Chile-Peru and Colombia-Peru** The respective administrations are urged to operationally interconnect AMHS between Argentina-Chile, Argentina-Peru, Brazil-Colombia, Brazil-Peru, Chile-Peru and Colombia-Peru, and that, to that end, they: a) Use the model Memorandum of Understanding (MoU) shown in Appendix B to this part of the report; b) Complete the information in the MoU, taking into	Interconnection of AMHS	MoU for the implementation of AMHS systems between: • Argentina-Chile, • Argentina-Peru, • Brazil-Colombia, • Brazil-Peru, and • Colombia-Peru	15 Dec 2010	SAM States/ Territory ICAO SAM Regional Office	RO/CNS RLA/06/901 project CNS experts	**VALID** Updated information is shown under SAM/IG/8, Report on Agenda Item 6, Appendix B.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	account the action plan for AMHS interconnection in Appendix C to this part of the Report; c) Present the MoU to the ICAO SAM Regional Office by 15 December 2009; and d) Sign the model MoU at the SAM/IG/5 meeting.						
6-5	Study for the regional implementation of a new communications network	Improvement in the communications systems	a) Study for a SAM ATN network b) Technical specifications for an IP ATN network	a) Jun 2011 b) Dec 2011	SAM/IG Group	RO/CNS RLA/06/901 project CNS experts	**a) COMPLETED** **b) COMPLETED** The study and technical specifications were approved

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-6	**Conclusion SAMIG/5-8 - Review of the SAM VOR/DME stations line-of-sight coverage database** **That the SAM States/Territory:** a) Review the information in the database delivered during the Meeting containing line-of-sight diagrams of the VOR/DME stations corresponding to their State; b) Send the comments corresponding to the database to the ICAO South American Regional Office no later tan 30 June 2010; c) Use the calculated line-of-sight coverage data as an element for the PBN operations feasibility study (RNAV 5, RNAV 1 and RNAV 2).	CNS infrastructure available with corresponding coverage	Line of site coverage at VOR/DME stations	30 Jun 2012	SAM States/ Territory ICAO SAM Regional Office	RO/CNS RLA/06/901 project CNS experts	**COMPLETED** VOR/DME coverage study was presented during SAM/IG/5 meeting

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-7	**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: a) Require from their AMHS providers the necessary support to successfully end the necessary interconnections; b) Make necessary arrangements to train personnel in the interconnection tasks, with the aim of minimizing the dependency with their providers; c) Maximize pertinent coordination; and d) States that have not yet done so, complete the drafting and signature of the MoU.	Interconnection of CNS systems	Interconnection of AMHS	End of 2011	SAM States	SAM States AMHS providers RO/CNS	**VALID** Coordination has been carried out with providers to complete the interconnection

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-8	**Conclusion SAM/IG/6-10 - Review to the study for a new SAM digital network** That SAM States analyze the study for the implementation of a new digital network for the SAM Region shown in Appendix B to this part of the Report, and send their comments to the ICAO SAM Regional Office by 31 January 2011.	Review of the study for the implementation of a new digital network for the SAM Region	Study examined	31 Jan 2011	SAM States	CNS experts and SAM RO/CNS	**COMPLETED** Many SAM States have examined the study and sent comments of the ICAO SAM Office. In addition, the study was reviewed during REDDIG RCC/14 meeting
6-9	**Conclusion SAM/IG/7-5 Review of the DME DME coverage in support of RNAV5 in the SAM Region** That the SAM States examine the DME DME coverage study in support of RNAV5 presented as an KMZ file during SAM/IG/7 meeting, as well as the DME DME coverage analysis for each RNAV route segment shown in Appendix F to this part of the report, and send their comments to the ICAO SAM Regional Office no later than 30 June 2011.	Review the DME/DME coverage study	Send comments to the SAM Regional Office	30 June 2011	States	RO/CNS	**COMPLETED** States reviewed the DME/DME coverage in support of RNAV 5 for the SAM Region

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-10	**Conclusion SAM/IG/7-6 Updating of the DME DME study** That SAM States, when making any changes to DME systems, inform the ICAO SAM Regional Office so that it may update and distribute the DME DME coverage study to support RNAV5.	Inform of any change in the current geometry change of DME systems.	Inform the Regional Office with sufficient time in advance	Permanent	States	RO/CNS	**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							
7-1	**SAM/IG/3-8 - Preparation of specific implementation plans for the interconnection of automated systems** That States of the SAM Region start the development of specific plans for the implementation of automated systems interconnection, considering the implementation dates indicated in Regional Interconnection Plan for Automated Systems in adjacent ACCs, specified in Appendix B of this part of the Report, and information contained in the following documentation: a) Memorandum of Understanding for the implementation of automated systems interconnection between two States having adjacent ACCs, Interface Control Document (ICD) for data communication between ATS dependencies in Caribbean and South	Operational implementation of ATM automated systems and interconnection of automated systems installed between adjacent ACCs	Memorandum of Understanding (MoU) between SAM pairs of States for the interconnection of automated systems	2012	SAM States	RO/CNS RLA/06/901 project CNS experts	**VALID** To date, the following MoUs for the interconnection of automated systems have been drafted and signed: • Argentina-Brazil, • Argentina-Chile; • Argentina-Uruguay; • Brazil-Uruguay; and • Brazil-Venezuela

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	American Regions (CAR/SAM ICD); b) Interface control document (ICD) for data communications between ATS units in the Caribbean and South American Regions (CAR/SAM ICD); c) System Interface Control Document (SICD); and d) Regional interconnection initial plan for ACC automated systems. e) Preliminary reference system/ subsystem specification for the air traffic control automation system (SSS).						
7-2	**SAM/IG/4-11 - Action plan for the implementation of Amendment 1 to Doc. 4444** That SAM States, taking into account the actions indicated in the strategy document for the implementation of Amendment 1 to ICAO PANS ATM, 15th Edition (Doc. 4444), contained in Appendix D to this part of the Report, draft their respective action plans for the implementation of the	Implementation of the new flight plan format	National Action plans for implementation of Amendment 1 to the 15th Edition of the PANS ATM (Doc 4444).	30 Nov 2010	SAM States	RO/CNS RLA/06/901 project CNS experts	**SUPERSEDED** Superseded by Conclusion SAM/IG/6-12

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	amendment, and send them to the ICAO SAM Regional Office by 30 March 2010, for their presentation at SAM/IG/5 Meeting.						
7-3	**Conclusion SAM/IG/5-9 - Analysis on the impact of Amendment 1 to the PANS/ATM on the automated systems** That the SAM States, through their national committees, take into account the contents of Appendix B, with views that it serve as reference for an initial analysis on the impact it will have on the automated systems involved in the flight plans process, in view of the implementation of the new flight plan format in accordance with Amendment 1 to the PANS/ATM, and that they send the results to the ICAO SAM Regional Office by 30 August 2010, for their presentation at the Seminar/Workshop for the Implementation of Amendment 1 to the 15th Edition of the a PANS/ATM, to be held in Lima from 13 to 15 September 2010.	Implementation of the new flight plan format	Analysis to the impact of the implementation of the new FPL on automated systems	30 Aug 2010	SAM States/ Territory	RO/CNS RLA/06/901 project CNS experts	**COMPLETED** Most SAM Sates have analyzed the impact of the new FPL implementation in automated systems

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7-4	**Conclusion SAM/IG/6-12 - Action plan for the implementation of Amendment 1 to Doc. 4444** That SAM States, taking into account the actions indicated in the strategy for the implementation of Amendment 1 to the 15th Edition of the ICAO PANS/ATM (Doc 4444), and using as reference the action plan model presented by the Secretariat and the action plan presented by Brazil during the Seminar/Workshop, which appear as Appendices E and F to this part of the report, draft their action plans for the implementation of the Amendment and send it to the ICAO SAM Regional Office no later than 30 November 2010.	States' drafting of action plan for the implementation of Amendment 1 to Doc 4444, 15th Edition	Action plan for the implementation of Amendment 1 to Doc 4444, 15th Edition	30 Nov 2011	SAM Sates	RO/CNS RO/ATM RO/AIM	**VALID** Until SAM/IG/8 meeting, all SAM States had drafted their national action plans, with the exception of Colombia, Ecuador and French Guiana (France)

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7-5	**Conclusion SAM/IG/6-13 Establishment of the Implementation Group for the New flight Plan Format** That SAM/IG establish a new group, to be named Implementation Group for the New Flight Plan Format, which would be in charge of the analysis on the actions to take for the implementation of the new flight plan format in the SAM Region, in order that in each SAM/IG meeting to be held in 2011 and 2012, the Group will have the opportunity of having a specific forum for the follow-up of this activity.	Establishment of Implementation Group for the New Flight Plan Format	Implementation Group for the New Flight Plan Format	SAM/IG/7	Implementation Group Coordinator for amendment 1 to 15th edition of Doc 4444 in the SAM Region.	RO/CNS RO/ATM	**COMPLETED** Implementation in SAM/IG/7

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7-6	**Conclusion SAM/IG/7-7 Publication of an AIC for a broad dissemination of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444)** That SAM States, taking into account the regional strategy for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444), take the corresponding measures to publish an AIC announcing the implementation, and disseminating the content, of Amendment 1 to the PANS-ATM, including the main dates agreed upon, no later than **1 August 2011.**	Prepare and publish AIC	AIC published	1 August 2011	States	RO/CNS RO/ATM RO/AIM	**VALID** Argentina, Brazil, Chile, Paraguay, Peru and Uruguay have published AICs

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7-7	**Conclusion SAM/IG/7-8 Safety assessment for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444)** That SAM States, taking into account the regional strategy for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444), adopt the corresponding measures to conduct a safety assessment for the implementation of Amendment 1 to the PANS-ATM, and send it to the ICAO SAM Regional Office no later than **30 November 2011.**	Carry out safety assessment for the implementation of the content o amendment 1 to the PANS-ATM, based on the guidelines prepared during the SAM/RA/02 Meeting.	Report of the safety assessment for the implementation of FPL 2012	30 November 2011	States	RO/ATM RO/AIM RO/CNS	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7-8	**Conclusion SAM/IG/7-9 Development of the training programme for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444)** That SAM States, taking into account the regional strategy for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444), adopt the corresponding measures to draft a training programme for the personnel that needs to be familiar with, and know how to apply, the modified concepts, especially air traffic controllers and ARO/AIS operators, for the implementation of Amendment 1 to the PANS-ATM, and send it to the ICAO SAM Regional Office no later than 31 October 2011.	Prepare a human resources training programme to learn and apply modified concepts for the implementation of FPL 2012, to consider ATCOs, ARO/AIS operators and telecommunication operators.	Training carried out	31 October 2011	States	RO/ATM RO/CNS RO/AIM	**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**	**OG**	**--**	**YES**	**OG**	**YES**	**OG**	**YES**	**YES**	**YES**	**PER:** Dec 2009
1-1 That States examine: a) Impact of RNAV routes implementation in t he 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.	**OG**	**OG**	**OG**	**YES**	**YES**	**OG**	**--**	**OG**	**OG**	**OG**	**OG**	**OG**	**YES**	**YES**	**COL:** June **ECU**: Local coordination with corresponding area. **PAR:** SAM/IG 5 **PER**: Dec 2009 **VEN:** Mar.2010
2-1 Implementation of RNAV routes	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**YES**	**YES**	**OG**	**YES**	**YES**	**OG**	**ECU:** Missing pronouncement of Venezuela in regard

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
															of the effective date for the implementation of the route Guayaquil / Madrid**.** **PER:** Chile and Peru in agreement with the part corresponding to their FIRs. RNAV5 Nov 2010.
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
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	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**OG**	**YES**	**YES**	**OG**	**YES**	**YES**	**GUY:** Nov. 2009 **SUR:** Will inform Nov.15,2009

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															
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	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**OG**	**YES**	**YES**	**OG**	**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 few 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.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
operating commercial flights, which have less than 5 700 kg. of MTOW – 15 May 2009; c) Other aircraft registered in the Region – 15 August 2009.															
2-13 **1.2** 1.2 Collect air traffic data to understand air traffic flows in a specific airspace	**YES**	**NO**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**OG**	**YES**	**YES**	**YES**	**YES**	**YES**	**PER**: carried out Jul 2009. Delivered to SAM Office.
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** to this part of the Report	**YES**	**OG**	**YES**	**YES**	**YES**	**OG**	**--**	**YES**	**OG**	**YES**	**OG**	**OG**	**YES**	**OG**	**ECU**: Developing **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**	**YES**	**YES**	**YES**	**YES**	**YES**	**OG**	**--**	**OG**	**OG**	**YES**	**YES**	**--**	**YES**	**YES**	**BRA and PAN:** publication is being harmonized with CA LAR. **ECU**: Coord. with

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															OPS COL: Information circular was published and may be seen at the hyperlink:CI 5102-082-002 **PAR:** signature pending Oct. 2010 **PER**: Dec 2009
3.5 Conclusion SAM/IG/3-3 PBN Implementation National Plans That States of ICAO South American Region, present their PBN Implementation	**YES**	**YES**	**YES**	**YES**	**YES**					**YES**	**YES**		**YES**	**YES**	**BOL:** delivered Dec. 2009 **VEN:** finalised and delivered.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															
4-2 **Conclusion SAM/IG/2-6** **ATFM Roadmap** That, a) the ATFM Roadmap in **Appendix B** to this part of the Report be adopted, with the aim of providing orientation to the ATFM community with regard to ATFM applications to be implemented in the short and medium term in the SAM Region; and b) the ICAO Secretariat send the ATFM	**OG**	**OG**	**YES**	**YES**	**YES**	**OG**	**--**	**OG**	**OG**	**YES**	**NO**	**OG**	**YES**	**YES**	**ECU:** ATFM **PER:** Mar 2010

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Roadmap to the GREPECAS ATFM Task Force for the analyses and actions deemed pertinent															
4-5 INITIAL ATFM AIC Model	**YES**	**YES**	**N/A**	**NO**	**YES**	**YES**	**--**	**YES**	**OG**	**YES**	**YES**	**OG**	**YES**	**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**	**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,	**OG**	**YES**	**OG**	**YES**	**YES**	**OG**	**OG**	**OG**	**OG**	**YES**	**YES**	**OG**	**YES**	**YES**	**BOL**: published in RAB91 **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,

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															RNP AR APCH and APV-BARO/VNAV
3-5 **Conclusion SAM/IG/3-5 Runway capacity of an international airport and ATC associated sector** SAM States are encouraged to carry out at least an exercise to determine the runway capacity of an international airport and ATC sector, associated or another one selected for each State, to present the results to the SAM/IG/4 Meeting, providing the following information: a) Amount of personnel trained for the exercise	**OG**	**OG**	**YES**	**YES**	**YES**	**YES**				**YES**	**YES**		**NO**	**YES**	**ECU:** has trained personnel and calculation Quito and Guayaquil airports **PAR**: has trained personnel and Airport calculation in Asunción airport. **VEN:** exercise requested was made, personnel from Venezuela has participated in ATFM training workshops **BOL:** training was provided to personnel in Viru Viru. **URU**: Continues with personnel problems. Support will be requested to the Regional Office to carry out activities.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
b) Methodology applied c) Result of the exercise, providing the declared capacity for each runway and ATC selected sector. d) Identification of problems found in the methodology applied.															
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:** César Varela **URU:** Adriana San Germán Tel.5982 604 0408 Int 5204 asangerman@gmail.com **VEN**: Carlos Gonzalez and Pablo Rattia
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	**OG**	**YES**	**OG**	**YES**	**YES**	**OG**	**OG**	**OG**	**OG**	**YES**	**YES**	**OG**	**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

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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 b) that job aids of aforesaid circulars be incorporated into Inspector's manuals of Operations and airworthiness.				**YES**	**YES**									publication. **VEN**: RNP10, RNAV2, RNP APP AR pending. COL: Airworthiness inspector guide can be consulted at hyperlink: Guía inspector Aeronavegabilidad
Conclusion SAM/IG/4-3 Continued data collection about PBN Fleet Capacity	**OG**	**OG**	**OG**	**YES**	**YES**	**OG**	**OG**	**OG**	**OG**	**OG**	**NO**	**OG**	**YES**	**YES**	**COL:** Had the same difficulties as Venezuela, and finally the information was

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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) that 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 be posted on the website of the SAM Office, in order that each State, through a															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
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/4-5 – Guidance for the application of a common methodology for calculating airport and ATC sector capacity The Guidance for the application of a common methodology for calculating airport and ATC sector capacity, shown in Appendix C to this part of the report, which recommends that SAM States apply the Brazilian methodology for calculating airport and ATC sector capacity, is approved.	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**				**YES**	**YES**		**YES**	**YES**	**BOL:** adopted Brazilian method. **VEN:** there is no sufficient personnel yet to comply this task in 100%, currently working on data collection.
Conclusion SAM/IG/4-11 Action plan for the implementation of Amendment 1 to Doc. 4444 That SAM States, taking into account	**YES**		**YES**	**YES**	**YES**			**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**Superseded** by Conclusion SAM/IG/6-12

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
the actions indicated in the strategy document for the implementation of Amendment 1 to ICAO PANS ATM, 15th Edition (Doc. 4444), contained in Appendix D to this part of the Report, draft their respective action plans for the implementation of the amendment, and send them to the ICAO SAM Regional Office by 30 March 2010, for their presentation at SAM/IG/5 Meeting.															
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.	**OG**	**YES**	**YES**	**YES**	**YES**			**OG**		**YES**	**NO**		**YES**	**YES**	**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**: Training was initiated. **VEN:** final training phase at the IUAC
Conclusion SAMIG/5-2 PBN/RNAV5 seminars for operators That SAM States, in view of the few operators that have	**OG**	**YES**	**YES**	**YES**	**YES**	**OG**	**OG**	**OG**	**OG**	**YES**	**YES**	**OG**	**YES**	**YES**	**BOL**: PBN seminars were carried out at all levels. **COL**: Several seminars were conducted for operators and several commercial operators

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															have already started the process. It is suggested that the restrictions to be applied to uncertified operators as of 22 Sep 2011, be published. **URU**: August 2011 **VEN**: continuously.
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	**YES**	**YES**	**YES**	**YES**	**NO**			**OG**		**YES**	**YES**		**YES**	**YES**	**VEN**: sent to the regional office and delivered during SAM/IG/6 Meeting

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
format.															
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.	**OG**	**OG**	**OG**	**YES**	**O/G**			**OG**		**YES**	**NO**		**YES**	**NO**	**Uru:** will request support of Regional Office to restructure airspace and procedures construction.
Conclusion SAM/IG/5-5 Prediction Program for the FDE Availability That: a) Progress be made in the study and application of the tool AUGUR (EUROCONTROL) by the States of the region. b) Considering that AUGUR tool (EUROCONTROL), incorporates	**NO**	**NO**	**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**COL**: Working with the SAPET software and in the process of validating the prediction. It is submitted to consideration whether process is correct for its application in PBN. **URU**: is waiting for the decision of ICAO RO.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
the Airports and Navaids in the SAM, it is suggested that through the Regional Office of ICAO, make contact with EUROCONTROL in order to establish the feasibility of extending the validity of calculating prediction made with the AUGUR tool for the different stages of flights, in the SAM Region. c) Through the ICAO Regional Office, establish contact with the FAA, in order to receive guidance on the procedures for approval of a prediction program for the FDE availability and the procedures used by their operators when performing operations such as RNAV based in GNSS out of United States; and															
d) ICAO Regional Office evaluate the possibility to lead a development process for															

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
development of an availability forecasting FDE programme for the SAM Region for its use in all flight phases															
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**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**NO**	**NO**	**YES**	Web
Conclusion SAMIG/5-8 Review of the SAM VOR/DME stations line-of-sight coverage database That the SAM States/Territory: a) Review the information in the database delivered during the Meeting containing line-of-sight diagrams of the VOR/DME stations corresponding to their State; b) Send the	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**Completed**

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
comments corresponding to the database to the ICAO South American Regional Office no later than 30 June 2010; c) Use the calculated line-of-sight coverage data as an element for the PBN operations feasibility study (RNAV 5, RNAV 1 and RNAV 2).															
Conclusion SAM/IG/5-9 Analysis on the impact of Amendment 1 to the PANS/ATM on the automated systems That the SAM States, through their national committees, take into account the contents of Appendix B, with views that it serve as reference for an initial analysis on the impact it will have on the automated systems involved in the flight plans process, in view of the implementation of the new flight plan format in accordance with Amendment 1 to the	**YES**	**N/A**	**YES**	**YES**	**O/G**	**YES**	**--**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	Completed

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
PANS/ATM, and that they send the results to the ICAO SAM Regional Office by 30 August 2010, for their presentation at the Seminar/Workshop for the Implementation of Amendment 1 to the 15th Edition of the a PANS/ATM, to be held in Lima from 13 to 15 September 2010.															
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**	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.			**YES**	**O/G**	**NO**					**O/G**	**O/G**		**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

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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**	**--**	**CHI:** As defined in SAM/IG/7
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**	**NO**	
Conclusion SAM/IG/6-6 Publication of an AIC/NOTAM announcing the postponement of the RNAV5 implementation date in the SAM Region That SAM States	**YES**	**YES**	**YES**	**YES**	**YES**					**YES**	**YES**		**YES**	**----**	**CHI:** NOTAM

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
take the corresponding action in order to publish an AIC/NOTAM announcing the postponement of the RNAV5 implementation date in the SAM Region for 22 September 2011.															
Conclusion SAM/IG/6-7 Manual on Collaborative Decision-Making (CDM) for ATFM That SAM States adopt the Manual on Collaborative Decision-Making (CDM) for ATFM shown in Appendix B to this part of the report.		**YES**	**YES**	**YES**	**YES**					**YES**	**NO**		**O/G**		**BOL:** the Manual of the FAA was adopted.
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.		**YES**	**N/A**	**YES**	**NO**					**YES**	**YES**		**NO**	**YES**	**URU:** depends on the delivery date by the provider (INDRA).
Conclusion		**N/A**											**YES**		

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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:															
a) Require from their AMHS providers the necessary support to successfully end the necessary interconnections;	**YES**	**N/A**	**YES**	**YES**	**YES**	**N/A**	**N/A**	**YES**		**YES**	**YES**	**YES**	**N/A**	**YES**	
b) Make necessary arrangements to train personnel in the interconnection tasks, with the aim of minimizing the dependency with their providers;	**YES**	**N/A**	**YES**	**YES**	**YES**	**N/A**	**N/A**	**YES**	**NO**	**YES**	**YES**	**YES**	**N/A**	**YES**	
c) Maximize pertinent coordinations; and	**YES**	**N/A**	**YES**	**YES**	**YES**	**N/A**	**N/A**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	
d) States that have not yet done so, complete the drafting and signature of the MoU.	**YES**	**N/A**	**O/G**	**O/G**	**O/G**	**N/A**	**N/A**	**O/G**	**O/G**	**YES**	**O/G**	**O/G**	**N/A**	**O/G**	
Conclusion SAM/IG/6-10 Review to the study for a new SAM digital network That SAM States analyze the study for the implementation of a new digital network for the SAM Region shown in	**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
Appendix B to this part of the Report, and send their comments to the ICAO SAM Regional Office by 31 January 2011.															
Conclusion SAM/IG/6-11 Changes in the AMHS systems and in the FDP for the implementation of Amendment 1 to the PANS/ATM That SAM States take into account the contents of Appendix D to this Agenda Item, with the aim that by 1 July 2012 they operate with the NEW flight plan format, in addition to the CURRENT format, States that have identified problems in their AMHS must make the corresponding changes before 31 December 2011. Also, the changes to make in the FDP installed at the various ATS units should be effected by the end of March 2012.	**YES**	**NO**	**OG**	**O/G**	**O/G**	**NO**	**NO**	**O/G**	**NO**	**O/G**	**YES**	**O/G**	**O/G**	**O/G**	
Conclusion SAM/IG/6-12 Action plan for the implementation of	**YES**	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**COL:** Training for ATC and FPL has started. There will be a transition period,

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Amendment 1 to Doc. 4444 That SAM States, taking into account the actions indicated in the strategy for the implementation of Amendment 1 to the 15th Edition of the ICAO PANS/ATM (Doc 4444), and using as reference the action plan model presented by the Secretariat and the action plan presented by Brazil during the Seminar/Workshop, which appear as Appendices E and F to this part of the report, draft their action plans for the implementation of the Amendment and send it to the ICAO SAM Regional Office no later than 30 November 2010.															since the amendment is effective only as of November 2012.
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		**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
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.															
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**		
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,	**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
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.															
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**					
Conclusion SAM/IG/7-5 Review of the DME DME coverage in	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**Completed**

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
support of RNAV5 in the SAM Region That the SAM States examine the DME DME coverage study in support of RNAV5 presented as an KMZ file during SAM/IG/7 meeting, as well as the DME DME coverage analysis for each RNAV route segment shown in Appendix F to this part of the report, and send their comments to the ICAO SAM Regional Office no later than 30 June 2011.															
Conclusion SAM/IG/7-6 Updating of the DME DME study That SAM States, when making any changes to DME systems, inform the ICAO SAM Regional Office so that it may update and distribute the DME DME coverage study to support RNAV-5.	**YES**	**YES**	**NO**		**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	Continuous activity.
Conclusion SAM/IG/7-7 Publication of an AIC for a broad dissemination of Amendment 1 to the 15th Edition of	**NO**	**NO**	**YES**	**YES**	**NO**	**NO**	**NO**	**NO**	**O/G**	**YES**	**YES**	**NO**	**YES**	**NO**	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
ICAO PANS ATM (Doc 4444) That SAM States, taking into account the regional strategy for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444), take the corresponding measures to publish an AIC announcing the implementation, and disseminating the content, of Amendment 1 to the PANS-ATM, including the main dates agreed upon, no later than **1 August 2011.**															
Conclusion SAM/IG/7-8 Safety assessment for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444) That SAM States, taking into account the regional strategy for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444), adopt the corresponding measures to conduct a safety assessment	**O/G**	**O/G**	**YES**	**O/G**	**NO**	**NO**	**NO**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**Chi:** is expecting to carry out before 30 November 2011

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
for the implementation of Amendment 1 to the PANS-ATM, and send it to the ICAO SAM Regional Office no later than **30 November 2011**.															
Conclusion SAM/IG/7-9 Development of the training programme for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444) That SAM States, taking into account the regional strategy for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444), adopt the corresponding measures to draft a training programme for the personnel that needs to be familiar with, and know how to apply, the modified concepts, especially air traffic controllers and ARO/AIS operators, for the implementation of Amendment 1 to the PANS-ATM, and send it to the ICAO SAM Regional	**O/G**	**O/G**	**YES**	**YES**	**NO**	**NO**	**NO**	**O/G**	**O/G**	**YES**	**O/G**	**O/G**	**YES**	**O/G**	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Office no later than **31 October 2011.**															
Preliminary exercise on runway capacity and ATC sectors estimation. The rest of the States are encouraged to present studies by SAM/IG/8										**O/G**			**YES**		

Instrucciones para el llenado del formulario - Instructions to fill in the form

- Cumplida: colocar **Sí** en el casillero correspondiente. / Accomplished: place **YES** in the corresponding box
- En ejecución: colocar **OG** (on going) e indicar en "observaciones" la fecha prevista de término./ In execution: place **OG** (on going) and indicate under "remarks" the estimated deadline
- No cumplida: colocar **NO** en el casillero correspondiente y, de ser el caso, hacer comentarios en columna de observaciones/ Not complied: place **NO** in the corresponding box and if such were the case, make comments in the remarks column

Agenda Item 2: Optimization of the ATS routes

Results of the SAM ATS/RO/3 Meeting

2.1 The Meeting, in analysing the results of the SAM/ATSRO/3 meeting, took note that, further to the successful implementation of Phase 2 of Version 1 of the ATS route network optimisation programme, at the ATS/RO/3 meeting IATA, as a result of this implementation did a predictive calculation of fuel savings and reduction of CO_2 released into the atmosphere.

2.2 The predictive calculation for 13 AIRAC cycles estimated savings in the order of U$S 7'638,047 at a cost of U$S 1.06 per kg of fuel. The calculation also showed that atmospheric pollution had been reduced by 22'697,971 kg of CO_2. These preliminary figures resulting from the implementation of Phase 2, Version 1 of the ATS Route Optimisation Programme, were considered to be quite encouraging for all the ATM community.

2.3 Likewise, the meeting was informed that participants of the SAM/ATSRO/3 Meeting identified some difficulties and other aspects that should be borne in mind when analysing Version 2 of the ATS route optimisation programme.

Improvements to the Action Plan, Phase 3, Version 2, of the SAM ATS Route Network Optimisation Programme

2.4 The meeting took note on the proposed improvements to the Action Plan by the SAM/ATSRO/3 Meeting, and agreed to support them through Regional Project RLA/06/901 and add other tasks that were considered pertinent, as shown in **Appendix A** to this part of the report.

2.5 With reference to the above, among the modifications carried out to the action plan, the following are emphasized:

a) It was deemed pertinent to develop guidance material for the application of the airspace flexible use concept to assist States in their application and in this connection it was agreed to request the support of Regional Project RLA/06/901 to hire an expert for a two-week period in 2012 to carry out this task.

b) It was agreed to encourage States that have not finished processing and sending the information on the air traffic data collection to understand airspace air traffic flows to finish these works as soon as possible, so as not to have a negative e impact on the ATS routes optimisation programme of the SAM Region *(*See *Conclusion ATSRO/03/02 - Collection of traffic data in the upper airspace).*

c) It was deemed pertinent to take into account in planning the task to prepare letters of agreement and contingency with adjacent States.

d) It was considered to request support of Regional Project RLA/06/901 to carry out a thorough study of the SAM ATS routes network with a view to prepare version 2 of the routes network and it was considered appropriate to hire two experts for a three-week period during the second half of February 2012, including within these three weeks the concurrence to the seminar on airspace planning requested.

e) With regard to the above, it was deemed necessary to hold a workshop-seminar on airspace planning requesting the support of Regional Project RLA/06/901 and DECEA (Brazil). With regard to this matter, the Secretariat is requested to send letters to DECEA Brazil to request two instructors. The objective is to prepare airspace planners of SAM States for the second half of February 2012 in Lima.

f) The support of Regional Project RLA/06/901 was also requested to carry out the fourth workshop-meeting for the ATS routes network optimisation in the SAM Region (SAM ATSRO/4) to carry out the follow-up and preparation of States in the implementation of the routes optimisation programme of Phase 3, Version 2.

g) It was deemed pertinent to carry out studies on airspace modelling and simulation in accelerated time, to assess scenarios developed for the Region, and in this connection it is necessary that the Secretariat request the Brazilian administration on the use of the tool available in Brazil. If its utilisation is feasible, it is requested that, through Regional Project RLA/06/901, the participation of 2 experts of t he Region is facilitated for the development of this task.

h) The meeting also considered necessary to carry out the assessment required applying a qualitative methodology through the use of SMS and in this connection; the support of Regional Project RLA/06/901 is requested to hire an expert for a two-week period to carry out this works. In parallel, a safety analysis must be made for the changes considered in their terminal areas (TMAs).

i) Other tasks as the drafting of restricted, prohibited, dangerous and reserved use areas of the SAM Region, and the application of CDO techniques were also considered in the updating of the action plan (See *Conclusion: ATSRO/03/05 - Analysis on the use and management of restricted, prohibited, danger and special use areas*).

2.6 On the other hand, the meeting took note that the participants at the SAM ATSRO/3 meeting agreed that, once the scenarios had been defined, and Version 2 of the ATS route network had been identified, a workshop/seminar should be held in 2013 to conduct the corresponding risk analysis, for which the support of Regional Project RLA/06/901 would also be required. In this respect, it was concluded that the most appropriate date for the implementation of Phase 3, Version 2, was **17 October 2013.**

Concepts and requirements still in force and that should be taken into account in the new process

2.7 The Meeting was informed that some concepts and requirements that had been noted during the first analysis of the SAM ATS route network, which should also be taken into account for the implementation of Version 2 of the ATS route network, as well as requirements, for requesting the implementation of a new RNAV route *(See Appendix B to the Report on Agenda Item 2 of the SAM ATSRO/3 Meeting).*

2.8 On the other hand, the meeting also considered the airspace planning principles, the information to be included by users in their request, the importance of identifying the gateways of the main TMAs in the SAM Region, the flexible use of airspace, the identification of special use areas and airspaces, and the systematic review of contingency plans and letters of operational agreement. These concepts and requirements appear in **Appendix B** to this part of the report.

Feasibility Study of 22 domestic and regional routes in the Argentinean airspace

2.9 The Meeting analysed the feasibility study carried out by the Civil Aviation National Administration (ANAC) Argentina, with the Air Navigation Regional Representatives of the EZEIZA, RESISTENCIA, CORDOBA, MENDOZA and COMODORO RIVADAVIA FIRs, the air operators: AEROLINEAS ARGENTINAS, AUSTRAL and ANDES AVIACIÓN; on 22 regional and domestic ATS air routes, in order to achieve a poli-functional airspace, providing economic and sustainable operations with respect to the environment to meet national aviation safety needs.

2.10 The meeting, taking into account that the date agreed by the SAM/ATSRO/3 Meeting for the implementation of Phase 3, Version 02 had been 17 October 2013 and that the ATS Routes Network Optimisation Programme Management of the SAM Region relies on the SAMIG, it took note of the Regional Notes shown in **Appendix C** to this part of the.

2.11 With regard to the routes mentioned in this Appendix, which are regional routes, the meeting was informed as follows:

a) **Route (2) Asuncion-Ezeiza**. It is not possible to implement it, and it is also not possible to eliminate route UA556. In this connection, Paraguay accepted to study alternatives and inform on this matter in the SAM/ATSRO/4 Meeting;

b) **Route (3) of Porto Alegre to Asunción**. The delegations of Argentina, Brazil and Paraguay should agree on an implementation date and present the proposal to the SAM/ATSRO/4 Meeting;

c) **Route (5) of the Rosario VOR to CALAMA Chile, with realignment of UL550**. Administrations of Argentina and Chile shall present a coordinated response to the SAM/ATSRO/4 Meeting;

d) **Route (10) of the ATACAMA VOR Chile to the LA RIOJA VOR in Argentina, which also implies realignment of UL650.** The Administrations of Argentina and Chile shall present a coordinated response to the SAM/ATSRO/4 Meeting;

e) **Route (13) which proposes the possible elimination of route 683 due to low traffic,** the Chilean administration will study the movement of this route and shall inform his decision on this elimination to the SAM/ATSRO/4 Meeting;

f) **Route (20) of EL CALAFATE VOR to the USHUAIA VOR.** The administration of Chile analyse with the Chilean Air Force (FACH) the operational possibility of this proposed route shall provide a definitive response for the SAM/ATSRO/4 Meeting;

g) **Routes (21) and (22)** were analysed by the administrations of Argentina and Uruguay, and IATA, and it was deemed pertinent, taking into account the complexity of this proposal, to leave an instance open to coordinate in a future meeting among these two administrations and IATA to work thoroughly on the feasibility study carried out by the Argentinean administration.

2.12 With regard to the routes enunciated in this Appendix, which are **domestic**, the meeting took note that the Argentinean administration and IATA agreed to meet in Buenos Aires during the first half of November 2011, at the Administrative premises of ANAC Argentina, to revise in depth the feasibility study on these routes.

Follow-up on the Safety Assessment Following the Implementation of Version 1 of the ATS Route Network

2.13 Regarding this matter, the Meeting recalled that States, after the implementation of Version 1 should analyse the lessons learnt, and monitor safety following the implementation further to implementation.

2.14 This analysis carried out during the SAM/RA/2 workshop, agreed on certain measures that should be taken into account during the implementation of Version 2, which were analysed during the meeting, suffered some modifications, as shown in **Appendix D** to this part of the report.

Cancellation of Route UL474

2.15 The meeting was informed of the different hazards after the implementation of route UL474:

a) Flight level corresponding to this route from ROKIN to TOMEK (odd) is the same level as UR640 entering the SKEC FIR via EDROD-ERIKO.

b) The flight level corresponding to this route from TOMEK to ROKIN (even) is the same level as route UR640 leaving SKEC FIR via ERIKO – EDROD.

2.16 This situation creates convergence points in the common boundary of MKJK FIR (Jamaica) and SKEC FIR (Colombia) with the same flight levels, which generates that in the event of having aircraft with no flight plan or transferences as it occasionally occurs, the time to react and solve the conflict is too short.

2.17 On the other hand, the meeting took note that the convergence points are in the boundaries of the radar coverage where there is also an intermittent signal and that the route is used with very low frequency, only by KLM operator.

2.18 The meeting will expect for an assessment by IATA on this route, as regards its traffic volume, in order to take a decision on its cancellation, during SAM/ATSRO/4 Meeting.

Coordination on route UM402

2.19 The meeting, while analysing route UM402, recently implemented, took note that the transference point SEKLO 30° 06'29"S 05647'58"W, being only 35 NM apart from the point KIMIK 29° 32'04"S 0556 53'29"W, requires simultaneous transference both in the Curitiba FIR and the Resistencia FIR, due to the short time in flight between points, overloading the work of ATCOs and Pilots.

2.20 In order to carry out an airspace cession in this route segment, the Administration of Brazil proposed that the administrations of Argentina, Brazil and Uruguay will initiate departing (DEP) and estimated (EST) message trials to assess in Resistencia, Curitiba and Montevideo FIRs the transmission and reception of messages in order to ensure appropriate information to guarantee civil-military coordination in the Brazilian territory when there is airspace cession by Curitiba FIR to Resistencia FIR.

2.21 With regard to the above, the delegates of the above-mentioned States participating in the meeting agreed to act as focal points to coordinate date and time of the corresponding trials and the result of the same and the agreements on this respect shall be presented to the SAM/ATSRO/4 Meeting.

Lima-Porto Alegre Route

2.22 With regard to this route, Argentina, Bolivia, Brazil, Paraguay and IATA agreed to present the corresponding study to route Lima-Porto Alegre in the SAM ATSRO/4 Meeting.

APPENDIX A (REVISED 12/10/11)

PROGRAMME FOR OPTIMISING THE ATS ROUTE NETWORK IN THE SOUTH AMERICAN REGION (GPIs 1, 5, 7, 8, 10, 11)

Activity	Start	End	Responsible party	Observations
1. **Phase One – RNAV-5 Implementation**				
1.1. RNAV-5 implementation in the SAM Region	**Apr 2008**	**Oct 2011**	**Regional Project RLA/06/901**	The implementation will be carried out according to the Implementation Programme approved at the SAM/IG/2 meeting.
2. **Phase Two – Implementation of Version 1 of the SAM ATS Route Network**				
Activity	**Start**	**End**	**Responsible party**	**Observations**
2.1. Conduct a Feasibility Study for Optimising the SAM Route Network	March 2009	Apr 2009	Regional Project RLA/06/901	**Completed**
2.2. Airspace Concept				
2.2.1 Collect traffic data to understand air traffic flows	June 2008	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901) States	**Completed** Secretariat sent request to States for data collection through letter LT 2/3A.13-LN 3/24.6.1-SA364 dated 8 June 2009. Deadline reply: 9 September 2009. Except for French Guyana and Panama all SAM States sent data collection.

2.2.2	Analyse the fleet navigation capacity	June 2008	SAM/IG/4	SAM/PBN/IG (Projects RLA/06/901 and RLA/99/901) States IATA	**Completed** Task 1.3 of the RNAV-5 Implementation Project
2.2.3	Determine the gateways of the main TMAs in the SAM Region	SAM/IG/3	SAM/IG/4	States	**Completed** Argentina, Bolivia, Brazil, Chile, Colombia, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela.
2.2.4	Determine and obtain the necessary tools to make the study mentioned in item 2.2.5 (aeronautical charts, specific software)	SAM/IG/3	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901)	**Completed** Flight Star.(Verify if the acquisition of another software is necessary)

2.2.5 Make a detailed study of the SAM ATS route network, with a view to preparing version 1 of the route network, including the following: • Indicate the domestic and international ATS routes that should be eliminated, in accordance with their use; • Propose the volume of exclusionary airspace for RNAV-5 application • Indicate the "conventional" RNAV routes that should be eliminated or replaced by RNAV routes in the exclusionary RNAV-5 airspace. • Indicate the RNAV routes that should be realigned, in accordance with the gateways of the main SAM TMAs (see 2.2.3). • Describe in detail the proposed new SAM route network, based on the analysis of the aforementioned items. • Describe in detail the interface between the SAM route network and the CAR route network. • Propose the initial draft Proposal of Amendment to the CAR/SAM ANP	SAM/IG/4	March 2010	SAM/PBN/IG (Project RLA/06/901)	**Completed** Three persons for a period of 3 weeks in order to carry out study. This requirement will be presented to the RLA/06/901 RCC meeting. 3 persons for a 3 week period. IATA and operators would be invited to select one person to assist in the development of this task.
2.2.6 Prepare safety assessment required, applying a qualitative methodology through the use of SMS	April 2010	May 2010	Project RLA/06/901	**Completed** This task requires the hiring of 1 expert in order to carry out required assessment applying SMS. This requirement will be presented to the RLA/06/901 RCC meeting. One person two weeks

2.2.7 Hold the Workshop of Experts from the SAM States to review and validate the study made under item 2.2.5.	SAM/IG/5	June 2010	SAM/PBN/IG (Project RLA/06/901) States	**Completed** This task requires the approval of the RCC meeting, in order to be able to count with RLA/06/901 support. Further to SAM/IG/5
2.3 Implementation of Version 1 of the SAM ATS Route Network				
2.3.1 Process the proposal of amendment to the CAR/SAM Air Navigation Plan	TBD		SAM Regional Office	**Completed** Shall depend on the decisions to be adopted by the routes workshop of 2.2.6
2.3.2 Publish version 1 of the SAM ATS Route Network	TBD		States	**Completed** Shall depend on the decisions adopted in the routes workshop of 2.2.6.
2.3.3 Entry into effect of version 1 of the SAM ATS Route Network	TBD			**Completed**
3. **Phase Three – Implementation of Version 2 of the SAM ATS Route Network**				
Activity	**Start**	**End**	**Responsible party**	**Observations**
3.1. **Flexible Use of Airspace**				

3.1.1. Develop guidance material for the application of the Flexible Use of Airspace concept, including: • Model for FUA LOA • Model for using non-permanent routes similar to that applied in EUROCONTROL (Conditional Routes – CDR). • Criterion for defining scenarios in which non-permanent routes are applied • Criterion for categorising non-permanent routes • Harmonised publication of non-permanent routes • Representation of non-permanent routes in aeronautical charts	SAM/ ATSRO/3	SAM/IG/9	SAM/PBN/IG (Project RLA/06/901)	Request for support of Regional Project RLA/06/901 to hire an expert for a two-week period.
3.1.2. Establish the Civil-Military Coordination Committee to evaluate application of the Flexible Use of Airspace concept mentioned in 3.1.1.	SAM/IG/7	SAM/IG/9	States	The Civil/Military Committees should be implemented in those States which have not done so. Civil/Military Meeting/Workshop carried out in Lima from 16 to 19 August 2011.
3.1.3. Develop proposals for route implementation and/or realignment, in keeping with the utilisation of FUA	SAM/IG/7	SAM/IG/9	States	See 3.1.2
3.2. **Airspace Concept**				
3.2.1. Collect traffic data to understand air traffic flows	SAM/IG/7	Sept. 2011	SAM/PBN/IG (Project RLA/06/901) States	Secretariat will send request to States. Reply date September 2011.
3.2.2. Analyse the fleet navigation capacity	SAM/IG/7	SAM/IG/9	SAM/PBN/IG (Projects RLA/06/901 and RLA/99/901) States	The information on RNAV5 approval is being sent to CARSAMMA and air

			IATA	operators and aircraft are expected to be ready for the implementation date (October 2011). The navigation capacity data base will be completed as provided in SAM/IG/2 and SAM/IG/4 (Conclusion SAM/IG/4-3).
3.2.3. Determine the gateways of the main TMAs in the SAM Region	SAM/IG/7	SAM/IG/9	States	
3.2.4. Prepare letters of agreement and contingency with adjacent States		SAM/IG/10	States	
3.2.5. Make a detailed study of the SAM ATS route network with a view to developing version 2 of the route network, including: • Determine necessary tools for the holding of the study mentioned in item 3.2.5 (Aeronautical Charts, specific software). • Definition of scenarios for the SAM airspace structure, including ATS routes, control sectors, TMA interface, for assessment using airspace modelling and fast-time ATC simulation tools. • Indicate the ATS routes that should be eliminated in accordance with their utilisation; • Propose, if necessary, the extent of exclusionary airspace volume for RNAV-5 application • Indicate, as necessary, the “conventional” ATS routes that should be eliminated or replaced by RNAV routes in accordance with the possible extension of the exclusive RNAV-5 airspace volume. • Indicate the RNAV routes that should be	SAM/IG/7	SAM/IG/9	SAM/PBN/IG (Project RLA/06/901)	Hiring of two experts is programmed for a three-week period during second half of February 2012.

realigned in keeping with possible modifications to the gateways of the main TMAs in the SAM Region. • Detail possible scenarios for version 2 of the SAM route network and of control sectors, based on the analysis of the previous items • Detail the interface between the SAM route network and the CAR route network • Propose the initial draft Proposal of Amendment to the CAR/SAM ANP. • Define the required safety assessment (qualitative or quantitative). • With the air traffic data, consider the possibility to implement RNAV5 parallel routes with adequate separation. • Prepare optimisation plan for restricted, prohibited, dangerous and reserved use in the SAM Region. • Application of CDO techniques.				
3.2.6. Carry out a Seminar/Workshop/Meeting on Airspace Planning	ATSRO/3	February 2012	Regional Project RLA/06/901	Request support of Regional Project RLA/06/901 and DECEA (Brazil). The ICAO Secretariat should send a letter to DECEA to request two instructors. The objective is to prepare airspace planning from States of the Region for the second half of February 2012 in Lima.
3.2.7. Carry out the Fourth ATS Routes Network Optimisation Workshop/Meeting for the SAM Region (SAM ATSRO/04)		April 2012	Regional Project RLA/06/901	

3.2.8.	Make Airspace Modelling and Fast-Time Simulation studies to assess the scenarios developed in 3.2.5	August 2012	SAM/IG/10	Regional Project RLA/06/901	Ask on the use of the tool available in Brazil. If its use is feasible, procure, through Regional Project RLA/06/901, the participation of two Experts from States of the Region.
3.2.9.	Prepare safety assessment required, applying a quantitative methodology through the use of SMS	SAM/ATSRO/ 4	SAM/IG/10	Regional Project RLA/06/901	The hiring of an expert for a two-week period is required to carry out this work. States should carry out a safety analysis for the changes in terminal areas.
3.2.10.	Hold the Fifth Workshop/Meeting for the ATS routes network optimisation of the SAM Region (SAM ATSRO/05), s to review and validate the studies made in items 3.2.5, and 3.2.8.	SAM/IG/10	March 2013	Project RLA/06/901 States	
3.2.11.	Carry out the Third Workshop/Seminar/Meeting on risk analysis of Version 02 of the ATS routes network for the SAM Region. Validation of the study of 3.2.9.	March 2013	SAM/IG/11	Regional Project RLA/06/901	
3.3.	**Implementation of Version 2 of the SAM ATS Route Network**				
3.3.1.	Process the proposal of amendment to the CAR/SAM Air Navigation Plan	August 2013		SAM Regional Office	
3.3.2.	Publish version 1 of the SAM ATS Route Network	22 August 2013		States	
3.3.3.	Entry into effect of version 2 of the SAM ATS Route Network	17 October 2013			

APPENDIX B

CONCEPTS AND REQUIREMENTS THAT CONTINUE TO BE VALID AND THAT SHOULD BE TAKEN INTO ACCOUNT IN THE NEW ATS ROUTE OPTIMIZATION PROCESS IN THE SAM REGION

1 Updating of statistical data about upper airspace traffic in the SAM Region

1.1 The ATSRO/3 Meeting, on analyzing ATS route Version 02 corresponding to Phase 3 of the optimization programme, acknowledged that it would be advisable to once again collect statistical data about all flights made in the SAM upper airspace (FL245 or above), on national and international routes, over the period from 01 to 31 August 2011 and their remittance to the SAM Regional Office before 30 September 2011. This would allow an assessment to be made of the evolution of the air traffic demand in the Region. The new form for collecting data about air traffic movements and the corresponding orientations needed for its completion are to be found in the Report of the ATS/RO/3 Meeting, Agenda Item 2, Appendix A.

2 General principles

2.1 The ATSRO/3 Meeting recognized some general principles that should be borne in mind:

a) the development of a harmonized and coherent route network requires the active participation of States in the international working groups created to establish or review the regional route network;
b) in order to identify deficiencies in the route network and in the organization of the ATC sectors, it is necessary to identify the main regional air traffic flows, together with those that extend beyond the Region and that have a direct impact on the regional route network;
c) the ATS route network and the supporting sectors need to be established and reviewed, in order to accommodate the main air traffic flows and thereby reduce the complexity of the airspace structure and balance the ATC workload;
d) the needed routes should be integrated into the network, so as to provide access to the regional route network to/from airports that are not served by it. It is also necessary to incorporate temporary or non-permanent routes, in order to relieve the air traffic load on the main ATS routes and ensure that flights are made with the most optimum profile possible;
e) ensure connectivity with the ATS route network from/to TMA airspace; and
f) provide for phased implementation, in order to ensure consistency with State implementation.

3 Planning Principles

3.1 The ATSRO/3 Meeting also stressed that airspace planners need to take into account the following planning principles:

a) Consider the air traffic volume on the existing and proposed routes;
b) Establish the shortest possible paths for most flights;
c) Give priority in planning to the areas with the heaviest traffic volume;
d) Meet the needs of civil and military users;
e) Carry out the route integration and sectorization of support during the early planning stages;
f) Integrate the route network and TMA arrival and departure paths (SIDs and STARs);
g) Check to see that at least 30 flights per month are made on the requested route. This criterion should also be applied whenever the possibility of eliminating existing routes is being considered; and
h) Avoid implementing independent routes, except when absolutely necessary.

4 User requirements

4.1 At the same time, in order to facilitate the study, users should file the following information:

a) Points of origin and destination of the proposed RNAV route;
b) Address of the proposed route;
c) Airspace affected;
d) Navigation specifications;
e) Number of expected annual operations;
f) Distance in NM between the points of origin and destination on existing routes;
g) Reduction in miles, comparing those of existing routes with the total number of NM between the points of origin and destination;
h) Annual operational savings in the amounts of fuel used (in kg), according to the types of aircraft that would operate on the route (the average, when appropriate);
i) Annual reduction of CO2 emissions into the atmosphere using the new route;
j) Preliminary geographic coordinates of the significant points on FIR borders and when the route crosses another, already established route;
k) List of FIRs involved on the proposed RNAV route; and
l) Comments/observations.

Note: whenever possible, a graph showing the approximate route path will be presented.

4.2 The form that was developed using the data for the implementation, realignment or elimination of RNAV routes is shown in the report of the ATS/RO/3 Meeting, Agenda Item 2, Appendix B.

5 Identification of the arrival and departure points of the main TMAs in the South American Region

5.1 In order to develop an optimum structure with a route network that is duly integrated with airport arrival and departure operations, it is necessary for ATS route planners and terminal area planners to design the new structures jointly and in harmony. This will avoid airspace constrictions that impede orderly, flexible and safe flows to and from airports, as well as guarantee the continuous, seamless airspace established in the ICAO global air navigation plan and the ATM operational concept.

5.2 Another important aspect to be taken into account is the tendency, when speaking of the ***design*** of the terminal to associate that development with the design or construction of approach procedures like those established in the PANS/OPS. The fact is that this is actually a supplement to the design itself of the terminal area, with a much broader significance that refers to the design of the terminal airspace concept, together with its routes, waits, airspace structure and the sectorization itself that integrates the whole with the ATS route network.

5.3 As established in the ***ATS route*** optimization programme, considering the need to reduce the workloads of pilots and air traffic controllers, mainly through more effective use of flight management systems (FMS) and by reducing the ground/air/ground communications burden, the integration of the RNAV route network and the TMA arrival and departure paths should be considered during the initial planning phase for the implementation of the new route network.

5.4 The challenges airspace planners will face in designing the airspace will be, in addition to the expected growth in air traffic, the following, among other things:

a) To satisfy ATS demands to ensure that the capacity is kept at at least the current levels and that delays stemming from terminal airspace constriction are minimized;
b) To satisfy operational safety requirements;
c) To satisfy requirements for ensuring environmental protection; and
d) To satisfy the various demands and requirements of airspace users, by taking account of new and varying user development plans.

5.5 For those reasons, planners, in designing their TMAs, should avoid the tendency to create an airspace that is “independent” of the route network and, together with the designers of PANS/OPS procedures, should consider ATC operational requirements, while obviously taking into account the protection of the environment and the associated costs and benefits.

5.6 In this connection, it is very important for adjacent States to hold bilateral working meetings for the purpose of harmonizing airspaces that include border areas or sectors, particularly on routes that could be affected by the traffic flow between adjacent FIRs and/or TMAs, by adopting operational agreements that should be published in their respective AIPs.

5.7 In regard to the foregoing, the ATS/RO/3 Meeting deemed that it would be timely to urge States to carry out the tasks associated with 3.2.3 of the action plan for Phase 3 of the ATS route optimization programme. This numeral stipulates that the arrival and departure points of the principal TMAs should be identified, in order to integrate them with Version 02 of the ATS route network and that it is necessary, in designing the TMAs and Approaches, to consider the following:

a) systematic FUA application and progress in implementing PBN in TMAs and approaches;
b) improving or at least keeping operational safety at its current levels, by complying with ICAO SARPs in this area and conducting the corresponding risk assessment;
c) ensuring that the design meets operational requirements by maintaining a balance between the interests of the ATC, airspace users and the environment, thereby promoting flexible use of airspace;

d) designing the airspace by applying the principle of collaborative decision-making (see the SAM CDM Manual); as a result, the TMA redesign project should provide for the involvement of a team of multidisciplinary specialists with representatives of all parties involved;

e) designing the airspace terminal as an integral part of the airspace from both the lateral and vertical viewpoints, in order to guarantee a continuous flow of operations; and

f) using continuous descent operations techniques, in order to maximize operational efficiency in the face of airspace requirements and restrictions, while considering the establishment of the maximum number possible of optimized arrivals (Doc. 9931).

5.8 The ATS/RO/3 Meeting, furthermore, urged States in the Region to present the advances made in their planning of TMAs and Approaches at the SAM/IG/8 Meeting and the final document at the SAM/IG/9 Meeting.

6 Flexible use of airspace

6.1 In examining this issue, the Meeting recognized that flexible use of airspace is an airspace management concept described by the International Civil Aviation Organization (ICAO) that seeks to achieve optimized, balanced and equitable airspace use among the different civil and military users; that strategic coordination and dynamic interaction contribute to the accomplishment of this aim; and that it is grounded in the Resolutions of the 35th Meeting of the ICAO Assembly, Initiative GPI-1 of the Global Air Navigation Plan (ICAO Doc. 9750), and that of GREPECAS.

6.2 The ATS/RO/3 Meeting also took into account the existence of activities that require the reserving of a certain volume of airspace for their exclusive or special use (SUA) during particular periods of time, given the characteristics of their flight profile, the importance of their operations or the risks involved in the operations to be conducted in that airspace and the need to separate them effectively and safely from other types of air activities.

6.3 It went into greater depth, as well, in its analysis of the notion of flexible use of airspace (FUA) as an airspace management concept based on the principle of accommodating all users as fully as possible in that airspace, considering effective communications, cooperation and the necessary coordination to guarantee operational safety, efficiency and environmental sustainability, acknowledging the great importance of the management of flexible use of airspace.

6.4 It was stressed that some SAR activities, exercises or military actions could require the coordination and cooperation of more than one State at a given moment and that the importance of having Civil/Military Coordination and Cooperation Committees in place in each State takes on even more significance in those cases.

6.5 On the other hand, several States recognized that Civil-Military Cooperation and Coordination in the South American Region have been traditionally based on the development of a dialogue between civil and military authorities, with a view to seeking better airspace use for both parties and improving cooperation in the use and integration, when possible, of their respective air traffic control facilities.

6.6 ICAO also asks States to inform military authorities about ICAO's effective provisions, such as Article 3 of the Convention on International Civil Aviation, Resolution A37-15 of the ICAO Assembly, Appendix O, and Annex 11, sections 2.16 and 2.17) and the guidance documents [the Manual concerning safety measures relating to military activities potentially hazardous to civil aircraft operations (Doc. 9554) and the Manual concerning interception of civil aircraft (Doc 9433) relating to civil-military coordination], as well as the promotion of familiarization visits by military personnel to air traffic services (ATS) units.

6.7 While the Standards, Recommended Practices, Recommendations and Conclusions of different events that have been approved for Regional application are aimed at the achievement of mutual cooperation among civil and military authorities, not all States have formally established Civil-Military Cooperation and Coordination Committees in place.

6.8 Participants at the Meeting pointed out that these cooperation and coordination committees or bodies make it possible to ensure the interlinkage of the parties at all levels, in order to reach decisions about problems of civil and military airspace management and air traffic control, which are an essential element for the implementation of Version 02 of the ATS route network, for the agreements reached between the parties for the application of flexible use of airspace depend directly on them.

6.9 Considering all of the foregoing, the Meeting considered it advisable to urge States that have not yet done so to:

a) take the necessary action to create civil/military cooperation and coordination committees or another similar body, in which representatives of civil aviation and military representatives concerned with the implementation of Civil/Military Cooperation and Coordination Committees participate, together with other airspace users; and
b) use, for guidance purposes, the manuals on the management of flexible use of airspace that are listed in the Report of the ATS/RO/3 Meeting, Agenda Item 2, Appendix D.

6.10 In regard to this same matter, it was considered that the simultaneous elaboration of a Model Letter of Agreement between civil and military units on flexible use of airspace would be highly useful to States in the Region. The Secretariat was accordingly asked to look into the most advisable mechanisms for developing this model.

7 Identification of special use areas and airspaces in the South American Region

7.1 The Region is in agreement that, in order to arrive at a comprehensive ATS route network that meets the needs of all users, including commercial, military, general and sports aviation and of unmanned aircraft systems, it is necessary to set up a civil/military cooperation system that will make it possible to analyze all restricted, prohibited and hazardous areas that have been created in the South American region, in order to implement the concept of flexible use of airspace.

7.2 It was also acknowledged that the analysis does not seek to arbitrarily eliminate or reduce airspace for special assigned uses, but to implement collaborative decision-making. This concept bears with it the search for best options capable of satisfying all airspace users and ensuring that needs that arise are met, regardless of the application of airspace restrictions.

7.3 Chapter 4 of the PBIP, on analyzing gaps in the existing ATM system in the SAM Region, identified one of the principal deficiencies as being the lack of policies and, therefore, of procedures for implementing flexible use of airspace. This creates problems for airspace design and management and does not permit the application of an optimum airspace structure and the use of optimum flight paths. (See PBIP, 4.3.1 c).

7.4 While the implementation of flexible use of airspace has improved considerably in recent years, there are sectors where limitations on the existing ATM system still exist, making tactical operations necessary in most cases.

7.5 In this connection, States are recommended to examine the different situations in which, for operational safety reasons, procedures or Letters of Agreement need to be established, in order to avoid tactical airspace management, for this would mean that the Control System would have to take all decisions in real time. While all action plans must allow for the possibility of tactical management, this should be the final option, for the most suitable solution cannot be applied when time is short and several data must be considered.

7.6 Furthermore, the existence of permanent reserved airspace has been identified, mainly for military purposes. This could, in a certain way, impede proper airspace planning in failing to allow for direct flights between origin and destination airports and/or city pairs, result in operation at inadequate flight levels and/or speeds that keep aircraft from maintaining optimum flight profiles, and also constitute an important element in ground and/or en-route delays associated with the system.

7.7 There is a consensus in the Region that SAM States should establish policies for the use of reserved airspace, both temporary and permanent, in order to, insofar as possible, avoid the adoption of restrictions on airspace use. Unmanned aircraft systems (UAS) should also be considered and integrated into SAM air navigation systems, thereby adding a new component to the aeronautical system that should begin to be taken into account.

7.8 From the foregoing, it can be deduced that Flexible use of airspace should start being implemented with the evaluation of hazardous, restricted or prohibited airspace that affects or could affect the routes with the heaviest traffic flows.

7.9 The ATS/RO/3 Meeting took note of the prohibited, restricted and hazardous areas published in State AIPs. The States, with a view to undertaking a preliminary study to allow for a more thorough and qualitative analysis to be made of these special use areas, requested the Secretariat to propose a form that could be used to continue collecting data from the States.

7.10 A simple analysis of the information that has been supplied reveals that a large percentage of special use airspace should be examined in the context of Civil/Military cooperation in each State in the Region. There are 124 prohibited areas, 421 restricted zones, 41 hazardous areas and 83 special areas published in the Region, including both the volcanic areas defined by Chile as special areas for air sports and recreational activities identified by Panama. This information will be processed later to determine the percentages of special use airspace located in the Region and the affect of these zones on civil aviation operations in the Region. This information could be presented at the SAM/IG/8 Meeting for analysis.

7.11 Understanding that implementation of the Flexible Airspace concept could create a problem for airspace optimization, ICAO deemed that it would be advisable to encourage States in the Region to participate in Seminars on Civil/Military Cooperation, inasmuch as events of this kind help to establish good communications between the parties involved, thereby making it possible to improve civil/military cooperation, coordination and interoperability.

7.12 In the light of the foregoing, the Meeting agreed that a survey should be conducted on the use and management of Restricted, Prohibited and Hazardous Areas in the Region, in order to update pertinent information, analyze their impact on airspace and consider their modification, elimination or change in category. The conclusions reached were that:

a) the Secretariat should circulate among the States the Form that appears in the Report of the ATS/RO/3 Meeting, Agenda Item 2 Appendix E, in order to update the information about the use and management of Restricted, Prohibited and Hazardous Areas in the SAM Region;

b) States should undertake an evaluation of hazardous, restricted and prohibited airspace that affects or could affect air circulation and process and subsequently present that information to the SAM/IG/8 Meeting and submit it in final form to the SAM/IG/9 Meeting; and

c) States should identify possible users of volumes of segregated airspace, thus making it necessary to prepare Operational Letters of Agreement (for example: UAS, MIL OPS, recreational activities, anti-hail campaigns, etc.).

APPENDIX C

ATS ROUTES STRUCTURE OPTIMISATION

CONCLUSIONS ON THE FEASIBILITY ANALYSIS

ANAC Argentina – ATM – Airspaces and Air routes Area
DATE OF SURVEY AND COORDINATION MEETINGS: 1, 2, 7 and 22 September 2011

Nº	RNAV ROUTE AND DIRECTION	OBSERVATIONS
1.	Monte Caseros/ ALDOS VOR Bi-directional	RESISTENCIA FIR. Possibility to create a Bi-directional RNAV from the VOR/DME MCS to the position LUCIA. Originating SID and STAR from the CATARATAS DEL IGUAZU (SARI) aerodrome to contemplate safe operations. 2012
2.	VOR Asunción/ VOR Ezeiza Bi-directional	ASUNCIÓN FIR / RESISTENCIA FIR / EZEIZA FIR. This proposal is not possible due to the fact that its trajectory is convergent and emergent to GUA VOR/DME, coincident with UL793, UW64, UW65, UB555, UW2; ACFT are in ascent and descent and safety conditions are not provided. On the other hand, elimination of UA556 is not feasible, since Argentinean air operators use daily and very often this AWY, and also, ACFT are hindered and do not have the capability of flying a conventional ATS route. It should also be observed that there is route A556 in the lower airspace, and it should be eliminated, limiting operations. Two possible operational solutions were observed: a) In this connection, Paraguay accepted to study alternatives and inform on this matter in the SAM/ATSRO/4 Meeting; b) Realign UM402: a new trajectory maintain in an open angle of 15 degrees with UA556, from thereon to position XXX-1 (ASUNCION-FIR SIS FIR) and from thereon to CARRASCO VOR. 2012
3.	Porto Alegre/ Asunción Bi-directional	CURITIBA FIR / RESISTENCIA FIR / ASUNCION. FIR Mandatory reporting points should be created in RESISTENCIA / CURITIBA FIR boundaries; and between RESISTENCIA / ASUNCION FIRs. Position ILPEP would be realigned in deleting the RNAV route proposed. Date of implementation to be agreed. r.
4.	ATOVO/ VOR Tucumán Uni-directional	EZEIZA FIR / CORDOBA FIR Conditions are not appropriate for the time being to be able to implement them, due to the fact that their trajectory does not maintain a lateral separation with a future realignment trajectory of UL550, ROS VOR / LOA VOR; it was also analysed that with UW5 in its origin, in point ATOVO, there is no tactical separation.

Nº	RNAV ROUTE AND DIRECTION	OBSERVATIONS
5.	VOR Rosario/ CALAMA (Chile) Realignment UL550 Bi-directional	FIR EZEIZA / FIR CORDOBA / FIR ANTOFAGASTA. Additionally, the CORDOBA ACC presented a safety study to justify such realignment. 2012 Aerolíneas Argentinas and AUSTRAL: Required a conventional ATS route between PAR VOR-SDE VOR- TUC VOR, Bi-directional, to join such destinations, leaving pending by the CORDOBA ACC, its analysis and feasibility. 2012
6.	VOR Rosario/ ASISA Uni-directional	FIR EZEIZA / FIR CORDOBA. The creation of the RNAV between the ROS VOR/DME – ASISA VOR/DME CBA VOR/DME, uni-directional. UW5, would be eliminated segment ROS VOR/DME –UBREL VOR/DME-ASISA VOR/DME CBA VOR/DME - TUC-VOR/DME SAL VOR/DME; and regarding UW2, segment ROS VOR/DME CAT VOR/DME. Segment TUC VOR/DME – SAL VOR/DME, AWY designator is changed. This proposal is not feasible for the time being, due to connections of UW2 towards CAT, AWY used by Aerolíneas Argentinas and Austral.
7.	Realignment UT653 MARCOS JUAREZ/ PAMAL. Bi-directional	CORDOBA FIR. Due to the affecting of restricted Area SAR 55, coordination with the corresponding military authority should be made, and a future meeting should be programmed to contemplate the need for re-locating the same. 2012.
8.	ALBAL/ARULA Bi-directional	MENDOZA FIR / CORDOBA FIR / EZEIZA FIR / RESISTENCIA FIR. At this time its implementation is not operationally feasible due to a series of crossing with other AWYs, and its reduced time for operational coordination in its trajectory parallel to the limit CBA/EZE/SIS FIR. Air traffics should also be contemplated (IBERIA, GOL, TAM, LAN, charter flights in season, etc.) BETWEEN CORDOBA and SAN PAULO, and if route UM400 is eliminate, these destinations should suffer from direct flights
9.	KAMUV/ VOR San Antonio Uni-directional	MENDOZA FIR / CORDOBA FIR / EZEIZA FIR An uni-directional RNAV route would be originated between VADON-XXX3 (EZE CTA boundary)-SNT VOR. 2012. UW10 would be eliminated, segment VADON-VOR TRC-VOR SNT; UW 57 would be extended, uni-directional, between VOR TRC towards XXX3, leaving UW 57: VOR/DME JUA-VOR/DME TRC-XXX3. W10 would be realigned in the segment between VOR TRC-VOR SNT, by VOR TRC-XXX3-VOR SNT. This new proposal must be again analysed with ACC EZE.

Nº	RNAV ROUTE AND DIRECTION	OBSERVATIONS
10.	VOR ATACAMA (CHILE)/ VOR La Rioja Bi-directional Realignment UL650	ANTOFAGASTA FIR / CORDOBA FIR. UL 650, Bi-directional is realigned, between VOR/DME ATACAMA (Chile) and VOR LAR. 2012
11.	TOSOR/UMKAL Uni-directional	MENDOZA FIR. For the time being, it is not possible from the operational point of view, due to crossings with AWYs of which there are ACFT ascending and descending. Coordination with the corresponding military authority must be made for the re-location of restricted Area SAR 103. When radar control service is provided, its implementation will be possible.
12.	NEBEG/ASADA/ VOR Ezeiza. Uni-directional	MENDOZA FIR / EZEIZA FIR. For the time being, it is not possible from the operational point of view, since it does not maintain lateral separation with UM424.
13.	ALBAL/ASADA Realignment UM424 Uni-directional	MENDOZA FIR / EZEIZA FIR. UM/M 424 would be realigned between position ALBAL-ASADA. Would be uni-directional between ALBAL-XXX-4, and Bi-directional between XXX-4-ASADA A SID would be originated and STAR a SRA as of position XXX-4. Coordination with the corresponding military authority must be made for the re-location of restricted Areas SAR 107 and SAR 33. 2012. Possible elimination of UR 683, due to low aircraft movement.
14.	BIXIM/ROPON Uni-directional	FIR EZEIZA. Possible implementation date 2012.
15.	CHATO/VOR Neuquén Uni-directional	FIR EZEIZA. The proposal is to originate an, uni-directional SID, correcting the exit exit course of BAR 040 to LIMAY by BAR 039 to LIMAY and from there an uni-directional RNAV to the VOR/DME NEU, which would shorten distances, save fuel and originate and exit with better performance of ACFT. 2012
16.	VOR General Belgrano/ MOXAN Uni-directional	EZEIZA FIR. An uni-directional RNAV would be originated from the VOR GBE to position MOXAN. Coordination with the corresponding military authority must be made for the re-location of restricted Areas SAR11, SAR 07 and SAR 08. The segment ATITO-MOXAN will be eliminated from UW18 . 2012
17.	VOR Tandil/ VOR Comodoro Rivadavia Bi-directional	FIR EZEIZA / FIR COMODORO RIVADAVIA. From the analysis it was learnt that there is no lateral separation with UA570, an ATS route with high movement. Its implementation is not feasible at the moment.
18.	VOR Tandil/ VOR Río Gallegos	FIR EZEIZA / FIR COMODORO RIVADAVIA. The proposal is PUGLI-VOR/DME GALLEGOS, Bi-directional.

Nº	RNAV ROUTE AND DIRECTION	OBSERVATIONS
	Bi-directional	2012 Coordination with the corresponding Argentinean military authorities (Air Force and Army) regarding the possibility to reduce the vertical upper limit to FL 235 of restricted areas SAR 20 and SAR 28.
19.	VOR El Calafate/ EGOSA Bi-directional	FIR COMODORO RIVADAVIA. The proposal is to originate an extension of UW 48, Bi-directional, between VOR/DME ECA and position EGOSA. The possibility to create in the lower airspace as W48 will be analysed, and to generate a SID/STAR to VOR/DME ECA. 2012
20.	VOR El calafate/ VOR USHUAIA Bi-directional	FIR COMODORO RIVADAVIA Its implementation is not feasible at the moment. Pending by the Chilean Air Force cordination regarding restricted areas located at the east of VOR/DME NAS and its afffectation to this new trajectory proposed.
21.	VOR Ezeiza/ VOR Melo(Uruguay) Uni-directional Realignment UN 857	FIR EZEIZA / FIR MONTEVIDEO. Aerolíneas Argentinas, sees as feasible at the momento, since it is one of the alternatives of flights with destination Europe
22.	VOR Bage (Brasil)/ KUKEN Uni-directional Realignment UN 741	FIR MONTEVIDEO / FIR EZEIZA Was contemplated on trajectory of UN 741, currently overlapping A 314. Aerolíneas Argentinas uses this route as alternative of flights coming from Europe. Its implementation is not feasible at the moment.

APPENDIX D

Measures to be taken into account during the implementation of Version 2

a) Comply with the AIRAC dates and with those agreed for the publication of amendments to their respective AIPs, since failure to do this could generate a potential safety hazard.
b) Set, duly in advance, a deadline for receiving optimisation proposals, in order to allow States and users to duly plan the implementation.
c) Prepare a transition plan establishing not only the effective date but also a time of implementation that suits all States, so as to have an acceptable volume of traffic and will not affect operations or jeopardise safety.
d) Update the letters of operational agreement and the ATC manuals before the implementation of the new version of the ATS route network, as well as the ATS contingency plan.
e) Inform and train the personnel and airspace users regarding the changes to be implemented, in order to avoid confusion and misinformation.
f) Incorporate, from the beginning of the route network optimisation programme, the operational personnel or their representatives and users, in order to plan the changes and, even more important, assess such changes from an operational point of view and be an essential part of the process.
g) Ensure continuity between SIDs and the route structure, and between the route structure and the STARs and approaches, using a common reference and compatible altitudes in the interface;
h) Avoid taking isolated action for airspace restructuring or in the national ATS route network that might have a significant impact on traffic beyond the area of jurisdiction of the State involved.
i) Plan a better airspace sectorisation in order to reduce ATC workload and optimise ATC capacity, including the possibility of delegating the ATS.
j) Improve civil/military cooperation and coordination to ensure the efficiency of the route network.
k) Permit the application of the flexible use of airspace (FUA) concept to make sure that the requirements of all airspace users are met.
l) Permit full integration with the domestic route network of the State.
m) Minimise the number of ATS routes, always taking into account traffic demand *vis-a-vis* ATC capacity and the possibility of applying direct routes.
n) Minimise the number of crossings inasmuch as possible, and when required, these crossings should be planned so as to avoid more congested sectors.
o) Improve the complexities of airspace structure that should be resolved during the implementation of Version 2 of the ATS route network.
p) When planning sectorisations and/or changes in the ATS routes network, a NAV/COM MRA (minimum reception altitude) study shall be effected to ensure sufficient coverage to guarantee safety.

Agenda Item 3: Implementation of performance-based navigation (PBN) in the SAM Region

Follow-up of the En-route PBN action plan (RNAV5

3.1 During the SAM/IG meetings have routinely reviewed the PBN Implementation Project – Short-term en-route operations in the SAM Region, and the associated regional en-route PBN action plan (RNAV5), introducing the changes deemed advisable, establishing responsible parties and start/end dates for the various activities, and adopting an action plan to guide the States.

3.2 Upon completing the review of the en-route PBN action plan (RNAV5), the Group had considered that there were still some unfulfilled tasks that were essential for such implementation that do not hinder RNAV5 implementation in the SAM Region in the date programmed (**20 October 2011**).

3.3 Upon completing the en-route PBN action plan for RNAV5 implementation, the result of RNAV5 teleconferences was taken into account, as well as comments supplied by States and users present. **Appendix A** to this part of the report shows the action plan for RNAV5 implementation duly updated.

3.4 Also, in order to follow-up of the tasks not finalised in the RNAV5 action plan, the status of each task by SAM State is attached as **Appendix B** to this part of the report, which indicates the status of each task by SAM State.

3.5 In view of the above, the meeting ratified **Conclusion SAM/IG/7-2 (RNAV5 implementation),** encouraging States of the South American Region to complete details for RNAV5 implementation in RNAV routes of the continental airspace at 09:01 UTC of **20 October 2011**.

3.6 The meeting took note that the monitoring programme foreseen in the RNAV5 action plan, after the implementation on 20 October 2011 must be initiated. This programme must be carried out as foreseen in **Conclusion SAM/IG/6-5** (Lateral navigation deviation reporting form – Appendix F to the Report on Agenda Item 6 o the SAM/IG/6 Report). In this connection, the meeting encouraged States and operators to fill and send such forms to CARSAMMA on the tenth day of each month. Also, States shall disseminate the forms among operators using their airspaces with a view that they also participate in the monitoring programme.

3.7 The meeting concluded also that the monitoring programme should comprise percentage verification of operations carried out by RNAV5 approved aircraft and operators, keeping in mind that up to date there has not been a complete assessment of such percentage. Thus, after the implementation, the Regional Project RLA/06/901 will be requested to perform such task.

Results of RNAV5 Teleconferences

3.8 The Meeting took note that, as agreed during the SAM/IG/7 Meeting, paragraph 3.27, RNAV5 TELCONS were held at least once a month, through the use of the SAM Regional Office's *Go-to-Meeting* tool to analyze pending activities for RNAV5 implementation foreseen for **20 October 2011**.

3.9 It should be highlighted that there was a considerable absence of some States, even though it had been a task established and further ratified by States during the SAM/IG/7 Meeting.

3.10 The calendar of virtual meetings established in the SAM/IG/7 was partially carried out in function of some changes in the dates established in view of the absence of some participants. Twelve RNAV5 TELCONS were held and the last TELCON is pending for 18 October 2011, as scheduled.

3.11 As a result of TELCONS, the Chilean Administration had offered the *e-Learning* tool for the application in the training of ATCOs and AIS operators in the CAR/SAM States. In this connection, the Chilean delegation has indicated the need for interested States to send a list of users of such too, as soon as possible, to the Lima Regional Office, containing the following information:

a) Full name (First name, Last name, Second last name)
b) E-mail
c) State.

3.12 The Lima Regional Office, in receiving information from States, will send them to the Chilean Administration.

3.13 Also, as a result of the mentioned TELCONS States were requested to initially send a list of RNAV5 approved aircraft with a view to speed up the process of creation of the CARSAMMA data base. Then, as soon as possible, States should send Form F5 for each one of the aircraft approved, as foreseen in SAM/IG/6-3 Conclusion (Forms CMA F5 and CMA F6). However, taking into consideration that some listings contain all data foreseen in such form, and in such cases, the meeting concluded that the submission of the corresponding F5 forms is not necessary. In cases in which the lists do not contain information foreseen in Form F5, States should send them to CARSAMMA. Also, for new requests, Form F5 is required.

3.14 While not all States have been able to participate in TELCONS, it should be highlighted that they have been successful and that they had been carried out in an appropriate manner and at low-cost, which enabled a follow-up of pending tasks for RNAV5 implementation. In this connection, the meeting set out a draft calendar of virtual meetings, with a view to a follow-up of RNAV5 implementation.

Draft calendar of RNAV5 TELCONS

18 OCT 11
27 OCT 11
10 NOV 11
08 DEC 11
11 JAN 12
09 FEB 12
08 MAR 12
11 APR 12

Implementation of Performance Based Navigation in Brazil

3.15 Brazil presented its PBN implementation project in Rio de Janeiro and Sao Paulo TMAs as a main tool available for fuel saving and consequent reduction in CO_2 emissions, contributing for the sustainable development of national and international air transport. Information on this project is attached as **Appendix C** to this part of the report.

Performance-based navigation (PBN) Manual for ATCOs

3.16 The meeting took note that Conclusion SAM/IG/5-1 and Task 3-15 "training programme and documentation for ATCOs and AIS operators, encouraged SAM Region States to use as guidance material for ATCOs and AIS operators the material available in the SAM/IG/5 Report. In this connection and with these guidelines, the Paraguayan Administration has concluded the development of PBN training material for ATCOs attached as **Appendix D** to this part of the report.

Validation of RNP AR procedures

3.17 The meeting took note that ICAO Doc 9906 indicates that the final step to acquire quality assurance in the design of instrumental procedures is flight inspection and validation of the same also establishes that these are separated activities that may be carried out by the same organisation or by different bodies.

3.18 Flight inspection is carried out to confirm capability of air navigation aids in which the procedure is based, as per ICAO Annex 10 and Doc 8071.

3.19 The aim of validation is to verify data on obstacles and navigation, and to assess the feasibility to apply in practice the proposed procedure. Validation is normally divided into: ground and flight validation. Ground validation must always be carried out, while flight validation may be ignored when it may be verified through ground validation that all data of obstacle, navigation and all other factors, normally considered in the procedure design are accurate and complete.

3.20 Validation is the necessary final quality assurance step in the procedure design process, prior to publication. The purpose of validation is the verification of all obstacle and navigation data, and assessment of fly ability of the procedure. Validation normally consists of ground validation and flight validation. Ground validation shall always be undertaken. When the State can verify, by ground validation, the accuracy and completeness of all obstacle and navigation data considered in the procedure design, and any other factors normally considered in the flight validation (4.6.3), then the flight validation requirement may be dispensed with.

3.21 Regarding Flight validation, Doc 8168 indicates that this validation shall be accomplished by a qualified and experienced flight validation pilot, certified or approved by the State. The objectives of the flight validation of instrument flight procedures are to:

a) provide assurance that adequate obstacle clearance has been provided;
b) verify that the navigation data to be published, as well as that used in the design of the procedure, is correct;
c) verify that all required infrastructure, such as runway markings, lighting, and communications and navigation sources, are in place and operative;
d) conduct an assessment of fly ability to determine that the procedure can be safely flown; and
e) evaluate the charting, required infrastructure, visibility and other operational factors.

3.22 As per the above, flight validation should not be confused with flight inspection. Flight inspection of instrument flight procedures is required to assure that the appropriate radio navigation aids adequately support the procedure.

3.23 Since RNP AR applications do not have a specific underlying facility, there is no flight inspection requirement in the PBN manual of navigation signals, therefore only guidelines are provided of ground and flight validation to be carried out before publication of one of these procedures.

3.24 Among other recommendations, it is suggested that, provided the unique nature of RNP AR procedures within ground validation, its assessment with flight simulator should be considered in order to verify as far as possible before flight validation the factors to be taken into account in this stage, including the possibility to apply this procedure in practice (fly ability of the procedure).

3.25 LAN Airlines is an RN AR operator cleared by Chilean CAD since 2009, and as a precursor of the implementation of this technology in the Region, it has actively participated in the development of RN PAR procedures and the validation activities of the same since 2007, placing at the disposition of CAD navigation performance and data base experts, flight simulators and RNP technical pilots who jointly carry out this task in order to deliver CAD ground validation reports that enable more certainties regarding the feasibility of products to be implemented before they are published.

3.26 During the ground validation process, LAN Airlines carries out a series of activities which could be summarised as follows:

a) **Coordination with navigation data bases**. Delivery of coded tables and graphics of the procedure to be validated to the provider for inclusion in the Nav Data customised by LAN, therefore this procedure will be available to be entered in the flight simulator as designed.
b) **Revision of the data base**. Once this procedure has been incorporated into the data base, the revision of all parameters that shape it and that have been recorded: geographical coordinates of each waypoint, path terminators, minimum and mandatory altitudes, speed restrictions, continuity of segments in the FMS, RNP recorded for each segment, holdings included in it. **Appendix E** to this part of the report shows how is the data received from the provider to be revised.

c) **Simulator session.** A simulator session is carried out with the procedure loaded, which lasts about 3 hours in which RNP technical pilots, with the presence of a procedures designer verify the feasibility to flight the procedure in different flight/weight configurations and meteorological conditions, putting special emphasis in minimum and maximum temperatures admitted for each particular procedure, banking angles achieved in RF segments with maximum winds considered in the design and performance reached in case of missed approach. During the session, the pilot and designer compare again data included in the chart or graphic of procedure corresponding to FMS, analyzing longitude, tracks, visual aids and presence of ground alarms which could eventually occur.

d) **Validation report.** A report is prepared to the CAD leaving evidence of all activities carried out in the simulator and its results, if the report is satisfactory, the deficiencies found are worked together with CAD and the validation process is again carried out. An example of such report is attached as **Appendix F** to this part of the report.

3.27 In view that aircraft velocities, their navigation systems and operational procedures vary from one type of aircraft to another, and from one airline to another, this ground validation does not confirm that in practice all RNP AR aircraft and operators may use a specific instrument procedure, each operator mill have to assess on time the possibility to use it according to the limitations and operational standards during the operational process of approval.

APPENDIX A

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

1.	Airspace concept	Start	End	Responsible party	Remarks
1.1	Establish and prioritize strategic objectives (safety, capacity, environment, etc.)	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901)	Completed
1.2	Collect traffic data in order to understand traffic flows in a given airspace	June/2008	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901)	Completed
1.3	Analyze the navigation capacity of the aircraft fleet	June/2008	SAM/IG/7	SAM/PBN/IG (Projects RLA/06/901 and RLA/99/901) States IATA	Completed 95% of the fleet in the SAM Region is candidate for RNAV5 approval. States should continue their efforts to complete the data base (Conclusion SAM/IG/4-3)
1.4	Analyze ground-based means of communication, navigation (VOR, DME) and surveillance to meet navigation specifications and the navigation reversal mode	June/2008	SAM/IG/7	SAM/PBN/IG (Projects RLA/06/901 and RLA/99/901) States	Completed The work was completed through the support of RLA/06/901 who CNS hired experts.
1.5	Optimize airspace structure, reorganizing the network or implementing new routes based on the strategic objectives of the airspace concept, taking into account airspace modelling, ATC simulations (fast time and/or real time), live tests, etc.	SAM/IG/2	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901) States IATA	Transferred. The meeting reviewed this task and decided that it was more appropriate to incorporate to the SAM Region ATS routes network optimization action plan (2.2.5 SAM Region ATS routes network optimization action plan)

2	**Safety assessment**	**Start**	**End**	**Responsible party**	**Remarks**
2.1	Prepare safety assessment execution using a qualitative methodology through the application of SMS	SAM/IG/2	SAM/IG/6	CARSAMMA Project RLA/06/901 Regional Office	**Completed**

3	Establish a collaborative decision-making process (CDM)	Start	End	Responsible party	Remarks
3.1	Coordinate planning and implementation requirements with air navigation service providers, regulators, users, aircraft operators and military authorities	SAM/IG/2	SAM/IG/9	SAM/PBN/IG States	**Valid** Some States have published an initial AIC. Other States have not done so yet. A new AIC is required informing on the change of implementation date.
3.2	Establish the implementation date	SAM/IG/1	SAM/IG/4	SAM/PBN/IG States	**Completed.** 18 November 2009 was established as tentative date. States analysed the feasibility of the tentative date in coordination with domestic operators and military authorities SAM/IG/4 defined as tentative implementation date 18 November 2010. During the SAM/IG/6 Meeting, it was decided to postpone implementation for 22 September 2011 since some tasks had not been executed. Keeping in mind the need for an additional analysis in terms of VOR/DME coverage and DME/DME for the publication of ENR 3.3, SAM/IG/7 Meeting has made a 28 days adjustment in the date of implementation (20 October 2011).
3.3	Establish the documentation format in the SAM PBN website	SAM/IG/1	SAM/IG/2	SAM Regional Office	**Completed**

3 Establish a collaborative decision-making process (CDM)	Start	End	Responsible party	Remarks
3.4 Report planning and implementation progress to the corresponding Regional Office. Conclusion to present national plans at SAM/IG/4	SAM/IG/2	SAM/IG/4	SAM/PBN/IG States	**Completed.** Eight SAM States presented a draft of their national PBN implementation plans and it was agreed that for 31 December 2009, States shall present the final version of the plan. The Secretariat was requested to as States that have not done so yet, submit their respective plans.

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

5 Aircraft and operator approval	Start	End	Responsible party	Remarks
5.1 Analyze aircraft and operator approval requirements (pilots, dispatchers and maintenance personnel) in keeping with the PBN manual, and develop the necessary documentation.	June/2008	SAM/IG/2	Regional Project RLA/99/901- Regional Safety Oversight Cooperation System	**Completed**
5.2 Publish national regulations for the implementation of the RNAV-5 navigation specification	SAM/IG/2	SAM/IG/7	States	**Completed**
5.3 Approval of aircraft and operators	SAM/IG/3	Permanent	States	**Valid** This is a continuous task that States have initiated and shall continue to carry out upon requirement of operators. Operators should be encouraged to initiate this process. States informed that there are still few requests for general aviation aircraft and operators approval States also informed that almost all commercial aircraft and operators (operators 121) are or are about to be approved until the date of implementation.
5.4 Establish and keep up to date a registry of approved aircraft and operators	SAM/IG/3	Permanent	CARSAMMA States Regional Office	**Completed** During SAM/IG/7 meeting, CARSAMMA has received information on approvals of only 71 aircraft and 4 operators from Argentina (19 aircraft and 2 operators) and Colombia (52 aircraft and 2 operators). This is an activity being developed permanently by each one of the States.

5 Aircraft and operator approval	Start	End	Responsible party	Remarks
5.5 Verify the operation of the continuous monitoring programme (aircraft and procedures)	Sep 2011	Permanent	States	**Completed** This is an activity being developed permanently by each on of the States and is considered in the surveillance plans.

6	Standards and procedures	Start	End	Responsible party	Remarks
6.1	Assess and, if applicable, publish the regulations on the use of GNSS.	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901) States	**Completed**
6.2	Finalize WGS-84 implementation	TBD	TBD	States	**Completed** States which have not done so, should provide the information
6.3	Develop an AIC model to report PBN implementation plans	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901)	**Completed**
6.4	Publish the AIC reporting PBN implementation plans	SAM/IG/2	SAM/IG/4	States	**Completed** States should publish on 9 April 2009
6.5	Develop an AIP Supplement model containing applicable standards and procedures, including the corresponding in-flight contingencies	SAM/IG/4	June 2010	SAM/PBN/IG (Project RLA/06/901)	**Completed**
6.6	Develop AIP amendment/AIP Supplement Model that contains in the part corresponding to ENR 3.3, including information related to RNAV5, as well as limitations as regards sensors applicable and critical radio navigation aids of each route segment	SAM/IG/5	SAM/IG/7	SAM/PBN/IG States	**Completed** A new format to publish ENR 3.3 routes was approved (Conclusion SAM/IG/6-4 and Appendix D to the Report on Agenda Item 6. Keeping in mind the results presented in task 1.4, at the SAM/IG/7 meeting made the necessary adjustments in the format to publish RNAV routes ENR 3.3 and formulated Conclusion SAM/IG/7-3
6.7	Publish the AIP Supplement containing applicable standards and procedures, including the corresponding in-flight contingencies	22 September 2011		States	**Valid** 10 States have published the information as per Conclusion SAM/IG/7-3. No information about 4 States
6.8	Review the Procedural Handbook of the ATS units involved	SAM/IG/5	October 2011	States	**Valid** 4 States indicated that this task is completed. 2

6 Standards and procedures	Start	End	Responsible party	Remarks
				States informed that the task is ongoing. 4 states indicated that the task was not completed. No information available from 4 States
6.9 Update the letters of agreement between ATS units	SAM/IG/5	October 2011	States	**Valid** 5 States indicated that this task is completed. 1 State informed that the task is ongoing. 3 states indicated that the task was not completed. No information available from 5 States.
6.10 Develop an amendment to regional documentation, if necessary	SAM/IG/3	June 2011	SAM/PBN/IG (Project RLA/06/901)	**Completed**
6.11 Submit a proposal of amendment to Doc. 7030, if necessary	SAM/IG/5	SAM/IG/6	SAM Regional Office	**Completed**

7. Training	Start	End	Responsible party	Remarks
7.1 Develop a training and documentation programme for operators (pilots, dispatchers and maintenance personnel)	SAM/IG/4	SAM/IG/5	Regional Project RLA/99/901	**Completed** The matters to be incorporated into each one of the training programmes of operators have been included in the corresponding advisory circulars
7.2 Develop a training and documentation programme for air traffic controllers and AIS operators	SAM/IG/4	SAM/IG/5	SAM/PBN/IG (Project RLA/06/901)	**Completed**
7.3 Develop a training programme for regulators (aviation safety inspectors)	SAM/IG/4	SAM/IG/5	RLA/99/901 States	**Completed** The SRVSOP technical committee has proposed a training programme oriented to the authorities
7.4 Conduct training programmes	SAM/IG/5	20 October 2011	States	**Valid** In order to conduct the training programmes, States should consider training programme and documentation for ATCOs and AIS operators Conclusion SAM/IG/5-1 and Appendix A to the Report on Agenda Item 3 (SAM/IG/5). 9 States indicated that the task has been completed. No information available from 5 States.
7.5 Conduct seminars for operators, explaining plans and expected operational and economic benefits	SAM/IG/9	20 October 2011	States	**Valid** States are encouraged to continue with the dissemination of RNAV5 implementation among such users. 7 States indicated that they have completed this task. 1 State has informed that this task is not applicable.

7. Training	Start	End	Responsible party	Remarks
				Since there is no national fleet. 1 state informed that the task is ongoing. No information available from 5 State.

8.	Implementation decision	Start	Responsible party	Remarks
8.1	Assess the available operational documentation (ATS, OPS/AIR)	October 2011	States	**Valid**
8.2	Assess the percentage of aircraft and operators (non-exclusionary airspace)	SAM/IG/7	States	**Completed** Keeping in mind that 95% of the fleet is in a condition for RNAV5 operations approval and that only completion of approval process is pending, the meeting has considered this task as completed. 9 States indicated that they have not completed this work. No information available from 5 States.
8.3	Analyze the results of the safety assessment	SAM/IG/6	States	**Completed**
8.4	Publish trigger NOTAM	3 October 2011	States	**Valid**

9. Performance monitoring system	**Start**	**End**	**Responsible party**	**Remarks**
9.1 Develop a post-implementation en-route operations monitoring programme	SAM/IG/4	SAM/IG/6	SAM/PBN/IG (Project RLA/06/901)	**Completed**
9.2 Implement a post-implementation en-route operations monitoring programme	October 2011	October 2012	States	**Valid**
9.3 assess the percentage of RNAV5 approved operations (non-exclusionary airspace)	SAM/IG/8	SAM/IG/9	SAM/PBN/IG (Project RLA/06/901)	**Valid**
Pre-operational implementation date	20 October 2011	20 October 2012		**Valid** SAM/IG/4 defined the tentative implementation date 18 November 2010. It was decided to postpone implementation for 22 September 2011 during SAM/IG/6, since some tasks had not been executed. Keeping in mind the need for an additional analysis VOR/DME and DME/DME for the publication of ENR 3.3, the meeting has made an adjustment of 28 days in the implementation date.
Definitive implementation date	20 October 2012			

APÉNDICE B / APPENDIX B

SEGUIMIENTO DE LAS TAREAS NO FINALIZADAS DEL PLAN DE ACCIÓN RNAV-5
FOLLOW-UP TO THE TASKS NOT COMPLETED IN THE RNAV5 ACTION PLAN

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
3.1 Coordinar necesidades de planificación e implementación con los proveedores de servicio de navegación aérea, reguladores, usuarios, operadores de aeronaves y autoridades militares / Coordinate need for planning and implementation with air navigation service providers, regulators, users, aircraft operators, and military authorities	SI	SI	SI	SI	SI			SI	SÍ	SÍ	O/G		O/G	SÍ	
5.3 Aprobación de aeronaves y operadores/ aircraft and operators approval.	SI	SI	SI	O/G	O/G			N/A	SÍ	SÍ	O/G		NO	O/G	Guyana no cuenta con una flota nacional de aeronaves que requiere aprobación Guyana does not count with national aircraft fleet requiring approval.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
6.7 Publicar Suplemento AIP que contenga normas y procedimientos aplicables, incluyendo las contingencias en vuelo correspondientes./ publish AIP supplement containing standards and procedures applicable including corresponding in-flight contingencies	SI	SI	SI	SI	SI			SI	SI	SI	SI		SI	SÍ	
6.8 Revisar el Manual de Procedimientos de las unidades ATS involucradas. / Review the procedural manual of ATS units.	SI	SI	SI	SI	NO			O/G	SÍ	NO	NO		NO	SÍ	
6.9 Actualizar cartas de acuerdo entre unidades ATS / Update letters of agreement among ATS units.	SI	SI	SI	SI	NO			O/G	SÍ	NO	NO		SI	SÍ	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
7.4 Conducir programas de capacitación ATCO y Operadores AIS / conduct training programmes for ATCOs and AIS operators	SI	SI	SI	SI	SI			SI	SÍ	SI	SI		SI	SÍ	
7.5 Realizar seminarios orientados a los operadores, indicando los planes y los beneficios operacionales y económicos esperados / carry out seminars oriented to operators indicating plans and operational and economical benefits expected.	SI	SI	SI	SI	SI			N/A	SÍ	SI	O/G		SI	SÍ	Guyana no cuenta con una flota nacional de aeronaves que requiere aprobación Guyana does not count with national aircraft fleet requiring approval.
8.1 Evaluar la documentación operacional disponible (ATS, OPS/AIR) / assess available operational documentation (ATS, OPS/AIR).	SI	SI	SI	SI	SI			SI	SÍ	SI	SI		SI	SÍ	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
8.4 Publicar trigger NOTAM / Publish trigger NOTAM	SI	SI	SI	SI	SI			SI	SÍ	SI	SI		SI	SÍ	

Instrucciones para el llenado del formulario - Instructions to fill in the form

- Cumplida: colocar **SÍ** en el casillero correspondiente. / Accomplished: place **YES** in the corresponding box
- En ejecución: colocar **O/G** (on going) e indicar en "observaciones" la fecha prevista de término./ In execution: place **O/G** (on going) and indicate under "remarks" the estimated deadline
- No cumplida: colocar **NO** en el casillero correspondiente y, de ser el caso, hacer comentarios en columna de observaciones/ Not complied: place **NO** in the corresponding box and if such were the case, make comments in the remarks column

OTRAS OBSERVACIONES / OTHER REMARKS	
ARGENTINA	
BOLIVIA	
BRAZIL	
CHILE	
COLOMBIA	
ECUADOR	
FRENCH GUIANA	

GUYANA	
PANAMA	
PARAGUAY	
PERU	
SURINAME	
URUGUAY	
VENEZUELA	

ATTACHMENT TO APPENDIX C/ ADJUNTO AL APENDICE C

(EN PORTUGUES UNICAMENTE)

PROJETO DE IMPLANTAÇÃO DA NAVEGAÇÃO BASEADA EM PERFORMANCE NO BRASIL

1. Implementação da PBN nas TMA Rio de Janeiro e São Paulo

1.1 Conceito do Espaço Aéreo

1.1.1 O Conceito de Espaço Aéreo Aéreo proporciona o esquema das operações dentro de um espaço aéreo e é desenvolvido para satisfazer os objetivos estratégicos explícitos, tais como a melhoria da segurança operacional, adequação dos serviços prestados ao aumento do tráfego aéreo, a capacidade de mitigação do impacto ambiental, etc. O conceito do espaço aéreo deve incluir detalhes da organização prática do espaço aéreo, baseando-se nas características de seus usuários, assim como na infraestrutura CNS / ATM disponível ou a implantar.

1.1.2 A implantação da PBN nas TMA Rio de Janeiro e São Paulo atenderá aos seguintes Objetivos Estratégicos:

a) Segurança Operacional – O emprego do conceito de Operações com Descida Contínua combinada com emprego de procedimentos ILS ou Procedimento de Aproximação com Guia Vertical Baroaltimétrico reduzirá a possibilidade de Colisões com o Solo em Vôo Controlado (CFIT). A utilização de janelas específicas de cruzamento entre Rotas Padrões de Chegada (STAR) e procedimentos de saída IFR evitarão o conflito entre aeronaves saindo e chegando dos principais aeroportos das TMA-RJ e TMA-SP. O emprego de espaçamento adequado entre trajetórias de saída e/ou de chegada, aplicando-se a performance de navegação das aeronaves, permitirá a redução da carga de trabalho de controladores e pilotos, propiciando as condições necessárias para que o tempo destes profissionais seja empregado para ações que proporcionem operações mais seguras.

b) Capacidade – A implementação da PBN, aliada à ressetorização do espaço aéreo e à revisão dos modelos operacionais dos Centros de Controle de Área Brasília e Curitiba, dos Controles de Aproximação de São Paulo e Rio de Janeiro e das Torres de Controle de Aeródromo de Campinas, Congonhas, Guarulhos, Galeão e Santos Dumont, propiciará as condições necessárias para o aumento da capacidade das TMA RJ e SP, permitindo um acréscimo na absorção de aeronaves nestes espaços aéreos.

c) Eficiência – A priorização de trajetórias ótimas de voo nos principais fluxos de tráfego aéreo, assim como o emprego de perfis adequados de descida e subida, permitirá uma redução do consumo de combustível do conjunto de usuários das TMA RJ e SP.

d) Proteção ao meio ambiente – A redução do consumo de combustível permitirá uma diminuição da emissão de gases nocivos na atmosfera. O emprego de procedimentos com descida contínua e, pontualmente, de procedimentos RNP AR no Aeroporto Santos Dumont permitirá a redução do ruído aeronáutico no entorno dos principais aeroportos das TMA RJ e SP.

e) Acesso – Não se espera um aumento significativo do acesso aos aeroportos das TMA envolvidas, tendo em vista que os equipamentos ILS existentes e a implementação de procedimentos CAT III em SBGR e SBGL garantem uma operacionalidade adequada nos aeroportos em questão. Pontualmente, caso se demonstre viável, a implantação de novos procedimentos em SBRJ, notadamente de RNP AR, poderá melhorar significativamente o acesso ao mencionado aeroporto.

1.2 Analisar dados de tráfego para entender os fluxos de tráfego aéreo

1.2.1 No contexto do Projeto de implantação PBN, foram identificados os principais fluxos de tráfego nas TMA Rio de Janeiro e São Paulo, tanto em termos históricos, como considerando seu crescimento futuro até o ano de 2015.

1.2.2 Os principais fluxos de tráfego devem ser considerados no planejamento da estrutura do espaço aéreo, a fim de que sejam priorizados, em termos de definição das rotas entre aeroportos e dos procedimentos de navegação aérea, IAC, STAR e SID.

1.2.3 Os dados de tráfego consistem na movimentação anual de aeronaves entre pares de aeroportos no período compreendido entre 2007 e 2010, considerando todas as ligações com origem ou destino nas TMA-RJ e TMA-SP.

1.2.4 Os dados de tráfego anuais foram obtidos coletando-se os valores reais de tráfego para a primeira semana de cada mês do ano de referência e estimando-se, com base no volume obtido para as doze semanas selecionadas, o valor anual de movimentação.

1.2.5 TMA Rio de Janeiro

1.2.5.1 Com base nas estimativas dos dados históricos de movimentação, foram observadas tendências de variação dos movimentos de tráfego aéreo não esperadas na análise da série histórica, mais especificamente, as ligações com destino: SBBH, SBEG, SBJP, SBNT, SBPA, SBRF, SBSL e SBSP. Para esses casos, foram avaliados também os dados reais, utilizando os dados diários referentes ao período de 2007 a 2010. Contudo, não foram observadas diferenças significativas entre os dados reais e aqueles estimados.

1.2.5.2 No caso específico das ligações entre o aeroporto internacional Antonio Carlos Jobim-Galeão (SBGL) e os aeroportos internacionais, consolidou-se a movimentação em cinco principais regiões de destino, quais sejam: África, América Latina (Norte), América Latina (Sul), Europa e USA.

1.2.5.3 Com base nos dados de tráfego anuais, com origem em SBGL ou no aeroporto Santos Dumont (SBRJ), calcularam-se as participações relativas de cada ligação no aeroporto de origem e as taxas de crescimento anuais registradas no período de 2007 e 2010 (

1.2.5.4 e 2). Além disso, avaliou-se a evolução da participação de cada aeroporto na TMA-RJ (Tabela 2: Participação Relativa e Taxas de Crescimento (%) - SBRJ

1.2.5.5), bem como o perfil de utilização das pistas na TMA-RJ (Figura 1: **Evolução da participação de SBGL e SBRJ na TMA-RJ**

1.2.5.6).

1.2.5.7 Definiu-se, como ponto de corte, para a apresentação das principais ligações com origem nos aeroportos SBGL e SBRJ, 1,0% de participação relativa do tráfego do aeroporto de origem acrescidas das ligações internacionais da TMA, o que totalizou 92% e 85% do tráfego dos aeroportos SBGL e SBRJ, respectivamente.

1.2.5.8 Foram assinaladas em amarelo, na
1.2.5.9 e 2, os casos em que as taxas de crescimento da entre os aeroportos (origem-destino) foram superiores a 12% a.a no período de 2007 a 2010.

1.2.5.10 Para cada par de aeroportos, buscou-se entender o comportamento do tráfego registrado no período analisado, identificando algumas situações atípicas ocorridas no período, como, por exemplo, a abertura de SBRJ a outros voos comerciais, além da ponte aérea Rio de Janeiro/São Paulo. Nessas análises, também foram observados aspectos da conjuntura econômica, como a crise mundial em 2008, ou o maior crescimento da economia brasileira no ano de 2010.

Origem	Destino	Participação Relativa em SBGL (%)				Taxa de Crescimento Anual (%)				
		2007	2008	2009	2010	2007/ 2008	2008/ 2009	2009/ 2010	2007/ 2010	2008/ 2010
SBGL	SBGR	13,9	11,0	12,0	12,5	-13,6	-3,4	10,4	-2,7	3,3
SBGL	SBSV	8,1	8,3	9,2	9,3	12,2	-3,1	7,2	5,2	1,9
SBGL	SBBR	11,3	12,0	9,7	6,7	16,4	-29,0	-26,5	-15,3	-27,8
SBGL	SBPA	4,0	5,0	4,8	5,7	38,4	-15,6	24,5	13,3	2,5
SBGL	SBRF	5,1	4,9	5,2	5,3	5,5	-6,6	7,8	2,0	0,3
SBGL	SBSP	7,7	5,3	5,2	5,0	-24,9	-13,7	2,5	-12,8	-6,0
SBGL	SBCT	4,9	6,4	5,1	4,8	43,1	-29,3	-0,6	0,2	-16,1
SBGL	SBCF	7,2	7,8	6,8	4,0	18,4	-23,9	-37,1	-17,3	-30,9
SBGL	SBVT	7,1	7,0	5,8	3,6	8,2	-26,6	-33,9	-19,3	-30,3
SBGL	SBKP	2,9	3,4	3,3	3,5	28,2	-12,3	12,3	8,1	-0,7
SBGL	SBFZ	2,5	2,4	3,3	3,1	4,3	20,5	0,9	8,2	10,3
SBGL	SBFL	1,6	1,9	2,7	2,3	34,3	23,3	-9,2	14,6	5,8
SBGL	SBNT	1,2	0,8	0,8	2,0	-25,0	-7,8	149,6	20,0	51,7
SBGL	SBFI	0,8	1,2	1,7	1,9	59,8	22,1	19,7	32,7	20,9
SBGL	SBBE	1,4	1,7	1,8	1,7	31,5	-3,7	1,6	8,7	-1,1
SBGL	SBJP	1,1	0,9	0,6	1,5	-15,6	-36,2	142,2	9,3	24,3
SBGL	SBRJ	0,6	0,6	0,8	1,4	21,2	8,7	86,6	35,0	42,4
SBGL	SBGO	0,5	1,1	1,3	1,2	136,5	5,7	-3,8	34,0	0,9
SBGL	SBEG	0,1	0,7	1,2	1,1	954,5	41,4	1,8	147,6	20,0
SBGL	SBSL	0,1	0,0	0,3	1,1	-76,9	1266,7	300,0	132,8	639,4
SBGL	EUROPA	3,2	3,2	3,4	3,6	8,9	-7,2	12,6	4,4	2,2
SBGL	USA	1,6	1,8	2,7	3,4	26,9	34,5	32,8	31,3	33,6
SBGL	AM. LATINA(N)	0,5	0,6	0,6	0,7	11,2	-1,3	20,7	9,8	9,1
SBGL	ÁFRICA	0,3	0,4	0,5	0,4	22,6	8,5	-6,0	7,7	1,0
SBGL	AM. LATINA(S)	5,0	4,7	4,6	5,6	2,6	-13,0	28,5	4,7	5,8

Origem	Destino	Participação Relativa em SBGL (%)				Taxa de Crescimento Anual (%)				
		2007	2008	2009	2010	2007/ 2008	2008/ 2009	2009/ 2010	2007/ 2010	2008/ 2010
SBGL (DEP TOTAL)		100,0	100,0	100,0	100,0				0,75	-3,38

Tabela 1: Participação Relativa e Taxas de Crescimento (%) - SBGL

Origem	Destino	Participação Relativa em SBRJ (%)				Taxa de Crescimento Anual (%)				
		2007	2008	2009	2010	2007/ 2008	2008/ 2009	2009/ 2010	2007/ 2010	2008/ 2010
SBRJ	SBSP	57,3	58,0	44,8	34,0	9,6	7,0	-5,2	3,6	0,7
SBRJ	SBBR	1,7	1,8	7,0	10,2	9,1	456,3	81,0	122,3	217,3
SBRJ	SBCF	0,0	0,1	4,3	7,4	66,7	9760,0	114,2	606,1	1353,3
SBRJ	SBVT	0,8	0,7	3,4	5,5	-5,0	578,9	103,1	135,7	271,3
SBRJ	SBKP	1,0	1,0	4,2	5,4	9,2	480,7	59,1	116,1	204,0
SBRJ	SBGR	2,2	1,4	3,7	4,8	-33,3	279,5	61,4	59,83	147,5
SBRJ	SBJR	4,4	4,7	3,6	2,9	16,6	6,2	1,2	7,81	3,7
SBRJ	SBBH	4,3	4,4	3,4	2,7	11,3	6,6	0,0	5,85	3,2
SBRJ	SBCT	0,2	0,2	1,9	2,7	28,6	1094,4	75,8	200,0	358,3
SBRJ	SBRP	1,3	3,3	3,0	2,3	173,7	28,0	-5,5	49,1	10,0
SBRJ	SBPA	0,4	0,5	0,9	2,2	19,4	191,9	189,8	116,1	190,9
SBRJ	SBSV	0,4	0,4	0,7	1,6	20,7	142,9	165,9	98,3	154,1
SBRJ	SBME	3,8	3,0	1,6	1,5	-13,9	-26,2	16,9	-9,43	-7,1
SBRJ	SBGO	0,2	0,2	0,4	1,0	14,3	200,0	193,8	116,0	197,0
SBRJ (DEP TOTAL)		100,0	100,0	100,0	100,0				23,2	31,5

Tabela 2: Participação Relativa e Taxas de Crescimento (%) - SBRJ

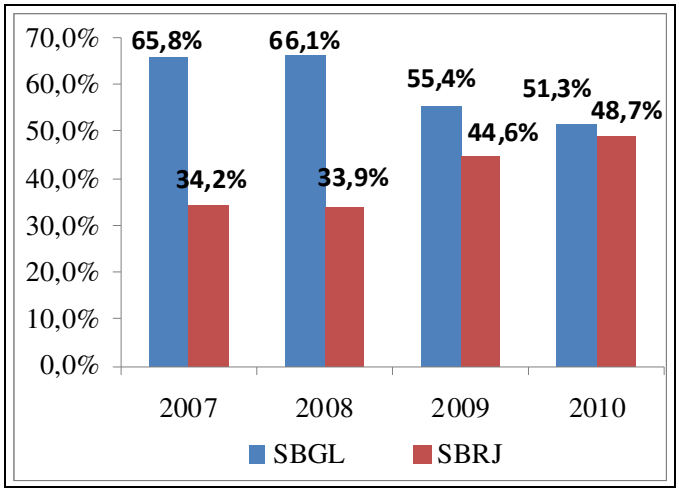


Figura 1: Evolução da participação de SBGL e SBRJ na TMA-RJ

Aeroportos	Pistas	Participação de Movimentação (2010) (%)
SBGL	Rwy 10 Rwy 15 Rwy 28 Rwy 33	59,8 14,7 16,7 8,8
SBRJ	Rwy 20 R Rwy 20 L Rwy 02 L Rwy 02 R	0,5 68,5 0,4 30,6

Tabela 3: Perfil de utilização das pistas para a TMA-RJ

1.2.5.11 Com base nos dados de participação relativa apresentados nas
1.2.5.12 e 2, foram obtidos os principais fluxos de tráfego aéreo da TMA-RJ, em 2010, que foram indicados na Carta de Área (ARC) da TMA-RJ (**Error! Reference source not found.**), para possibilitar o trabalho dos Planejadores de Espaço Aéreo.

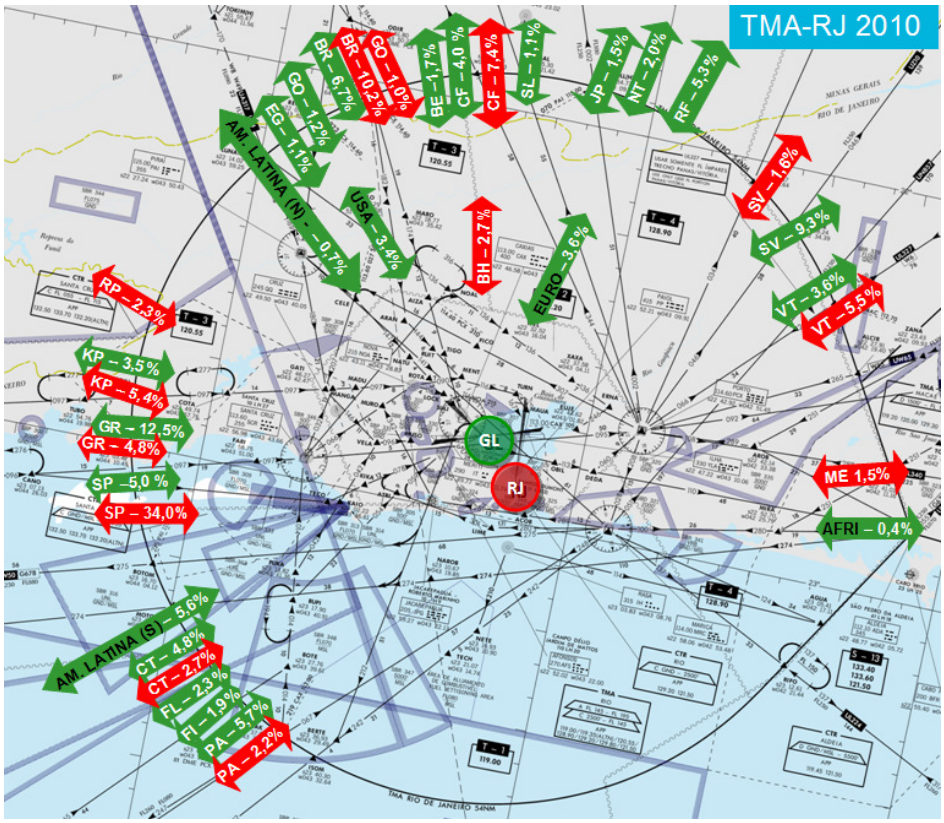


Figura 2: Principais Fluxos de Tráfego da TMA-RJ

1.2.6 TMA São Paulo

1.2.6.1 Com base nas estimativas dos dados históricos de movimentação, foram observadas tendências de variação dos movimentos de tráfego aéreo não esperadas na análise da série histórica, mais especificamente, as ligações com destino: SBAR, SBBE, SBBH, SBCY, SBFZ, SBGL, SBJP, SBLO, SBNF, SBNT, SBPA, SBRF, SBSL, SBSR e SBVT. Para esses casos, foram avaliados também os dados reais, utilizando os dados diários referentes ao período de 2007 a 2010. Contudo, não foram observadas diferenças significativas entre os dados reais e aqueles estimados.

1.2.6.2 No caso específico das ligações entre os aeroportos internacionais de Guarulhos (SBGR) e de Campinas (SBKP) e os aeroportos internacionais, consolidou-se a movimentação em cinco principais regiões de destino, quais sejam: África, América Latina (Norte), América Latina (Sul), Europa e USA.

1.2.6.3 Com base nos dados de tráfego anuais, com origem no aeroporto de Congonhas (SBSP), SBGR e SBKP, calcularam-se as participações relativas de cada ligação no aeroporto de origem e as taxas de crescimento anuais registradas no período de 2007 e 2010 (Tabelas 4, 5 e 6). Além disso, avaliou-se a evolução da participação de cada aeroporto na TMA-SP (Figura 3), bem como o perfil de utilização das pistas na TMA-SP (Tabela 4).

1.2.6.4 Definiu-se, como ponto de corte, para a apresentação das principais ligações com origem nos aeroportos SBGR, SBSP e SBKP, 1,0% de participação relativa do tráfego do aeroporto de origem acrescidas das ligações internacionais da TMA, o que totalizou 87%, 77% e 93% do tráfego dos aeroportos SBGR, SBSP e SBKP, respectivamente.

1.2.6.5 Foram assinaladas em amarelo, nas Tabelas 4, 5 e 6, os casos em que as taxas de crescimento entre os aeroportos (origem-destino) foram superiores a 12% a.a no período de 2007 a 2010.

1.2.6.6 Para cada par de aeroportos, buscou-se entender o comportamento do tráfego registrado no período analisado, identificando algumas situações atípicas ocorridas no período, como por exemplo, a abertura de SBRJ a outros voos comerciais, além da ponte aérea Rio de Janeiro/São Paulo e a operação de uma nova empresa no aeroporto de SBKP. Nessas análises, também foram observados aspectos da conjuntura econômica, como a crise mundial em 2008, ou o maior crescimento da economia brasileira no ano de 2010.

Origem	Destino	Participação Relativa em SBGR (%)				Taxa de Crescimento Anual (%)				
		2007	2008	2009	2010	2007/ 2008	2008/ 2009	2009/ 2010	2007/ 2010	2008/ 2010
SBGR	SBSV	6,3	6,8	6,9	6,6	12,6	10,2	13,9	12,2	12,0
SBGR	SBGL	9,3	7,7	7,4	6,3	-14,0	4,9	1,2	-3,0	3,1
SBGR	SBPA	4,7	5,0	6,2	5,6	10,7	35,4	8,4	17,6	21,2
SBGR	SBBR	4,3	4,8	5,5	5,6	15,7	25,2	20,4	20,4	22,8
SBGR	SBCT	3,8	3,7	4,3	4,5	2,5	25,5	25,3	17,2	25,4
SBGR	SBRF	4,1	4,4	4,7	4,4	11,2	18,1	10,1	13,1	14,1
SBGR	SBCF	2,7	3,0	3,6	3,6	15,1	30,4	18,9	21,3	24,5
SBGR	SBFZ	3,3	2,9	2,7	3,1	-9,5	-0,2	37,9	7,6	17,4
SBGR	SBFL	2,2	2,9	2,8	2,6	38,1	5,9	7,6	16,3	6,7
SBGR	SBRJ	0,4	0,3	1,7	2,4	-15,7	500,0	63,6	102,3	213,3
SBGR	SBEG	3,1	2,9	2,4	2,1	-5,2	-10,3	8,2	-2,7	-1,5
SBGR	SBNT	1,7	1,6	2,0	2,0	2,3	35,2	16,6	17,2	25,5
SBGR	SBRP	1,3	1,5	1,8	1,6	22,6	27,4	7,7	18,9	17,1
SBGR	SBCG	1,7	1,8	1,6	1,5	6,8	0,0	11,4	5,9	5,5
SBGR	SBSP	2,9	2,0	1,5	1,4	-28,6	-19,0	13,8	-13,0	-4,0
SBGR	SBMO	1,9	1,6	1,4	1,4	-10,9	-7,0	18,9	-0,5	5,2
SBGR	SBCY	1,2	1,0	0,9	1,3	-10,8	1,3	66,4	14,6	29,8
SBGR	SBFI	1,4	1,7	1,4	1,3	26,2	-5,7	5,1	7,8	-0,4
SBGR	SBGO	1,0	2,0	1,5	1,2	115,6	-15,6	-5,4	19,9	-10,6
SBGR	SBBE	0,4	0,4	0,9	1,2	21,3	116,5	58,1	60,7	85,0
SBGR	SBPS	0,7	1,1	1,1	1,1	54,4	13,5	11,9	25,2	12,7
SBGR	SBMT	1,3	1,1	1,1	1,1	-9,8	5,2	18,0	3,8	11,4
SBGR	AM. LATINA (S)	14,5	14,4	13,0	12,3	3,3	-2,0	13,1	4,6	5,3
SBGR	EUROPA	6,8	7,4	6,1	5,3	13,5	-10,2	4,2	2,0	-3,3
SBGR	USA	6,2	6,0	5,7	5,0	-0,3	4,4	5,0	3,0	4,7
SBGR	AM. LATINA (N)	1,7	1,8	1,7	1,6	13,6	1,5	14,9	9,8	8,0
SBGR	ÁFRICA	0,7	0,8	1,0	1,1	30,1	26,4	31,5	29,3	28,9
SBGR (DEP TOTAL)		100,0	100,0	100,0	100,0				10,5	13,8

Tabela 4: Participação Relativa e Taxas de Crescimento (%) – SBGR

Origem	Destino	Participação Relativa em SBSP (%)				Taxa de Crescimento Anual (%)				
		2007	2008	2009	2010	2007/ 2008	2008/ 2009	2009/ 2010	2007/ 2010	2008/ 2010
SBSP	SBRJ	18,3	22,7	22,2	20,5	4,0	4,6	-0,1	2,8	2,3
SBSP	SBBR	8,3	9,3	9,3	9,7	-6,1	7,4	12,0	4,1	9,7
SBSP	SBCF	5,6	7,0	6,6	6,6	5,5	0,6	7,6	4,5	4,0
SBSP	SBCT	7,1	6,6	6,0	6,0	-22,0	-1,5	7,7	-6,1	3,0
SBSP	SBPA	6,1	5,9	5,1	5,1	-18,7	-7,7	8,5	-6,6	0,1
SBSP	SBFL	4,2	4,6	4,0	4,1	-8,3	-6,9	11,1	-1,8	1,7
SBSP	SBGL	4,4	3,9	3,2	3,2	-27,4	-12,3	9,0	-11,5	-2,2
SBSP	SBGO	3,2	3,0	2,7	2,8	-21,4	-4,3	11,5	-5,7	3,3
SBSP	SBVT	2,1	2,7	2,9	2,8	7,1	15,2	4,3	8,7	9,6
SBSP	SBNF	1,9	2,2	2,1	2,2	-5,4	1,3	14,4	3,1	7,6
SBSP	SBUL	1,6	1,9	1,9	1,9	-3,4	5,7	10,1	4,0	7,9
SBSP	SBCG	1,4	1,7	1,7	1,7	2,3	11,3	6,5	6,6	8,9
SBSP	SBJV	1,5	1,7	1,7	1,7	-6,5	5,9	7,8	2,2	6,8
SBSP	SBRP	2,4	1,7	1,5	1,6	-40,3	-6,7	17,6	-13,2	4,7
SBSP	SBSV	1,7	2,4	1,6	1,6	17,4	-27,8	5,3	-3,7	-12,8
SBSP	SBSR	1,9	1,8	1,6	1,5	-17,0	-5,6	3,3	-6,8	-1,3
SBSP	SBLO	1,3	1,0	1,3	1,5	-39,6	44,4	27,7	3,6	35,8
SBSP	SBGR	1,4	1,1	1,2	1,2	-32,8	13,6	5,7	-6,9	9,6
SBSP	SBBH	1,8	0,8	0,9	1,1	-63,3	20,6	34,0	-16,0	27,1
SBSP (DEP TOTAL)		100,0	100,0	100,0	100,0				-1,1	7,6

Tabela 5: Participação Relativa e Taxas de Crescimento (%) – SBSP

Origem	Destino	Participação Relativa em SBKP (%)				Taxa de Crescimento Anual (%)				
		2007	2008	2009	2010	2007/ 2008	2008/ 2009	2009/ 2010	2007/ 2010	2008/ 2010
SBKP	SBCT	14,5	13,5	12,3	9,7	2,9	52,7	8,7	19,5	28,8
SBKP	SBCF	9,0	9,7	8,3	8,6	20,8	41,9	43,8	35,1	42,9
SBKP	SBRJ	0,3	0,6	6,7	8,5	166,7	1608,3	76,3	331,5	448,9
SBKP	SBSV	0,7	0,1	7,8	6,6	-79,2	9540,0	17,4	186,8	964,0
SBKP	SBGL	11,9	14,0	7,9	6,2	31,7	-6,2	7,8	10,0	0,6
SBKP	SBPA	1,2	0,6	7,8	5,8	-46,3	2077,3	3,5	129,6	374,8
SBKP	SBBR	9,8	8,6	5,5	5,7	-2,4	7,2	42,7	14,3	23,7
SBKP	SBRF	0,6	0,5	2,8	3,6	-5,3	866,7	76,4	152,8	313,0
SBKP	SBFL	2,1	2,2	1,4	3,3	14,1	6,2	222,1	57,4	84,9
SBKP	SBVT	0,1	0,0	3,9	3,0	-50,0	23700,0	8,4	405,3	1506,2
SBKP	SBNF	0,0	0,0	3,0	3,0	0,0	18300,0	37,5	532,5	1490,6
SBKP	SBFZ	0,2	0,2	2,5	2,7	12,5	1600,0	51,6	207,2	407,7
SBKP	SBGO	0,2	0,2	0,0	2,6	14,3	-62,5	7200,0	215,1	423,2
SBKP	SBCG	0,2	0,1	1,4	2,3	-50,0	2050,0	132,6	192,4	607,1
SBKP	SBBH	1,4	2,4	1,7	1,9	85,4	19,1	55,7	50,9	36,2
SBKP	SBMO	0,2	0,2	1,2	1,8	33,3	787,5	118,3	195,6	340,2
SBKP	SBGR	6,6	6,0	1,4	1,6	0,5	-59,5	57,3	-13,9	-20,2
SBKP	SBSP	4,2	2,9	1,4	1,5	-23,0	-20,6	47,1	-3,5	8,1
SBKP	SBNT	0,2	0,3	0,3	1,3	100,0	110,0	442,9	183,6	237,6
SBKP	SBEG	0,7	1,3	2,1	1,3	95,8	170,2	-15,7	64,6	50,9
SBKP	SBJD	0,0	1,7	2,7	1,1	---	164,5	-43,3	---	22,5
SBKP	SBCY	0,3	0,1	0,0	1,0	-44,4	-80,0	8700,0	113,8	319,5
SBKP	AM. LATINA (S)	13,6	14,3	8,0	7,3	17,5	-7,0	25,6	11,1	8,1
SBKP	EUROPA	0,1	0,2	0,0	0,2	105,9	-88,6	1975,0	69,6	54,0
SBKP	USA	2,7	2,5	1,2	1,1	2,1	-18,5	29,5	2,5	2,7
SBKP	AM. LATINA (N)	1,5	1,4	0,4	0,5	4,2	-55,0	100,0	-2,1	-5,1
SBKP	ÁFRICA	1,9	1,6	0,3	0,4	-3,0	-68,2	78,3	-18,1	-24,7
SBKP (DEP TOTAL)		100,0	100,0	100,0	100,0				36,8	51,9

Tabela 6: Participação Relativa e Taxas de Crescimento (%) - SBKP

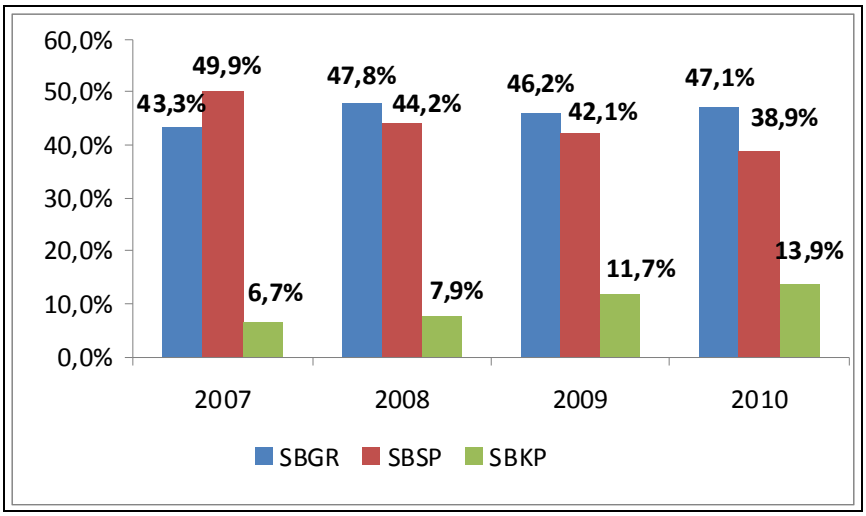


Figura 3: Evolução da participação de SBGR, SBSP e SBKP na TMA-SP

Aeroportos	Pistas	Participação de Movimentação (2010) (%)
SBGR	Rwy 09 R	41,4
	Rwy 09 L	41,9
	Rwy 27 L	8,5
	Rwy 27 R	8,2
SBSP	Rwy 17 R	57,0
	Rwy 17 L	6,8
	Rwy 35 L	32,8
	Rwy 35 R	3,4
SBKP	Rwy 15	77,4
	Rwy 33	22,6

Tabela 7: Perfil de utilização das pistas para a TMA-SP

1.2.6.7 Com base nos dados de participação relativa apresentados nas Tabelas 4, 5 e 6, foram obtidos os principais fluxos de tráfego aéreo da TMA-SP, em 2010, que foram plotados na ARC da TMA-SP (**Error! Reference source not found.**).

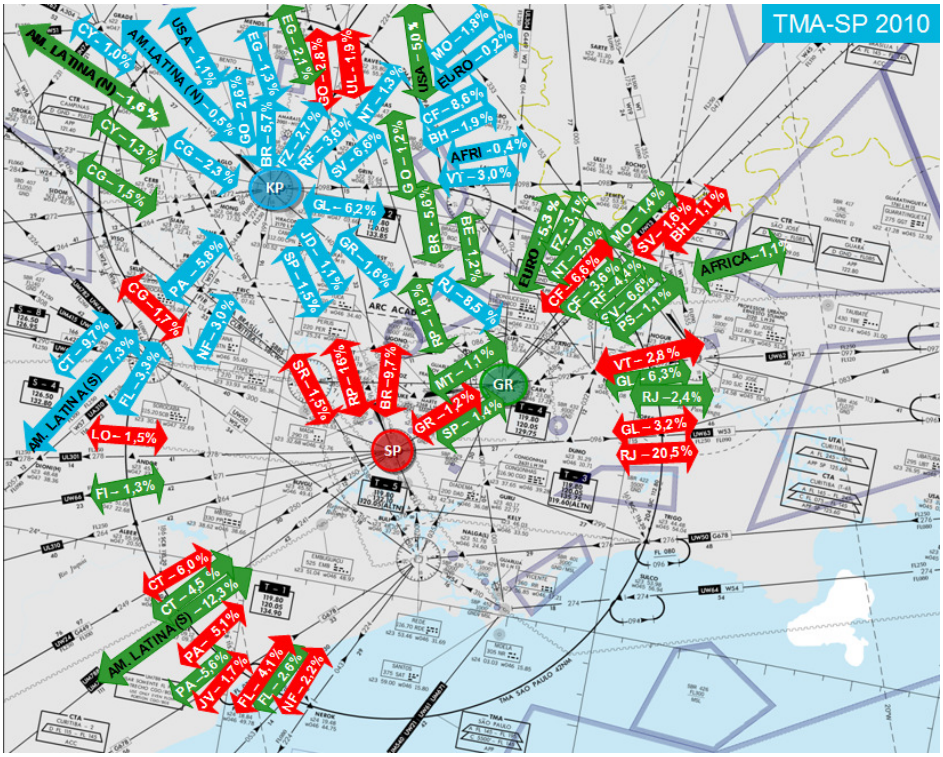


Figura 4: Principais Fluxos de Tráfego da TMA-SP

1.3 Analisar as projeções de tráfego para o espaço aéreo envolvido

1.3.1 Considerando que a previsão de implantação da PBN nas TMA-RJ e TMA-SP é abril de 2013, tornou-se necessária a análise da projeção da demanda no espaço aéreo envolvido, a fim de garantir que a implantação em questão atenda aos fluxos de tráfego aéreo esperados para o horizonte de tempo especificado. Desta forma, foram identificados os fluxos de tráfego entre os principais aeroportos do país e as TMA-RJ e TMA-SP para o ano de 2015.

1.3.2 Com base nos dados históricos de tráfego, avaliou-se o comportamento da série (2007 a 2010) para cada par origem-destino de aeroportos, buscando identificar possíveis tendências de crescimento. Contudo, não foi possível identificar nenhum comportamento típico que pudesse ser replicado como tendência de curto prazo.

1.3.3 Assim, optou-se por consolidar os dados históricos de movimento, agregando todas as ligações com origem nas TMA-RJ e TMA-SP e com destino nas demais unidades aeroportuárias. Definiu-se, como ponto de corte, para a apresentação das principais ligações, 1,0% de participação relativa do tráfego na TMA de origem acrescidas das ligações internacionais.

1.3.4 Com base nos dados de tráfego agregados, com origem na TMA-RJ e TMA-SP, calcularam-se as participações relativas de cada ligação para a TMA de referência e as taxas de crescimento anuais registradas no período de 2007 e 2010. Embora ainda se observe comportamentos atípicos para algumas ligações, a consolidação dos dados, em sua maioria, proporcionou uma melhor avaliação em termos de tendências de tráfego.

1.3.5 Para exemplificar a metodologia adotada, tomou-se como exemplo as ligações com origem em SBGR, SBSP e SBKP com destino a SBSV e consolidaram-se esses fluxos de tráfego entre a TMA-SP e SBSV. A partir dos dados históricos consolidados (Figura 5), foi possível identificar um comportamento mais previsível da série, podendo-se extrapolar este comportamento para o curto prazo (2015).

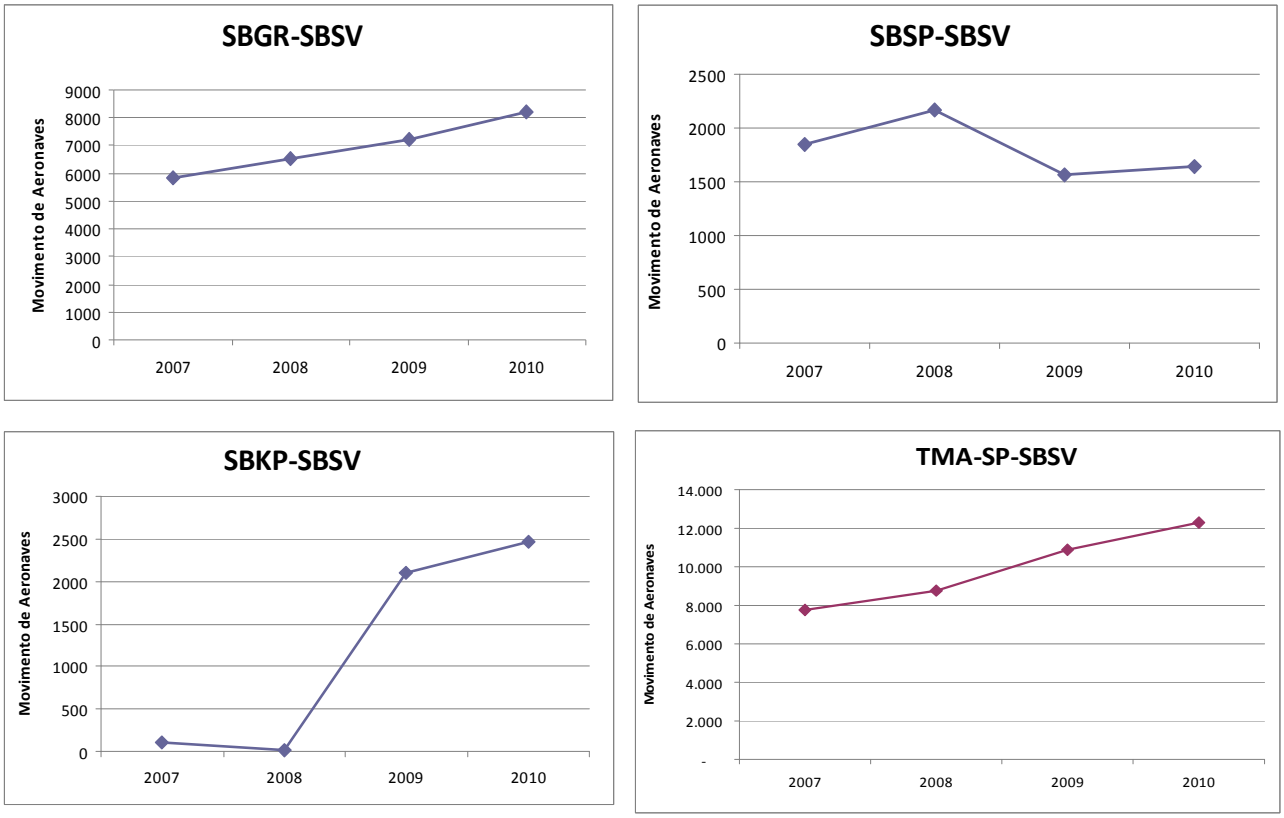


Figura 5 – Ligação origem TMA-SP e destino SBSV

1.3.6 Assim, o cálculo das previsões para 2015 baseou-se no comportamento registrado pela série histórica consolidada, considerando as taxas de crescimento anual registradas em cada ligação no período de 2007/2010, 2008/2010, 2007/2009, bem como em uma análise de regressão simplifica.

1.3.7 A análise para definição da taxa de crescimento futuro de cada ligação foi realizada observando-se: as características específicas do aeroporto de destino, questões relacionadas a restrições de capacidade de pista e pátio e de demanda reprimida (Tabela 8), possibilidade de privatização do aeroporto, bem com o padrão de comportamento das taxas de crescimento no período analisado. Dessa forma, foi possível definir a taxa registrada que melhor se ajustava ao comportamento esperado para a ligação (TMA-aeroporto) para o período de 2010 a 2015.

Fonte de Dados	Aeroportos com restrições de capacidade (pista ou pátio)
McKinsey & Company	SBGR; SBSP; SBKP; SBRJ; SBBH; SBBR; SBSV; SBCY; SBNT; SBFL; SBGO
Dados do CGNA	SBBR; SBCF; SBCT; SBKP; SBRJ; SBGR; SBSP

Tabela 8 – Aeroportos que apresentam demanda reprimida (2010)

1.3.8 A partir dos dados projetados de cada uma das principais ligações, estimou-se o volume absoluto de tráfego na TMA em 2015, considerando a mesma participação relativa do somatório das rotas em 2010, e obteve-se a participação relativa de cada ligação na TMA em 2015 (Tabelas 2 e 3).

1.3.9 Nas Tabelas 2 e 3, estão destacadas, em vermelho, as taxas consideradas para o cálculo das projeções, com base nas quais foi investigado se o crescimento futuro estimado será inferior ou superior a 12% a.a. Nesse sentido, obteve-se que 45% e 44% das ligações com origem na TMA-RJ e TMA-SP, respectivamente, registrarão crescimento superior a 12% a.a.

1.3.10 As Tabelas 9 e 10 apresentam, na coluna referente à participação relativa, um ordenamento dos nove principais fluxos de tráfego para os anos de 2010 e 2015, buscando avaliar possíveis alterações em termos de importância relativa das principais rotas.

1.3.11 Adicionalmente, as Tabelas 9 e 10 apresentam a partição do tráfego em 2010, em termos percentuais, entre os aeroportos com origem nas TMA-RJ e TMA-SP, respectivamente. Nesse sentido, considerando o crescimento estimado para 2015, assinalaram-se os aeroportos que deverão ser preponderantes, como origem, nas respectivas terminais.

1.3.12 Com base nos dados de participação relativa nas terminais apresentados nas Tabelas 9 e 10, plotou-se a ARC da TMA-RJ e TMA-SP para o ano de 2015 (Figura 6 e 7) e pode-se avaliar se deverão ocorrer mudanças significativas em termos de participação relativa entre 2010 e 2015.

Origem	Destino	Taxas de Crescimento (% a.a.)					Part Rel na TMA-RJ (2010) (%)	Part Rel na TMA-RJ (2015) (%)	Partição do Tráfego (2010)	
		07/10	08/10	07/09	Regr 1	Regr 2			SBGL	SBRJ
TMA-RJ	SBSP	0,6	-0,3	3,2	3,7	4,7	19,1 (1)	14,2 (1)	2,5	16,6
	SBGR	5,2	17,0	-1,8	10,7	16,8	8,8 (2)	11,8 (2)	6,4	2,4
	SBBR	11,2	9,0	10,2	7,3	10,5	8,4 (3)	8,8 (3)	3,4	5,0
	SBCF	16,0	14,7	16,7	9,8	16,0	5,7 (4)	7,0 (4)	2,1	3,6
	SBSV	9,8	8,5	6,4	6,1	8,3	5,6 (5)	5,1 (7)	4,8	0,8
	SBVT	6,6	6,2	5,0	4,8	6,0	4,6 (6)	3,8 (9)	1,9	2,7
	SBKP	37,8	44,6	38,8	15,1	39,2	4,4 (7)	5,5 (5)	1,8	2,6
	SBPA	23,6	17,3	13,3	10,1	18,8	4,0 (8)	4,6 (6)	2,9	1,1
	SBCT	14,6	2,7	13,5	7,9	12,2	3,8 (9)	4,1 (8)	2,5	1,3
	SBRF	5,6	5,6	2,0	3,6	4,3	3,0	2,5	2,7	0,3
	SBFZ	8,2	10,3	12,1	7,3	10,0	1,6	1,5	1,6	0,0
	SBBH	1,1	4,3	0,3	0,8	0,8	1,5	1,0	0,2	1,3
	SBFL	14,6	5,8	28,7	11,2	18,0	1,2	1,0	1,2	0,0
	SBRP	49,1	10,0	87,2	18,2	9,3	1,1	1,1	0,0	1,1
	SBGO	53,6	29,2	62,7	16,5	52,5	1,1	1,5	0,6	0,5
	SBNT	20,0	51,7	-16,8	21,0	59,6	1,0	1,6	1,0	0,0
	SBFI	32,7	20,9	39,7	14,3	33,2	1,0	1,2	1,0	0,0
	EUROPA	4,4	2,2	0,5	---	--- (12,6)	1,8	2,0	1,8	0,0
	USA	31,3	33,6	30,6	13,7	31,4 (26,9)	1,8	3,6	1,8	0,0
	AM. LAT (N)	9,8	9,1	4,8	5,8	7,9	0,4	0,3	0,4	0,0
	ÁFRICA	7,7	1,0	15,3	7,0	9,3	0,2	0,2	0,2	0,0
	AM. LAT (S)	4,7	5,8	-5,5	---	---	2,9	2,3	2,9	0,0
	TOTAL						100,0	100,0	51,3	48,7

Tabela 9: Taxas de crescimento e participação relativa (2015) – TMA-RJ

- Crescimento da TMA-RJ (2010/2015) = 10,1% a.a.

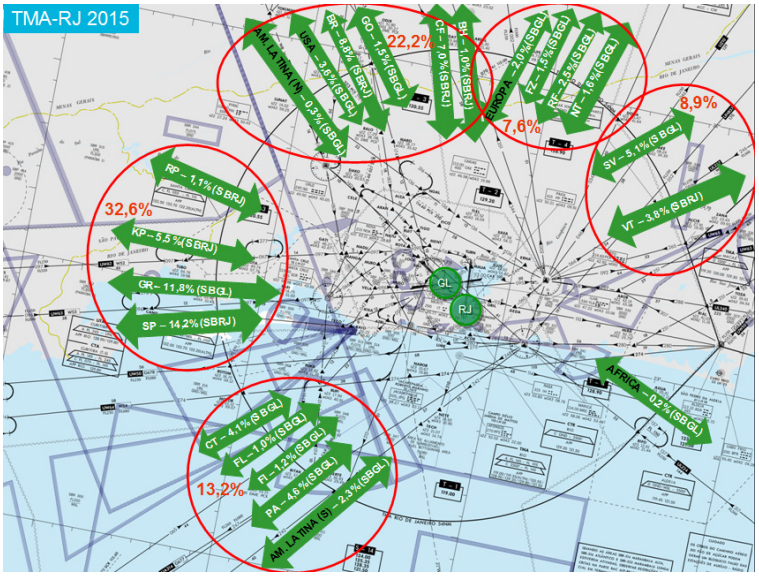


Figura 6: ARC Rio de Janeiro (2015)

Origem	Destino	Taxas de crescimento (%)					Part Rel na TMA-SP (2010) (%)	Part Rel na TMA-SP (2015) (%)	Partição de Tráfego (2010)		
		07/10	08/10	07/09	Regr 1	Regr 2			SBGR	SBSP	SBKP
TMA-SP	SBRJ	11,1	14,9	11,7	8,1	11,9	10,3 (1)	10,6 (1)	1,1	8,0	1,2
	SBBR	10,2	15,5	6,6	6,9	9,7	7,2 (2)	8,6 (2)	2,6	3,8	0,8
	SBCT	5,6	15,3	1,7	10,1	15,4	5,8 (3)	5,5 (5)	2,1	2,4	1,3
	SBCF	14,0	16,1	12,3	8,8	13,7	5,5 (4)	6,1 (3)	1,7	2,6	1,2
	SBPA	9,6	19,3	10,5	7,9	11,4	5,5 (5)	5,5 (6)	2,7	2,0	0,8
	SBGL	-3,8	1,3	-7,5	3,7	4,1	5,1 (6)	3,6 (7)	3,0	1,2	0,9
	SBSV	16,6	18,8	18,3	10,4	17,6	4,6 (7)	6,1 (4)	3,1	0,9	0,6
	SBFL	8,2	9,1	2,5	4,9	6,3	3,3	2,8	1,2	1,6	0,5
	SBRF	16,8	25,9	15,0	10,2	17,5	2,6	3,4	2,0	0,1	0,5
	SBGO	7,1	7,3	4,4	4,8	6,1	2,0	1,6	0,6	1,0	0,4
	SBVT	12,3	17,6	17,9	9,8	15,1	1,9	2,0	0,4	1,1	0,4
	SBFZ	13,7	30,9	2,2	15,0	30,3	1,9	2,3	1,4	0,1	0,4
	SBCG	13,6	18,8	10,0	8,4	13,1	1,7	1,6	0,7	0,7	0,3
	SBNF	20,0	37,7	17,6	11,5	21,8	1,4	1,5	0,2	0,8	0,4
	SBRP	-0,3	11,3	-6,3	8,1	11,2	1,4	1,4	0,8	0,6	0,0
	SBEG	1,9	5,1	-0,3	4,2	5,0	1,3	1,0	1,0	0,1	0,2
	SBNT	20,7	35,4	14,6	11,0	15,6	1,1	1,4	0,9	0,0	0,2
	SBUL	15,6	26,8	11,6	9,5	20,8	1,1	1,3	0,4	0,7	0,0
	SBCY	7,3	31,0	-15,4	14,6	28,7	1,1	1,3	0,7	0,3	0,1
	SBBH	10,9	10,9	2,6	14,6	27,8	1,0	1,0	0,2	0,4	0,3
	EUROPA	2,4	-2,9	0,9	1,8	2,0 (5,5)	2,5	1,9	2,5	0,0	0,0
	USA	3,0	4,6	1,4	2,4	1,5 (6,2)	2,5	2,0	2,4	0,0	0,1
	AM. LATINA (N)	8,5	6,6	3,4	4,9	6,4	0,8	0,7	0,7	0,0	0,1
	ÁFRICA	18,8	18,1	11,4	9,4	15,9	0,6	0,6	0,4	0,1	0,1
	AM. LATINA (S)	5,5	5,7	1,1	2,6	3,9	6,8	5,3	5,8	0,0	1,0
	TOTAL						100,0	100,0	47,2	38,9	13,9

Tabela 10: Taxas de crescimento e participação relativa (2015) – TMA-SP

- Crescimento da TMA-SP (2010/2015) = 11,4% a.a.

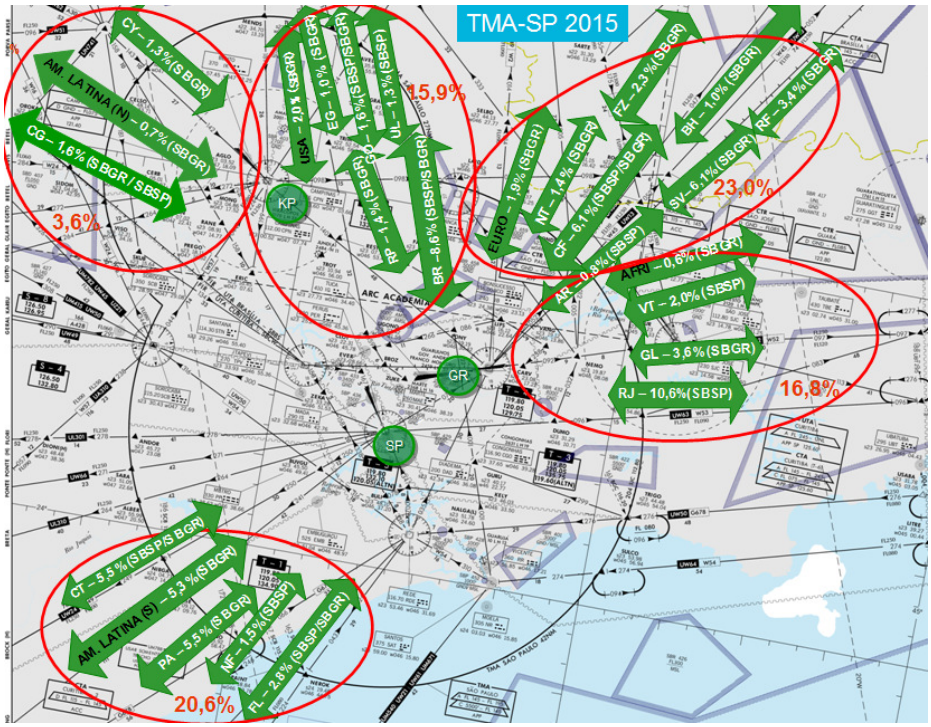


Figura 7: ARC São Paulo (2015)

1.3.13 Com base nos agrupamentos de rotas propostos e circulados em vermelho nas ARC da TMA-RJ e TMA-SP (Figuras 6 e 7), apresenta-se, nas Tabelas 11 e 12, o comparativo de participação relativa dos principais fluxos de tráfego para os anos de 2010 e 2015 nas respectivas terminais.

1.3.14 As projeções para o curto prazo (2015) dos agrupamentos assinalados em vermelhos e para as ligações individuais entre os aeroportos destacados nas ARC serão as referências para que os planejadores de espaço aéreo priorizem os pontos e entrada e saída dessas TMA.

	Participação Relativa na TMA-RJ (%)	
Ligações	2010	2015
SBSP, SBGR, SBKP, SBRP	33,4	32,6
SBBH, SBCF, SBGO, SBBR, USA, AM. LATINA (N)	18,9	22,2
SBCT, SBFL, SBFI, SBPA, AM. LATINA (S)	12,9	13,2
SBSV, SBVT	10,2	8,9
SBRF, SBFZ, SBNT, EUROPA	7,4	7,6

Tabela 11: Comparativo entre as participações relativas na TMA-RJ (2010 e 2015)

	Participação Relativa na TMA-SP (%)	
Ligações	2010	2015
SBCF, SBBH, SBNT, SBFZ, SBAR, SBSV, SBRF, EUROPA	20,3	23,0
SBCT, SBPA, SBNF, SBFL, AM. LATINA (S)	22,8	20,6
SBRJ, SBGL, SBVT, AFRICA	17,9	16,8
SBBR, SBEG, SBGO, SBUL, SBRP, USA	15,5	15,9
SBCY, SBCG, AM. LATINA (N)	3,6	3,6

Tabela 12: Comparativo entre as participações relativas na TMA-SP (2010 e 2015)

1.4 Analisar a capacidade de navegação da frota de aeronaves que opera nas TMA.

1.4.1 Foram consolidadas as informações estatísticas da operação de decolagens das aeronaves nos aeroportos de SBGR, SBSP, SBKP, SBGL e SBRJ. Estas informações foram segregadas por aeroporto, por empresa aérea e por tipo de aeronaves, visando à identificação da capacidade de navegação estimada da frota que opera nas TMA.

1.4.2 Devido às restrições de dados relativas a alguns tráfegos nos aeroportos em análise, optou-se por consolidar os dados de movimentação, agregando todas as informações de movimento de decolagens da seguinte forma:

a) Voos DOMÉSTICOS (PRINCIPAIS) – movimentação de aeronaves em voos domésticos das principais empresas nacionais, quais sejam: TAM, GOL, WEB, AZUL, PASSAREDO, AVIANCA e PANTANAL;
b) Voos DOMÉSTICOS (OUTROS) – movimentação relativa às aeronaves militares e de aviação geral;
c) Voos INTERNACIONAIS – movimentação de aeronaves em voos internacionais.

1.4.2.2 Outra consideração realizada no sentido de estimar a capacidade da frota nas TMA foi a retirar o movimento de decolagens de aeronaves de asa rotativa (9,9% do total do movimento do aeroporto) do item voos DOMÉSTICOS (OUTROS) para o aeroporto de Congonhas, que não interferem na circulação aérea das aeronaves de asa fixa, a fim de obter maior precisão nos resultados e devido à alta representatividade deste segmento de tráfego para o aeroporto.

1.4.2.3 Os representantes das empresas aéreas, TAM, GOL, WEB, AZUL, PASSAREDO, AVIANCA e PANTANAL, informaram as capacidades de navegação estimada da frota de suas aeronaves que operam nas FIR nacionais, embora não contem, necessariamente, com a aprovação formal da Agência Nacional de Aviação Civil.

1.4.2.4 Considerando as informações apresentadas pelas empresas aéreas, pode-se consolidar a capacidade da frota de acordo com a Tabela 13.

Empresas Aéreas	Quantitativo de Aeronaves	
	RNAV (GNSS e DME/DME/ INERCIAL)	RNAV (somente DME/DME/ INERCIAL) (Aeronave)
TAM	150	4 (A320)
GOL	129	-
WEBJET	-	24 (B737-300)
AZUL	33	-
PANTANAL	-	5 (ATR 42)
PASSAREDO	14	2 (EMB 120)
AVIANCA	3	13 (F100)
TOTAL	329	48

Tabela 43: Capacidade RNAV das aeronaves das principais companhias aéreas nacionais

1.4.2.5 Para exemplificar a metodologia adotada para estimar o percentual de operação a ser beneficiada com o projeto PBN, tomou-se como exemplo o aeroporto SBRJ. Para tal, para cada empresa, considerou-se o total de movimentos registrados no ano de 2010 e a capacidade RNAV de sua frota (Tabela 14).

EMPRESAS AÉREAS	VALOR ABS DEP. (2010)	PART. RELAT. (%)	VALOR ABSOLUTO	
			RNAV (GNSS e DME/DME/ INERCIAL)	RNAV (DME/DME/ INERCIAL)
TAM	15.813	24,3	15.402	411
GOL	13.654	21,0	13.654	-
WEB	4.714	7,2	-	4.714
AZUL	4.537	7,0	4.537	-
PANTANAL	131	0,2	-	131
PASSAREDO	1.447	2,2	1.266	181
AVIANCA	4.204	6,5	788	3.416
SUBTOTAL	44.500	68,3	35.648	8.852

Tabela 14: Quantitativo de movimentos de aeronaves que operaram RNAV no aeroporto SBRJ

1.4.2.6 Adotando o procedimento descrito para SBRJ para os demais aeroportos das TMA-RJ e TMA-SP, foi possível obter o quantitativo de movimento de aeronaves a ser beneficiado pela implementação do projeto PBN em cada uma das TMA (Tabela 15 e 16).

1.4.2.7 Cabe destacar que, aproximadamente, 11% do total de movimento em SBGL, 31% de SBRJ, 4% de SBGR, 10% de SBKP e 29% de SBSP são de voos DOMÉSTICOS (OUTROS) - aeronaves militares e de aviação geral - para os quais se desconhece a capacidade da frota. Nesse sentido, foi feita uma simulação considerando que 25% desses movimentos são operados por aeronaves com capacidade RNAV.

1.4.2.8 Assim, as Tabelas a seguir trazem a consolidação do quantitativo e participação relativa do movimento de aeronaves a ser beneficiado pelo projeto PBN para as TMA, considerando os dados históricos (2010) e simulados. Essas estatísticas foram segregadas nas Tabelas 15 e 16 considerando, respectivamente, a capacidade de operação RNAV (GNSS) e RNAV (GNSS/DME/DME/INERCIAL).

	VALOR ABSOLUTO (DEP)		PART. REL. (%)	
	HISTÓRICO (2010)	SIMULADOS (25%)	HISTÓRICO (2010)	SIMULADOS (25%)
SBGL	53.041	54.833	81%	84%
SBRJ	36.448	41.607	60%	64%
TMA-RJ	89.489	96.440	69%	74%
SBGR	101.596	102.861	83%	84%
SBSP	71.211	79.117	72%	72%
SBKP	32.575	33.676	87%	90%
TMA-SP	205.382	215.655	76%	80%

Tabela 15: Estimativa do percentual de operação RNAV (GNSS) a ser beneficiado com o projeto PBN na TMA-RJ e TMA-SP

	VALOR ABSOLUTO (DEP)		PART. REL. (%)	
	HISTÓRICO (2010)	SIMULADOS (25%)	ESTIMADOS	SIMULADOS (25%)
SBGL	58.246	60.038	89%	92%
SBRJ	45.300	49.569	69%	76%
TMA-RJ	103.456	109.607	79%	84%
SBGR	116.902	118.167	96%	97%
SBSP	79.165	86.171	72%	78%
SBKP	32.964	34.066	88%	91%
TMA-SP	229.031	238.404	85%	88%

Tabela 16: Estimativa do percentual de operação RNAV (GNSS/DME/DME/INERCIAL) a ser beneficiado com o projeto PBN na TMA-RJ e TMA-SP

1.4.2.9 Com base nos dados estatísticos e da característica da frota foi avaliada a capacidade de navegação da frota de aeronaves que operam nas TMA-RJ e TMA-SP e estimado o percentual de operações a ser beneficiado pelo projeto PBN, conforme resumo abaixo:

	Capacidade RNAV	
	GNSS	GNSS/DME/DME/INERCIAL
SBGL	81%	89%
SBRJ	60%	69%
TMA-RJ	69%	79%
SBGR	83%	96%
SBSP	72%	72%
SBKP	87%	88%
TMA-SP	76%	85%

Tabela 17: Resumo do percentual de operações a ser beneficiado pelo projeto PBN nas TMA

1.5 Desenvolver os ajustes necessários na estrutura de rota.

1.5.1 Com base nos dados estatísticos do projeto PBN, foram identificados os fluxos de tráfego entre os principais aeroportos do país e nas terminais TMA-RJ e TMA-SP para o ano de 2015.

1.5.2 Desta forma, considerando o conceito PBN em área Terminal, foram observados os fluxos ideais de entrada e saída, não apenas entre as TMA SP e RJ, como também das principais TMA do entorno: Curitiba, Brasília, Belo Horizonte (figura 8). O cenário ideal da estrutura de rotas servirá de base para a elaboração do conceito de espaço aéreo (STAR e SID) destas TMA.

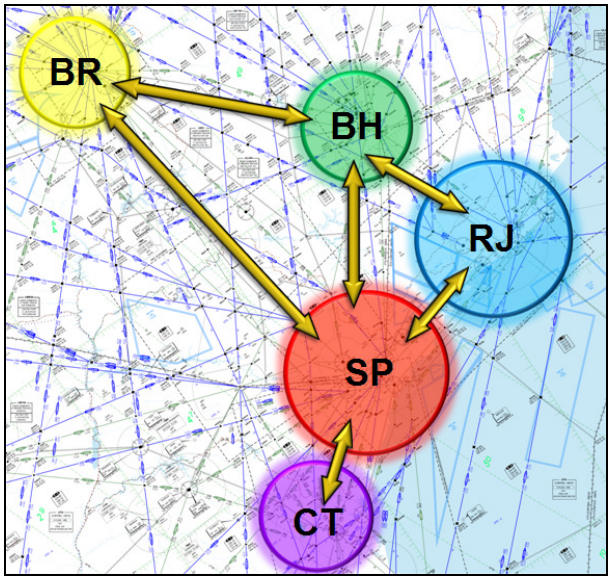


Figura 8 – Principais fluxos entre as TMA SP e RJ

1.5.3 Portões de entrada/saída das TMA

1.5.3.1 Para cada TMA elencada, São Paulo, Rio de Janeiro, Brasília, Belo Horizonte e Curitiba, foram estabelecidos os cenários ideais, baseados no Conceito PBN em TMA, conforme figura 9.

1.5.3.2 Neste conceito, denominado “Four Corner”, de acordo com o posicionamento físico das pistas do aeródromo, é estabelecido um quadrilátero fictício sobre o espaço aéreo da TMA e o aeródromo ao centro. A partir deste quadrilátero, a equipe de planejadores de Espaço Aéreo começa a construir um sistema de rotas e procedimentos de chegadas (STAR) e saídas (SID).

1.5.3.3 As aeronaves chegando entram no espaço aéreo em qualquer um dos 4 vértices do quadrilátero. As aeronaves partindo são direcionadas para qualquer um dos lados do quadrilátero. Este conceito aumenta a eficiência dos fluxos de tráfego aéreo no espaço aéreo da TMA e os cruzamentos acontecem próximo do aeródromo, de forma bem definida, liberando a ascensão da aeronave o mais breve possível. De igual forma, as STAR podem ser configuradas para permitir as Operações com Descida Contínua (CDO).

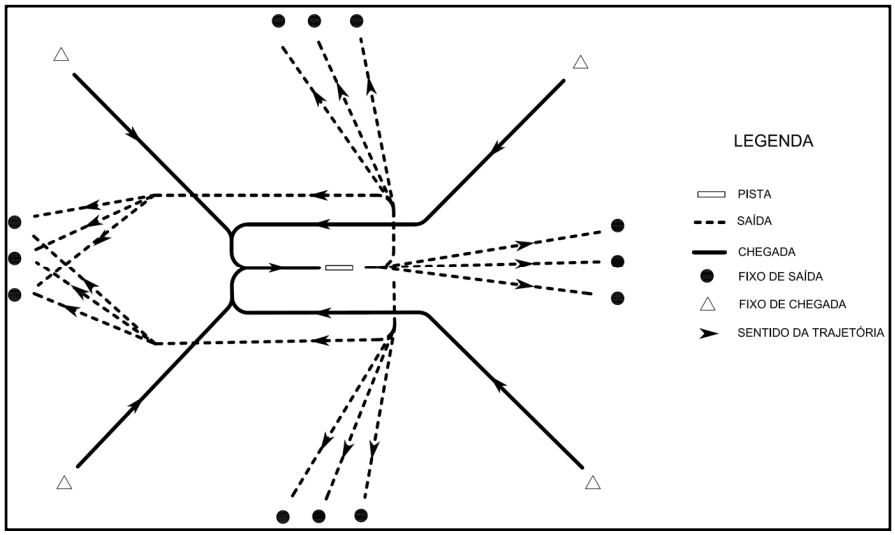


Figura 9 – Conceito “Four Corner”

1.5.3.4 TMA Brasília

2.5.3.4.1 A TMA Brasília, em 2010, teve seus procedimentos ajustados conforme o conceito “Four Corner”, portanto, seus portões de entrada e saída já estavam bem definidos. Todavia, para as aeronaves procedentes de São Paulo, para que sejam ajustadas para entrada nestes portões, elas necessariamente efetuam diversos cruzamentos, aumentando assim, tempo e distância de vôo. (figura 10).

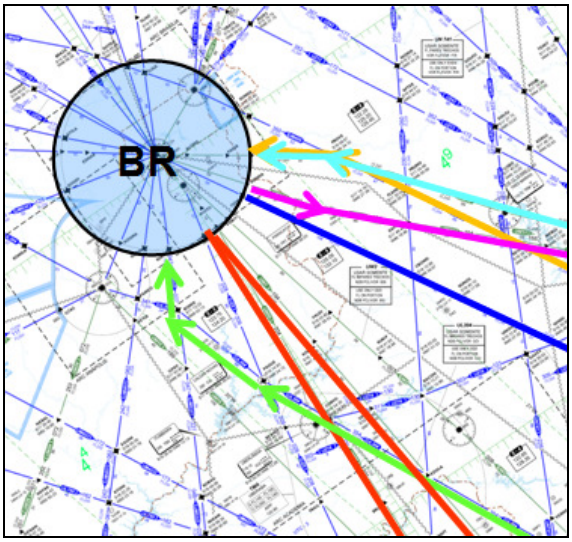


Figura 10 – Circulação em 2011 para a TMA-BR

1.5.3.5 TMA Belo Horizonte

2.5.3.5.1 A TMA BH já apresenta alguns problemas de circulação aérea para os dois grandes aeroportos: Confins e Pampulha. Com a atual rede de rotas, o principal problema encontrado é a impossibilidade de criação de portões de entrada/saída bem definidos nas ligações com RJ e SP, pois o setor de chegada de SP está no setor de saída para o RJ (figura 11).

2.5.3.5.2 Além destes fatos, a referida TMA está localizada em um ponto central da Região Sudeste, onde acontecem vários fluxos de tráfego aéreo em cruzamento, tais como: SP/Região NE/Europa, RJ/BR e VT/BR. Desta forma, a atual rede de rotas concentra considerável fluxo de tráfego aéreo sobre a TMA BH, congestionando o setor do ACC-BS naquela região da FIR.

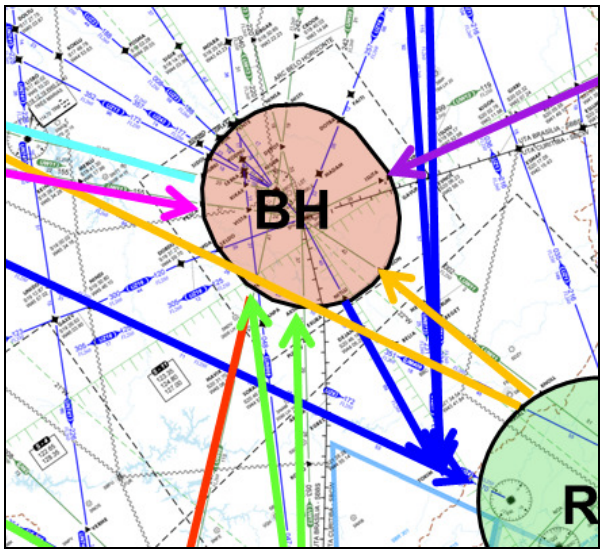


Figura 11 – Circulação em 2011 para a TMA-BH

1.5.3.6 TMA Curitiba

2.5.3.6.1 A avaliação da implantação do conceito PBN na TMA CT indica que os pontos de entrada e saída para aquela TMA estão invertidos, tomando como referência o fluxo entre esta TMA e a TMA SP. Entretanto, o realinhamento de rotas para a América do Sul e, consequentemente, para a Região Sul do país, será realizada na versão 2 da rede de rotas, prevista para outubro de 2013.

1.5.3.7 TMA São Paulo

2.5.3.7.1 Considerando a TMA de maior movimento do país, foi observado que, devido a complexidade da proximidade de 3 grandes aeroportos (SP, GR e KP), algumas rotas provocam vários cruzamentos nos setores do ACC-BS. Estes cruzamentos não são percebidos dentro da área terminal, contudo, quando se amplia o escopo de análise, são detectados diversos cruzamentos, tais como:

- Saída da TMA São Paulo e chegada na TMA Brasília – este cruzamento ocorre em rota.

As aeronaves partindo de São Paulo saem pelo setor NE da TMA e cruzam as chegadas de Brasília, no setor norte e as chegadas de BH, no setor nordeste, ocasionando aumento da complexidade do espaço aéreo (figura 12)

- Saída da TMA São Paulo e chegada na TMA Florianópolis, Porto Alegre e Navegantes – As aeronaves partindo de São Paulo, saem pelo setor Oeste da TMA e cruzam as chegadas oriundas da Região Sul do país para a TMA –SP. Estas chegadas ocorrem no setor Sul da referida TMA.

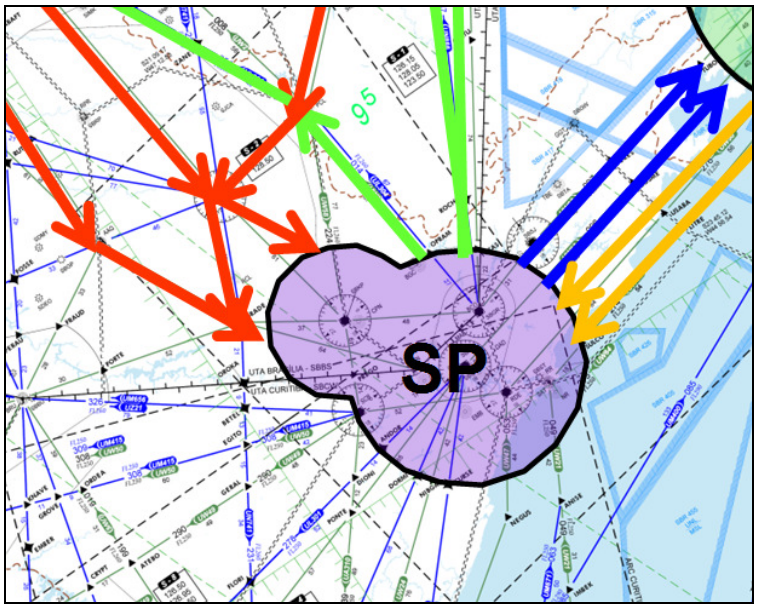


Figura 12 – Circulação em 2011 para a TMA-SP

1.5.3.8 TMA Rio de Janeiro

2.5.4.8.1 A TMA RJ apresenta os mesmos problemas observados na TMA SP: cruzamentos em rota e proximidade de aeroportos. Tais cruzamentos ocorrem entre a TMA RJ e TMA BH. As aeronaves procedentes de BH e Região NE, compulsoriamente cruzam as saídas da TMA RJ no setor ao norte da TMA, ocasionando também aumento de complexidade nos setores do ACC-CW (figura 13)

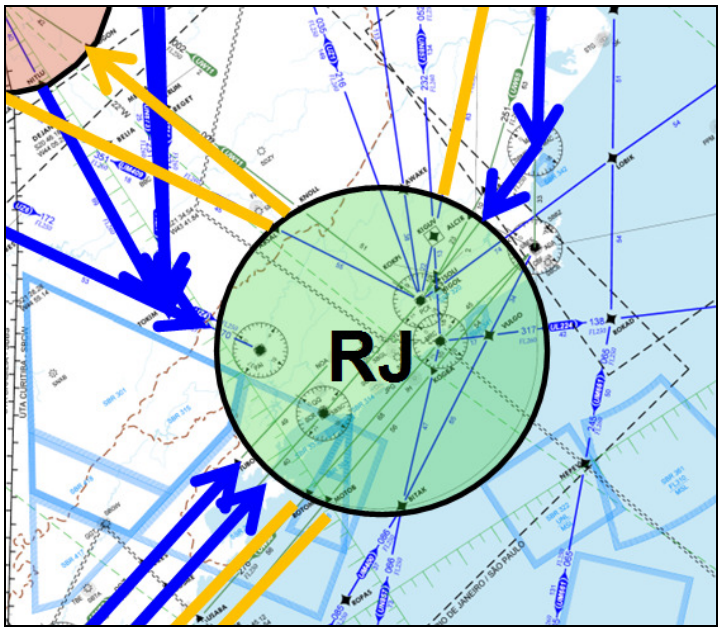


Figura 13 – Circulação em 2011 para a TMA-RJ

1.5.4 Reestruturação da rede de Rotas

1.5.4.1 A partir de todos os problemas apresentados, o estudo foi direcionado para a reestruturação da rede de rotas localizadas dentro do polígono que compreende as TMA SP, RJ, BR, BH e VT (figura 14)

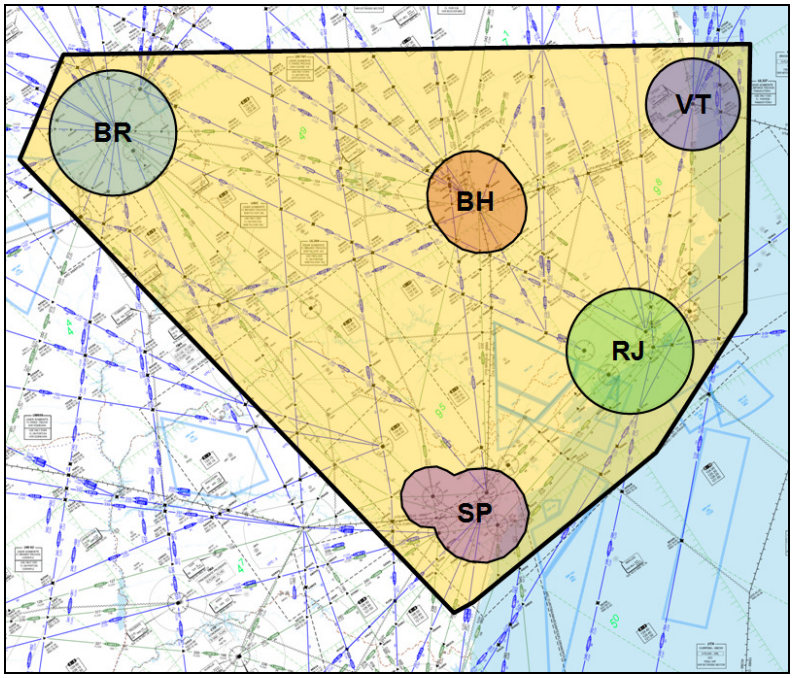


Figura 14 – Polígono que compreende as alterações de rotas

1.5.4.2 O polígono abrangeu também a TMA de Vitória, devido aos problemas de rotas que chegam ao setor NE da TMA RJ, bem como a possibilidade da ligação entre as TMA BR, VT e BH, que evita o sobrevôo na TMA BH.

1.5.4.3 O polígono não incluiu a TMA CT para não ocorrer, em uma mesma data, a mudança de toda circulação da Região Sul do país aliada à Região Sudeste. Além do grande volume de mudanças, a decisão de não alterar tais rotas está pautada no compromisso formal estabelecido na América do Sul de aplicação do conceito de versões de rede de rotas, que devem ser realizadas de forma harmonizada por todos os Estados envolvidos. Desta forma, a alteração de rotas RNAV na região Sul do país será realizada na versão 2 da rede de rotas SAM, prevista para outubro de 2013.

1.5.4.4 Todas as rotas foram elaboradas dentro dos parâmetros estabelecidos para RNAV-5, com rotas paralelas ligando as TMA, separadas em 18NM, nos casos de rotas bidirecionais, ou em 16,5 NM, nos caso de rotas unidirecionais. Tais rotas têm como objetivo a ligação destas TMA e acesso às demais regiões do país (norte e nordeste).

1.5.4.5 Durante a concepção da nova rede de rotas, tornou-se necessário o realinhamento das rotas ATS superiores com as rotas ATS inferiores e o estabelecimento de fixos comuns nestas aerovias, de forma a atender a ambas, superiores e inferiores, com vistas a reduzir a complexidade do espaço aéreo e o número de procedimentos a serem elaborados (SID/STAR) e, consequentemente, o número de cartas a serem publicadas.

1.5.4.6 As rotas com destino/procedência da TMA São Paulo (figura 15) foram desenvolvidas com vistas a atender:

- Saídas/Chegadas mais diretas para Brasília – desta forma foram criadas 4 rotas ATS paralelas, sendo duas mais externas de saída da TMA-SP e duas internas de chegada à TMA-SP. Neste sentido, pode-se ajustar a saída mais a oeste para os aeródromos de SP e KP, e a mais a leste para GR. Isto não impede de serem elaboradas saídas de GR para a aerovia que está mais a oeste, para gerenciamento de fluxo e contingência. Este arranjo possibilitou a criação de setores definidos de entrada/saída da TMA, além de rotas diretas entre os aeródromos envolvidos.
- Saída para a Região Norte do país e EUA – foi criada uma quinta rota ATS paralela às quatro descritas anteriormente, mais a leste, partindo de São José dos Campos para atender a Região Norte do país e EUA, sem o sobrevôo da TMA Brasília.
- As aerovias a leste da TMA, com destino a TMA RJ foram realinhadas, com separação de 10NM (serão as únicas rotas ATS RNAV 1). Com o propósito de se manter o alinhamento com as rotas ATS no espaço aéreo inferior (convencionais), buscou-se o alinhamento, com guia positivo de curso, por meio dos diversos auxílios à navegação em ambas as TMA (NDB e VOR).
- As rotas ATS entre as TMA-SP e TMA-RJ foram projetadas de forma a atender uma circulação independente entre os pares de aeroportos SBSP/SBRJ e SBGR/SBGL. Desta forma, o sentido destas rotas ATS será estabelecido de forma que as saída da TMA-SP serão ao centro e as chegadas a TMA-SP pelos extremos. Em abril de 2013 uma quinta aerovia será implantada na porção mais ao sul. Esta aerovia terá por finalidade atender as aeronaves em cruzamento. A aerovia mais ao norte atenderá a circulação de SBKP, que vem atingindo altas taxas de crescimento, além de atender possíveis aeronaves procedentes da região NE/Europa, que entram na TMA-RJ, com destino a SBGR e

SBKP.

- Foram criadas 3 rotas ATS paralelas partindo do setor NE da TMA-SP com destino a TMA-BH e Região NE do país e Europa. A rota mais ao norte, de duplo sentido, atenderá SBKP e ao fluxo para a região norte e Europa, evitando o sobrevôo da TMA Belo Horizonte. As duas outras rotas serão em sentido único, possibilitando a entrada pelo setor NE da TMA, com objetivo de contemplar um dos maiores fluxos da TMA-SP. Este sentido possibilitou a criação de setores de controle bem definidos de entrada/saída na TMA BH, em conjunto com as rotas que chegam naquela TMA procedentes da TMA RJ.

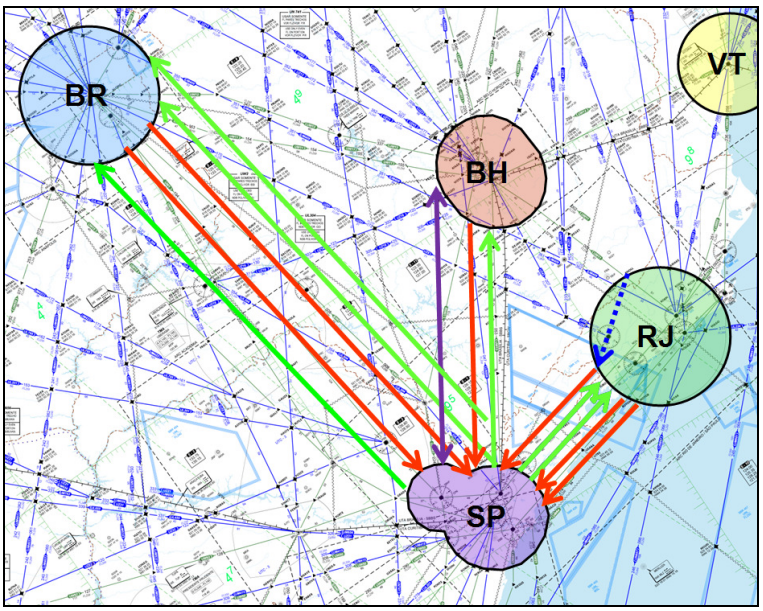


Figura 15 – Rotas ATS com origem/destino para TMA SP após reestruturação

1.5.4.7 As rotas com destino/procedência da TMA Rio de Janeiro (figura 16) foram desenvolvidas com vistas a atender:

- Circulação direta evitando cruzamento ao norte da TMA pelas aeronaves que procedem de BH e Região NE.
- As rotas ATS entre as ligações SP e RJ foram citadas no item anterior, e foram dispostas com vistas a atender circulações independentes entre pares de aeródromos;
- As rotas ATS com destino/procedência de Vitória foram realinhas, permitindo criação de setores de chegada e saída.

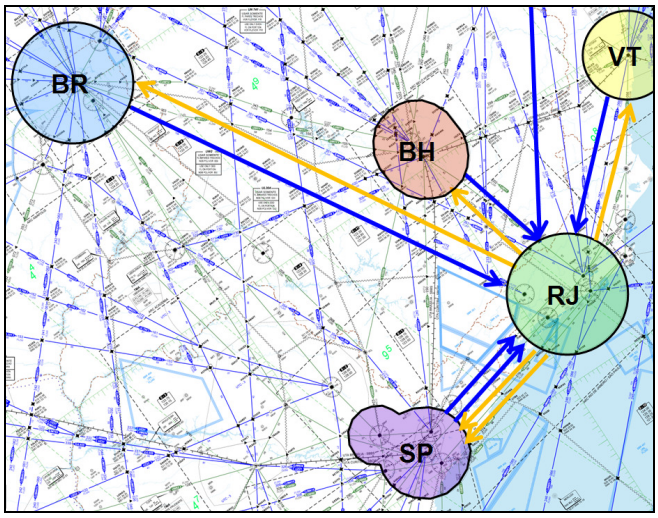


Figura 16 – Rotas ATS com origem/destino para TMA RJ após reestruturação

1.5.4.8 As rotas ATS com destino/procedência das TMA Brasília, Belo Horizonte e Vitória (figura 17) foram desenvolvidas com vistas a atender um aumento do fluxo entre os pares destas TMA, evitando-se o sobrevôo da TMA BH. Esta remodelagem inicialmente não estava contemplada, entretanto, devido ao posicionamento contiguo da TMA VT à TMA RJ, foi decidida a ampliação do escopo inicial.

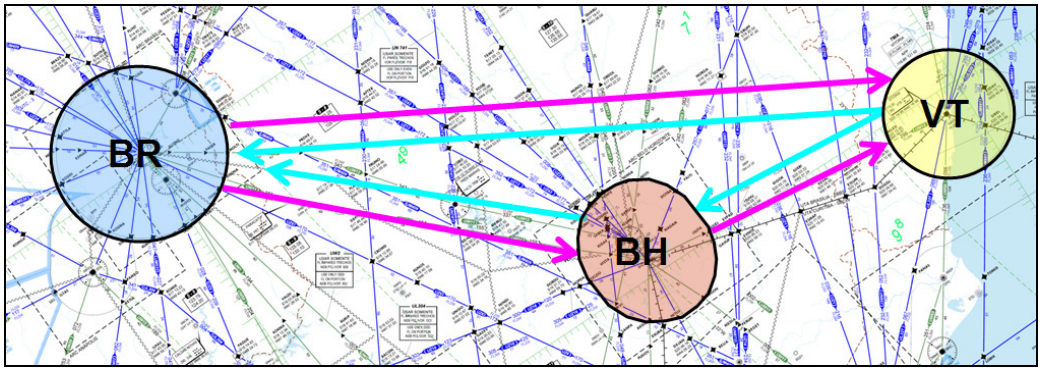


Figura 17 – Rotas ATS com origem/destino entre as TMA BR, BH e VT após reestruturação

1.5.4.9 Desta forma, com a reestruturação de rotas RNAV 5, pode-se observar uma diminuição na complexidade do espaço aéreo em rota, gerados atualmente pelo alto número de cruzamentos, comparando-se as figuras 18 e 19.

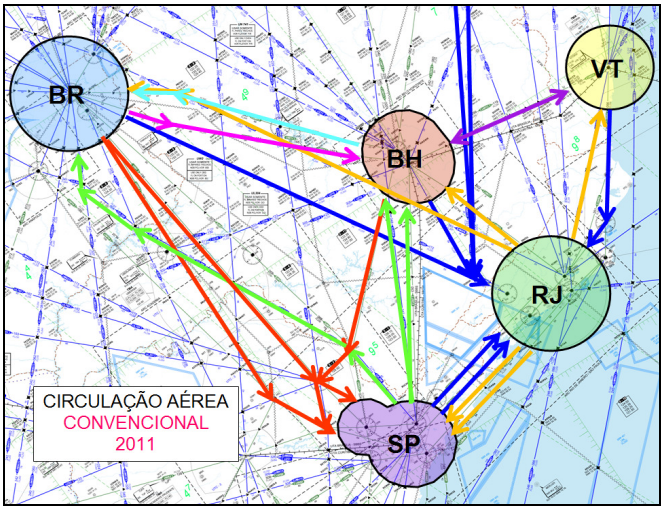


Figura 18 – Rotas com origem/destino entre as TMA antes da reestruturação

1.5.4.10 A data de entrada em vigor desta reestruturação foi estabelecida para março de 2012 (figura 18), ou seja, aproximadamente um ano antes da aplicação do conceito de espaço aéreo PBN nas TMA-RJ e TMA-SP. Tal antecipação permitirá um melhor gerenciamento dos recursos, em termos de capacitação e produção de todas as informações aeronáuticas necessárias, além de permitir uma melhor diluição de todo volume de alterações nos procedimentos em rota e em TMA.

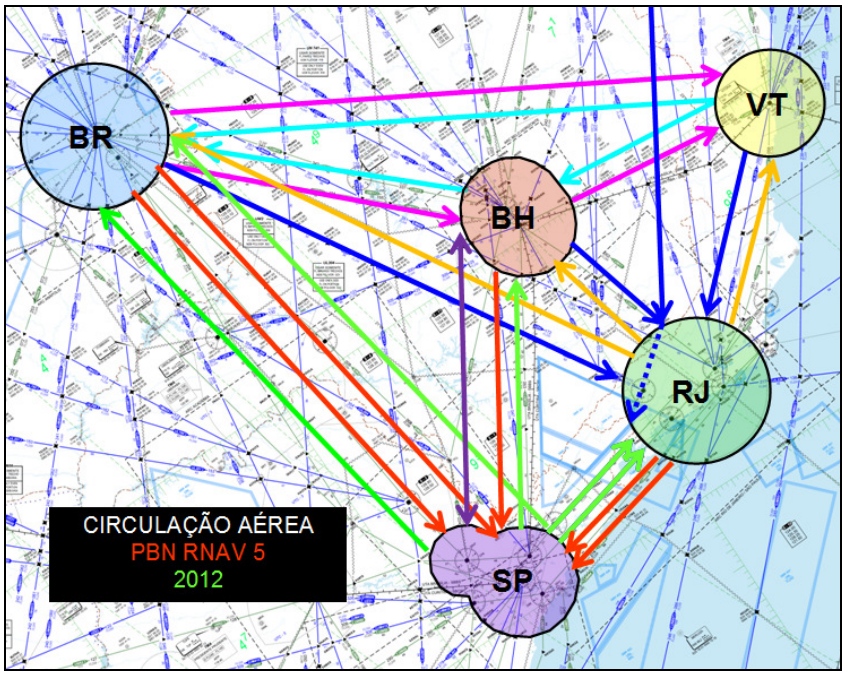


Figura 19 – Rotas com origem/destino entre as TMA após a reestruturação

1.5.4.11 Com a reestruturação nas rotas em Março de 2012, foi necessário estabelecer um plano de transição para garantir a compatibilidade entre a nova rede de rotas e a circulação aérea nas TMA-RJ e TMA-SP, que somente serão modificadas em Abril de 2013. A solução encontrada permitiu adaptar os

procedimentos existentes à nova rede de rotas e, desta forma, manter o status atual do "modus operandi" dos controles de aproximação do Rio de Janeiro e São Paulo (APP-RJ e APP-SP).

1.5.4.12 Para a reestruturação das rotas de Março 2012, foram estabelecidas rotas novas (a ser implantadas), rotas realinhadas e rotas canceladas parcialmente ou em sua totalidade. Estes eventos foram planejados tanto para o espaço aéreo superior, como para o inferior.

1.5.4.13 Considerando que a significativa reestruturação que será implementada na rede de rotas do centro sul, será necessária uma reavaliação da cobertura/geometria DME/DME e VOR/DME para operações RNAV-5, visando a publicação de eventuais restrições de emprego de sensores.

1.6 Versão inicial do Conceito do Espaço Aéreo da TMA Rio de Janeiro

1.6.1 A concepção da nova circulação aérea da TMA RJ, com base no Conceito de Navegação Baseada em Performance, foi desenvolvida com base nos objetivos estratégicos do projeto e em algumas premissas abaixo relacionadas:

a) Aumento da capacidade de navegação aérea RNAV da frota;
b) Crescimento do tráfego aéreo em um horizonte de 5 anos;
c) Circulação aérea independente entre os 2 principais aeroportos da TMA-RJ (SBGL e SBRJ); e
d) Novo portão de entrada no setor NE da TMA-RJ.

1.6.2 Em função da proximidade entre os dois principais aeroportos da TMA-RJ (cerca de 5 NM) e da existência de obstáculos naturais no entorno operacional, a circulação aérea reveste-se de significativa complexidade, tornando necessário o estabelecimento de diversos padrões operacionais, que criam dependências entre os tipos de operação nos dois aeroportos, que são determinadas, principalmente, pelas condições meteorológicas reinantes.

1.6.3 De posse desses dados, a circulação aérea foi planejada de forma a atender rotas mais diretas para estes aeroportos, minimizando os possíveis cruzamentos, de forma que as rotas de chegada fossem distintas para cada aeroporto.

1.6.4 Considerando o movimento de toda TMA, podem-se agrupar todas as ligações em cinco grandes fluxos:

a) Oeste - ligações com São Paulo, Guarulhos, Campinas e Ribeirão Preto;
b) Norte – ligações com Brasília, Confins, EUA, Goiânia e Belo Horizonte;
c) Sudoeste – ligações com Porto Alegre, Curitiba, América do Sul (cone sul), Foz do Iguaçu e Florianópolis;
d) Leste – ligações com Salvador e Vitória; e
e) Nordeste – ligações com Europa, Recife, Natal e Fortaleza.

1.6.5 Inicialmente, foram concebidos pelo menos três cenários distintos, com vistas a atender a metodologia de simulação fast-time do EUROCONTROL (Best Practices in the Development of Simulation Scenarios for Validation Activities in Fast and Real-Time Simulation). Tais cenários tentam

esgotar todas as possibilidades de circulação de forma que a ferramenta de simulação seja um auxílio na tomada de decisão em um momento anterior à utilização dos recursos de controladores e pilotos.

1.6.6 Todavia, em função do cronograma estabelecido, foram descartados alguns cenários e desenvolvidos dois cenários: cenário um, considerando uma alteração limitada da rede de rotas ATS, e cenário dois, considerando o cenário com a melhor configuração da rede de rotas no entorno do Rio de Janeiro.

1.6.7 Cenário 1

1.6.7.1 Neste cenário estão contidas poucas modificações de grande impacto, conforme abaixo descrito:

a. Sem modificações significativas na rede rotas ATS

b. Criação de mais um ponto de chegada no setor NE, com vistas a priorizar um setor de fluxo considerável. Foram concebidas rotas paralelas, permitindo maior capacidade de espaço aéreo.

c. Circulação convencional: os impacto à circulação convencional foram minimizados devido a sobreposição de rotas baseadas em auxílios no solo.

d. Sem alterações no limite da Terminal.

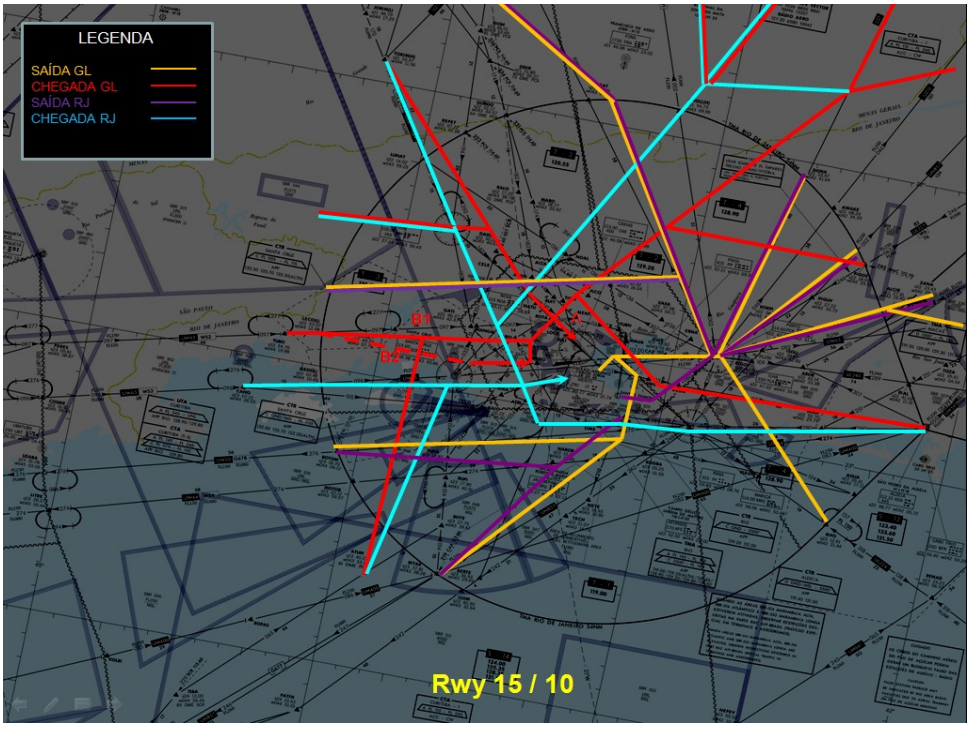


Figura 20 – Cenário 1

1.6.8 Cenário 2

1.6.8.1 O cenário dois contempla maiores modificações de grande impacto:

a. Modificações significativas na rede de rotas ATS, de acordo com o item 2.5 da presente nota de estudo

b. Criação de mais um ponto de chegada no setor NE, com vistas a priorizar um setor de fluxo considerável, além de dividir a carga de trabalho do ATCO. Foram concebidas rotas de saída e chegada paralelas, permitindo maior capacidade de espaço aéreo.

c. Ligação TMA-RJ/TMA-SP segregada: Segregação do fluxo entre as TMA-RJ e TMA-SP entre pares de aeroportos com uma rota ATS exclusiva para Guarulhos e Campinas, duas chegadas paralelas, sendo uma para o Galeão e outra para mais ao Sul para o Santos Dumont; além de outras duas saídas para Congonhas e Curitiba. Neste sentido há um ganho em redução de distância tanto para as aeronaves com destino a Guarulhos com decolagens do Galeão, quanto do Santos Dumont para Congonhas, com rotas mais diretas, privilegiando o maior fluxo da TMA-RJ.

d. O limite da TMA-RJ foi modificado para atender ao fluxo proveniente da região NE, permitindo um melhor gerenciamento do tráfego na STAR.

e. Os EAC, principalmente ao norte da ligação TMA-RJ/TMA-SP, deverão ser objetos de negociação de seus limites horizontais para melhor uso do espaço aéreo, assim como ter sua utilização flexibilizada, permitindo o seu uso por outros usuários nos momentos em que não estiver sendo empregado.

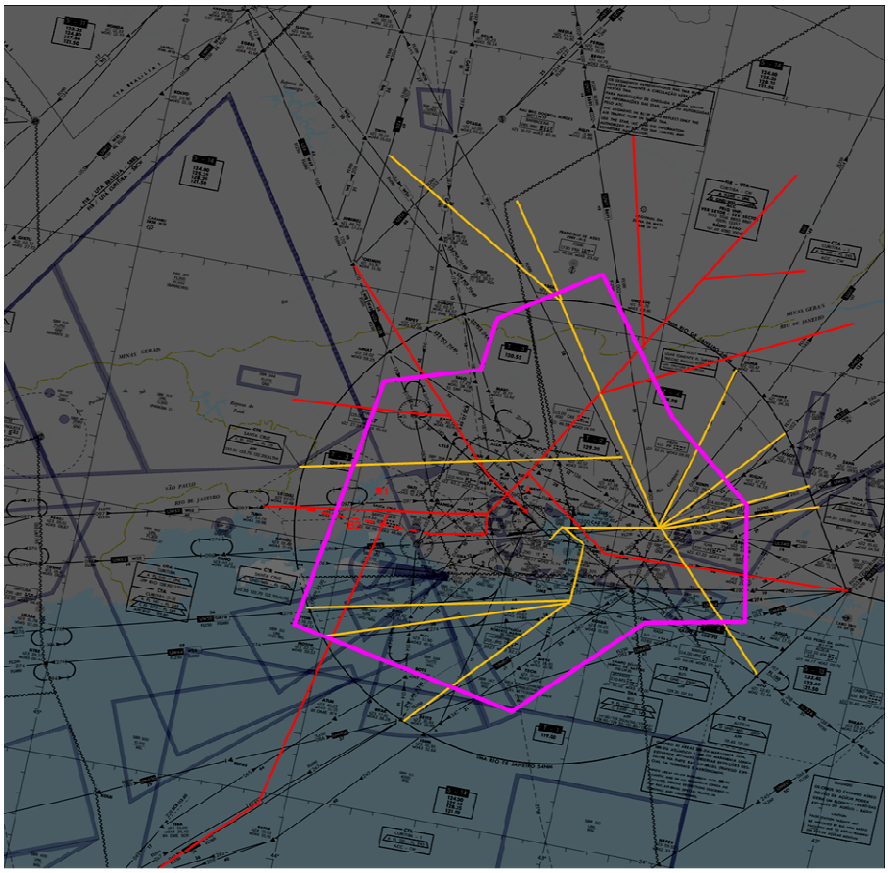


Figura 21 – Cenário 2

1.6.8.2 Todavia, por motivos de calendário para utilização do simulador fast-time, apenas um cenário será desenvolvido em plenitude, o cenário dois. Para este cenário todas as fases de simulação serão realizadas, tendo como comparação apenas o cenário Base line (atual). Este cenário será descrito a seguir.

1.6.9 Concepção dos Procedimentos

1.6.9.1 Foram planejados 210 procedimentos RNAV/RNP e 87 procedimentos convencionais para diversas fases do vôo (STAR, SID e IAC), totalizando cerca de 80 cartas, contemplando o crescimento do tráfego nos aeroportos envolvidos, bem como a operação independente entre eles.

1.6.10 Limite de TMA e Setorização

1.6.10.1 Limite da Terminal

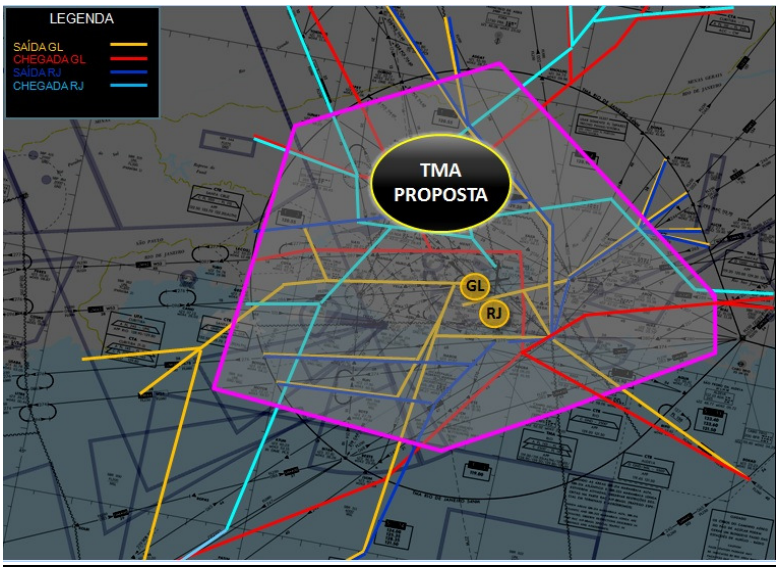


Figura 22 – Limtes TMA-RJ

2.6.10.1.1 Os limites da TMA-RJ foram planejados para atender ao fluxo proveniente da região NE, permitindo um melhor gerenciamento do tráfego aérea na chegada deste setor, além de desconsiderar as áreas em que não havia necessidade de provisão de serviço pelo Controle Rio, como o setor Leste e Sul, que foram reduzidos.

a. Setor 1 – Saída Oeste

Figura 23 – Setor 1 – TMA-RJ

i. Os limites do Setor um foram planejados para receber as decolagens do Santos Dumont e do Galeão, pista 28/33 com curva à esquerda, para os Setores Oeste e Sudoeste da Terminal. Receberá também as chegadas do Setor Sudoeste, quando a pista em uso em SBGL for a 28/33.

b. <u>Setor 2 – Chegadas Sudoeste e Oeste</u>

Figura 24 – Setor 2 – TMA-RJ

i. Os limites do Setor dois foram planejados para receber as chegadas dos Setores Oeste e Sudoeste da Terminal, as decolagens provenientes do Setor um que não consigam alcançar o nível mínimo para cruzamento do setor, além das decolagens da pista 28/33 do Galeão.

c. Setor 3 – Chegada NO, N e NE

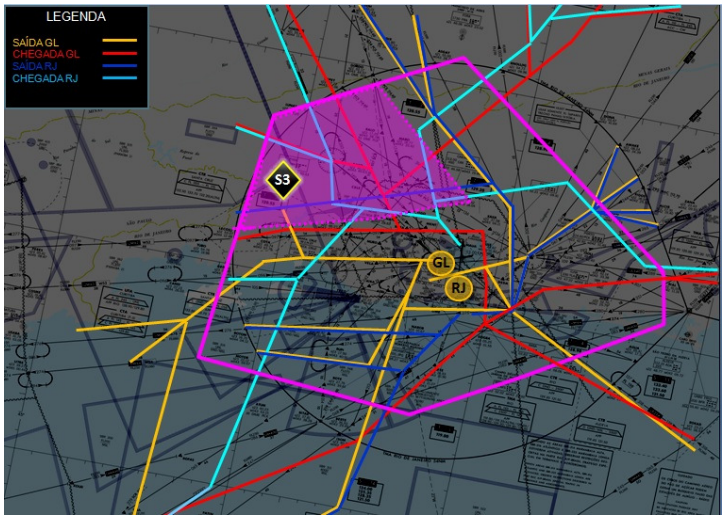


Figura 25 – Setor 3 – TMA-RJ

i. Os limites do Setor três foram planejados para receber as chegadas dos Setores Noroeste, Norte e Nordeste, além das saídas para a Rota ATS que atenderá ao fluxo com destino a Guarulhos e Campinas.

d. Setor 4 – Chegadas Norte e Nordeste

Figura 26 – Setor 4 – TMA-RJ

i. Os limites do Setor quatro foram planejados para receber as chegadas dos Setores Norte e Nordeste, além das saídas provenientes do Setor cinco que não consigam alcançar o nível mínimo para cruzamento do setor.

e. <u>Setor 5 – Saída Norte e Chegada Leste</u>

Figura 27 – Setor 5 – TMA-RJ

i. Os limites do Setor cinco foram planejados para receber as saídas do Santos Dumont para os setores Norte, Nordeste e Oeste, as saídas do Galeão pista 10/15, 28/33 com

curva à direita e àquelas com curva à esquerda para os setores Norte e Nordeste, além das chegadas do Setor Oeste da Terminal.

f. Setor 6 – Final Santos Dumont

Figura 28 – Setor 6 – TMA-RJ

i. Os limites do Setor final RJ foram planejados para receber todas as chegadas dos setores "alimentadores" supracitados com destino ao Aeroporto Santos Dumont, exceto quando as decolagens do Galeão forem com curva à esquerda, situação em que esse setor é incorporado ao Setor final Galeão RWY 28/33.

ii. Essa incorporação foi feita para simplificar a setorização, pois não haverá demanda para a parte Oeste do setor Final RJ, já que toda aproximação será via NDB YLA.

g. Setor 7 – Final Galeão

Figura 29 – Setor 7 – TMA-RJ

i. Os limites do Setor final GL (RWY 10/15) foram planejados para receber todas as chegadas dos setores "alimentadores" com destino ao Aeroporto Internacional do Rio de Janeiro (AIRJ), quando a pista em uso no Galeão for a 10/15.

h. <u>Setor 8 – Final Galeão 2</u>

Figura 30 – Setor 8 – TMA-RJ

i. Os limites do Setor final GL 2 (RWY 28/33) foram planejados para receber todas as chegadas dos setores "alimentadores" supracitados com destino ao Aeroporto Internacional do Rio de Janeiro (AIRJ), quando a pista em uso no Galeão for a 28/33

ii. Este setor é flexível, pois quando a pista em uso for a 28/33, este setor junta-se ao setor 7 (Final GL). Quando não estiver sendo aplicada esta configuração operacional, este setor une-se ao setor 5.

1.7 Versão inicial do Conceito do Espaço Aéreo da TMA São Paulo

1.7.1 A concepção da nova circulação aérea da TMA –SP, com base no Conceito de Navegação Baseada em Performance, foi desenvolvida com base nos objetivos estratégicos do projeto e em algumas premissas abaixo relacionadas:

a) Aumento do movimento de tráfego aéreo no Aeroporto de Campinas;
b) Aumento da capacidade de navegação aérea RNAV da frota;
c) Crescimento do tráfego aéreo em um horizonte de 5 anos;
d) Circulação independente entre os 3 grandes aeroportos da TMA-SP (SBGR, SBSP e SBKP);
e) Novo portão de entrada no setor NE da TMA-SP; e
f) Absorção do APP-SJ pelo APP-SP;

1.7.2 Desta forma, o estudo para a TMA de maior movimento do país, agrega elevado grau de complexidade, em função das seguintes variáveis:

a) Três grandes aeroportos com participação de movimentos e de fluxo entre pares de cidades e entre pares de aeroportos bem distintos entre si, que dificulta a formação de setores de saída e chegada;
b) Proximidade entre os principais aeroportos, que dificulta elaboração de procedimentos nos perfis ótimos de voo;
c) Topografia acidentada que prejudica o planejamento de saídas e chegadas, bem como cobertura de freqüência e estações baseadas no solo;
d) Mix de aeronaves que operam nestes aeroportos muito heterogêneos, criando a necessidade de elaboração de procedimentos com perfis distintos.

1.7.3 Considerando a participação dos três grandes aeroportos da TMA (Guarulhos, Congonhas e Campinas) pode-se observar claramente uma divisão homogênea entre Guarulhos e Congonhas, entretanto, nos últimos cinco anos, constata-se o crescimento da participação de Campinas e um ligeiro decréscimo nos dois outros aeroportos.

1.7.4 Desta forma, a concepção da circulação para a TMA SP considerou tal crescimento, bem como os fluxos de maiores movimentos entre estes aeroportos e os principais aeroportos do país, além das principais ligações internacionais.

1.7.5 A partir destes dados, a circulação aérea foi planejada de forma a atender rotas mais diretas para estes aeroportos, minimizando os possíveis cruzamentos, de forma que as rotas de saída e chegada fossem distintas para cada aeroporto.

1.7.6 Considerando o movimento de toda TMA, podem-se agrupar todas as ligações em cinco grandes fluxos:

a) Noroeste - ligações com Campo Grande, Cuiabá e países da América do Sul (cone norte);
b) Norte – ligações com Brasília, Goiânia, Manaus, Interior de São Paulo e EUA;
c) Nordeste – ligações com Belo Horizonte, Salvador, Recife, Fortaleza e Europa;
d) Leste – ligações com Rio de Janeiro, Vitória e África;
e) Sudoeste – ligações com Curitiba, Florianópolis, Porto Alegre e América do Sul (cone sul).

1.7.7 Os principais fluxos da TMA SP são sudoeste e nordeste. Comparando os dados estatísticos em 2010 com a projeção estimada para 2015, há um pequeno crescimento nas regiões de maior movimento, ocorrendo uma inversão entre as regiões de primeiro e o segundo maior movimento: nordeste e sudoeste.

1.7.8 Assim, o fluxo de maior movimento (nordeste), na projeção para 2015, é o menos favorecido em termos de distância e tempo voados. Como as ligações de chegada e saída foram planejadas priorizando os maiores fluxos, procurou-se adaptar a ligação nordeste para ingresso e saída da TMA pelo setor NE.

1.7.9 Da mesma forma que o mencionado no item 2.6, acerca do conceito do espaço aéreo da TMA-RJ, inicialmente, foram concebidos pelo menos 3 cenários distintos, com vistas a atender a metodologia de simulação fast-time do EUROCONTROL (Best Practices in the Development of Simulation Scenarios for Validation Activities in Fast and Real-Time Simulation). Tais cenários tentam esgotar todas as possibilidades de circulação de forma que a ferramenta de simulação seja um auxílio na tomada de decisão em um momento anterior à utilização dos recursos de controladores e pilotos.

1.7.10 Todavia, em função do cronograma estabelecido, foram descartados alguns cenários e desenvolvidos 2 cenários somente: cenário um, considerando uma alteração limitada da rede de rotas ATS, e cenário dois, considerando o cenário com a melhor configuração da rede de rotas no entorno do Rio de Janeiro.

1.7.11 Cenário 1

1.7.11.1 Neste cenário estão contidas poucas modificações de grande impacto, conforme abaixo descrito:

a. Sem modificações significativas na rede rotas ATS

b. Criação de mais um ponto de chegada no setor NE, com vistas a priorizar setor de maior fluxo. Foram concebidas rotas paralelas, permitindo maior capacidade de espaço aéreo.

c. Fluxo de Campinas: como os setores não serão alterados, haverá um acúmulo de tráfego aéreo com destino ou proveniente de Campinas na vertical de Congonhas, com vistas a atender as chegadas e saída para a região sul e Rio de Janeiro. Houve a necessidade de 4 janelas de altitudes de restrição sobrepostas.

d. Circulação convencional: os impacto à circulação convencional foram minimizados devido à sobreposição de rotas baseadas em auxílios no solo. Houve pequenos ajustes na circulação convencional, principalmente nas chegadas de Brasília e Nordeste.

e. Limite da TMA: o limite da TMA-SP foi modificado para atender ao fluxo proveniente da região NE, permitindo um melhor gerenciamento dos tráfegos na STAR, além de permitir a inclusão de São José dos Campos.

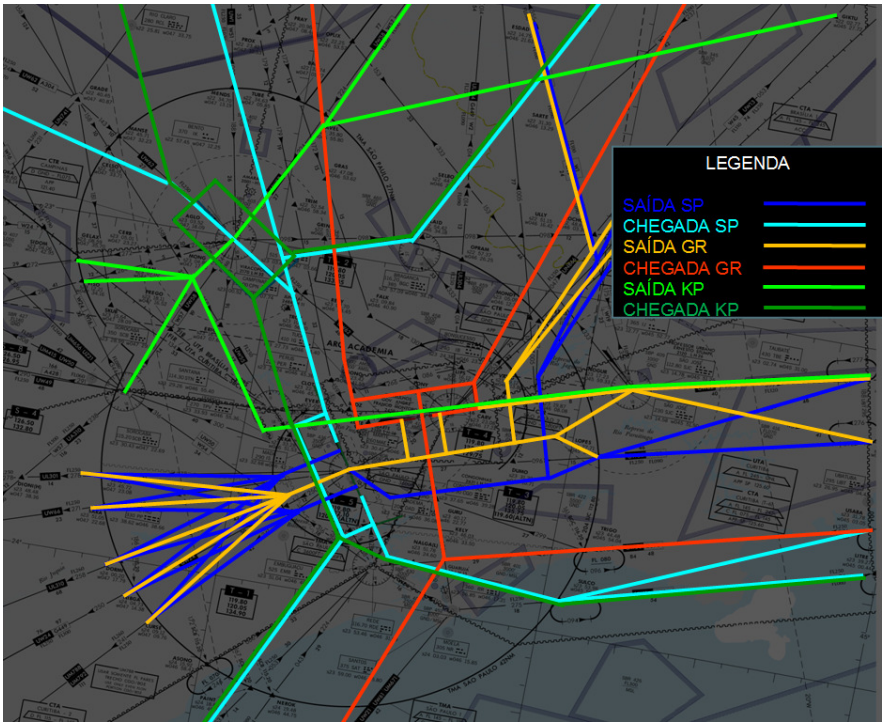


Figura 31 – Cenário 1

1.7.12 Cenário 2

1.7.12.1 O cenário 2 (figura 2) contempla maiores modificações de grande impacto:

a. Inversão de rotas: neste cenário há inversão de rotas entre as ligações TMA-SP e TMA-BR, TMA-SP e TMA-RJ (com a utilização do tubo segregado).

b. SID e STAR: seriam criados mais um ponto de chegada no setor NE, com vistas a priorizar o setor de maior fluxo. Foram concebidas rotas de saída e chegadas paralelas, permitindo maior capacidade de espaço aéreo.

c. Fluxo de Campinas: há uma separação do fluxo de Campinas. As rotas de saída e chegada para esta localidade evitam o centro da TMA onde se encontram os aeroportos de Congonhas e Guarulhos

d. Tubo segregado: a partir do movimento estatístico de aeronaves entre pares de aeroportos da TMA-SP e TMA-RJ e, com vistas a permitir fluxos segregados dentro das duas TMA, houve uma upgrade no conceito de inversão de rotas citado no item a. O tubo seria segregado entre pares de aeroportos. Há duas aerovias que fazem a ligação Guarulhos/Campinas e Galeão e outras duas que ligam Congonhas a Santos Dumont. Neste sentido há uma separação no mix de aeronaves da Ponte Aérea e demais aeronaves de maior porte. As chegadas do setor NE e Europa terão a opção de prosseguir via tubo para a TMA-SP.

e. Limite da TMA: o limite da TMA-SP foi modificado para atender ao fluxo proveniente da região NE, permitindo um melhor gerenciamento do tráfego na STAR, além de permitir a inclusão de São José dos Campos.

f. Setorização: com a inversão de rotas houve a necessidade de alteração de setorização. Dentro deste conceito, e com a criação de rotas de chegada no setor NE da TMA e de saída pelo setor NW, as setorizações necessitaram de ajustes para compor portões de chegada/saída.

g. Espaço Aéreos Condicionados: Os EAC, principalmente ao norte da ligação TMARJ/TMASP, deverão ter seus limites horizontais alterados para melhor uso do espaço aéreo, assim como ter sua utilização flexibilizada, permitindo o seu uso por outros usuários nos momentos em que não estiver sendo empregado.

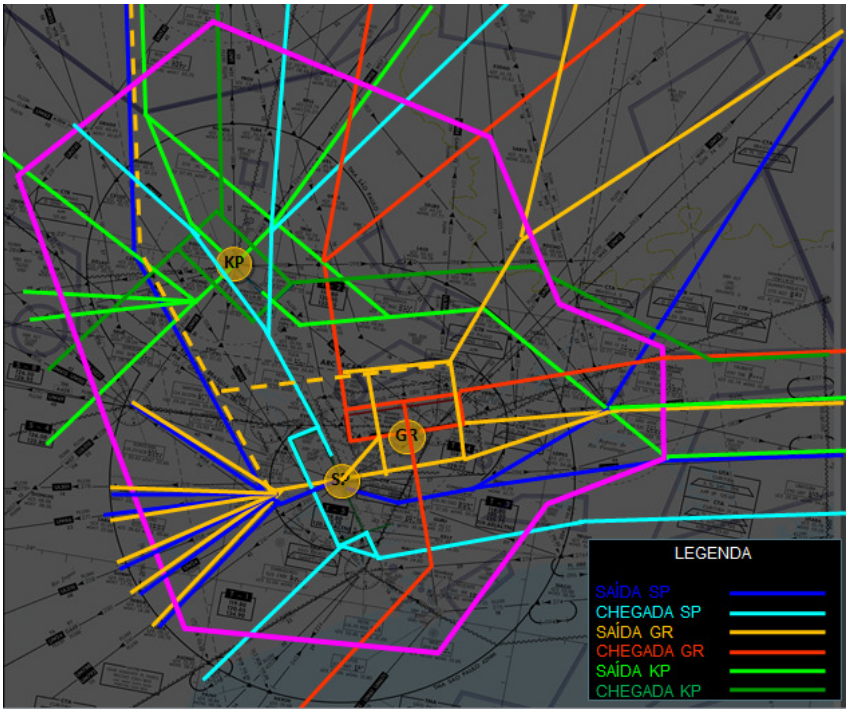


Figura 32 – Cenário 2

1.7.12.2 Todavia, por motivos de calendário para utilização do simulador fast-time, apenas um cenário será desenvolvido em plenitude, o cenário 2. Para este cenário todas as fases de simulação serão realizadas, tendo como comparação apenas o cenário Base line (atual).

1.7.13 Concepção dos Procedimentos

1.7.13.1 Foram concebidos cerca de 112 procedimentos RNAV/RNP e 112 procedimentos convencionais (Tabela 1) para as diversas fases do voo (STAR, SID e IAC), totalizando cerca de 60 cartas, que contemplam o crescimento do tráfego nos aeroportos envolvidos, bem como a operação independentes entre eles.

1.7.13.2 Todos os procedimentos foram planejados de forma a atender o tipo de navegação requerida. Desta forma, foram criados procedimentos convencionais (SID/STAR) apenas para as rotas ATS convencionais, assim como foram concebidos procedimentos RNAV apenas para rotas RNAV.

1.7.13.3 Esta estratégia, aliada ao realinhamento das rotas ATS superiores com as rotas ATS inferiores, e o estabelecimento de fixos comuns nestas aerovias, de forma a atender a ambas, superiores e inferiores, reduziu o número de procedimentos a serem elaborados e, consequentemente, o número de cartas a serem publicadas.

1.7.13.4 Mantendo a mesma estratégia de redução do número de cartas a serem elaboradas e confeccionadas, houve a preocupação em estabelecer um mesmo IAF, tanto para os procedimentos convencionais, como para os procedimentos RNAV, evitando a duplicação de STAR. Desta forma, mesmo que a aeronave/tripulação não seja homologada para RNP APCH, procedimento baseado exclusivamente em sensor GNSS, ela poderá ser conduzida para o mesmo IAF, com vistas a completar um procedimento convencional.

1.7.14 Limite de TMA e Setorização

1.7.14.1 A setorização procurou ser estabelecida por meio de setores distintos de chegada e saída. Tal conceito permite um melhor gerenciamento do tráfego e uma diminuição da complexidade do espaço aéreo.

1.7.14.2 O planejamento para a nova TMA e respectiva setorização compreenderá 12 setores, sendo 02 setores predominantemente de chegadas, 03 setores predominantemente de saídas, 01 setor híbrido com chegadas e saídas, 03 setores finais e 03 setores VFR (01 de helicópteros na final SP e 02 de aeronaves/helicópteros na TMA).

1.7.14.3 Limite da Terminal

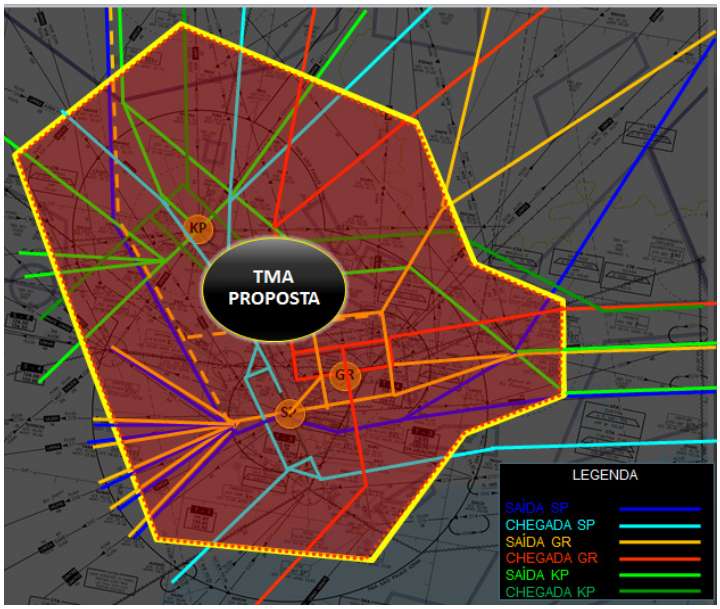


Figura 33 – Limite da TMA-SP.

O limite da TMA seguiu as diretrizes para planejamento do espaço aéreo em área terminal. Para tanto, esta área engloba somente o espaço aéreo necessário para conter os procedimentos previstos para TMA (SID, STAR, IAC). Desta forma, haverá menor restrição aos voos VFR no entorno da TMA.

a. Setor 1 – Chegada Sul

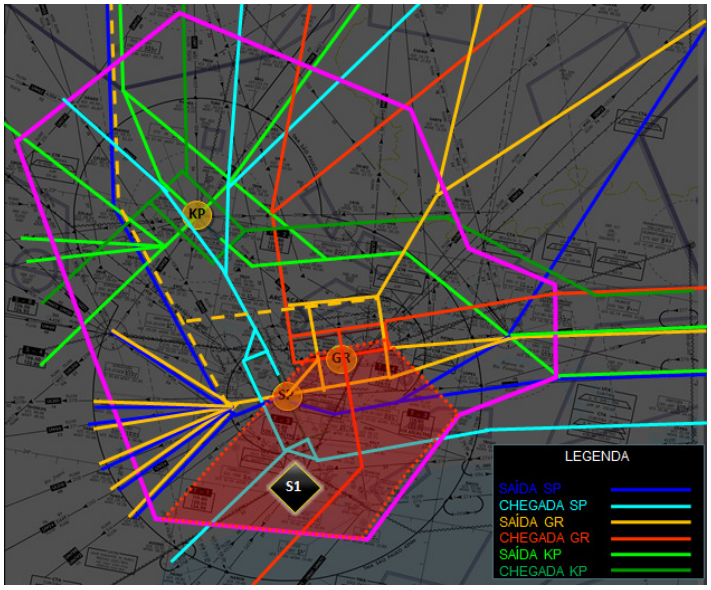


Figura 34 – Setor 1 da TMA-SP.

i. O setor 1 é predominantemente destinado às chegadas oriundas da Região Sul e àquelas procedentes do setor sul da ligação TMARJ/TMASP (procedentes de SBRJ), ambas com destino a SP e GR.
ii. Possui limite superior o FL195 e o limite inferior o FL055, exceto na porção sobreposta ao setor 6, quando então o limite inferior é o FL 120. Desta forma, as aeronaves com destino a SP e GR são transferidas diretamente aos setores finais.

b. Setor 2 – Saída Oeste

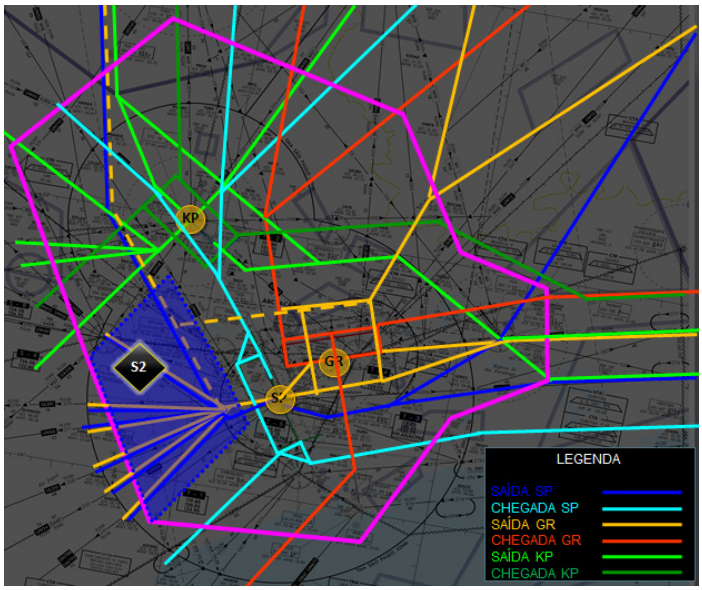


Figura 35 – Setor 2 da TMA-SP.

i. O setor 2 é predominantemente de saída com destino a Região Sul e Oeste da TMA SP, ambas procedentes de SP e GR.
ii. Possui limite superior o FL195 e o limite inferior o FL055, exceto na porção sobreposta ao setor final SP, quando então o limite superior é o FL 060 com vista a efetuar o cruzamento das aeronaves na perna do vento radar de SP. Desta forma, as aeronaves procedentes de SP após a decolagem chamam diretamente este setor.
iii. As aeronaves procedentes de GR, com destino a Região Sul e Oeste são transferidas diretamente pelo setor 6 a este setor.

c. Setor 3 – Saída Norte

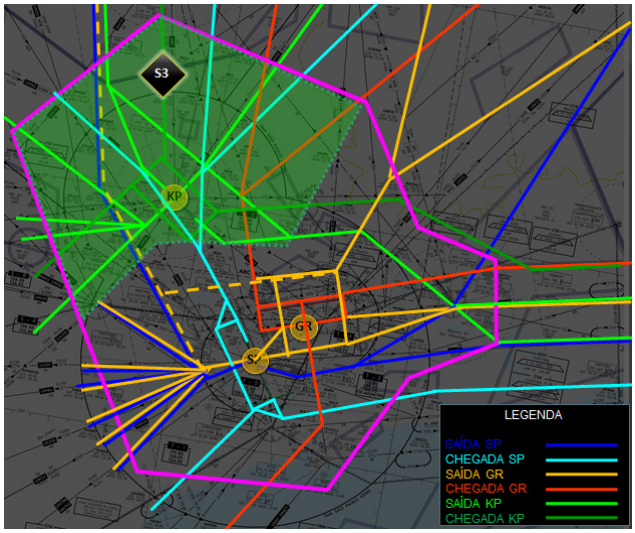


Figura 36 – Setor 3 da TMA-SP.

i. O setor 3 é predominantemente de saída com destino a Região Norte, Nordeste e Oeste da TMA SP, todas procedentes de KP.
ii. Este setor também será responsável pelas chegadas provenientes da Região Sul, e Leste (ligação TMARJ/TMASP) com destino a KP.
iii. Possui limite superior o FL120 e o limite inferior o FL055, exceto na porção sobreposta ao setor final KP, quando então o limite superior é o FL 060 com vista a efetuar o cruzamento das aeronaves na perna do vento radar de KP. Desta forma, as aeronaves procedentes de KP após a decolagem chamam diretamente este setor.
iv. As aeronaves procedentes de GR e SP com destino a BR, e que são de baixa performance, poderão adentrar este setor, transferidas pelo setor 2, caso não atinjam a altitude necessária para serem transferidas diretamente pata o ACC BS por aquele setor.

d. Setor 4 – Chegada Norte

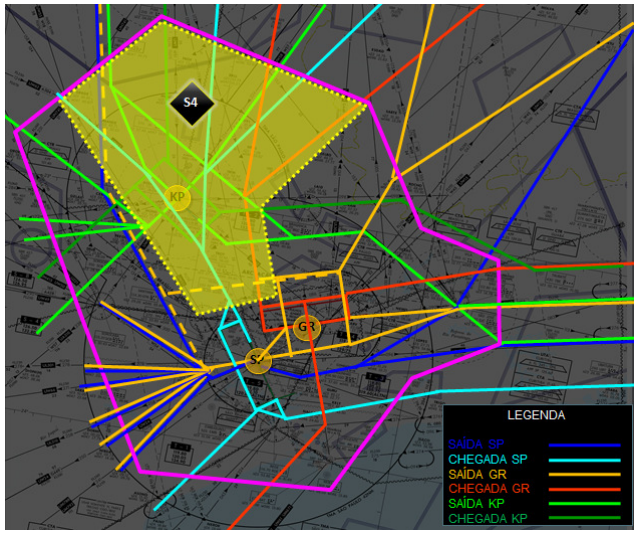


Figura 37 – Setor 4 da TMA-SP.

i. O setor 4 é predominantemente destinado às chegadas oriundas da Região Norte, Oeste e Nordeste, com destino a SP, GR e KP.
ii. Possui limite superior o FL195 e o limite inferior o FL055, exceto na porção sobreposta ao setor 3, quando então o limite inferior é o FL 120. Desta forma, as aeronaves com destino a SP e GR são transferidas diretamente aos setores finais.

e. Setor 5 – Saída Nordeste

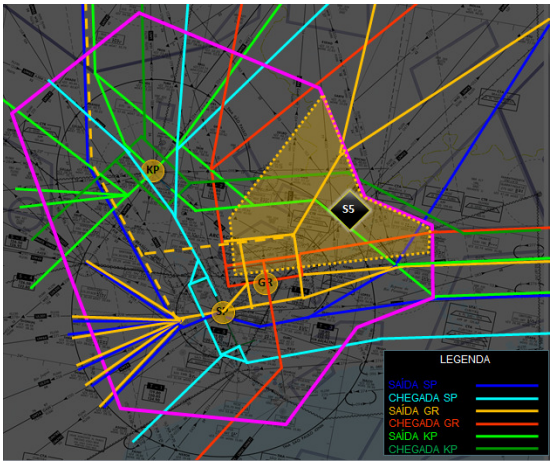


Figura 38 – Setor 5 da TMA-SP.

i. O setor 5 é híbrido, tanto com chegadas como saídas. As saídas têm como destino a Região Norte e Nordeste da TMA SP, procedentes de GR, as chegadas para GR procedente da ligação TMARJ/TMASP e as saídas e chegadas de KP, com destino/procedente da ligação TMARJ/TMASP .

ii. Possui limite superior o FL195 e o limite inferior o FL055, exceto na porção sobreposta ao setor final GR, quando então o limite superior é o FL 060 com vista a efetuar o cruzamento das aeronaves na perna do vento radar de GR. Desta forma, as aeronaves procedentes de GR após a decolagem chamam diretamente este setor.
iii. As aeronaves procedentes de KP, com destino à TMA-RJ são transferidas diretamente pelo setor 3 a este setor, e vice-versa.

f. Setor 6 – Saída Leste

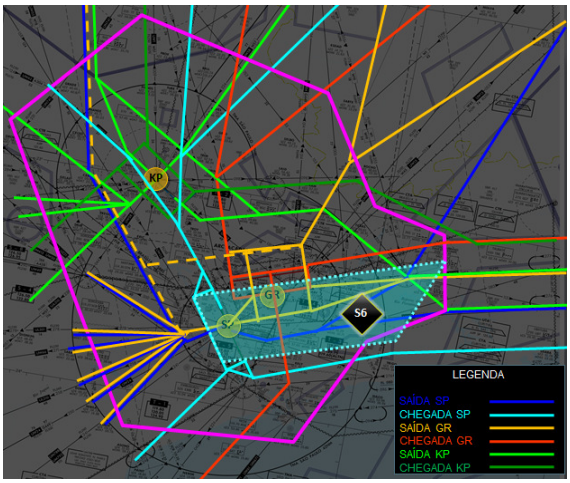


Figura 39 – Setor 6 da TMA-SP.

i. O setor 6 é predominantemente de saída com destino a Região Leste da TMA SP, procedentes de GR e SP
ii. Possui limite superior o FL195 e o limite inferior o FL055, exceto na porção sobreposta ao setor final SP, quando então o limite superior é o FL 110, com vista a efetuar o cruzamento das aeronaves na perna do vento radar de SP, e na porção sobreposta ao setor 1, quando o limite superior é o FL 060, com vistas a efetuar cruzamento das aeronaves nas STAR com destino a GR. Desta forma, as aeronaves procedentes de GR após a decolagem chamam diretamente o setor 2 e as aeronaves nas STAR de Gr chamam diretamente o setor final.

g. Setor 7 – Final Guarulhos

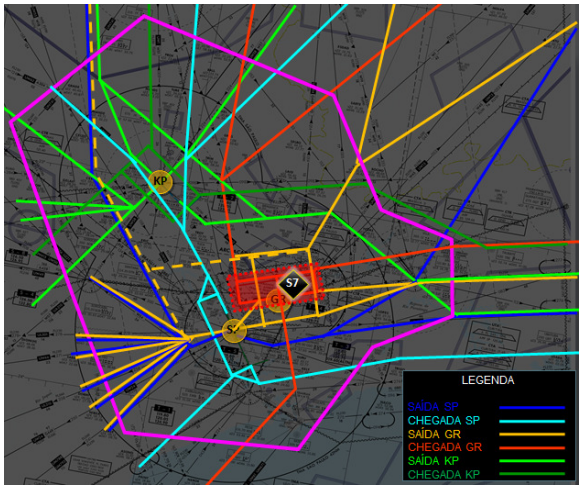


Figura 40 – Setor 7 da TMA-SP.

i. O setor 7 é destinado às chegadas/aproximações com destino a GR
ii. Possui limite superior o FL110 e o limite inferior o GND.

h. Setor 8 – Final São Paulo

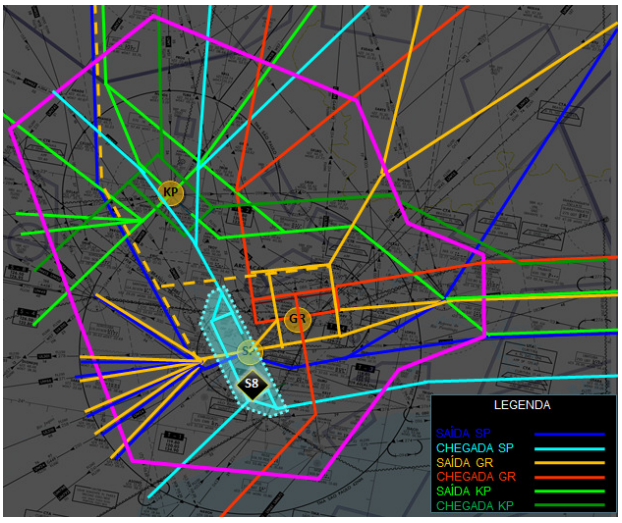


Figura 41 – Setor 8 da TMA-SP.

i. O setor 8 é destinado às chegadas/aproximações com destino a SP
ii. Possui limite superior o FL110 e o limite inferior o GND.

i. Setor 9 – Final Campinas

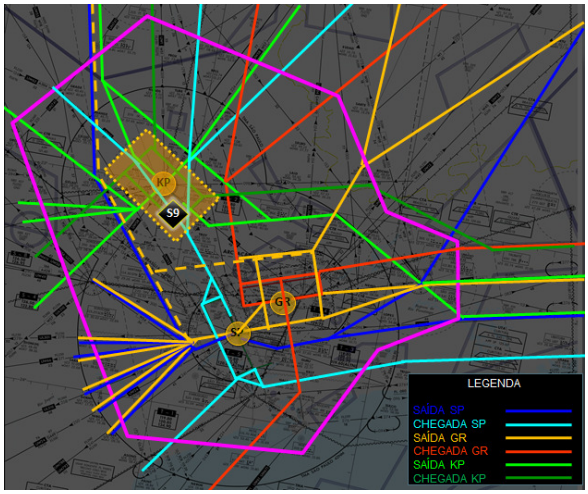


Figura 42 – Setor 9 da TMA-SP.

i. O setor 9 é destinado às chegadas/aproximações com destino a GR
ii. Possui limite superior o FL110 e o limite inferior o GND.

j. Setor 10 – Controle de Helicópteros

i. O setor 10 é o responsável pelo controle de helicópteros, situado na TWR-SP.
ii. Espaço aéreo retangular (6NM por 5NM) na final da pista 17. Possui limite superior o FL070 e o limite inferior o GND.

k. Setor 11 – VFR Sul

i. O setor 11 é destinado aos tráfegos VFR no setor sul da TMA-SP.
ii. Possui ao sul os mesmos limites laterais da TMA-SP, e ao norte, a linha que passa sobre os VOR SCB, NDB MAE e VOR SJC. Os limites verticais compreendem o limite inferior GND e o superior o FL 145. Nesse caso, é considerado o espaço aéreo formado pela projeção dos limites laterais da TMA-SP, abaixo de FL055 até o GND.

l. Setor 12 – VFR Norte

i. O setor 12 é destinado aos tráfegos VFR no setor norte da TMA-SP.
ii. Possui ao norte os mesmos limites laterais da TMA-SP, e ao sul, a linha que passa sobre os VOR SCB, NDB MAE e VOR SJC. Os limites verticais compreendem o limite inferior GND e o superior o FL 145. Nesse caso, é considerado o espaço aéreo formado pela projeção dos limites laterais da TMA-SP, abaixo de FL055 até o GND.

1.8 Realizar Simulação ATC (Tempo Acelerado e Tempo Real) e Emprego de Simuladores de Voo

1.8.1 A próxima fase da etapa de desenvolvimento do conceito de espaço aéreo da TMA-RJ e da TMA-SP é a realização das simulações necessárias para otimizar as possibilidades de sucesso do projeto.

1.8.2 A Simulação ATC em tempo acelerado terá como objetivo principal a verificação das métricas relacionadas à sustentabilidade do transporte aéreo, notadamente no que diz respeito à redução do tempo de voo, da economia de combustível e da redução da emissão de gases nocivos na atmosfera. Além disso, esta simulação também terá como objetivo a compatibilização da capacidade ATC com a demanda existente e projetada de tráfego aéreo, por meio da verificação da adequação da proposta de setorização.

1.8.3 A simulação em tempo real será realizada, principalmente, para verificar a carga de trabalho atribuída ao controlador de tráfego aéreo, em função do novo modelo operacional, a fim de verificar, também, a adequação da setorização proposta.

1.8.4 O emprego dos simuladores de voo terá como objetivo a verificação da adequação das restrições de níveis nas SID e STAR, considerando a performance da maioria dos usuários das TMA-RJ e TMA-SP, a fim de possibilitar o emprego das Operações com Descida Constante e minimizar as restrições das subidas das aeronaves.

1.9 Processo de Decisão Colaborativa (CDM)

1.9.1 Para garantir a eficácia do processo de decisão colaborativa relacionado à implementação PBN nas TMA-RJ e TMA-SP, foram criados dois fóruns específicos para a apresentação, discussão e aprovação dos diversos produtos do projeto.

1.9.2 O fórum interno é formado pelas organizações do Departamento de Controle do Espaço Aéreo (DECEA) e envolve os responsáveis pela provisão dos serviços de navegação aérea.

1.9.3 O fórum externo é formado pelo fórum interno, acrescido de representantes das empresas aéreas, da aviação geral, da aviação militar e da indústria em geral.

1.9.4 Até a presente data, foram realizadas três reuniões do fórum interno e duas do fórum externo, nas quais os diversos stakeholders envolvidos tiveram oportunidade de discutir as propostas apresentadas, contribuindo para o seu aperfeiçoamento, e aprová-las com as modificações julgadas necessárias, que resultaram nos produtos apresentados na presente nota de estudo.

2. Conclusão

2.1 A reestruturação das rotas no entorno das TMA SP e RJ permitirá, além de rotas mais diretas entre pares de aeroportos, a diminuição de conflitos nos setores dos ACC BS e CW. Estes ganhos podem ser obtidos por meio de rotas paralelas RNAV 5 em todo espaço superior.

2.2 Tal reestruturação causará menor impacto na fase de reestruturação dos procedimentos das TMA SP e RJ, visto que o volume de informações e alterações será dividido em etapas distintas, com tempo hábil para que os usuários e controladores possam se adaptar ao novo cenário além dos limites da TMA.

2.3 As TMA Rio de Janeiro e São Paulo devido às particularidades de volume de tráfego e proximidade de grandes aeroportos, aliada a topografia local, apresenta um elevado grau de

complexidade, e sua restruturação necessita ser implantada, com vistas a absorver o crescimento de tráfego previsto até 2015.

2.4 A partir da reestruturação da rede de rotas, foi possível estabelecer portões de entrada/saída por meio da elaboração de SID/STAR para os aeroportos principais. A elaboração considerou as diretrizes para planejamento de espaço aéreo em área terminal, tais como: utilização do conceito “four corner”, agrupamento de STAR, dispersão de SID, limites de TMA e setores com vistas a englobar o necessários de procedimentos ATS, entre outros.

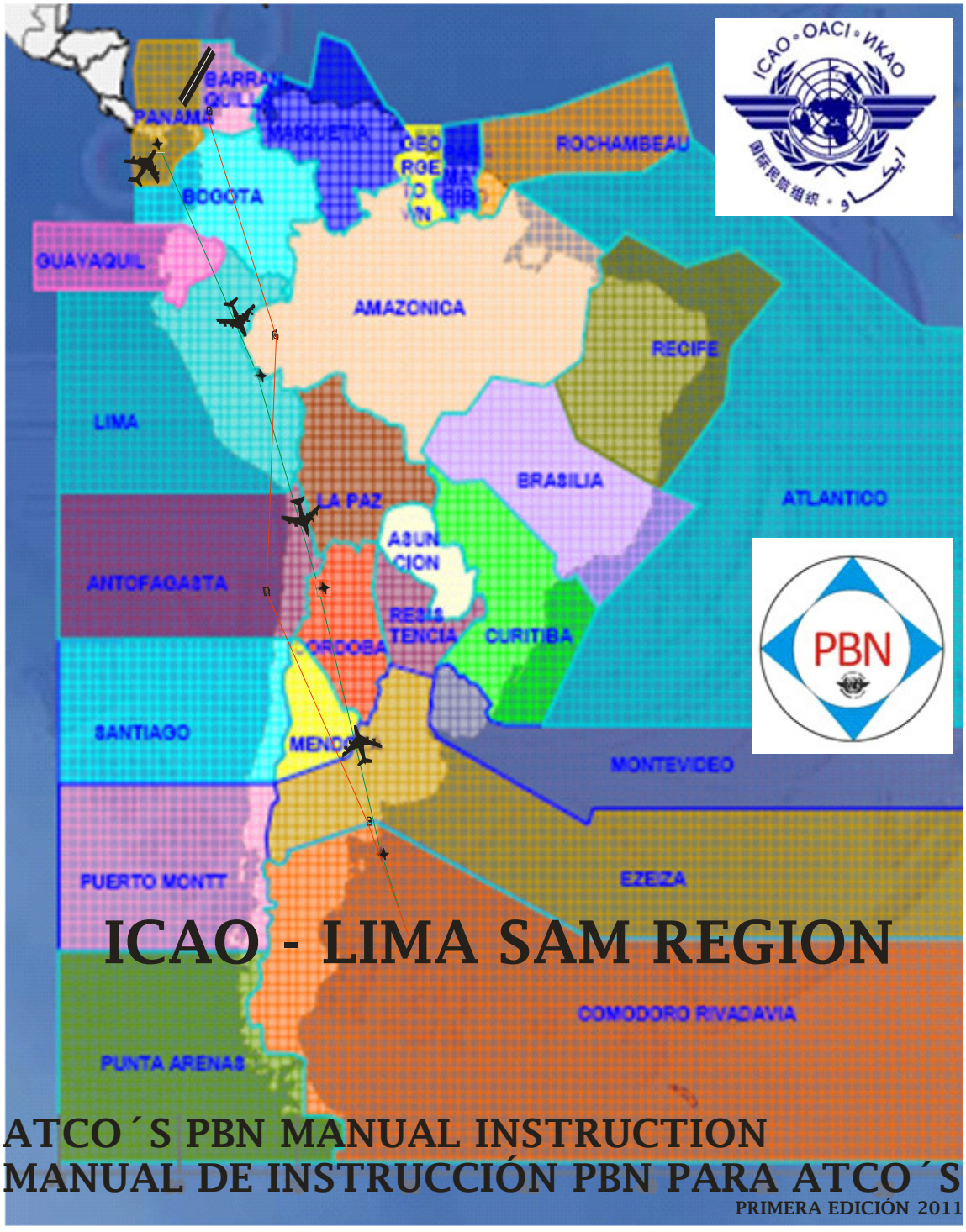
2.5 A estrutura de procedimentos em TMA no conceito PBN seguiu os objetivos estratégicos estabelecidos para o projeto, contemplando as melhorias em termos de segurança operacional, capacidade, eficiência e proteção ao meio ambiente., além de permitir que fossem concebidos procedimentos convencionais de forma a coexistir com os procedimento RNAV/RNP.

2.6 Desta forma, as próximas fases do projeto de STA e STR poderão validar o planejamento aqui descrito, ou ainda, permitir que se façam os ajustes necessários para a otimização de sua implantação.

2.7 São esperados resultados significativamente positivos em termos de redução de distância e tempo voados e, em consequencia, do consumo de combustível e de emissão de gases nocivos na atmosfera. Tais resultados serão estimados durante a fase de simulação e medidos na fase de monitoração pós-implementação.

- FIN -

APÉNDICE D / APPENDIX D
(Available in Spanish only)



NAVEGACIÓN BASADA EN LA PERFORMANCE (PBN) PROGRAMA BÁSICO DE CAPACITACIÓN PARA CONTROLADORES DE TRÁNSITO AÉREO

1 PREFACIO

1.1 El Documento 9613 “Manual sobre la navegación basada en la performance” expresa que la introducción de la PBN puede involucrar considerable cantidad de inversión en términos de entrenamiento, educación y material para pilotos y controladores de tránsito aéreo.

1.2 En algunos Estados han sido efectivamente utilizados paquetes de instrucción y entrenamiento basado en computadores. Por su lado, la OACI adicionalmente ha suministrado capacitación y seminarios en materia PBN. Asimismo, en el Doc. 9613 en cada una de las especificaciones de navegación, se incluyen los aspectos más relevantes que debe ser proporcionado a los pilotos y controladores.

1.3 Utilizando las guías y recomendaciones elaboradas por el Grupo de Implantación de la Región SAM (SAM/IG), hemos obtenido el siguiente material que, ante todo persigue la simplicidad en la transmisión de las ideas, conceptos y aplicaciones de la PBN en la Región SAM.

2 OBJETIVO DEL CURSO

2.1 El objetivo del Curso PBN es suministrar a los controladores de tránsito aéreo suficiente conocimiento y familiarización con el concepto PBN lo que permitirá una implantación segura de la navegación basada en performance.

3 APLICACIÓN

3.1 El presente material puede ser adoptado por los proveedores de servicio de navegación aérea (ANSP), con miras a proveer capacitación y nociones generales del Concepto de la Navegación Basada en Performance (PBN) y sus diferentes usos y aplicaciones en las distintas fases de vuelo y acorde a la región de información de vuelo en cuestión.

3.2 El contenido del Manual PBN, puede y debería ser aplicado en el entrenamiento de los Controladores de Tránsito Aéreo, con miras a lograr una capacitación homogénea en la región. En el mismo contexto y a criterio de los expertos y especialistas de cada estado, puede ser modificado, aumentando el alcance del contenido, de acuerdo a las necesidades de cada proveedor ANSP.

CONTENIDO

13.2 FLY BY
13.3 PATH TERMINATORS

Capítulo 14 FRASEOLOGÍA

14.1 FRASEOLOGÍA GENERAL

1 CONCEPTO DE NAVEGACIÓN BASADA EN LA PERFORMANCE (PBN)

Capítulo 1. Descripción de la navegación basada en la performance

1.1 Introducción

1.1.1 Generalidades

1.1.1.1 El concepto de navegación basada en la performance (PBN) especifica que los requisitos de performance del sistema RNAV de la aeronave se definen en función de la precisión, integridad, disponibilidad, continuidad y funcionalidad necesarias para las operaciones propuestas en el contexto de un concepto de espacio aéreo particular, con el apoyo de la infraestructura de navegación apropiada. En ese contexto, el concepto de PBN representa un cambio de navegación basada en sensores a navegación basada en la performance. Los requisitos de performance se expresan en especificaciones para la navegación, que también identifican la elección de los sensores y del equipo de navegación que pueden usarse para satisfacer los requisitos de performance. Estas especificaciones para la navegación proporcionan a los Estados y a los explotadores orientación específica para la implantación a fin de facilitar la armonización mundial.

1.1.1.2 En el marco de la PBN, los requisitos de navegación genéricos se definen principalmente en función de los requisitos operacionales. Por consiguiente, los explotadores evalúan las opciones con respecto a la tecnología y los servicios de navegación disponibles. La solución escogida debería ser la más eficaz con relación al costo para el explotador, en vez de ser una solución establecida como parte de los requisitos operacionales. La tecnología puede evolucionar con el tiempo sin que sea necesario revisar las operaciones propiamente dichas, siempre que el sistema RNAV satisfaga el requisito de performance.

1.1.2 Contexto de la PBN

1.1.2.1 La PBN es uno de los elementos habilitantes de un concepto de espacio aéreo. Comunicaciones, vigilancia ATS y ATM también son elementos esenciales de un concepto de espacio aéreo. Esto se demuestra en la Figura I-A-1-1. El concepto de navegación basada en la performance (PBN) se funda en el uso de un sistema de navegación de área (RNAV). Los componentes de información básicos para la aplicación de la PBN son dos:

1) la infraestructura de ayudas para la navegación; y

2) la especificación para la navegación.

- La aplicación de los componentes mencionados antes a rutas ATS y procedimientos por instrumentos en el contexto del concepto de espacio aéreo resulta en un tercer componente:

3) la aplicación de navegación.

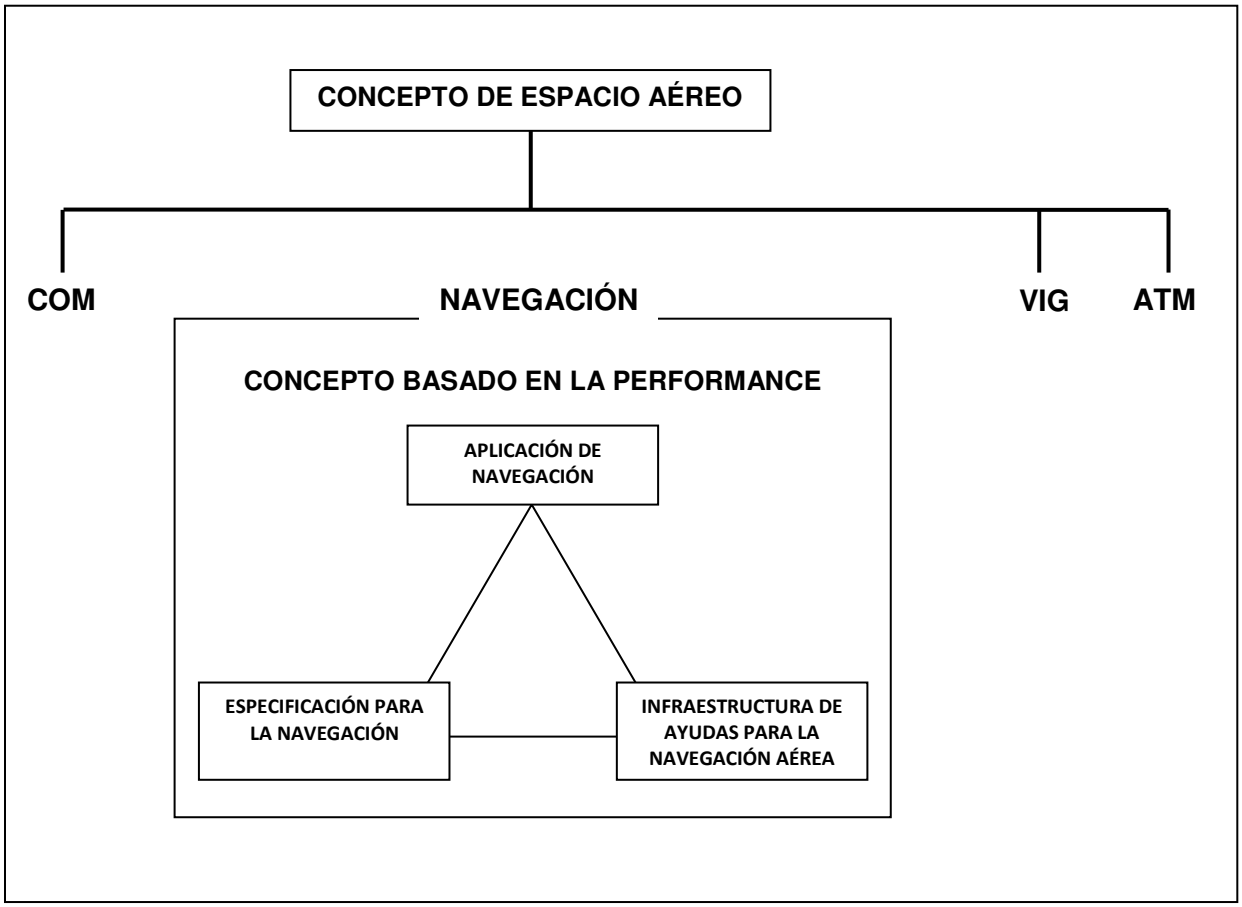


Figura I-A-1-1. Concepto de navegación basada en Ia performance

1.1.3 Alcance de la navegación basada en la performance

1.1.3.1 Performance lateral

1.1.3.1.1 Por razones preexistentes relacionadas con el concepto RNP, la PBN actualmente está limitada a operaciones con requisitos de performance lateral lineal y limitaciones de tiempo. Por esta razón, las operaciones con requisitos de performance lateral angular (es decir, operaciones de aproximación y aterrizaje con guía vertical para los niveles de performance del GNSS APV-I y APV-II, así como operaciones de aproximación y aterrizaje de precisión ILS/MLS/GLS) no se consideran en este manual.

Nota. Si bien este manual no proporciona ninguna especificación para la navegación que defina el FTE longitudinal (hora de llegada o control 4D), el requisito de precisión de las especificaciones RNAV y RNP está definido por las dimensiones lateral y longitudinal, lo que posibilita futuras especificaciones para la navegación que definen el FTE. (Véase en el Doc. 9613, Volumen II, Parte A, Capitulo 2, 2.2.2 un examen detallado de la performance longitudinal y también la Figura I-A-1-2).

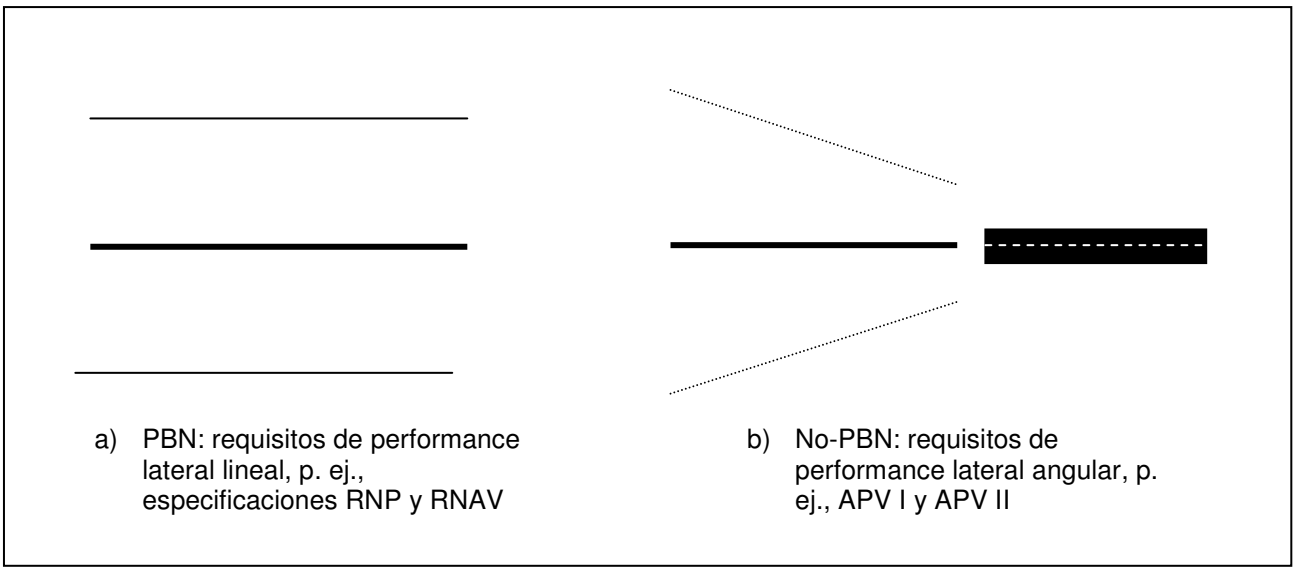


Figura I-A-1-2. Requisitos de performance lateral para Ia PBN

1.1.3.2 Performance vertical

1.1.3.2.1 A diferencia de la vigilancia lateral y del margen de franqueamiento de obstáculos, para los sistemas VNAV barométricos no hay una alerta de error de la posición vertical ni una relación del doble entre un 95% de precisión del sistema total requerida y el límite de performance. Por lo tanto, la VNAV barométrica no se considera RNP vertical.

1.2 Especificación para la navegación

1.2.1 Los Estados usan las especificaciones para la navegación como base para la elaboración del material para la aprobación de aeronavegabilidad y operacional. Una especificación para la navegación expresa en detalle la performance requerida del sistema RNAV en cuanto a precisión, integridad, disponibilidad y continuidad; las funcionalidades de navegación que el sistema RNAV debe tener; los sensores de navegación que deben estar integrados en el sistema RNAV; y los requisitos impuestos a la tripulación de vuelo. Las especificaciones OACI para la navegación figuran en el Volumen II del Doc. 9613.

1.2.2 Una especificación para la navegación es una especificación RNP o bien una especificación RNAV. Una especificación RNP incluye el requisito de vigilancia y alerta autónomas de la performance de a bordo, mientras que la especificación RNAV no incluye este requisito.

1.2.3 Vigilancia y alerta de la performance de a bordo

1.2.3.1 La vigilancia y alerta de la performance de a bordo es el principal elemento que determina si el sistema de navegación alcanza el nivel de seguridad operacional necesario para una aplicación RNP; este requisito se relaciona con la performance de navegación lateral y con la longitudinal; y

permite a la tripulación de vuelo detectar si el sistema de navegación no logra, o no puede garantizar con una integridad de 10^{-5}, la performance de navegación requerida para la operación que realiza. En la Parte A del Volumen II del Doc. 9613, se presenta una descripción detallada de la vigilancia y alerta de la performance de a bordo y de los errores de navegación.

1.2.3.2 Los sistemas RNP ofrecen mejoras respecto a la integridad de las operaciones; esto quizá permita un espaciado menor entre rutas y puede proporcionar suficiente integridad para que en un espacio aéreo especifico se usen únicamente sistemas RNAV. Por consiguiente, el uso de los sistemas RNP puede ofrecer beneficios considerables en cuanto a seguridad operacional, operaciones y eficiencia.

1.2.4 Requisitos funcionales de navegación

1.2.4.1 Tanto las especificaciones RNAV como las especificaciones RNP incluyen requisitos respecto a ciertas funcionalidades para la navegación. En un nivel básico, entre estos requisitos funcionales pueden incluirse:

a) indicación continua de la posición de la aeronave con relación a la derrota presentada al piloto a los mandos en una pantalla de navegación situada en su principal campo de visión,

b) presentación de distancia y rumbo al punto de recorrido activo (To),

c) presentación de velocidad respecto al suelo o tiempo al punto de recorrido activo (To),

d) función de almacenamiento de datos de navegación; y

e) indicación adecuada de fallas del sistema RNAV, incluidos los sensores

1.2.4.2 Entre las especificaciones de navegación más perfeccionadas se incluyen el requisito de bases de datos de navegación y la capacidad de ejecutar procedimientos de base de datos

1.2.4.3 Significado de las designaciones RNAV y RNP

1.2.4.3.1 Cabe señalar que, en los casos en que la precisión de navegación se usa como parte de la designación de una especificación para la navegación, la precisión de navegación es únicamente uno de los muchos requisitos de performance incluidos en la especificación para la navegación — véase el Ejemplo 1.

1.2.4.3.2 Dado que para cada especificación para la navegación se definen requisitos de performance específicos, una aeronave aprobada para una especificación RNP no está automáticamente aprobada para todas las especificaciones RNAV. Del mismo modo, una aeronave aprobada para una especificación RNP o RNAV que tiene un requisito de precisión estricto (p. ej., especificación RNP 0.3) no está automáticamente aprobada para una especificación para la navegación que tenga un requisito de precisión menos estricto (p. ej., RNP 4).

1.2.4.3.3 Por ejemplo, parecería lógico que una aeronave aprobada para RNP 1 básica esté automáticamente aprobada para RNP 4; sin embargo, no es así. Las aeronaves aprobadas para los requisitos de precisión más estrictos quizá no satisfagan necesariamente algunos de los requisitos funcionales de la especificación para la navegación que tiene un requisito de precisión menos estricto.

Ejemplo 1

Una designación RNAV 1 se refiere a una especificación RNAV que incluye un requisito de precisión de la navegación de 1 NM entre muchos otros requisitos de performance. Si bien la designación RNAV 1 puede sugerir que 1 NM (lateral) es el único criterio de performance requerido, no es así. Como todas las especificaciones para la navegación, la especificación RNAV 1 que figura en el Volumen II del Doc. 9613 incluye todos los requisitos respecto a la tripulación y al sistema de navegación de a bordo.

Nota: Las designaciones de las especificaciones para la navegación son un nombre abreviado de todos los requisitos de performance y funcionalidad.

1.3 Infraestructura de ayudas para la navegación aérea

1.3.1 La infraestructura de ayudas para la navegación aérea se refiere a ayudas para la navegación basadas en tierra o en el espacio. Las ayudas basadas en tierra incluyen equipo DME y VOR. Las ayudas basadas en el espacio incluyen elementos GNSS definidos en el Anexo 10 — Telecomunicaciones Aeronáuticas

1.4 Aplicaciones de navegación

1.4.1 Una aplicación de navegación es una aplicación de una especificación para la navegación y de la correspondiente infraestructura de ayudas para la navegación a rutas ATS, procedimientos de aproximación por instrumentos y/o a un volumen de espacio aéreo definido, de conformidad con el concepto de espacio aéreo. Una aplicación RNP se apoya en una especificación RNP; una aplicación RNAV se apoya en una especificación RNAV. Esto se ilustra en el Ejemplo 2.

Ejemplo 2

Los sensores necesarios para satisfacer los requisitos de performance para una especificación RNAV 1 en un Estado en particular no dependen solamente de la capacidad de a bordo de la aeronave. Una infraestructura DME limitada o consideraciones de políticas respecto al GNSS podrían llevar a que las autoridades impongan requisitos de sensores de navegación específicos para una especificación RNAV 1 en ese Estado.

Como tal, la AIP del Estado A podría exigir el GNSS como un requisito para su especificación RNAV 1 porque el Estado A dispone únicamente del GNSS en su infraestructura de ayudas para la navegación. La AIP del Estado B podría exigir DME/DME/IRU para su especificación RNAV 1 (una decisión política para no permitir el GNSS).

Cada una de estas especificaciones para la navegación se implantaría como una aplicación RNAV 1. Sin embargo, las aeronaves equipadas con GNSS únicamente y aprobadas para la especificación RNAV 1 en el Estado A no serían aprobadas para operar en el Estado B.

1.5 Beneficios obtenidos por el uso de la PBN

1.5.1 La navegación basada en la performance ofrece varias ventajas con respecto al método de sensores específicos empleados en la elaboración de criterios para el espacio aéreo y el franqueamiento de obstáculos. Por ejemplo, la PBN:

a) Aumento de la seguridad del espacio aéreo; permite un uso más eficiente del espacio aéreo (emplazamiento de rutas, rendimiento del combustible, atenuación del ruido, etc.)

b) Reducir el tiempo de vuelo de las aeronaves

c) Aprovechar la capacidad RNAV y/o RNP instaladas a bordo de un porcentaje de la flota de aeronaves; aclara la forma en que se usan los sistemas RNAV; y facilita el proceso de aprobación operacional de los explotadores, proporcionando un conjunto limitado de especificaciones para la navegación previstas para uso mundial; evita tener que desarrollar las operaciones en función de sensores específicos cada vez que evolucionan los sistemas de navegación, lo que sería de un costo prohibitivo. Se espera que la expansión de los servicios de navegación por satélite contribuya a que aumente la diversidad de los sistemas RNAV de las diferentes aeronaves.

d) Mejorar las trayectorias de llegada a los aeropuertos y al espacio aéreo en cualquier condición meteorológica

e) Permitir la implantación de trayectorias de aproximación, salidas y llegadas más precisas; reduce la necesidad de mantener rutas y procedimientos en función de sensores específicos y los costos conexos. Por ejemplo, desplazar una sola instalación terrestre VOR puede repercutir en docenas de procedimientos, dado que el VOR puede emplearse en rutas, aproximaciones VOR, aproximaciones frustradas, etc. Agregar nuevos procedimientos en función de los sensores aumentaría este costo y el rápido crecimiento de los sistemas de navegación disponibles haría que en poco tiempo las rutas y los procedimientos en función de sensores específicos no sean económicamente abordables

f) Deberíamos considerar los beneficios obtenidos en la reducción de emisión de CO2 a la atmosfera.

1.6 Evolución futura

1.6.1 Desde una perspectiva de la navegación basada en la performance, es probable que las aplicaciones de navegación progresen de 2D a 3D/4D, aunque es difícil determinar hoy en día el tiempo necesario y los requisitos operacionales. Por consiguiente, la vigilancia y alerta de la performance de a bordo aún debe ser elaborada en el plano vertical (RNP vertical) y la labor en curso está dirigida a armonizar los requisitos de performance longitudinal y lineal. También es posible que en el futuro puedan incluirse en la PBN los requisitos de performance angular relacionados con la aproximación y el aterrizaje. Del mismo modo, también podrían incluirse especificaciones en apoyo de aplicaciones de navegación específicas para helicópteros y requisitos funcionales de espera.

1.6.2 Dado que se confía más en el GNSS, la elaboración de conceptos de espacio aéreo aumentará la necesidad de asegurar la integración coherente de elementos habilitantes de navegación, comunicaciones y vigilancia ATS.

Capítulo 2. Conceptos de espacio aéreo

2.1 Introducción

2.1.1 Este capítulo explica el concepto de espacio aéreo y su relación con las aplicaciones de navegación, que se funda en el concepto de navegación basada en la performance descrito en el capítulo anterior.

2.2 Concepto de espacio aéreo

2.2.1 Un concepto de espacio aéreo puede considerarse como una visión general o un plan general para un espacio aéreo en particular. Un concepto de espacio aéreo se basa en principios particulares y empalma con objetivos específicos. Los conceptos de espacio aéreo deben incluir un cierto nivel de detalle para que puedan introducirse cambios en un espacio aéreo. Los detalles podrían explicar, por ejemplo, la organización y gestión del espacio aéreo y las funciones que habrán de desempeñar las diversas partes interesadas y los usuarios del espacio aéreo. Los conceptos de espacio aéreo también pueden describir las diferentes funciones y responsabilidades, los mecanismos empleados y las relaciones entre personas y máquinas.

2.2.2 Los objetivos estratégicos regulan la visión general del concepto de espacio aéreo (véase la Figura I-A-2-1). Generalmente, los usuarios del espacio aéreo, la gestión del tránsito aéreo (ATM), los aeropuertos y también las políticas gubernamentales y sobre el medio ambiente identifican estos objetivos. El concepto de espacio aéreo y el concepto de operaciones tienen la función de responder a esas necesidades. Los objetivos estratégicos que comúnmente regulan los conceptos de espacio aéreo son seguridad operacional, capacidad, eficiencia, acceso y medio ambiente. Como lo sugieren más adelante los Ejemplos 1 y 2, los objetivos estratégicos pueden dar como resultado que se introduzcan cambios en el concepto de espacio aéreo.

Figura I-A-2-1. Objetivos estratégicos y concepto de espacio aéreo

Ejemplo 1

Seguridad operacional: El diseño de procedimientos de aproximación por instrumentos RNP podría ser una manera de aumentar la seguridad operacional [disminuyendo el número de impactos contra el suelo sin pérdida de control (CFIT)].

Capacidad: Planificar la adición de una pista más en un aeropuerto para aumentar la capacidad provocará un cambio en el concepto de espacio aéreo (serán necesarios nuevos enfoques para las SID y STAR).

Eficiencia: La necesidad de un usuario de optimizar los perfiles de vuelo durante las salidas y llegadas podría hacer que los vuelos sean más eficientes en términos de consumo de combustible.

Medio ambiente: La necesidad de reducción de las emisiones, rutas de ruido mínimo o de llegadas/aproximaciones en descenso continuo (CDA), son razones ambientales que causan cambios.

Acceso: La necesidad de prever una aproximación con mínimos inferiores a los que prevén los procedimientos convencionales, a fin de asegurar el acceso continuo al aeropuerto durante periodos de mal tiempo, puede dar como resultado una aproximación RNP a esa pista.

Ejemplo 2

Si bien el GNSS está relacionado fundamentalmente con la navegación, también es el elemento principal de las aplicaciones de vigilancia ADS-B. Como tal, las funciones de determinación de la posición y mantenimiento de la derrota del GNSS ya no se limitan a ser un elemento habilitante de la navegación para un concepto de espacio aéreo. El GNSS, en este caso, es también un elemento habilitante de la vigilancia ATS. Lo mismo ocurre con las comunicaciones por enlace de datos: el sistema de vigilancia ATS también usa los datos (por ejemplo, en ADS-B y navegación)

2.3 Conceptos de espacio aéreo y aplicaciones de navegación

2.3.1 El efecto en cascada de los objetivos estratégicos respecto al concepto de espacio aéreo impone requisitos a los diversos “elementos habilitantes”, tales como comunicaciones, navegación, vigilancia ATS, gestión del tránsito aéreo y operaciones de aeronaves. Los requisitos funcionales de navegación, ahora dentro de un contexto de navegación basada en la performance, deben ser identificados. Estas funcionalidades de navegación están formalizadas en una especificación para la navegación que, junto con una infraestructura de ayudas para la navegación aérea, da apoyo a una aplicación de navegación en particular. Como parte de un concepto de espacio aéreo, las aplicaciones de navegación también tienen una relación con comunicaciones, vigilancia ATS, ATM, herramientas ATC y operaciones de vuelo. El concepto de espacio aéreo une todos los elementos en

un todo integrado.(Véase la Figura I-A-2-2).

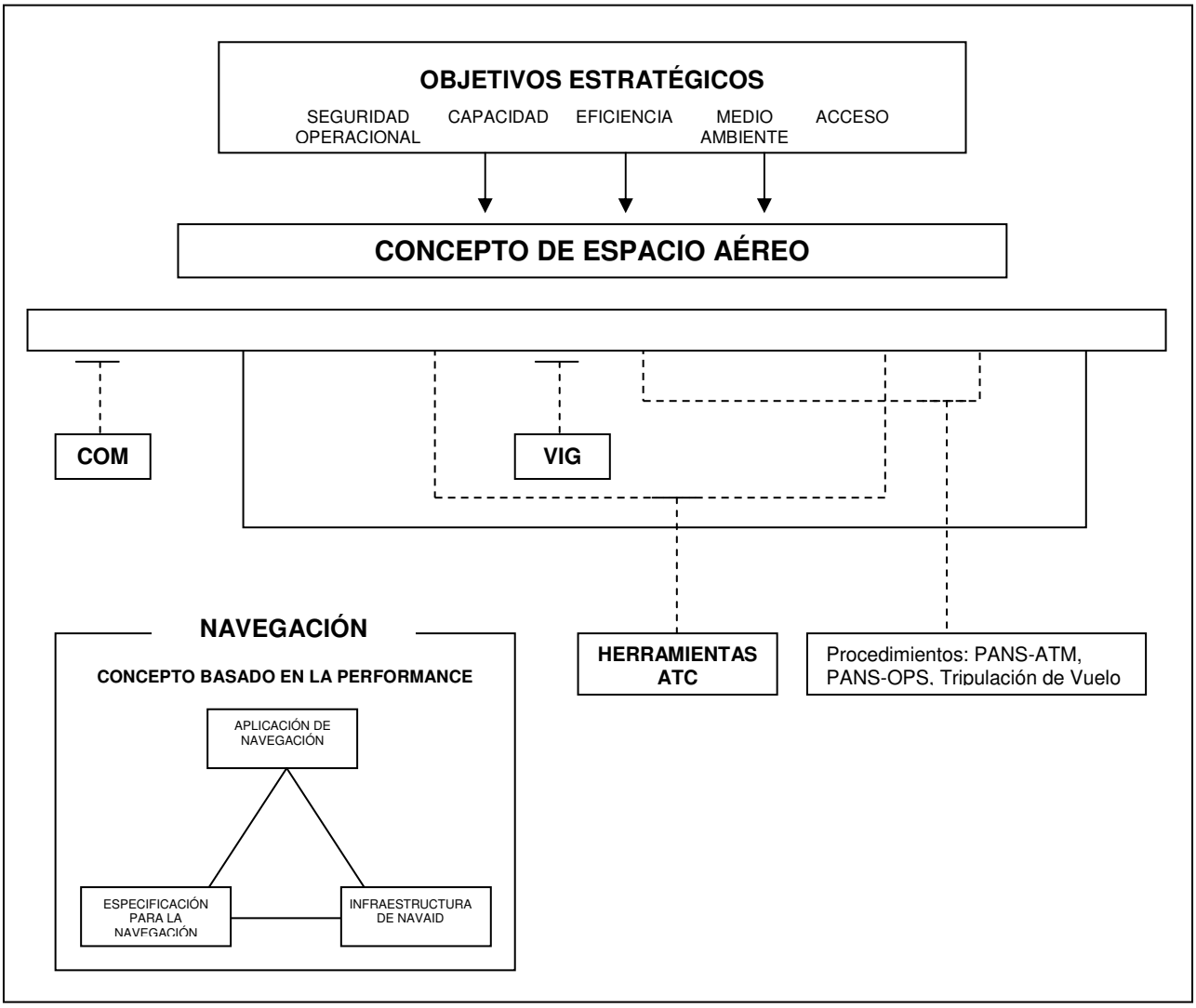


Figura I-A-2-2. Relación: Navegación basada en la performance y concepto de espacio aéreo

2.3.2 El enfoque anterior es descendente: comienza en el nivel general (¿Cuáles son los objetivos estratégicos? ¿Qué concepto de espacio aéreo es necesario?) A fin de identificar los requisitos específicos, es decir, la forma en que los CNS/ATM llenarán los requisitos de este concepto y su concepto de operaciones.

2.3.3 La función que ha de desempeñar cada elemento habilitante en el concepto general debe ser identificada. Ningún “elemento habilitante” puede elaborarse aisladamente, es decir, los elementos habilitantes de comunicaciones, vigilancia ATS y navegación deberían formar un todo integrado.

2.4 Conceptos de espacio aéreo por área de operación

2.4.1 Oceánico y continental remoto

2.4.1.1 Dos aplicaciones de navegación, RNAV 10 y RNP 4, sirven actualmente para los conceptos de espacio aéreo oceánico y continental remoto. Ambas aplicaciones de navegación usan principalmente el GNSS para dar apoyo al elemento de navegación del concepto de espacio aéreo. En el caso de la aplicación RNAV 10, no es obligatoria ninguna forma de servicio de vigilancia ATS. En el caso de la aplicación RNP 4, se usa la ADS contrato (ADS-C).

Nota: La RNAV 10 sigue llevando la designación RNP 10

2.4.2 En ruta continental

2.4.1.1 Las aplicaciones RNAV apoyan actualmente los conceptos de espacio aéreo en ruta continental. La RNAV 5 se usa en las Regiones Oriente Medio (MID) y Europa (EUR), pero a la fecha de publicación de este manual se designa como B-RNAV [RNAV básica en Europa y RNP 5 en el Oriente Medio]. En los Estados Unidos, una aplicación RNAV 2 da apoyo a un concepto de espacio aéreo en ruta continental. Actualmente, las aplicaciones RNAV continental dan apoyo a conceptos de espacio aéreo que incluyen vigilancia radar y comunicaciones directas controlador-piloto (orales). Considere que a partir del 20 de octubre de 2011 se implantará la RNAV5 en el espacio aéreo superior de la Región SAM.

2.4.3 Espacio aéreo terminal: llegadas y salidas

2.4.3.1 Las aplicaciones RNAV dan apoyo a los conceptos de espacio aéreo terminal existentes que incluyen salidas y llegadas. Estas aplicaciones se usan actualmente en la Región Europa (EUR) y en los Estados Unidos. La aplicación RNAV en el espacio aéreo terminal europeo se conoce como P-RNAV (RNAV de precisión). Si bien la especificación RNAV 1 tiene una precisión de navegación común con la P-RNAV, esta especificación para la navegación regional no llena todos los requisitos de la especificación RNAV 1, la aplicación en el espacio aéreo terminal de los Estados Unidos conocida como US RNAV tipo B ha sido alineada con el concepto PBN y ahora se llama RNAV 1. La RNP básica fue elaborada principalmente para su aplicación en un espacio aéreo terminal de poca densidad de tránsito, sin radar. Se prevé que en el futuro se elaborarán más aplicaciones RNP, tanto para el espacio aéreo en ruta como para el terminal.

2.4.4 Aproximación

2.4.3.1 Los conceptos de aproximación abarcan todos los segmentos de la aproximación por instrumentos, es decir, inicial, intermedio, final y aproximación frustrada. Estos necesitarán cada vez más especificaciones RNP que requieren una precisión de navegación de 0,3 NM a 0,1 NM o menos. Típicamente, tres clases de aplicaciones RNP son características de esta fase del vuelo: nuevos procedimientos para pistas para las que nunca hubo un procedimiento por instrumentos, procedimientos que reemplazan o sirven como reserva para procedimientos por instrumentos existentes basados en diferentes tecnologías y procedimientos elaborados para mejorar el acceso al aeropuerto en entornos muy exigentes.

2 BENEFICIOS OBTENIDOS POR EL USO DE LA PBN

2.1 Ver numeral 1.5 del capítulo 1 de este manual

Capítulo 3 CONSIDERACIONES SOBRE SEGURIDAD OPERACIONAL

3.1 Implantación de la PBN y la Seguridad Operacional

3.1.1 A todos los usuarios del concepto PBN les interesa la seguridad operacional. Los planificadores del espacio aéreo y los diseñadores de procedimientos, así como los fabricantes de aeronaves y los proveedores de servicios de navegación aérea (ANSP), necesitan asegurarse de que su parte del concepto de espacio aéreo cumpla los requisitos de seguridad operacional pertinentes. Los Estados del explotador especifican los requisitos para el equipo de a bordo y necesitan estar seguros de que los fabricantes realmente cumplen estos requisitos. Otras autoridades especifican un requisito para la seguridad operacional en el plano del concepto de espacio aéreo. Estos requisitos se usan como base para el espacio aéreo y el diseño de procedimientos y, también en este caso, las autoridades necesitan estar seguras de que se cumplen sus requisitos

3.1.2 Demostrar que los requisitos de seguridad operacional se cumplen es algo que las diferentes partes interesadas logran de diversas maneras. El medio que se emplea para demostrar la seguridad operacional de un concepto de espacio aéreo no es el mismo que se usa para demostrar que las aeronaves cumplen los requisitos de seguridad operacional. Cuando se han llenado todos los requisitos de seguridad operacional, los controladores de tránsito aéreo y los pilotos deben respetar sus respectivos procedimientos a fin de garantizar la seguridad de las operaciones

Capítulo 4 RECEPTORES GPS Y CONCEPTOS DE INTEGRIDAD RAIM, ALERTAS RAIM, FDE

4.1 Funciones Básicas

4.1.1 Receptores GPS

4.1.2 Integridad RAIM, Alertas RAIM

4.1.2.1 Programa de predicción de la vigilancia de la integridad (RAIM) del GPS (CA 91-002 – SRVSOP)

4.1.2.1.1 Cuando se utilice un programa de predicción de la vigilancia de la integridad (RAIM) del GPS para cumplir con las disposiciones de este documento, éste deberá cumplir con los siguientes criterios:

a) Proporcionar una predicción de la disponibilidad de la función de vigilancia de la integridad (RAIM) del equipo GPS, adecuado para llevar a cabo operaciones RNAV 5.
b) Haber sido desarrollado de acuerdo con los criterios del Nivel D de la RTCA DO 178B/EUROCAE 12B, como mínimo.
c) Utilizar un algoritmo RAIM idéntico de aquel que se utiliza en el equipo de a bordo de la aeronave o un algoritmo basado en hipótesis para la predicción RAIM que proporcione un resultado conservador.
d) Calcular la disponibilidad RAIM, utilizando un ángulo de enmascaramiento del satélite de no más de 5 grados, excepto cuando la AAC autorice la utilización de un ángulo de enmascaramiento menor.
e) Disponer de la capacidad de deselección manual de los satélites GPS que se haya notificado que estarán fuera de servicio para el vuelo previsto.
f) Permitir al usuario seleccionar:

1) la ruta prevista y los aeródromos de alternativa seleccionados; y

2) la hora y duración del vuelo previsto.

4.1.3 FDE (Detección de Fallas y Exclusión)

4.2 Circulares de Asesoramiento para aprobación de aeronaves y explotadores

4.2.1 En total se presentaron las siguientes 7 CA con sus respectivas ayudas de trabajo en los apéndices que a continuación se detallan:

1. CA 91-001 – Aprobación de aeronaves y explotadores para operaciones RNAV 10 (designada y autorizada como RNP 10)
2. CA 91-002 - Aprobación de aeronaves y explotadores para operaciones RNAV 5
3. CA 91-003 – Aprobación de aeronaves y explotadores para operaciones RNAV 1 y RNAV 2
4. CA 91-006 – Aprobación de aeronaves y explotadores para operaciones RNP 1 básica
5. CA 91-008 – Aprobación de aeronaves y explotadores para operaciones RNP APCH
6. CA 91-009 – Aprobación de aeronaves y explotadores para operaciones RNP AR APCH
7. CA 91-010 – Aprobación de aeronaves y explotadores para operaciones APV/baro-VNAV

Capítulo 5 REQUERIMIENTOS DE LOS SISTEMAS DE NAVEGACIÓN

5.1 Precisión: Durante las operaciones en el espacio aéreo o en rutas designadas como RNAV 5, el error lateral del sistema total no excederá de 5 NM para, por lo menos, el 95% del tiempo total de vuelo. El error a lo largo de la derrota tampoco excederá de ±5 NM para, por lo menos, el 95% del tiempo total de vuelo.

5.2 Integridad: El mal funcionamiento del equipo de navegación de la aeronave se clasifica como una condición de falla importante en virtud de los reglamentos de aeronavegabilidad (es decir, 10^{-5} por hora).

5.4 Continuidad: La pérdida de función se clasifica como una condición de falla de menor importancia si el explotador puede revertir a un sistema de navegación diferente y dirigirse a un aeropuerto adecuado.

5.5 Funcionalidad; Señal en el espacio: Si se usa GNSS, el equipo de navegación de la aeronave dará la alerta si la probabilidad de que los errores de señal en el espacio que causan un error de posición lateral superior a 10 NM excede de 10^{-7} por hora (Anexo 10, Volumen I, Tabla 3.7.2.4-1).

Capítulo 6 CONCEPTO BÁSICO SOBRE APROBACIÓN DE AERONAVEGABILIDAD Y OPERACIONES PARA OPERACIONES RNAV Y RNP

6.1 Aprobación de aeronavegabilidad

6.1.1 El proceso de aprobación de aeronavegabilidad asegura que cada uno de los elementos del equipo RNAV instalado es de un tipo y un diseño apropiados para la función prevista y que la instalación funciona adecuadamente en las condiciones de operación previsibles. Además, el proceso de aprobación de aeronavegabilidad identifica las limitaciones de instalación que deben considerarse para la aprobación operacional. Esas limitaciones y toda otra información pertinente para la aprobación de la instalación del sistema RNAV están documentadas en el manual de vuelo del avión (AFM) o en el suplemento del mismo, según corresponda. La información también puede repetirse y ampliarse en otros documentos, tales como los manuales de operaciones para los pilotos o para la tripulación de vuelo. El proceso de aprobación de aeronavegabilidad está bien establecido en los Estados de los explotadores y se refiere a la función prevista de la especificación para la navegación que ha de aplicarse

6.2 Aprobación operacional

6.2.1 Las aeronaves deben estar equipadas con un sistema RNAV que permita a la tripulación de vuelo navegar de conformidad con criterios operacionales definidos en la especificación para la navegación.

6.2.2 El Estado del explotador es la autoridad responsable de aprobar las operaciones de vuelo.

6.2.3 La autoridad debe estar convencida de que los programas operacionales son adecuados. Deberían evaluarse los programas de instrucción y los manuales de operaciones.

6.2.4 Proceso de aprobación RNAV general

6.2.5 El proceso de aprobación operacional supone en primer lugar que la correspondiente aprobación de la instalación/aeronavegabilidad ha sido otorgada.

6.2.6 Durante las operaciones, la tripulación debería respetar toda limitación establecida en el AFM y sus suplementos.

6.2.7 Los procedimientos normales están indicados en la especificación para la navegación, incluidos los detalles de las medidas que la tripulación debe tomar durante la planificación previa al vuelo, antes de comenzar el procedimiento y durante el procedimiento.

6.2.8 Los procedimientos anormales están indicados en la especificación para la navegación, incluidos los detalles de las medidas que la tripulación debe tomar en caso de falla del sistema RNAV de a bordo y en caso de que el sistema no pueda mantener la performance prescrita de las funciones de vigilancia y alerta de a bordo.

6.2.9 El explotador debería tener un sistema para investigar los sucesos que afecten a la seguridad operacional a fin de determinar el origen de los mismos (procedimiento codificado, problema de precisión, etc.).

6.2.10 La lista de equipo mínimo (MEL) debería identificar el equipo mínimo necesario para satisfacer la aplicación de navegación.

6.3 Aprobación de aeronavegabilidad y operaciones para operaciones RNAV-X

6.3.1 El sistema RNAV instalado debería cumplir un conjunto de requisitos de performance básicos descritos en la especificación para la navegación, que define los criterios de precisión, integridad y continuidad. También debería cumplir un conjunto de requisitos funcionales específicos, tener una base de datos de navegación y dar apoyo a cada terminación de trayectoria especifica que requiera la especificación para la navegación.

Nota: Para ciertas aplicaciones de navegación, una base de datos de navegación podría ser opcional.

6.3.2 Para un sistema RNAV multisensor, debería hacerse una evaluación a fin de determinar qué sensores cumplen el requisito de performance descrito en la especificación para la navegación.

6.3.3 La especificación para la navegación generalmente indica si para cumplir los requisitos de disponibilidad y/o continuidad es necesaria una instalación simple o doble. El concepto de espacio aéreo y la infraestructura de ayudas para la navegación son elementos clave para decidir si es necesaria una instalación simple o doble.

6.4 Aprobación de aeronavegabilidad y operaciones para operaciones RNP-X

6.4.1 El sistema RNP instalado debería cumplir un conjunto de requisitos de performance RNP básicos, descritos en la especificación para la navegación, que deberían incluir una función de vigilancia y alerta de a bordo. También debería cumplir un conjunto de requisitos funcionales específicos, tener una base de datos de navegación y dar apoyo a cada terminación de trayectoria especifica que requiera la especificación para la navegación.

6.4.2 Para un sistema RNP multisensor, debería realizarse una evaluación a fin de determinar qué sensores cumplen el requisito de performance RNP descrito en la especificación RNP

Capítulo 7 REQUERIMIENTOS SOBRE PLANES DE VUELO

7.1 Ver: A I C A12/C13 de 15 SEP 2011

Aplicación en la FIR ASUNCIÓN de la Enmienda 1 a los PROCEDIMIENTOS PARA LOS SERVICIOS DE NAVEGACIÓN AÉREA GESTIÓN DEL TRÁFICO AÉREO PANS-ATM (DOC. 4444, 15 ª EDICIÓN) DE LA OACI, que complementa los Procedimientos y Contenido del Nuevo Formato del Plan Vuelo y sus Mensajes ATS, a partir del 15 de noviembre de 2012.

Capítulo 8 PROCEDIMIENTOS ATS

8.1 Procedimientos Generales

8.1.2 Los procedimientos ATS son necesarios para usarlos en el espacio aéreo que utiliza aplicaciones RNAV y RNP. Entre los ejemplos al respecto cabe incluir los procedimientos para poder usar la funcionalidad de a bordo para desplazamiento paralelo o para que sea posible la transición entre espacios aéreos que tienen requisitos de performance y funcionalidad diferentes (es decir, diferentes especificaciones para la navegación). A fin de facilitar una transición de ese tipo es necesaria una planificación detallada, a saber:

a- determinación de los puntos específicos a los que se dirigirá el tránsito a medida que este pase de un espacio aéreo que requiere una especificación para la navegación con requisitos de performance y funcionales menos estrictos a un espacio aéreo que requiere una especificación para la navegación con requisitos de performance y funcionales más estrictos;

b- coordinación de las actividades con las partes que corresponda a fin de obtener un acuerdo regional con los detalles de las responsabilidades.

8.1.3 Los controladores de tránsito aéreo deberían adoptar las medidas pertinentes para proporcionar más separación y coordinar con otras dependencias ATC según corresponda, cuando se les informe que el vuelo no puede mantener el nivel de performance de navegación prescrito

8.2 Procedimientos de Contingencia

A DESARROLLAR

Capítulo 9 ESPACIAMIENTO DE RUTAS Y SEPARACIONES MÍNIMAS

9.1 Ver DINAC R 4444

Capítulo 10 ESPACIOS AÉREOS EXCLUYENTES

10.1 No se aplica en la FIR Asunción

Capítulo 11 PROCEDIMIENTOS EN EL ÁREA TERMINAL

11.1 Ver las siguientes publicaciones:

a) AIC A09-C10 2011;
b) AIC A10-C11 2011;
c) AIC A11-C12 2011;
d) CA N° 91.001 RNAV 2011
e) CA N° 91.002 RNAV 2011
f) CA N° 91.003 RNAV 2011
g) CA N° 91.008 RNP 2011
h) CA N° 91.009 RNP 2011
i) CA N° 91.010 APV 2011
j) CA N° 91.006 2011

Nota: estas publicaciones se corresponden a las citadas en el Capítulo 4 de este manual.

Capítulo 12 CARTAS AERONÁUTICAS, INTERPRETACIÓN

12.1 Demostraciones prácticas y análisis de documentos AIP Paraguay parte AD

Capítulo 13 COMPORTAMIENTO DE AERONAVES, FLY OVER, FLY BY

13.1 Seminario Taller sobre usos y aplicación de la PBN en las diferentes fases del vuelo y espacios aéreos.

Capítulo 14 FRASEOLOGÍA

14.1 Ver Capítulo 12 del DINAC R4444

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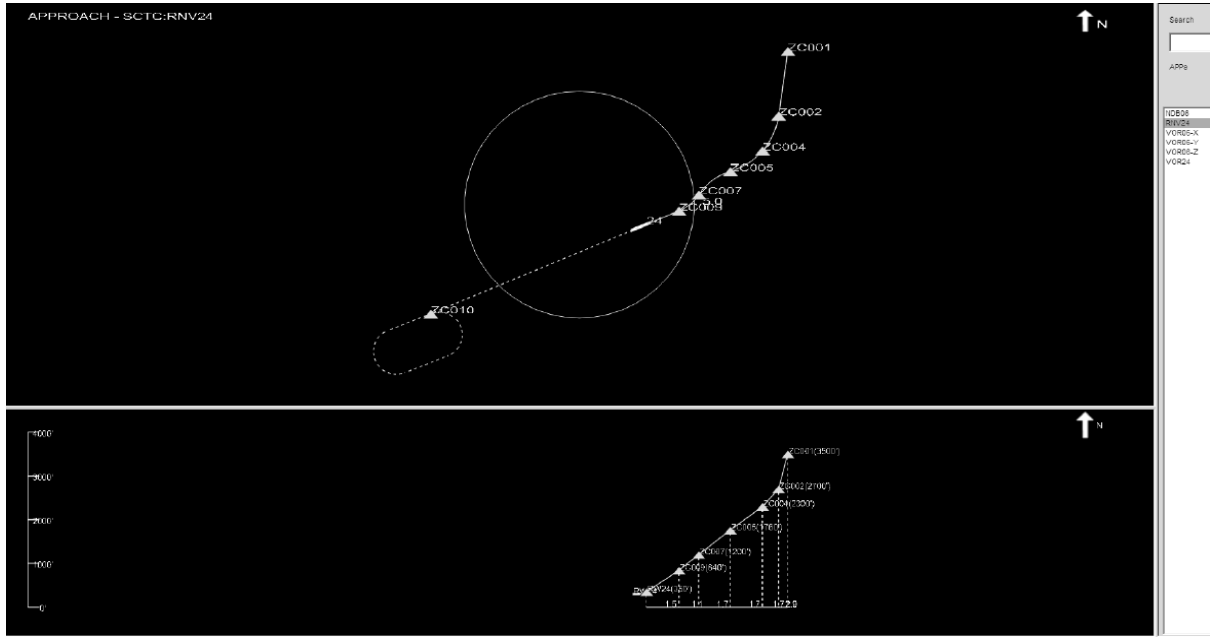
Apéndice E / Appendix E

Data recibida desde el proveedor de Bases de Datos de Navegación

	Proc	R	C	Via	Rwy	TrAlt	Fix	Type	T	PT	O	M	Cs/Hd	Alt 1	Alt 2	Dist	Rad	Nav	FPA	CAS	GSCA	Cnd	ARC/MSACtr	RNP	Time
SCTC	D30TC	2	Y	APPTRN	RW24		D30TC	WAYPOINT_FIX		IF	N	N		8000											
SCTC	D30TC	2	Y	APPTRN	RW24		ZC001	WAYPOINT_FIX		TF	N	N		3500A										1,000	
SCTC	RNV24	2	Y	RNAV	RW24		ZC001	WAYPOINT_FIX		IF	N	N		3500A											
SCTC	RNV24	2	Y	RNAV	RW24		ZC002	WAYPOINT_FIX		TF	N	N		2700A						180				0.500	
SCTC	RNV24	2	Y	RNAV	RW24		ZC004	WAYPOINT_FIX	R	RF	N	N	213.5	2300A		1.69			-3.00				ZC003	0.500	
SCTC	RNV24	2	Y	RNAV	RW24		ZC005	WAYPOINT_FIX	R	RF	N	N	246.0	1760		1.69			-3.00				ZC003	0.120	
SCTC	RNV24	2	Y	RNAV	RW24		ZC007	WAYPOINT_FIX	L	RF	N	N	206.0	1200		1.69			-3.00				ZC006	0.120	
SCTC	RNV24	2	Y	RNAV	RW24		ZC009	WAYPOINT_FIX	R	RF	N	N	239.8	840		1.10			-3.00				ZC008	0.120	
SCTC	RNV24	2	Y	RNAV	RW24		24	RUNWAY_FIX		TF	Y	N		350					-3.00					0.120	
SCTC	RNV24	2	Y	RNAV	RW24		ZC010	WAYPOINT_FIX		TF	Y	Y		3500										1,000	
SCTC	RNV24	2	Y	RNAV	RW24		ZC010	WAYPOINT_FIX	R	HM	N	Y	60.0											1,000	1.00



APPENDIX F

RNP AR Instrument Procedure Flight Simulator Assessment Form			
1.	Date:	2.	Aircraft Type:
3.	Procedure:	4.	FMS/Software:
5.	PIC:	6.	Data Base / AIRAC Cycle:

Flight simulation assessment				Chart assessment			
		Yes	NO			Yes	No
7.	Comparison Nav Data and chart			14.	Chart with sufficient details		
8.	Assessed under DA/MDA			15.	RNP < 1 in miss approach		
9.	Assessed faster/slower than indicated			16.	Notes RF required		
10.	Assessed boundaries sup/inf Temperature			17.	Notes velocities non-standard		
11.	Flyability			18.	Note reason of non-standard miss approach ascent		
12.	Radio navigation aid unselected			19.	Note temperature limits		
13.	Assessed night /IMC			20.	Chart of agreement with flight trajectory		

Assessment of approach segments						
		Initial	Intermediate	Final	Miss approach	HLDG
21.	Segment direction					
22.	Distance					
23.	Descent angle					
24.	Length					
25.	EGPWS					
26.	Wind					
27.	Banking angle maximum RF reached					

28. Description of the activities carried out:

(Insert the objective of the simulator session and full description of each one of the flights carried out including parameters used in each one, such as: temperature, QNH, high winds and surface wind, visibility, runway condition)

Example:

Session is carried out to validate new procedure .....etc etc.....

1. New procedure is initiated in XXXXX to XXXXFT, T° 28°C (maximum allowed in the chart), QNH 1013, wind calm, , CAVOK, wet runway.....etc etc.....
2. New procedure is initiated in XXXXX to XXXXFT, T° 0°C (minimum allowed in the chart), QNH 1013, wind 360/08, visibility 1600m, dry runway.....etc etc.....
3. New procedure is initiated in XXXXX to XXXXFT, T° 10°C, QNH 1013, wind 360/08, visibility 3000m, dry runway, aircraft with maximum landing weight.....etc etc.....
4. New procedure is initiated in XXXXX to XXXXFT, T° 10°C, QNH 1013, wind 360/08, visibility 3000m, dry runway, aircraft with maximum landing weight, in approach engine failure in miss approach.....etc etc.....

RNP AR Instrument Procedure Flight Simulator Assessment Form	
29.	Remarks: *(recommendations or findings made during simulation activity)*
30.	Conclusion: *(indicate if the procedure is appropriate)*
31.	Signature participants:

Agenda Item 4: Standards and procedures for performance-based navigation operations approval

Implementation of a tool for prediction of RAIM availability in the SAM Region.

4.1 The meeting revised WP/20 and WP/28 presented by the Secretariat and Colombia, respectively, o the implementation of a tool for prediction of RAIM availability in the SAM Region, and reached the following conclusions:

a) There is an operational requirement for the use of a RAIM/FDE tool in the SAM Region, which should be implemented as soon as possible, keeping in mind that PBN GNSS-Based procedures are applied, such as primary sensor in the Region, which demand such prediction;

b) The meeting determined that the best option for the implementation of the referred tool is that offered by DWI, in consideration to the fact that it is the provider of the AUGUR forecast system, by EUROCONTROL. Interphase proposed, access and consultation options maintenance and associated costs.

c) Secretariat shall request additional information on the progress in the development and its possible application to the rest of the SAM Region of the tool used by the Colombian administration, updating the information of WP/28, with a view to present to the RLA/06/901 Fifth Meeting of the Coordination Committee (RCC/5), a definitive proposal on the implementation of a RAIM/FDE availability forecast system applicable to the SAM Region; and

d) That civil aviation authorities assess, if feasible and necessary to carry out the approval of RAIM prediction tools, already used by commercial operators, keeping in mind that the existing interphase between softwares available to fill the flight plan and the predictive tool currently used by them, greatly facilitates the processing of such plans.

4.2 Further details on the implementation of the predictive RAIM tool may be found under Agenda Item 6.

4.3 The meeting recalled that during the SAM/IG/7 meeting Colombia was requested to research about the possibility to extend the service of the predictive RAIM tool SAPET (Satellite Performance Evaluation Tool) to the SAM Region.

4.4 With reference to the referred task, the Colombian administration highlighted the following aspects:

a) Currently version 3.7 is available and version 3.8 will be available soon.

b) This tool has been used to predict RAIM availability in the next Colombian airports: SKBO, SKBQ, SKAS, SKTM, SKSV, SKYP, SKSA, SKBS, SKCG, SKCZ, SKUI, SKSP and SKUC.

c) The acquisition of terminal with more capacity and exclusive and dedicated internet access to the NANU and GPS almanacs is being assessed. Currently the internet channel is shared with all users and sometimes the connection fails.

4.5 The Colombian delegation indicated that, in order to extend this service to the SAM Region, next items should be taken into account:

a) Updated Data Base of airports, air space terminals and terrain of all SAM Region.

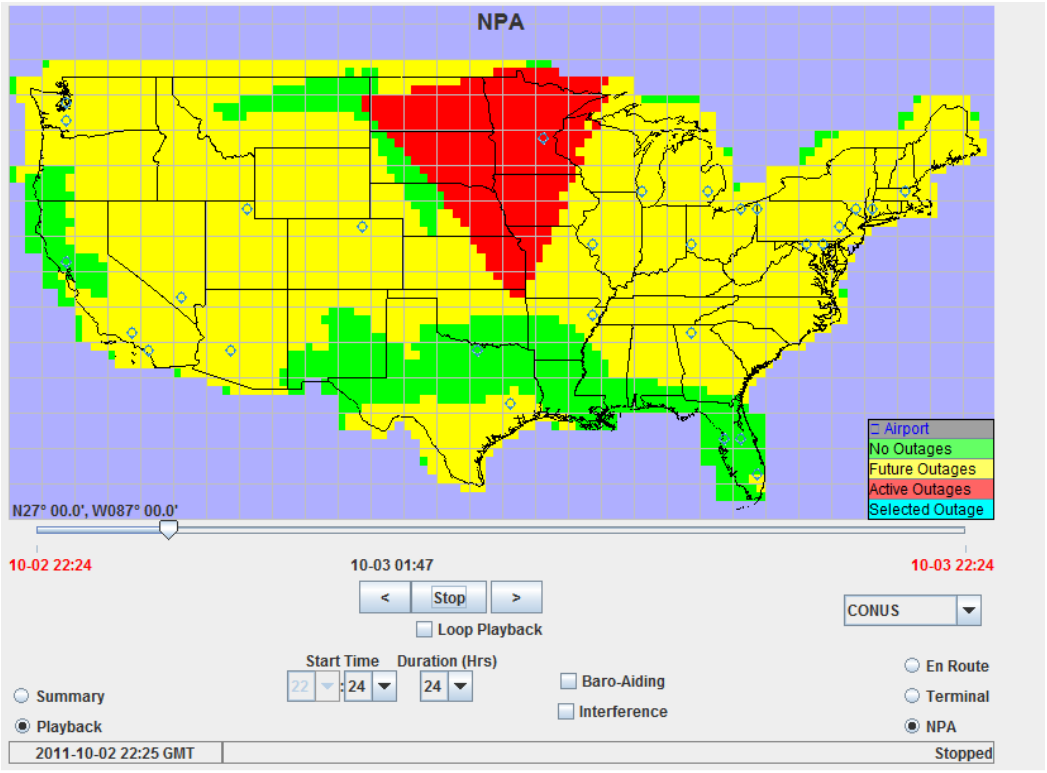
b) Updated obstacles Data Base of all SAM Region.

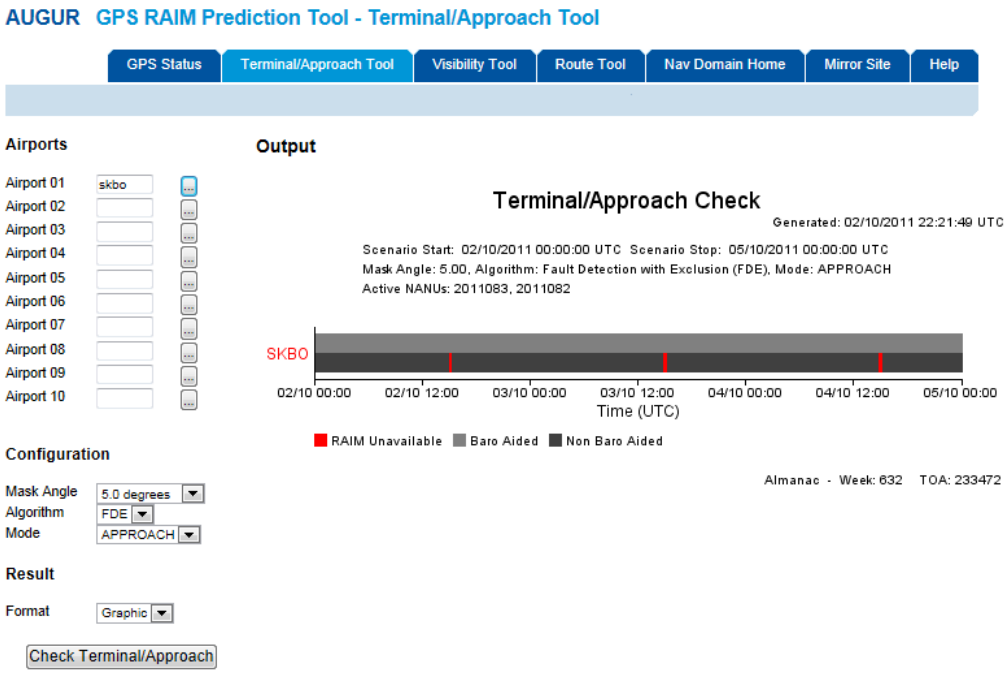
c) Interactive presentation to the user in similar way to the FAA web page: http://www.raimprediction.net/applet.php or AUGUR web page: http://augur.ecacnav.com/. (See samples in **Appendix A**).

d) Designation of technical personnel to assume the responsibility for the tool management.

e) Tool validation

APÉNDICE A / APPENDIX A





Agenda Item 5: Air Traffic Flow Management Implementation (ATFM) in the SAM Region

5.1 The Meeting recalled that during SAMIG meetings, matters related with ATFM implementation in the South American Region and its associated activities have been reviewed repeatedly. Also, the meeting considered that States should have human resources both material and economical to be able to accelerate the ATFM implementation process in the SAM Region.

5.2 The representatives at the meeting considered that the lack of personnel devoted specifically to ATFM activities has been one of the main problems faced in the implementation of air traffic flow management. In addition, it was concluded that persons managing the ATFM in their States are involved with other functions, which does not enable continuity in the tasks related to this matter.

5.3 Therefore, it is considered appropriate the creation or identification and maintenance of stable work teams to maintain continuity of the activity at a national and regional level.

5.4 As part of the works, the meeting reviewed the tasks contained in the Action plan for the implementation of ATFM in the Region and also analysed the tasks of projects in the ATFM programme requesting the Secretariat to take the necessary actions so that the same be executed in the framework of Regional Project RLA/06/901.

Course on Runway and ATC Sector Capacity Calculation for instructors

5.5 As agreed by the SAM/IG/7 meeting, the Secretariat confirmed the inclusion in Regional Project RLA/06/901 of a Runway and ATC Sector Capacity Calculation for instructors, in Lima, Peru, from 24 to 28 October 2011. Some countries have already made the calculation for the runway at one airport, as an exercise, but it needs to be done for the other airports and ATC sectors. The meeting considered pertinent to continue with these instances to train instructors by States which have not completed the same.

ATFM Teleconferences

5.6 The Meeting recalled that States should hold daily teleconferences amongst air traffic flow management units as part of the ATFM implementation process in the Region.

5.7 On the other hand, the meeting agreed that ATFM messages exchange is necessary to enable the completion of phases of ATFM implementation in the Region. Representatives agreed that e-mail or SKYPE are valid tools for States to start handling air traffic management information. These tools have been considered as the simplest way to disseminate the ATFM philosophy in the Region, furthermore, it was deemed pertinent, in order to standardise communications, to use the form model used so far by Paraguay, Colombia and Venezuela, presented as **Appendix A** to this part of the report. The meeting noted that only Paraguay, Colombia and Venezuela maintain their exchange of messages active.

5.8 The meeting agreed that the messages exchanges be made as per Appendix A to the report on Agenda Item 5 of the SAM/IG/5. Representatives agreed that the date of the first contact should be on 21 November 2011 and that States should exchange information and ATFM messages. The Secretariat is also requested to send to States in electronic format, the form model contained in **Appendix B** to this part of the report.

5.9 On the other hand, it is requested to all States to send the Secretariat before 14 November 2011 their e-mails, contact telephone and address to enter SKYPE in order to exchange information and ATFM messages. Also, the Secretariat is requested to send to States in electronic format the form contained in Appendix B.

Revision and updating of the action plan for ATFM implementation

5.10 The meeting analysed the action plan for the implementation of ATFM in airports and the airspace (ATC Sectors) of the Region, which contemplates tasks by designated personnel assigned with established dates for compliance. The revised action plan is presented as **Appendix C** to this part of the report.

5.11 The meeting emphasized that the following States have presented the preliminary exercise on estimated runway capacity and ATC: Bolivia, Brazil, Colombia, Paraguay, Peru and Venezuela. Therefore, the rest of the States are encouraged to present their studies to the SAM/IG/9 Meeting.

5.12 The meeting also recalled that States must inform the Secretariat the implementation phases of the ATFM in analysing its evolution according to the progress in regional terms. Therefore, States are requested to send the Secretariat the data detailed below, as soon as possible and before 31 December 2011:

a) Factors affecting implementation:
   i) Lack of personnel, training
   ii) Automation tools
   iii) Laws, etc.

b) Pre-operational implementation phase:
   i) What has been made to date for ATFM implementation
   ii) What do you think lacks to be done; and
   iii) Tentative date for finalization

c) Operational implementation phase:
   i) Tentative date for implementation

Revision of the GREPECAS projects work programme

5.13 The meeting analysed and reviewed the work programme of projects proposed by GREPECAS/16 meeting, where the existing subgroups were replaced by the valid projects. Representatives agreed that for the ATFM programme there are two associated projects: Improve the balance between demand and capacity and flexible use of the airspace.

5.14 The meeting recalled that during the SAM/IG/7 it was not possible to designate a coordinator for the project *Improve the balance between demand and capacity and flexible use of the airspace* which was left vacant and proposed the designation of a coordinator for this project.

5.15 The meeting approved Brazil as a Coordinator of the above-mentioned project, upon a proposal from Uruguay, supported by Peru, Venezuela and Panama. On this respect, Mr. Juarez Franklin Gouveia was elected as Project Coordinator for the project "*improve the balance between demand and capacity and flexible use of the airspace."*

Volcanic Eruption Contingency Plan for the South American Region

5.16 In analyzing this matter, the meeting reviewed WP/03 and recalled that during the Fourth Meeting of the Coordination Committee of Regional Project RLA/06/901 - Assistance in the implementation of an ATM regional system according to the ATM operational concept and the corresponding technological CNS support, one of the priority tasks considered was the development of a contingency plan to face volcanic eruptions, since during the last years a series of events had occurred at a worldwide level, and particularly in the South American Region, which significantly affected the normal operation of international civil aviation, and consequently caused serious inconveniences for passengers and economical and financial aspects of the aeronautical field.

5.17 Based on the above, and with the assistance of experts in aeronautical meteorology and air traffic, and as a follow-up of ICAO guidelines, a draft contingency plan was prepared for volcanic eruptions in the South American Region, document which was analysed by the Meeting. The contingency plan was analysed in first instance by an Ad-hoc group created to this end, and then by the ATFM Ad-hoc Group.

5.18 It could be noted that some aspects are not sufficiently mature yet, to be incorporated into the plan, and that a further analysis will be required. As an example, it was noted that in the proper definitions of the low, mid and high contamination, the value of volcanic ash concentration has not been defined yet, and this is a relevant aspect in safety. While this plan makes reference to the need to have high-quality information, it could be convenient to emphasize this matter, and especially point out that the information should be disseminated following ICAO standards.

5.19 The incorporation of the text corresponding to the aeronautical authorities' responsibility during the event, should also be thoroughly analysed, as well as the creation of a crisis committee, as soon as there is information available of a volcanic alert phase, and to establish in general terms which should be its composition and functions.

5.20 The need to have in this type of circumstances has been evident to have a flow management unit or flow management post (FMU/FMP) in each State, which shall enable a point of contact clearly defined for coordination among ATS service provider units, and particularly for air operators may have first-hand information and may apply the collaborative in decision-making (CDM) concept.

5.21 Also, and recognising that not all States have yet an FMU/FMP, the Meeting felt that a list of States focal points should be available, with the telephone numbers, e-mails and other relevant data, and should be published in the South American Region website. States should have a password in order to maintain the information duly updated. The Meeting was also of the opinion that the specific functions of the contact point should be developed and established.

5.22 Taking into account the importance of this plan, and its implication in safety, and aspects mentioned above, the Meeting was of the opinion that the most convenient would be that this document were analysed more thoroughly by States and by the different fields involved in the same, and that a revision be made by the aeronautical meteorology and aerodromes implementation groups, in order to obtain further information and procedures that could be incorporated in the plan.

5.23 In this connection, it was suggested to send the draft contingency plan to States of the South American Region, for comments, and to continue with the efforts to have this plan as soon as possible, with the support of Regional Project RLA/06/901.

Regional contingency plan for natural disasters and / or catastrophic events

5.24 The Meeting reviewed the WP/23 and recalled that during the Twelfth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/12) examined the problems that occurred with different states with respect to catastrophic natural disasters that affected the operation international civil aviation and thus was responsible for economic and financial losses. According to Conclusion RAAC/12-9 should be developed a regional contingency plan to deal with possible disasters related to mentioned problems.

5.25 The Meeting agreed that it would be important to develop a contingency plan taking into account natural disasters and events in the region in recent times. For example it was considered that it should be taken into account lessons learned from the earthquake that affected airports in Chile, or other incidents that affect the global aviation system, such as AENA experience in the development of contingency plans.

5.26 Furthermore, the Meeting considered that in order to develop a contingency plan, the States must consider the active participation of ATS service providers units, airport managers and aircraft operators as well as any other organization or authority to be considered necessary. It also was considered important to have an ATFM structure (FMU / FMP) in each State, which would have a clear focal point for coordination in order to get first-hand information and apply the concept of collaborative decision making (CDM).

5.27 The meeting requested the Secretariat to create a group of experts for the purposes of the preparation of Regional contingency plan based on the support of Regional Project RLA/06/901 Implementation Assistance of a Regional ATM System by considering the ATM Operational Concept and Technology Support for CNS.

Follow-up to the conclusions and decisions adopted by the SAMIG meetings

5.28 The meeting reviewed and updated Appendix A to the report on agenda item 1 the list of conclusions and decisions adopted by the Meetings SAM/IG in the ATFM area.

APPENDIX A

TELE-CONFERENCE FORM (v1.0)

1. STATE:	
2. REPRESENTATIVE:	
3. DATE/UTC TIME:	
4. AERODROME 1:	

4.1	Without delay	
	With delay	Time:

4.1.1	Aerodrome characteristics:
a. RWY:	NOTAM Nº
b. Nav. Aids:	NOTAM Nº
c. Impact	

4.1.2	Meteorology
a.	Phenomena:

APÉNDICE B / APPENDIX B

LISTA DE CONTACTOS PARA LAS TELECONFERENCIAS ATFM/ CONTACT LIST FOR ATFM TELCONS

Pais/ Empresa State/ Company	Cargo / Position	Persona(S) a cargo/ Responsible	TEL Contacto Contact TEL	E-MAIL	Contacto SKYPE SKYPE Contact	Dirección AMHS Address
URUGUAY	Director de Tránsito Aéreo	LUIS OTHEGUY	598 99592113	atfm@dinacia.gub.uy		
ESTADOS UNIDOS	International Operations	RONALD ANDRES FISCHER	540 4224561	ronald.a.fischer@faa.gov	ronnie.boy2	
	Manager, International Operations	STEVE McMAHON	540 4224130	steve.mcmahon@faa.gov		
VENEZUELA	Supervisor de la Unidad de Gestión de Afluencia	MARIBEL MAYORA	0058 212 3552898	m.mayora@inac.gob.ve		
				maribelmayora@gmail.com		
PERU	ATM Officer	VICTOR ZAVALETA	511 6301150 - 1151	vzavaleta@corpac.gob.pe	atfm.corpac	SPIMZDZX
			51 991897092	vzavaleta01@gmail.com		
	ATM Officer	JAIME CONTRERAS	511 6301150 - 1151	jcontreras@corpac.gob.pe	atfm.corpac	SPIMZDZX
	ATFM / ATCO	CARLOS GUERRA	511 6301150 - 1151	cguerra@corpac.gob.pe	atfm.corpac	SPIMZDZX
PANAMÁ	ACC supervisor	IVAN DE LEON	5075019807	cerap@aeronautica.gob.pa		
				ideleon@aeronautica.gob.pa		
METRON AVIATION		JOE HOF	7032340859	joe.hof@metroaviation.com		
IATA	American Airlines	TOBIN H. MILLER	7034196533	tobin.miller@aa.com		
BRASIL	Cgna /Capacidad	JUAREZ FRANKLIN	5521 2101 6391 - 6615	franklin@cgna.gov.br		
	Cgna / Flujo	PAULO BARCELLOS	5521 2101 6536	barcellos@cgna.gov.br		
			5521 9499 7669			
	CGNA / Flujo	RICARDO BRANCO	5521 2101 6536	brancodrb@cgna.gov.br		
	Gerencia Nacional	GERENTE NACIONAL	5521 2101 6449	dcc@cgna.gov.br		

APPENDIX C

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	**Sep 2008**	**Apr 2010**		
1.1 Prepare ATFM survey	N/A	Aug 2008	Project RLA/06/901 Regional Office	**Completed**
1.2 Send survey to the States of the Region	Aug 2008	SAM/IG/2	Regional Office	**Completed**
1.3 Analyse the methodology presented by Brazil for estimating airport capacity (runway capacity)	June 2008	SAM/IG/2	ATFM/IG	**Completed** and analyzed through WP/08, WP/16.
1.4 Send response to survey	N/A	SAM/IG/2	States	**Completed** Except for French Guyana, Guyana, and Suriname.
1.5 Assess survey results	N/A	SAM/IG/3	ATFM/IG	**Completed**
1.6 Course offered by Brazil on Airport Capacity (runway capacity) Estimate	Mar 2009	Mar 2009	Brazil	**Completed** The course was carried out from 23 – 27 March 2009, as planned
1.7 Development of the Methodology for the Calculation of Airport (runway capacity) and Airspace Capacity in the SAM Region	Nov 2008	Jul 2009	Brazil and USA RLA/06/901	**Completed** Presented at SAM/IG/4

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
1.8 Carry out exercise of Calculation of airport (runway capacity) and ATC sectors Capacity in the SAM Region as per the Course offered by Brazil	Sept 2009	SAM/IG/9	States	**Valid** Through Conclusion SAM/IG/4-5, the guidance material for the application of a common methodology for the calculation of airport and ATC sectors capacity was approved. Bolivia, Brazil, Colombia, Paraguay, Peru and Venezuela presented their preliminary exercise.
1.9 Carry out Calculation of Airport and Airspace Capacity of main airports by States.	Sept 2009	SAM/IG/9	States	**Valid** Brazil, Paraguay and Peru presented the data. Venezuela presented its runway capacity calculation for the Maiquetia airport.
1.10 Identify airports where periods exist where the demand is greater than existing capacity including simulations, if necessary, by States.	Sept/Oct 2009	SAM/IG/9	States	**Valid** Brazil, Paraguay and Peru presented the data.
1.11 Determine operational factors affecting airport demand and capacity to optimise utilisation of existing capacity, including simulations, is necessary.	Sept/Oct 2009	SAM/IG/9	States	**Valid** Brazil, Paraguay and Peru presented the data.
1.12 Present the conclusions on existing airport capacity	**N/A**	SAM/IG/9	States	**Valid** Brazil and Peru presented their conclusions on airport capacity (runway capacity)
2. Coordination with the ATM community				
2.1 Present initial AIC model	SAM/IG/2	SAM/IG/2	ATFM/IG	**Completed**
2.2 Publish initial AIC	SAM/IG/2	Next AIRAC	States	**Completed**

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
		date/2009 after SAM/IG/3		
2.3 Promote seminars to the ATFM community, taking into account the CDM concept for ATFM implementation, and begin the relevant coordination		December 2010	States	**Completed** On 29 to 31 March 2010, the First CDM Workshop was carried out in Rio de Janeiro, Brazil, with the participation of 27 experts. The second ATFM/CDM Workshop will be carried out in Rio de Janeiro during 26 and 27 November 2010
2.4 Inform the GREPECAS CNS/ATM Subgroup	SAM/IG/3	Permanent	N/A	**Completed** The GREPECAS CNS/ATM/SG/1 Meeting (Lima, Peru, 15 to 19 March 2010) was informed on the progress in the ATFM areas carried out to date in the SAM Region (see 5.4) The CNS/ATM/SG/2 Subgroup was also informed on the development achieved to date, and the ATFM and CDM Manuals were presented for its standard application in the CAR and SAM Regions. Both documents condensed in one were approved by GREPECAS/16 Meeting (para. 3.5.4 and Concl. 16/35) for its application in both regions.
3. Infrastructure and database		**Aug 2008**		

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
3.1 Send the results of the survey developed by the hired expert to the Automation Group.		Dec 2008		**Completed**
3.2 Send to the Automation Group the information obtained by the expert hired on the data bases used in the Brazil, United States and Eurocontrol units	Jan 2009	TBD		**Valid**
3.3 Coordinate implementation activities with the Automation Group			ATFM/IG	**Permanent**
4. Policy, standards, and procedures				
4.1 Hiring of an expert to draft the manuals on ATFM measures for airports and FMU and FMP procedures			N/A	**Completed**. Task included in 4.2
4.2 Hiring of an expert for the elaboration of the ATFM Manual		February 2009	Regional Office	**Completed**. Task developed from 6 to 17 July 2009
4.3 Detailed development of ATFM Manual chapters	Dec 2008	SAM/IG/5	Regional Office	**Completed** Approved partial draft, including ATFM concepts for airspace and airports at SAM/IG/2 Meeting. Presented at SAM/IG/4
4.4 Detailed development of the second part of ATFM Manual Chapters.	Dec 2009	Jun 2010	Regional Office (RLA/06/901)	**Completed** The ATFM Manual was analysed from 4-15 October, with the assistance of experts from Colombia and Brazil and some changes were introduced, in order to improve its structure.

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
4.5 Present the model AIC Supplement		SAM/IG/6	ATFM/IG	**Completed** With the assistance of an expert from Peru, an AIP Supplement Model, to be used by States as reference, was prepared and developed (see SAM/IG/6 WP/08).
4.6 Approve the AIC Supplement		SAM/IG/6	ATFM/IG	**Completed** The AIC supplement model was approved by SAM/IG/6
4.7 Publish the AIP Supplements		SAM/IG/9	States	**Valid**
5. Training				
5.1 Draft ATFM training plans and submit them		TBD	States	**Permanent**
5.2 Train the team on decision-making at airports		December 2011	States	**Completed** See 5.1.
5.3 Hiring of an expert to draft Manual on the Introduction to ATFM for the ATM Community		TBD	Regional Office	**Completed** The ATFM Manual was prepared and submitted to CNS/ATM/SG. Guidelines to inform ATM community on ATFM and CDM general concepts. These guides may be provided in courses, seminars or others.

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
5.4 Present and assess the Manual for the Introduction to ATFM for the ATM Community		SAM/IG/6	RLA/06/901	**Completed** Through the hiring of experts, the ATFM manual was developed. GREPECAS/16 Meeting adopted the manual for the CAR and SAM Regions through Conclusion 16/35. It has been planned to develop a second part of such manual.
5.5 Train the members of the ATM community in the CDM and ATFM concepts		TBD	States	**Completed** The ATFM SAM Course was held in Rio de Janeiro, Brazil, from 22 to 26 March, 18 experts participated and the holding of tele-conferences was agreed, same which started on 12 April with excellent results. The First CDM Workshop was held from 29 to 31 March 2010, with the participation of 27 experts. The Second ATFM SAM course was held in Rio de Janeiro, Brazil, from 23 to 25 November 2010, with the participation of 29 experts. On 26 and 27 November 2010, the Second CDM Workshop was held in Rio de Janeiro, Brazil was held, with the participation of 29 experts. The Second Seminar/Workshop on airport capacity calculation

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
				and ATC sectors was held in Rio de Janeiro, Brazil, from 21 to 25 March 2011, with 23 participants.
5.6 Train FMP/FMU staff for application of ATFM measures for airports		TBD	States	**Permanent**
5.7 Monitor the training of the ATM community			States	**Permanent**
6. Final implementation decision				
6.1 Identify and review factors that may affect the implementation decision		SAM/IG/9	States	**Valid**
6.2 Declare the pre-operational implementation in the defined area		SAM/IG/9	States	**Valid**
6.3 Declare the final operational implementation in the defined area		SAM/IG/9	States	**Valid**
7. Monitor system performance				
7.1 Draft the ATFM post-implementation follow-up programme at airports	SAM/IG/6	SAM/IG/9	ATFM/IG	**Valid**
7.2 Implement the ATFM post-implementation follow-up programme at airports	SAM/IG/7	SAM/IG/9	States	**Valid**
Tentative pre-operational implementation date		SAM/IG/9	**States**	**Valid**
Tentative definitive implementation date		SAM/IG/9	**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				
1.1 Analyse the methodology to estimate ATC sector airspace capacity presented by Brazil	Jun 2008	SAM/IG/2		**Completed**
1.2 Prepare an airspace demand survey	TBD	TBD		
1.3 Attend the course on Airspace Capacity Estimate **(ATC Sector).**	Mar 2009	States		**Completed**
1.4 Carry out the States estimate airspace ATC sector capacity at the major airports	**Sept. 2009**	SAM/IG/9	States	**Valid** States must submit their studies before the SAM/IG/8 Meeting. Brazil has presented their studies.
1.5. Identify airspace sectors where demand sometimes exceeds capacity, including simulations by the States, if necessary	**TBD**	SAM/IG/9	States	**Valid** States must submit their studies before the SAM/IG/9 Meeting. Brazil has presented their studies.
1.6 Identify factors affecting airspace demand and capacity in order to optimise the use of existing capacity, including simulations if necessary	**TBD**	SAM/IG/9	States	**Valid** States must submit their studies before the SAM/IG/9 Meeting. Brazil has presented their studies.
1.7 Present conclusions on the existing airspace capacity.	**TBD**	SAM/IG/9	States	**Valid** States must submit their studies before the SAM/IG/9 Meeting. Brazil has presented their studies.
2. Coordination with the ATM community	**Sep 2008**	**Aug 2009**		

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**
2.1Consider by the ATM community the implementation of ATFM in airspace	Sep 2008	SAM/IG/9	States	**Valid** States in implementation phase should coordinate with the ATM community the necessary actions for the ATFM implementation process and submit them to the Secretariat before the SAM/IG/9 Meeting.
3. Infrastructure and database	**TBD**	**Dec 2013**		**Valid**
3.1 Send requirements to the Automation Group, as stipulated in Appendix B of the ATFM CONOPS	**TBD**	**TBD**	ATFM/IG	**Valid**
3.2 Coordinate implementation activities with the Automation Group	N/A	Dec 2013	ATFM/IG	**Valid**
4. Policy, standards, and procedures	**TBD**	**Jun 2013**	States	**Valid**
4.1 Develop ATFM policies, taking into account the objectives and principles established in the CAR/SAM ATFM CONOPS	**TBD**	**TBD**	States	**Valid**
4.2 Develop a regional strategy and framework for the implementation of Centralized ATFM units	**2008**	**2014**	Regional Project RLA/06/901	**Valid**
4.3 Develop template/contents for operational agreements between Centralized ATFM units for interregional demand/capacity balancing	**2008**	**2014**	Regional Project RLA/06/901	**Valid**
4.4 Define common elements of situational awareness between FMUs; • common traffic displays, • common weather displays (Internet), • communications (teleconferences, web), and • daily teleconference/messages methodology advisories	**2008**	**2012**	Regional Project RLA/06/901	**Valid** States maintain web conferences for exchange of information. Paraguay, Colombia and Venezuela maintain telcons for exchange of information. As of

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**
				21 November 2011 States are committed to establish telcons as per implementation plan.
4.5 Define common electronic information and minimum databases required to support decision making process and alerting systems for interoperable situational awareness between Centralized ATFM units	**2008**	**2014**	Regional Project RLA/06/901	**Valid**
4.6 Develop a regional strategy to implement the use of a flexible upper airspace (FUA): • 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 /	**200/8**	**2015**	Regional 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. Training	**TBD**	**May 2013**		
5.1 Train the team on airspace data collection	Jun 2009	March 2011	States	**Completed** A first course was carried out in March 2009. The second course on runway capacity and ATC sector was held in Rio de Janeiro, Brazil, from 21 to 25 March 2011, with 23 participants. The third seminar-workshop, focused to instructors on airport capacity and ATC sectors will be held from 24 to 28 October 2011, in Lima, Peru.
5.2 Air Traffic Flow Management Course	Mar 2010	Nov 2010	Brazil	**Completed** Hosted by RP RLA/06/901. The Second ATFM Course was held in Rio de Janeiro, Brazil, from 22 to 26 March 20101 with 28 experts, and the holding of tele-conferences was agreed, and they have been held as of 12 April 2011, with excellent results. The Second ATFM SAM Course was held in Rio de Janeiro, Brazil, from 23 to 25 November 2010, with 29 Experts. The Third Seminar-workshop on airport capacity and ATC sectors will be held in Lima,

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**
				Peru, from 24 to 28 October 2011, addressed to instructors.
5.3 Train personnel in ATFM strategic measures for airspace	**TBD**	**TBD**	States	Permanent An ATFM CDM course was carried out in Brazil in 2010 with the participation of several States
5.4 Prepare plans and ATFM training material	**TBD**	**TBD**	States	**Valid**
5.5 Conduct training of personnel involved.	**TBD**	**TBD**	States	**Valid**
			States	**Valid**
6. Final implementation decision	**N/A**	**Sep 2013**	States	**Valid**
6.1 Analyse factors affecting the implementation decision	**N/A**	**SAM/IG/9**	States	**Valid**
6.2 Declare pre-operational implementation in the area defined	**N/A**	**SAM/IG/9**	States	**Valid**
6.3 Declare definitive operational implementation in the area defined	**N/A**	**SAM/IG/9**	States	**Valid**
7. Monitor system performance	**TBD**	**N/A**	States	**Valid**
7.1 Draft ATFM post-implementation follow-up programme	**TBD**	Aug 2013	Regional Project RLA/06/901	**Valid**
7.2 Implement ATFM post-implementation follow-up programme	Dec 2013	N/A	States	
Tentative pre-operational implementation date	**N/A**	**Jul 2013**	States	**Valid**
Tentative definitive implementation date	**N/A**	**Dec 2013**	States	**Valid**

Agenda Item 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

Evaluation of operational aspects to determine improvements to communications capabilities

SAM ATN architecture

6.1 Under this Agenda Item, the Meeting analyzed WP/11 (Project Coordinator), WP/14 (Secretariat), WP/17 (Secretariat) and WP/28 (Colombia).

SAM ATN architecture project

6.2 The Meeting noted the progress made in the implementation of the SAM ATN Architecture Project (D1) activities, whose details are shown in WP/11, and considered that practically all activities taken under consideration in the Project had been carried out, remaining the completion of the IP routing policy document and a safety guide REDDIG. In this respect, the Meeting was informed that by the end of 2011, a final Project-closing document will be drafted, which will be forwarded to the ICAO Regional Office for its review and presentation at the first meeting of the GREPECAS Programmes and Projects Review Committee (PPRC/1).

Follow-up to the implementation of the new REDDIG II digital network

6.3 The Meeting took note, in follow-up to the activities for the implementation of the new REDDIG II digital network, of the Seminar/Workshop on New Technologies in Satellite and Ground Networks, conducted in Lima, Peru, from 18 to 20 July 2001, when the industry presented technical solutions to the regional requirement for a mixed automatic network; that is to say, primarily satellite and secondarily, ground. Further information is shown in Appendix B to WP/14.

6.4 The Meeting was informed that the technical specifications for REDDIG II were drafted last August in the standardized manner of the ICAO Technical Cooperation Bureau (TCB), in charge to carry out the future bidding. This document was circulated to States for the reception of pertinent comments by mid-October 2011. Copy of same is shown in Appendix C to WP/14.

6.5 The Meeting received information that the Twelfth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/12) approved the starting of the bidding process for REDDIG II implementation and, therefore, the commitment of States to deposit the funds necessary during 2012 to bear the recurrent and non-recurrent costs. In this regard, TCB will start the bidding process during the first quarter of 2012; REDDIG member States should provide the necessary support for their communications experts to participate in the bidding process.

6.6 The Meeting, taking into account the progress made towards REDDIG implementation, reviewed the action plan shown in **Appendix A** to this part of the Report.

6.7 WP/27**,** presented by Colombia, showed, on the one hand, the degree of implementation of its domestic AMHS and, on the other, proposed certain aspects absolutely in line with the Region and the Secretariat, and over which respective decisions had been taken, such as the need for REDDIG II, topic mentioned before.

Review to FASID Tables CNS 1Ba and CNS 1Bb

6.8 As a result of AMHS implementation, AMHS interconnection, the interconnection of automated systems which include AIDC, among other applications, as well as REDDIG II implementation plans to represent the SAM ATN network, the Meeting examined the updated Tables CNS 1Ba and CNS 1Bb, shown in Appendices A and B of WP/17. In this respect, the Meeting deemed it convenient that the Tables were circulated to States for their updating and submission to the Regional office by 30 November 2001, and formulated the following conclusion:

Conclusion SAM/IG/8-1 Updating to FASID Tables CNS 1Ba and CNS 1Bb

That, in view of the implementation of new AMHS, the interconnection of automated systems including AIDC, among other applications, as well as the REDDIG II digital network implementation plan:

a) The ICAO South American Regional Office circulate FASID Tables CNS1Ba and CNS 1Bb to all SAM States by the end of October 2011 for their review; and
b) States of the Region send the results to their Tables review by mid-December 2011.

SAM ATN ground-ground and air-ground applications

6.9 Under this Agenda Item, WP/12 (Project Coordinator), WP/13 (Secretariat), WP/15 (Secretariat), WP/15 (Secretariat) and WP/16 (Brazil) were analyzed.

SAM ATN ground-ground and air-ground applications Project

6.10 The Meeting noted the progress made in the carrying out of activities pertaining to the SAM ATN ground-ground and air-ground applications Project, shown in Appendices A and B to WP/12.

Data links implementation in the SAM Region

6.11 The Meeting took note of the global operational data ling document (GOLD), adopted by the SAT Region during SAT/FIT/5 meeting (Lisbon, Portugal, 17-18 May 2010) through Conclusion SAT/FIT/5-7. In this respect, the Meeting deemed it convenient that it be adopted as a regional document for its application in Oceanic FIRs.

6.12 It was considered that, with the aim of encouraging data link use in the SAM Region, there was the possibility of conducting a *Seminar on Ground-ground and Ground-air Data Links Implementation in the SAM Region* in mid-2012, with the support of RLA/06/901 projects and previous approval of the fifth meeting of RLA/06/901 Coordination Committee Meeting (RCC/5), to be carried out in Lima, Peru, from 5 to 6 December 2011.

6.13 The Meeting analyzed the action plan for data links implementation in the SAM Region presented in Appendix E of WP/13. In this regard, it considered that same would be a good tool for the ground-air data link planning in support of oceanic en route and terminal area operations, as well as in some selected continental areas, as specified in the *Air navigation system performance-based implementation plan for the SAM Region*, but that its implementation should be carried out once the operational objectives are well defined. Therefore, the aspects taken into consideration in the action plan could be taken as a guideline, and some activities of this plan would be included in the ATN ground-ground and ground-air applications Project, shown in Appendices A and B to WP/12. The list updated list of the ATN ground-ground and ground-air applications Project's activities is shown as **Appendix B** to this part of the report.

Follow-up to AMHS interconnection

6.14 The Meeting took note of the progress made in AMHS interconnection, described in WP/15. In this respect, worth highlighting is that in June 2011 AMHS message exchange trials were carried out between the Brasilia (Brazil) MTA and the CIPE (Argentina) MTA of test. Network connection trials were conducted between the Lima and Manaos MTAs, pending only the message exchange tests. **Appendix C** to this part of the Report presents the updated action plan for AMHS systems' interconnection.

Updating of domestic action plans for CNS systems improvements

6.15 The Meeting noted the updating of the action plan for CNS improvements for the short and medium-term as regards en route and terminal area operations pertaining to Brazil, who, in follow-up to Conclusion SAM/IG/4-8, presented a revision to the Action Plan on CNS Improvements in Brazil, found in the Appendix to WP/16. In addition, the delegate from Guyana handed the Secretariat with an updating to the CNS systems improvements in Guyana.

6.16 In this respect, the Meeting was reminded of the importance of keeping the national action plans for CNS improvements in the short and medium term for en route and terminal area operations duly updated and inform so to the Regional Office.

Evaluation of operational requirements to determine the implementation of improvements to the navigation capabilities

6.17 Under this Agenda Item, WP/18 (Brazil), WP/19 (Secretariat) and WP/20 (Secretariat) were presented.

GBAS implementation guide

6.18 Note was taken of an initial GBAS implementation guide document, presented in the Appendix to WP/18. In this regard, the Meeting found the guide as an initial document to be considered upon, and deemed it convenient to possibly including in it aspects pertaining to the ionosphere impact analysis over the GPS systems in support of the GBAS systems.

Follow-up to the implementation of navigation aspects in the SAM Region

6.19 The Meeting examined FASID Table CNS 3 presented in Appendix A to WP/19, and considered that same should be circulated to all States for its updating and submission to the Regional office by 30 November 2011. In this regard, the Meeting formulated the following conclusion:

Conclusion SAM/IG/8-2 Updating of FASID Table CNS 3

That, with the aim of updating the information in FASID Table CNS 3:

a) The ICAO South American Regional Office circulate FASID Table CNS 3 to all SAM States by the end of October 2011 for their review; and
b) States of the Region send the results to the Table review by mid-December 2011.

6.20 In addition, the Meeting took note that the Secretariat would be circulating Lists 1 and 2 during the first quarter of 2012, for their updating by the States of the Region.

DME/DME coverage updating

6.21 Note was taken on the DME/DME coverage updating, carried out on the basis of updated information from the VOR/DME stations of some States of the Region. **Appendix D** to this part of the Report presents the updated DME/DME coverage for the Region. In addition, on the basis of the changes made to the DME/DME coverage, an analysis regarding DME/DME coverage over the Regions RNAV routes is presented as **Appendix E** (to be included in SAM/IG/8 final report) to this part of the Report.

Implementation of a RAIM availability prediction took in the SAM Region

6.22 The Meeting, in follow-up to Conclusion SAM/IG/5 – FDE *availability prediction programme*, analyzed the two solution proposals on RAIM availability predictions from the industry, and the initial studies made by Colombia to extend the RAIM availability application it has installed domestically to all the SAM Region. Detailed information is shown in WP/20 and WP/28.

6.23 The Meeting considered, after an extensive debate, that the Region required a RAIM availability prediction service to ensure PBN operations for en-route, non-precision approach, vertical guide approach (APV) and terminal area for each of the States of the Region.

6.24 In addition, the Meeting, after analyzing the information presented for the implementation of a RAIM availability prediction services, considered that from the proposals received from the industry, that of DWI was the most appropriate for the Regin and, in reference to Colombia, the Meeeting deemed it convenient that the Secrtariat request it completed the technincal-financial study for avilability predicion by 15 November 2011, with the aim that regional project RLA/06/901 RCC/5 meeting could define the better technical-financial solution. In this resect, the Meeting formulated the following conclusion:

Conclusion SAM/IG/8-3 Implementation of a RAIM/FDE prediction system in the SAM Region

That, in order for the FDE SAM Region to have a common service for predicting RAIM and FDE availability to support PBN operation for en-route, non-precision approach, vertical guide approach (APV) and terminal area:

a) the Fifth Meeting of the Coordination Committee of Regional Project RLA/06/901 consider the purchase of the RAIM prediction service selected between the proposals presented by DWI and Colombia; and

b) ICAO analyse the most convenient way for States that are not members of Regional Project RLA/06/901 to pay the corresponding fee for the RAIM prediction service.

APPENDIX A

ACTION PLAN FOR THE IMPLEMENTATION OF A NEW DIGITAL NETWORK FOR THE SAM REGION (SAM ATN NETWORK)

ACTIVITIES	ACTION TO BE TAKEN BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
1 Identify current voice and data services requirements, as well as those scheduled to be implemented in the short, medium and long term in the Region, in support of air navigation	SAM/IG Group for the implementation of CNS improvements	List of services requirements in support of air navigation for the Region, including those scheduled for the short, medium and long term	SAM/IG/6	**Completed** Identified in the study for the implementation of the new digital network, REDDIG II
2 Analysis of band width required for the services identified in Activity 1	SAM/IG Group for the implementation of CNS improvements	Amount of band width required to support the requirements specified in Activity 1	SAM/IG/6	**Completed** Identified in the study for the implementation of the new digital network, REDDIG II
3 Determination of costs for the band width increase in REDDIG	SAM/IG Group for the implementation of CNS improvements	Implementation costs of new REDDIG services	SAM/IG/6	**Completed** Identified in the study for the implementation of the new digital network, REDDIG II
4 Study of the new REDDIG technological platform and determination of its cost	SAM/IG Group for the implementation of CNS improvements	Definition of the REDDIG technological platform	SAM/IG/6	**Completed** Identified in the study for the implementation of the new digital network, REDDIG II
5 Study of a ground regional IP structure supporting the services required and defined in Activity 1, as well as of the band width requirements defined in Activity 2	SAM/IG Group for the implementation of CNS improvements	Definition of a regional ground IP network model structure	SAM/IG/6	**Completed** Identified in the study for the implementation of the new digital network, REDDIG II

ACTIVITIES	ACTION TO BE TAKEN BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
6 Determination of costs for the implementation of Activity 5	SAM/IG Group for the implementation of CNS improvements	Implementation costs of a digital ground IP network structure	SAM/IG/6	**Completed** Cost estimates were identified in the study for the implementation of the new REDDIG II regional digital network and consulted with some communications service providers
7 Study on the structure of a mixed (ground and satellite) regional digital network structure	SAM/IG Group for the implementation of CNS improvements	Model definition	SAM/IG/6	**Completed** Identified in the study for the implementation of the new digital network, REDDIG II
8 Determination of the costs for the implementation of Activity 7	SAM/IG Group for the implementation of CNS improvements	Implementation costs of a mixed (ground and satellite) digital network structure	SAM/IG/6	**Completed** Cost estimates were identified in the study for the implementation of the new REDDIG II digital network and consulted with the industry (manufacturers, integrators and communications service providers)
9 Comparisons between the network infrastructure models specified in Activities 4, 5 and 7	SAM/IG Group for the implementation of CNS improvements	Comparative study between the ground IP and mixed (satellite and ground) satellite network models	SAM/IG/6	**Completed** Identified in the study for the implementation of the new digital network, REDDIG II
10 Determination of the regional network infrastructure model, on the basis of results of Activity 9	SAM/IG Group for the implementation of CNS improvements	Final review to the study of the new digital network, REDDIG II	SAM/IG/7	**Completed** The study for the new SAM digital network was distributed to all REDDIG member States and Panama for comments. Replies were received from Argentina, Brazil, Chile and Panama. REDDIG RCC/14 meeting (Lima, Peru, 16-18 March 2011) examined and approved the infrastructure model formulated in the study. In addition, SAM/IG/7 meeting endorsed RCC/14 meeting's approval.

ACTIVITIES	ACTION TO BE TAKEN BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
11 Holding of a seminar/workshop on new satellite and ground networks technology	Secretariat	Technological solutions for the new REDDIG II regional network configuration	Lima, Peru, 18-20 July 2011	**Completed** During this seminar/workshop, the communications services providers, integrators and manufacturers will present initial implementation proposals on the new REDDIG II digital network
12 Acceptance process for the implementation of the network infrastructure model determined by Activity 10, through a public bidding process	SAM/IG Group for the implementation of CNS improvements	Acceptance of the public bidding process for the implementation of a SAM network infrastructure	SAM/IG/7	**Completed** REDDIG RCC/14 meeting examined and approved the infrastructure model formulated in the study. In addition, SAM/IG/7 meeting endorsed RCC/14 meeting's approval.
13 Preparation of technical specifications for the implementation of the SAM network infrastructure specified in Activity 10	SAM/IG Group for the implementation of CNS improvements	Technical specifications for the implementation of a SAM network infrastructure	Aug 2011	**Completed** The technical specifications were drafted with the support of RLA/06/901
14 Circulation to States of the technical specifications for the implementation of the SAM network infrastructure	Secretariat	Approval of technical specifications for the implementation of the SAM network infrastructure	Sep 2011	**Completed** Circulated to all REDDIG members for comments
15 Presentation of REDDIG network study and technical specifications to RAAC/12 meeting	Secretariat	Go ahead for the public bidding process through ICAO	Oct 2011	The Twelfth Meeting of the Civil Aviation Authorities of the SAM Region (RAAC/12) approved starting the bidding process for the implementation of REDDIG II, through the formulation of Conclusion RAAC/12-6
16 International bidding process for REDDIG II implementation	ICAO Technical Cooperation Bureau	Bidding process	Feb 2012	

ACTIVITIES	ACTION TO BE TAKEN BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
17 Evaluation of offers presented to determine winning company	Reduced group of experts members of REDDIG and Secretariat	Assessment of offers	Mar 2012	
18 Review and approval of offer evaluation analysis and approval of winning company	REDDIG Coordination Committee meeting (RCC/5)	Designation of winning bidder for the network implementation	May 2012	

APPENDIX B (SUMMARY)

PROGRAMME GROUND-GROUND AIR-GROUND INFRASTRUCTURE

PROJECT ATN GROUND-GROUND AND AIR-GROUND APPLICATIONS

COORDINATOR Omar Gouarnalusse

Nro.	Main Task	Nro.	Secondary Task	Nro.	Third Task	Start/End	Responsible	Status	Deliberables
D.2.1	Management Process processes	D.2.1.1	formalization	D.2.1.1.1	Description	May 2011 / Oct. 2011	Project D2	Valid	Project Document
D.2.2	Project Development	D.2.2.1	Analysis of the infrastructure and current and future applications	D.2.2.1.1	Analyse infrastructure and G-G current and future applications	2009 / May 2012	ICAO - Project D2	Valid	Updated regional G-G Action Plan
				D.2.2.1.2	Implementation Plan ground-ground applications	xxxx/2014	ICAO - Project D2 - States	Valid	AMHS implementation Plan AIDC Implementation Plan
				D.2.2.1.3	analyse infrastructure and A-G current and future applications	2009 / May 2012	ICAO - Project D2	Valid	Updated regional A-G Action Plan
				D.2.2.1.4	Air-ground applications implementation plans	2011 /TBD	ICAO - Project D2 - States	Valid	implementation plan A-G applications VDL Trials CPDLC (VDL) Implementation study
D.2.3	Project Closing					TBD	Project D2	Valid	

APPENDIX B (DETAIL)

PROGRAMME GROUND-GROUND AND GROUND-AIR COMMUNICATION INFRASTRUCTURE
PROJECT ATN GROUND-GROUND AND AIR-GROUND APPLICATIONS
COORDINATOR Omar Gouarnalusse

Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Start	End	Responsible party
2.1	Project management processes								
2.1.1		Project formalisation					may-11	oct-11	Regional Coordinator
2.1.1.1			Project description						
2.1.1.1.1				Designation of the Project Coordinator					
2.1.1.1.2				Designation of the Project Team					
2.1.1.1.3				Analysis of ICAO strategic planning					
2.1.1.1.4				Development of PD					
2.1.1.1.4.1					Scope of the project				
2.1.1.1.4.2					Background of the project				
2.1.1.1.4.3					Definition and analysis of assumptions				
2.1.1.1.4.4					Definition and analysis of restrictions				
2.1.1.1.4.5					Definition and analysis of risk				
2.1.1.1.4.6					Definition and analysis of resources required				
2.1.1.1.4.7					Definition and analysis of associated projects				
2.1.1.1.5				Definition of the scope of the project					
2.1.1.1.6				Definition of project frameworks					
2.1.1.1.7				Delivery and approval of the document					
2.2									
2.2.1									
2.2.1.1			Analysis of current and future G-G infrastructure and applications						
2.2.1.1.1				CNS deficiencies in the SAM Region					Completed
2.2.1.1.2				Drafting of CNS improvement guidelines					
2.2.1.1.2.1					CNS improvement guidelines				Completed
2.2.1.1.2.2					National action plans				Completed
2.2.1.2.									
2.2.1.2.1				ATN addressing for G-G applications					
2.2.1.2.1.1					ATN addressing plan for G-G applications				Completed
2.2.1.2.2									
2.2.1.2.2.1					Interconnection guidelines				Completed

Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Start	End	Responsible party
2.2.1.2.2.2	Development of the project	Analysis of current and future infrastructure and applications	Ground-ground applications implementation plan	Action plan for AMHS interconnection	Standard Memoranda of Understanding				Completed
2.2.1.2.2.3					Tests between States				
2.2.1.2.2.3.1						Argentina - Brazil			Completed
2.2.1.2.2.3.2						Argentina - Paraguay	SAM/IG/7	SAM/IG/9	States
2.2.1.2.2.3.3						Argentina - Peru	SAM/IG/7	SAM/IG/9	States
2.2.1.2.2.3.4						Argentina - Chile	SAM/IG/7	SAM/IG/9	States
						Argentina - Uruguay	TBD	TBD	States
						Argentina - Bolivia	TBD	TBD	States
2.2.1.2.2.3.5						Brazil - Paraguay	SAM/IG/7	SAM/IG/9	States
2.2.1.2.2.3.6						Brazil - Peru	SAM/IG/7	SAM/IG/9	States
2.2.1.2.2.3.7				AMHS interconnection action plan	Tests between States	Brazil - Colombia	SAM/IG/7	SAM/IG/9	States
2.2.1.2.2.3.8						Brazil - Venezuela	SAM/IG/7	SAM/IG/9	States
2.2.1.2.2.3.9						Brazil - Guyana	SAM/IG/8	SAM/IG/9	States
2.2.1.2.2.3.10						Brazil - Suriname	SAM/IG/8	SAM/IG/9	States
2.2.1.2.2.3.11						Peru - Colombia			Completed
2.2.1.2.2.3.12						Peru - Chile	SAM/IG/9	SAM/IG/9	States
2.2.1.2.2.3.13						Guyana - Suriname			Completed
2.2.1.2.2.4					Analysis of tests		On going	On going	States / ICAO / Coord.
2.2.1.2.2.5					Recommendations for integration		On going	On going	ICAO / Coord.
2.2.1.2.2.6				AMHS interconnection action plan	Operational integration				
2.2.1.2.2.6.1						Argentina - Brazil	SAM/IG/7	TBD	States
2.2.1.2.2.6.2						Argentina - Paraguay	SAM/IG/7	TBD	States
2.2.1.2.2.6.3						Argentina - Peru	SAM/IG/7	TBD	States
2.2.1.2.2.6.4						Argentina - Chile	SAM/IG/7	TBD	States
2.2.1.2.2.6.5						Brazil - Paraguay	SAM/IG/7	TBD	States
2.2.1.2.2.6.6						Brazil - Peru	SAM/IG/7	TBD	States
2.2.1.2.2.6.7						Brazil - Colombia	SAM/IG/7	TBD	States
2.2.1.2.2.6.8						Brazil - Venezuela	SAM/IG/7	TBD	States

Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Start	End	Responsible party
2.2.1.2.2.6.9	Development of the project	Analysis of current and future infrastructure and applications	Ground-ground applications implementation plan			Brazil - Guyana	SAM/IG/8	TBD	States
2.2.1.2.2.6.10						Brazil - Suriname	SAM/IG/8	TBD	States
2.2.1.2.2.6.11						Peru - Colombia			Completed
2.2.1.2.2.6.12						Peru - Chile	SAM/IG/9	TBD	States
2.2.1.2.2.6.13						Guyana - Suriname			Completed
2.2.1.2.2.7					Updating of Table CNS 1Bb		SAM/IG/8	15-nov-11	States
2.2.1.2.3				AIDC interconnection action plan					
2.2.12.3.1					Interface control document (ICD)		jun-12	SAM/IG/10	Experts / ICAO
2.2.1.2.3.2					Standard Memoranda of Understanding				Completed
2.2.1.2.3.3					Tests between States		On going	TBD	States
2.2.1.2.3.4					Analysis of tests		TBD	TBD	States / ICAO / Coord.
2.2.1.2.3.5					Recommendations for integration		TBD	TBD	ICAO / Coord.
2.2.1.2.3.6					Operational integration		TBD	TBD	ICAO / Coord.
2.2.1.3	Development the project cto	Analysis of current and future infrastructure and applications	Analysis of current and future A-G infrastructure and appications						
2.2.1.3.1				CNS deficiencies in the SAM Region					Completed
2.2.1.3.2				Drafting of CNS improvement guidelines					
2.2.1.3.2.1					CNS improvement guidelines				Completed
2.2.1.3.2.2					National action plans				Completed
2.2.1.4			Air-ground	ATN addressing for A-G applications					
2.2.1.4.1					ATN addressing plan for A-G applications		On going		
2.2.1.5				Analysis of the status of data link in the SAM Region					
2.2.1.5.1					Identification of the level of implementation of air data link in the SAM Region		oct-11	may-12	States / ICAO
2.2.1.5.2					Identification of data link capabilities of the air fleet of the SAM Region and airlines certified to operate data link		oct-11	may-12	States / ICAO
2.2.1.5.3					Determination of the characteristics of existing G/A VHF equipment and its data transmission capabilities		oct-11	may-12	States / ICAO
2.2.1.5.4					Revision of FASID Table CNS 2 A		oct-11	may-12	States / ICAO

Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Start	End	Responsible party
2.2.1.6			Air-ground applications implementation plan	Strategy for the implementation of ground-air communication systems in the SAM Region					
2.2.1.6.1					Drafting of the document on the strategy for the implementation of ground-air communication systems in the SAM Region		mar-12	may-12	Expert
2.2.1.6.2					Revision of the GOLD document for its implementation in the SAM Region as guiding document for oceanic and continental en-route ground-air data links		oct-11	nov-11	States
2.2.1.6.3					Drafting of the guiding document for ground-air data link at aerodromes in the terminal area, approach and VOLMET		may-12	oct-12	Experts
2.2.1.7				Regional data link trials					
2.2.1.7.1					Drafting of a regional plan for the conduction of ground-air data link trials for en-route and aerodrome applications		nov-12	nov-12	Experts
2.2.1.7.2					Conduction of ground-air data link trials for en-route and aerodrome applications		dic-12	dic-13	States
2.2.1.8	Development of the project	Analysis of current and future infrastructure and applications	Air-ground application implementation plan	National data link trials					
2.2.1.8.1					Argentina		TBD	TBD	States
2.2.1.8.2					Brazil		TBD	TBD	States
2.2.1.8.3					Colombia		TBD	TBD	States
2.2.1.8.4					Chile		TBD	TBD	States
2.2.1.8.5					Peru		TBD	TBD	States
2.2.1.8.6					Uruguay		TBD	TBD	States
2.2.1.8.7					Paraguay		TBD	TBD	States
2.2.1.8.8					Bolivia		TBD	TBD	States
2.2.1.8.9					Ecuador		TBD	TBD	States
2.2.1.8.10					Venezuela		TBD	TBD	States
2.2.1.8.11					Guyana		TBD	TBD	States
2.2.1.8.12					Suriname		TBD	TBD	States
2.2.1.8.13					Cayenne		TBD	TBD	States
2.2.1.8.14					Panama		TBD	TBD	States

Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Start	End	Responsible party
2.2.1.9				Standards and procedures			TBD	TBD	ICAO
2.2.1.10				CDPLC implementation action plan					
2.2.1.10.1					Implementation guidance		TBD	TBD	ICAO / Coord.
2.2.1.10.2					Determination of routes to be implemented		TBD	TBD	ICAO / Coord.
2.2.1.10.3					National implementations		TBD	TBD	ICAO / Coord.
2.2.1.11				System performance monitoring					
2.2.1.11.1					Drafting of ground-air data link post-implementation monitoring programme for en-route and aerodrome operations		TBD	TBD	States / ICAO / Coord.
2.2.1.11.2				System performance monitoring	Execute the ground-air data link post-implementation monitoring programme for en-route and aerodrome operations		TBD	TBD	States / ICAO / Coord.
2.3	Closing of the project							TBD	Regional Coordinator

APPENDIX C

ACTION PLAN FOR THE INTERCONNECTION OF AMHS SYSTEMS IN THE SAM REGION

ITEM	ACTIVITY	RESPONSIBLE	EXPECTED RESULT	STATUS	FINALIZATION DATE
1	2	3	4	5	6
1	Review of the ATN Regional Plan as regards AMHS implementation	Secretariat	Revised ATN ground ground applications plan (Table CNS 1Bb)	Completed	Jun 2009
2	Review and assignment of intra-regional routers IP addressing	Secretariat	Assignment of IP addressing	Completed	Jun 2009
3	Review of CAAAS addressing plan	SAM States	Revised CAAS addressing Plan	Completed	Jun 2009
4	Prepare interconnection protocol tests to determine bandwidth required for transmission of AMHS messages between MTAs through REDDIG	RLA/06/901 project CNS Expert	Protocol interconnection tests. A guide for the operational interconnection of AMHS systems was drafted	Completed	Dec 2009
5	Preparation of Guide for the Operational Interconnection of AMHS Systems in the SAM Region	RLA/06/901 project CNS Expert	Guide for the operational interconnection of AMHS systems in the SAM Region	Completed	Oct 2009
6	Drafting of a model MoU for the interconnection of AMHS	Argentina	Model MoU for the interconnection of AMHS	Completed	Oct 2009
7	MoU for the interconnection of AMHS currently implemented in the SAM Region: a) Argentina-Brazil b) Argentina-Chile c) Argentina-Peru d) Argentina-Paraguay e) Brazil-Colombia f) Brazil-Paraguay g) Brazil-Peru h) Chile-Peru i) Colombia-Perú j) Colombia-Panama k) Colombia-Venezuela l) Peru-Venezuela m) Brazil-Suriname n) Guyana-Venezuela o) Suriname-Venezuela p) Brazil-Guyana q) Guyana-Suriname r) Brazil-Venezuela The AMHS interconnection MoU in Bolivia, Ecuador, French Guiana (France) and Uruguay should be drafted once AMHS installation is completed at national level.	SAM States involved	MoU for interconnection of AMHS systems between SAM States having AMHS implemented.	Valid a), b) c), d), f), g), i) & q) completed	e) h) Oct 2012 j) Jul 2012 k) Jul 2012 l) Dec 2011 m) May 2012 n) Jul 2012 o) Jul 2012 p) May 2012 r) May 2012

ITEM	ACTIVITY	RESPONSIBLE	EXPECTED RESULT	STATUS	FINALIZATION DATE
1	2	3	4	5	6
8	Phase I Interconnection trials between MTAs of: a) Argentina-Brazil b) Argentina-Paraguay c) Brazil-Paraguay d) Colombia-Peru e) Argentina-Chile f) Argentina-Peru g) Brazil-Peru h) Guyana-Suriname Types of tests to carry out: Network transportation; Network connectivity; Message exchange; Preparatory phase. **Note**: Inclusion has been made of only the AMHS interconnected between States having implemented and signed the MoU.	Argentina, Brazil, Chile, Colombia, Paraguay, Peru and REDDIG Administration	Interconnection trials between Argentina, Brazil, Chile and Paraguay MTAs	Valid a) message exchange trials were held between Brasilia (Brazil) and CIPE (Argentina) MTAs b) network transportation and connectivity, and message exchanges trials carried out. c) MoU was updated, as entrance node to Brazil will be Curitiba, and the network connectivity, and transport and exchange of messages tests will be carried out. d) and h) Operational interconnection trials completed e), f) and g) No tests carried out	a) Jun 2011 b) Dic 2011 c) Dic 2011 e) Mar 2012 f) Mar 2012 g) Mar 2012
9	Operational interconnection implementation at the following MTAs: a) Argentina-Paraguay b) Argentina-Brazil c) Argentina-Chile d) Argentina-Peru e) Brazil-Paraguay f) Brazil-Peru g) Colombia-Peru h) Guyana-Suriname **Note**: Inclusion has been made of only the AMHS interconnected between States having implemented and signed the MoU.	Argentina, Brazil, Chile, Colombia, Paraguay and Peru	Operational implementation of AMHS systems	g) Colombia and Peru completed and operating h) Guyana and Suriname completed and operating	a) Abr 2012 b) Jan 2012 c) Abr 2012 d) Jan 2012 e) Jan 2012 f) Jan 2012

APPENDIX D

UPDATED DME/DME COVERAGE FOR THE REGION BASED ON THE INFORMATION ON VOR/DME STATIONS IN SOME STATES OF THE REGION

SAMIG8_Asu6_ApnD_Proyecto DME-DME FINAL rev9.kmz

RUTAS RNAV Región SAM

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UL201			
	MITU CO VOR/DME (MTU)	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	ABIDE		
	ABIDE	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**AMAZONICA**
	CLOTI	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	MINIB		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	BUMBA		
	EGLER PERSA OBEBA IRUMI BARGE	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	RONEN ARPAR KUGMA		
	CANON		
	CANON	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**BRASILIA**
	ILMOK		
	EQUAL	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	ANGOL	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	GRACE		
	MABMA		
	ABUSE	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	
	TESEK		
	ISIRO		
	ASTOB		
	HASTE	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	PIRASSUNUNGA VOR/DME (PIR)		
UL206			
	VITORIA VOR/DME (VTR)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**BRASILIA**
	CALVO		
	CALVO		**RECIFE**
	ABROLHOS NBAV	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	PAMOX		
	DEMON ILKOX GIANT FLUTE NEMOL BUGAT REGIS	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	
	ARUNU BUTAP KODOS	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**ATLANTICO**

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UL211			
	LA PLATA VOR (PTA)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**EZEIZA**
	ESLAN		
	GATOS		
	PAGAD		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	REKUL		
		TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	GUXOR		
	ANKOK		
	KILOS		
	KAKIN		
	KETIS		
	MORSI		
	MUNES		
UL216			
	FOZ VOR/DME(FOZ)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CURITIBA**
	BITUR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**ASUNCION**
	BITUR	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	
	SOSMO		
	EGELU		
	ARVOP		
	ARVOP		**CURITIBA**
	ESDER	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	SIDAK		
	SIDAK	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**LA PAZ**
	POSPA		
	ARMUK		
	ARMUK	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**AMAZONICA**
	UBSIM		
	ESBUL		
	DOTKI		
	EVOLO		
	ILSOV		
	PORTO VELHO VOR/DME (PVH)		
	NELIT		
	MAZAR		
	RITMO		
	MEDLE		
	NAFTA		
	BUMBA		
	AKSUK		
	GABRIEL VOR/DME (SGC)		
	ZORRO		
	ZORRO	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**BOGOTA**
	LOKES	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**MAIQUETIA**
	LOKES		
	PUERTO AYACUCHO VOR/DME (PAY)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	EKUNA		
	SAN FERNANDO VOR/DME (SFD)		
	DAVEX		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	SAN SEBASTIAN NDB (SSB)		
	ALTOS VOR/DME		
UL224			
	MARICA VDMRC	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	VULGO		
	ROKAD		**CURITIBA**
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	CIDER		
UL300			
	BOGOTA "BOG" VOR/DME-NDB		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	**BOGOTA**
	ROLUS		
	ROLUS		
	IQUITOS VOR/DME (IQT)		**LIMA**
		TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	OSORA		
	OSORA		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	**AMAZONICA**
	TEMOR (FIR AMAZONICA)		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	SELVA		
	SELVA		
	ETEBA	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	TOMIX		
			LIMA
	OPKUL		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	OLGAS		
	ARICA VOR/DME (ARI)		
	ARICA VOR/DME (ARI)		
		TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	TIVIL INT		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	TUNIN INT		**ANTOFAGASTA**
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	BAGRE INT		
		TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	ALDER INT		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	TONGOY VOR/DME TOY		
			SANTIAGO

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UL301			
	ASUNCION VOR/DME(VAS)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**ASUNCION**
	KEVUR		
	BITUR	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	
	BOLIR		
	BOLIR		**CURITIBA**
	VENUS	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	TILKI		
	RABAN		
	MINOT		
	GALES		
	FLORI		
	DIONI		
	ANDOR		
	CONGONHAS VOR/DME (CGO)		
UL302			
	LIMA DVOR/DME	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**LIMA**
	ARPON		
	ILMAR		
	IREMI		
	IREMI INT	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**ANTOFAGASTA**
	ASEPU INT		
	ELASA INT		
	ATEDA INT		
	TONGOY VOR/DME (TOY)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**SANTIAGO**
UL304			
	BONSUCESSO VOR/DME (BCO)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**BRASILIA**
	OPRAM		
	POCOS NDB (PCL)		
	ZANET		
	EDOLA		
	CORVO		
	PAGUE		
	ROMIX		
	PAMEO		
	GOIANIA VOR/DME (GOI)		
	KOMGA		
	OPLIK		
	OPORA		
	OPRUX		
	OPRUX		
	TEREX		
	LITUK		
	DADOT	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**AMAZONICA**
	MULUV		
	MUMSA		
	DARLO		
	ITAITUBA NDB (YUB)		
	ILTAN		
	ESLEX		
	TEPIM		
	PUERA		
	KAKIL		
	ILNOV		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	DAPSA BOA VISTA VOR/DME (BVI)		
	BOA VISTA VOR/DME (BVI) BUVKU BUVTU ISANI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ISANI CANAIMA VE LODIR RONER ERIPA CABO CODERA AKNUR BEGAB OPSEN EDGEL GAVA ILKIT	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MAIQUETIA
UL305			
	BARRANQUILLA VOR/DME /BAQ) MAGANGUE VOR/DME (MGN) BAGRE	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BARRANQUILLA
	BAGRE OTU VOR/DME (OTU) MARIQUITA VOR/DME GIRARDOT VOR/DME (GIR) DIKUN PULTU	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BOGOTA
	PULTU TERAS	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	GUAYAQUIL
	TERAS OSUBU VUKOK TARAPOTO VOR/DME (TAP)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	ENPAP	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	LIMA
	AMVEX	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	LIMA DVOR/DME (LIM)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UL306			
	LIMA DVOR/DME (LIM) KADEL	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	LIMA
	SELVA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	SELVA BOBAS PANOL VERDE PALIO ARTIK INTER LANCE		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	RITMO JOUST EGLER SALSA ESBUV EGBIB CHECK ASUMI MANAUS VOR/DME (MNS) TEPEM DADEG DOMGA PUERA INPUT LODOK ROGIN LONAS AKNIB ANSOX SIROS	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	AMAZONICA
	SIROS DIMAS DORLI DABRA CAYENNE VOR/DME (CYR)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
UL308			
	UGADI ANPAL	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	GUAYAQIL
	ANPAL ITALU	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	LIMA
	UGEMA ISREN SALINAS VOR/DME (SLS) LIMA DVOR/DME (LIM)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
UL309			
	GABRIEL VOR/DME (SGC) IODAD CLOTI MULIP PRIMA JURIS INTER GEDOX BRANCO VOR/ME (RBC)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	AMAZONICA
	GRAFO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	GRAFO ELANI		LA PAZ
	AKSES LA PAZ VOR/DME (LPZ)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	IRONO EMPEX		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	EMPEX	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	ANTOFAGASTA
	CALAMA VOR/DME (LOA)		
	CEPAM		
	PABOS		
	ASALO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	DILOK		
	TABON DVOR/DME (TBN)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UL310			
	CONGONHAS VOR/DME (CGO)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	CURITIBA
	DORMI		
	ORANA		
	PAGIN		
	SERGI		
	PUNTO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ATARI		
	EDMAR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	SIGAS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ERVAS	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	ARULA		
UL312			
	LOGAL	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	GUAYAQUIL
	ANGES		
	ERIZO		
	OSAKI		
	OSAKI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	LIMA
	AKSER		
	SALINAS VOR/DME (SLS)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
UL318			
	ESMERALDAS VOR/DME	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	GUAYAQUIL
	VAMOS		
	VAMOS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BOGOTA
	BOLDO		
UL322			
	GEORGETOWN VOR/DME (TIM)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	GEORGETOWN
	BUVIP		
	BUVIP		
	ILNOV		
	ISOSU		
	KIGOM		
	ISUNU		
	ISIVA		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	MANAUS VOR/DME (MNS) CHAMP POLEN DOKBU AROPI PAKEM BARGE SIMON ILTAR REDON ILTEG ESBUL MUDAB ILRES	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**AMAZONICA**
	ILRES VAROM NILSO	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**LA PAZ**
	SEDMA VIRU-VIRU (VIR) GAXOK	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	GAXOK SALTA VOR/DME SAL	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**CORDOBA**
	ALGAR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	EGIKA	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	ASIMO		**MENDOZA**
	ASIMO DILOK TABON VOR/DME TBN	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**SANTIAGO**
UL324			
	FOZ VOR/DME (FOZ) CATARATAS DEL IGUAZU VOR/DME (IGU) ALDOS LUCIA ILPEP ELAMO	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**RESISTENCIA**
	ELAMO CUARA	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**CURITIBA**
	CUARA GUTIL DAYMA ANPON PALOL TORON KUKEN	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**MONTEVIDEO**
	KUKEN EZEIZA VOR/DME (EZE)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**EZEIZA**

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UL327			
	PORTO VOR/DME KIGUV	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CURITIBA**
	PANAS VITORIA VOR/DME (VTR)	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	VITORIA VOR/DME (VTR) LIVAM	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**BRASILIA**
	PORGA	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	PORGA GUSOD ONSEK VADAD ETIMO ASANU SERIM	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**ATLANTICO**
UL330			
	VITORIA VDVTR MINIG POLVO	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**BRASILIA**
	POLVO DESEX EMTUP BILUX UDIGA EGUPA ASDOK	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	**ATLANTICO**
UL335			
	VITORIA VDVTR KIKAT	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**BRASILIA**
	GARUP	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	GARUP VODSA TURAB MELEM ISUPA DAGAM AKRAN	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**ATLANTICO**
UL337			
	VUDAL ALDIT DABAM EDMAX GUTIM ILMET ARMUR	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**MAIQUETIA**
UL340			
	PORTO VOR/DME (PCX) KIGOL	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CURITIBA**
	LOBIK EKALO	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL**	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UL344			
	ARTOM PUPES LOLIN AMERO	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**GUAYAQUIL**
	AMERO	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**LIMA**
	VALEM	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	ANKOR EVRID SALINAS VOR/DME (SLS) LIMA DVOR/DME (LIM)	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
UL348			
	DOMINGO VOR/DME DGO		
	MORSA INT	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**SANTIAGO**
	ROBIK INT MAKRA INT CARPA INT	**TRAMO SIN COBERTUA DME/DME / SEGMENT WITHOUT DME/DME**	
	TACAS INT GAMBA INT OSTRA INT VINAP INT ISLA DE PASCUA VOR IPA HANPI INT SAKOB INT SAURI INT	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	
UL375			
	UKEDI EGIMI DIKEB OBKUT ORARO BODAK NOISE PUGSA DIGOR ARUNU UDIGA ETIMO ISUPA LOKIM SISET	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**ATLANTICO**
UL401			
	VENTANAS VOR/DME VTN ANPUK	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**SANTIAGO**
	ANPUK JURAK ESDIN INT	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**ANTOFAGASTA**
	ESDIN ILVOS KARAZ	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**LIMA**

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	KARAZ OSELO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	GUAYAQUIL
UL404			
	CERES VOR /DME ERE MEVUR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	CORDOBA
	MEVUR UBRIX		
	UBRIX BOKEN	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	MARIA	TRAMO SIN COBERTURA DME / DME / SEGMENT WITHOUT DME/DME	
	VIRU VIRU VOR/DME (VIR)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	LA PAZ
UL417			
	EGAPO ISATO	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	BARRANQUILLA
	ALGUK MIBEN UGOTA IROTI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	IROTI PUKEN LONAX BUTAN	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BOGOTA
	PABON	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	PABON ARUXA DOGLO TENUG ARTIK ESBUK BRANCO VOR/DME (RBC)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	AMAZONICA
	ISARA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ISARA APARE KIMUR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	LA PAZ
	PUBUM	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	PUBUM IMBER		CORDOBA
	UBRIX MEVUR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	MEVUR CERES VOR/DME (ERE)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UL423			
	ISEBA		PANAMA
	OPKOL	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ILTUR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ILTUR AMBALEMA VOR/DME (ABL)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BOGOTA

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UL465			
	TABOGA DVOR/DME ARNAL	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**PANAMA**
UL474			
	TABOGA DVOR/DME (TBG) MANBO FRANK ROKIN	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**PANAMA**
	TOMEK	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	**BARRANQUILLA**
UL540			
	NADIR PABID MOLRI ISULO RIXOM ILNES IMPERATRIZ VOR/DME (YTZ)	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	
	KEVOS ESNER	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	KOLGI	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	ESLUR UGUTO ISKAX ORAVU DADOT ISTAR	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**AMAZONICA**
	PADAK		
	GERTU UVBIL ESKES	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	VUDAM DADEL ILMOK ESLEK KUMIR OGTUR UREVI ISUNO ISIVU KOGMO ERVEL	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	
	ERVEL KIVIL VIRU VIRU VOR/DME (VIR)	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**LA PAZ**
UL550			
	LIMA DVOR/DME (LIM) ASIA VOR/DME (ASI) PISCO VOR/DME (SCO)	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	**LIMA**

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	ESGOL		
	DORKA		
	DORKA		ANTOFAGASTA
	SAREG	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	CALAMA VOR/DME (LOA)		
	KONRI	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	KONRI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	CORDOBA
	ALGAR		
	TUCUMAN VOR/DME (TOC)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	PUBER		
	PORKA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	OPTIR		
	DOPRI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ROKER		
	ROSARIO VOR/DME (ROS)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	EZEIZA
UL650			
	ATACAMA VOR/DME		ANTOFAGASTA
	DAT		
	PABOS INT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	GEKAL INT		
	GEKAL INT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	CORDOBA
	BUSLO		
	CATAMARCA VOR/DME (CAT)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
UL655			
	EGODI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	PANAMA
	ASIBO		
	ASEPI	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	ASEPI		BOGOTA
	ESARO		
	DABAX	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	SIMAT		
	IRUVA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	PABON		
	ASAPA		
	ASAPA	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	AMAZONICA
	AKTOR		
	JURIS		
	LANCE		
	MASON		
	OGLAM		
	BOGUR		
	DIKAL		
	REDON		
	TELIR		
	ISOSA		
	MARIN		
	CRONE		
	UREVI		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	ISENA		
	ISENA ISEKI ISUDU DIMER ANGAS ESTER EGIMO	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	BRASILIA
	EGIMO LIVER KALER SILOR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	CURITIBA
	DAKEM BAURU NDB (BRU)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UL695			
	ARUSI EGIMI DIKEB OBKUT ORARO BODAK NOISE PUGSA DIGOR BUTAP EGUPA ASANU DAGAM FHAW	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	ATLANTICO
UL775			
	PUERTO MONTT VOR/DME GUTIN PABAL	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	PUERTO MONTT
	PABAL ESQUEL VOR/DME ESQ	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	COMODORO RIVADAVIA
UL776			
	KAISO IBERT UTGIN ROLIG NEKOB	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	GEORGETOWN
	NEKOB TIRIOS NDB (TIR)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	PARAMARIBO
	TIRIOS NDB (TIR) AKNIB AMVER MOMVI PADIL GAVUX ISKAX MEVOS	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	AMAZONICA
	MEVOS RONAL	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	DOLVI		BRASILIA

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	BRASILIA VOR/DME (BSI)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UL780			
	DAGUD	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	PANAMA
	BUXOS		
	BUXOS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BOGOTA
	UGUPI		
	UGUPI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	GUAYAQUIL
	GUAYAQUIL		
	VAKUD		
	VAKUD	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	LIMA
	TRUJILLO VOR/DME (TRU)		
		TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	ISREN		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	MOXES		
	SORTA	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	SORTA INT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	ANTOFGASTA
	ISPEL INT		
	LIVOR INT		
	SULNA INT		
	VENTANAS VOR/DME VTN	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	SANTIAGO
UL793			
	PAGAK	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MAIQUETIA
	ALGOK		
	KAKER		
	IMBAT		
	GATUG		
	EDPAL		
	DAVEX		
	BIVAP		
	LOGON		
	SIMUR		
	LOGIR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	UGAGA		
	UGAGA	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	AMAZONICA
	AKNOV		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	TEFE VOR/DME (TFE)		
	EGLER	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	GLINT		
	MUPEG		
	ISOLU		
	EGELO		
	DIKAL		
	EVOLO		
	KUGOL		
	ALBOM		
	UDIDI		
	VALLE	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	LA PAZ
	KIBIL		
	OMERO		
	ZOZOG		
	CAMBA		
	ORUMU		
	ORUMU		
	ORUMU		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	MOROS EGEXO KUBIR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	ASUNCION
	KUBIR AKPEL	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	RESISTENCIA
	RESISTENCIA DAMIS KILIP TODES	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	TODES IMBAK DALAB GUALEGUAYCHU VOR/DME GUA	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	EZEIZA
UL795			
	ESIPO OPTAS LOKUR DOLPO ATIGA DANVO TOMAX SUBMA EKUNA LOGON	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MAIQUETIA
	VUMPI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	VUMPI BIVUT BINAS LUCRE ASUMI REPIL FERAL	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	AMAZONICA
	CHAMP IRUMO		
	UGEMU ALTA FLORESTA VOR/DME (ATF) UVBIL RONIL	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	RONIL KOGPA SAMAR GARCAS VORDME (BAG)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	BRASILIA
	NILON NEFAR		
	ATONI MIKAN PASTE QUILT	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	RUTLE PIRASSUNUNGA VOR/DME (PIR)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UL797			
	IQUIQUE NDB UCU AKNUV INT TOKOL INT ILPEM INT	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**ANTOFAGASTA**
UM400			
	CORDOBA VOR/DME (CBA) GEMOP OPTIR ROMUR SIKOB	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CORDOBA**
	SIKOB KILIP PULEN ARULA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**RESISTENCIA**
	ARULA		**CURITIBA**
	ERVAS	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	REKIR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	ISOVI		
	VUPIT PERNA		
	TIGDA PADIR TENUD GEDEL	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	PAKOV		
	SIDOX RONUT IMBEK KOLBI ROPAS BITAK VULGO	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	ALDEIA VOR/DME (ADA)		
UM402			
	ISIGI SIDAM	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**MAIQUETIA**
	SIDAM TELUR KUMIX	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**GEORGETOWN**
	KUMIX UDUSA	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	**MAIQUETIA**
	UDUSA ILNER KOKPO BOA VISTA VOR/DME (BVI) ANBIX NILBU ILSUB KIGUX		
	MANAUS VOR/DME (MNS) KOKPA	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	IRUMO OPLIM DEMIT SIPAK ARPAR PARDO ISUGO NABAL CRONE ABATE ISIVU NIBMI UBKAB		AMAZONICA
	SIDAK	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	SIDAK REMEK	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	LOBAX ASUNCION VOR/DME (VAS) UPOVA KONTO SIMOR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	ASUNCION
	SIMOR BOKIL KIMIK	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	RESISTENCIA
	KIMIK SEKLO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	CURITIBA
	SEKLO	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	MUKIB MIGOT ILSIM ETEXU OGLAP ANDAN VUKAS CARRASCO VOR/DME (CRR)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MONTEVIDEO
UM403			
	BRASILIA VOR/DME (BSI) SIREM PAMEO KETUL EGONI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BRASILIA
	ATONI		
	TESEK VAMIK PUKIL	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	PUKIL POXET	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	KALER		
	BUTNA SIRIS ORBAM DUNCE	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	CURITIBA
	KABEG		
	REBOX	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	REBOX		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	SOSMO	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	ASUNCION
	NILKI		
	ASUNCION VOR/DME (VAS)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UM409			
	PORTO VDPCX	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BRASILIA
	ABSAL		
	BARBACENA NDB (BBC)		
	BELIA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	DEJAN	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	EKUBA		
	AKSUG		
	TRIVI		
	MOPDA		
	REINA		
	FLAND		
	PROVE		
	DOMGI		
	FORMOSA VDFRM		
	ILSUL		
	DOMLI		
	DOTKA		
	BRAZE		
	DOLVI		
	EGBAV	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	POLAN		
	DOTLA		
	DADOT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	AMAZONICA
	DOMDA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	EPKOK		
	ESMAR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	GAXIM	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	MAMGI		
	SIGEP	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	KUBID		
	MALPU		
	TEPEM		
	ISUNU		
	ILSUB		
	GEDIX		
	PABUX		
	DOGTO		
	LITUX		
	BIVUT		
	VUMPI		
	VUMPI		MAIQUETIA
	SIMUR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	PUERTO AYACUCHO VOR/DME (PAY)		
	PUERTO AYACUCHO VOR/DME (PAY)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BOGOTA

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	AMAYA	DME/DME COVERAGE	
	BARINAS VOR/DME ISAGA BUTOL IROSA SIGAB MARACAIBO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MAIQUETIA
UM414			
	NDB ELORZA/EZA OPRUS	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MAIQUETIA
	OPRUS GELER		BOGOTA
	ILTEN	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ILMUX	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	ILMUX IQUITOS VOR/DME (IQT)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	LIMA
	BORLA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	TINGO MARIA NDB AMVEX	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	LIMA DVOR/DME (LIM)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UM415			
	LIMA DVOR/DME ASIA VOR/DME (ASI)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	LIMA
	MEXUR LITOT OPKUL JULIACA VOR/DME (JUL) DOBNI	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	DOBNI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	LA PAZ
	VIRU VIRU VOR/DME (VIR) SIDAK	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	SIDAK		CURITIBA
	DARIO ESPIN MUCUS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	DUNCE PRUDENTE VOR/DME (PRR) NERVO KNAVE GROVE ORDEA EGITO SOROCABA VOR/DME (SCB)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UM417			
	VOR/DME MAIQUETIA / MIQ		
	KOTOM		
	TUY VOR/DME (TUY)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**MAIQUETIA**
	MUDAG		
	UGRUL		
	VAGAN	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	VAGAN		
	AKSUM		
	ISODI		
	ILNIG		
	NILBU		
	KIGOM	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**AMAZONICA**
	ISOBA		
	DADEG		
	LUTVI		
	NISLA		
	ESDAS		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	ESMAR	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	LUVTA		
	TAROP	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
UM418			
	CORDOBA VOR/DME CBA		
	MAVBI	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CORDOBA**
	DOPRI		
	UMSAR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**EZEIZA**
	IMBAK		
	RODOV		
	RODOV		
	SASKU	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**MONTEVIDEO**
	MUKIB		
	ARTOX		
	UBLAM		
	UBLAM	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	SIDUL		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	EKOGA		
	MUNOR		
	MUMIL	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CURITIBA**
	ISOGU		
	PORTO ALEGRE VDPOR		
UM419			
	TABOGA DVOR/DME (TBG)		**PANAMA**
	AROVI	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	ANSON		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UM423			
	GUAYANA VOR (GNA) PAKON	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**MAIQUETIA**
	PAKON DIVRA BOA VISTA VOR/DME (BVI) KIGOX ISOSU NAXIT DOMGA DOLTI ESMED EVNUL ESLAX NAXUM MUPIR EPKOK	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE** **TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**AMAZONICA**
	TAROP PADAK MORMA	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE** **TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	MORMA MUMBU MALMI OBGES DIMUB MOXOB MOSNA MUPET NAXIV NEBAL EGONI RORAG PASTE	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME** **TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**BRASILIA**
UM424			
	SANTIAGO DVOR/DME AMB LINER INT SUPRA INT ALBAL INT	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**SANTIAGO**
	ALBAL SAN RAFAEL VOR/DME SRA RODIK	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**MENDOZA**
	RODIK EDNOR LOGAM PABAS ASADA EZEIZA VOR/DME EZE		**EZEIZA**

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UM525			
	TABOGA DVOR/DME	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**PANAMA**
	SIROT	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	BITIX		
	BITIX	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**BARRANQUILLA**
	AMBIL		
	BUTES		
	BUTUM		
	ANDUR	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	ALGUK		
	EDMOL		
	SELAN	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
UM527			
	LIMA DVOR/DME (LIM)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**LIMA**
	GAVIL		
	MUMAT	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	SIGOB		
	SIGOB	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**AMAZONICA**
	TEMOR	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	
	SIGIX		
	MINUT		
	TEMID		
	VUKEB		
	TENUG		
	AKTOR		
	MULIP		
	MINIB		
	AKSUK		
	AKNOV		
	DIMUK		
	ARVIX		
	BIVUT		
	ARVOT		
	AKSUM		
	BUVKU	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	DIVRA		
	DOBDA		
	DOBDA	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**GEORGETOWN**
	TIM		
	UTGIN		
	DAGTO		
	UMREM		
	UMREM	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	**PARAMARIBO**
	TRAPP		
	RESISTENCIA VOR/DME SIS	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**RESISTENCIA**
	TIKLA		
	PORKA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CORDOBA**
	KUGIN		
	BURMI		
	SAN JUAN VOR/DME JUA		**MENDOZA**

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	ASIMO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ASIMO DILOK TABO VOR/DME (TBN)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	SANTIAGO
UM530			
	BRASILIA VDBSI KOGDI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BRASILIA
	OPLIK MOSNA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ISOPA SAMAR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	MIPAD ILSOT	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	LUVTI EQUAL KOGDU ESLEK	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	MUGEP ISUGO ISOSA KODPI KOGLA ILTEG DOTKI KUGOL KOGLU BUVKI	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	AMAZONICA
	BUVKI DADED	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	LA PAZ
	DADED BRANCO VDRBC	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	AMAZONICA
UM532			
	BRASILIA VDBSI KUKOL ROMIK ILPAV RORAG	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BRASILIA
	MIKAN	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ISIRO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	MUGOT SILOR VULTO LONEG PRUDENTE VDPRR SIRED RODUS	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	CURITIBA
	TILKI		
	DIDOM TELIX	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	NEDOK		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	LODUR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	SIGAS		
	REKIR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	CUARA		
UM534			
	ROSARIO VOR/DME ROS	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	EZEIZA
	ANRAL		
	DALAB		
	SUGRA		
	SIGRA	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MONTEVIDEO
	ENSAS		
	LOLIL		
	ILSIM		
	PORLI		
	URURI		
	URURI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	CURITIBA
	LOBOR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ISOBU		
	NEBID		
	OBLAD		
	PORTO ALEGRE VDPOR		
UM538			
	TABOGA DVOR/DME (TBG)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	PANAMA
	LODAX		
	DABOR		
	PUDAK		
	PUDAK	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	BOGOTA
	ITATA		
UM540			
	CARRASCO VOR/DME (CRR)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MONTEVIDEO
	MOLBI		
	AKPOD		
	AKPOD	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	CURITIBA
	AROMA	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	CALVE		
	PORTO ALEGRE	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	JUICE	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	NANDU		
	PONCA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	OSAMU		
UM542			
	PUDAK	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BOGOTA
	ITATA		
	ITATA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	GUAYAQUIL
	MIBAR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ATIPU		
	ATENO		
	ARNEL		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UM544			
	ASUNCION VOR/DME (VAS)VAS	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**ASUNCION**
	PADOT	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	EGELU	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	AKSUL		
	AKSUL	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**CURITIBA**
	ESPIN		
	CAMPO GRANDE VDCGR		
UM548			
	VAS	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**ASUNCION**
	ROLOK		
	FOZ VOR/DME (FOZ)		
	FOZ VOR/DME (FOZ)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CURITIBA**
	DOGTI		
	TELIX	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	ILBEK		
	PUNTO	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	DADUS		
	VERBO		
	CURITIBA VDCTB		
	PARANAGUA NBPNG		
	RONUT		
UM654			
	EZEIZA VOR/DME EZE	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**EZEIZA**
	KUKEN		
	KUKEN	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**MONTEVIDEO**
	TILDA		
	PUMIL		
	ETEXU		
	PORLI		
	GAMOT		
	GAMOT		**CURITIBA**
	SIDUL		
	BRICK	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	VUPIT		
	ATARI		
	ILBEK	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	AULIC		
	RABAN		
	NETOS		
	KNAVE		
	BAURU NDB (BRU)		
	PERAU		
	PERAU	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	FOSSE		
	HASTE	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	GAUZE	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	ABAFT	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BRASILIA
	EDOLA		
	BACON	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	CROWD		
	DEPTI		
	FLAND		
	PRUMO		
	AFTER		
	NIDNA		
	1HATCH		
	NEFAS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	NEFAS		RECIFE
	MALBA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	OLEAR		
	PACAS	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	AUGUR		
	BIRTI		
	KODMI	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	NEFRO		
	GAXEX		
	PUREU		
	ILNER	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	FORTALEZA VDFLZ	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
UM656			
	SOROCABA VOR/DME (SCB)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	CURITIBA
	BETEL		
	MINCE		
	BAURU NDB (BRU)		
	EQUIV		
	MUGOT		
	MEVIL		
	PUKIL		
	PUKIL	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	BRASILIA
	KOXIS		
	MAMGU		
	MALMU	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	KODMU		
	ANGOL		
	LUVTI		
	RAPAT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	RAPAT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	AMAZONICA
	DADEL		
	ESDAG		
	KIGUL		
	DEMIT		
	DOKBU		
	EGBEM		
	EKOXU		
	ESBUV		
	ESDAX		
	EPKIR		
	MONIC		
	DIMUK		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	BUVKA		
	BUVKA	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	MAIQUETIA
	LOGIR		
	RELUN	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	USEKO		
	SILIK	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	BARINAS VOR/DME (BNS)		
UM659			
	LESIR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	PANAMA
	OGLUT		
	OGLUT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	BOGOTA
	ANRAX		
	ANRAX	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	GUAYAQUIL
	GUAYAQUIL VOR/DME		
UM661			
	CARRASCO VO/DME	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MONTEVIDEO
	KILIUM		
	TODAX		
	DAKIS		
	DAKIS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	CURITIBA
	OPTUR		
	TOSAD	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	DIDAB		
	IREKI		
	ARVOR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	MILUG		
	NEPEV		
	ROKAD	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	LOBIK		
	TOMID		
	SIREL		
	ESDAV	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BRASILIA
	KIKAT		
	LIVAM		
	MINIG		
	MUDSA		
	OPROP	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	ATLANTICO
	PAMOX		
	SAMTI		
	TEMUP		
	KOGRI		
	KULEP		
	MOXIP		
	NILKI		
	VUKIR		
	PUGSA		
	ERETU		
UM664			
	ARICA VOR/DME ARI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	ANTOFAGASTA
	DANKI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	LIMA
	LOLES		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	LOLES	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	ANTOFAGASTA
	VAGUR		
	VAGUR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	LA PAZ
	LA PAZ VOR/DME		
UM665			
	GUAYAQUIL VOR/DME	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	GUAYAQUIL
	PUNAS		
	CUENCA VOR/DME		
	KORBO		
	KORBO	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	LIMA
	OSUBU		
	IQUITOS VOR/DME (IQT)		
UM668			
	LIMA DVOR/DME (LIM)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	LIMA
	GATUK		
	GEBAG		
	AKREL	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	CUSCO VOR/DME (ZCO)		
	URCOS VOR/DME (URC)		
	OPTOP		
	OBLIR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	ANKIS	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	LA PAZ
	BOKAP		
	OBKUL	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	PAPEK	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	KADOX		
	TRINIDAD–VOR (TRI)		
	NILSO		
	TEPUG		
	LOBON		
	POSPA		
	GEDUS		
	GEDUS	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	AMAZONICA
	KOGMO		
	NIBMI		
	ISUDU		BRASILIA
	CUIABA VOR/DME (CIA)		
	LISAN		
	KODMU		
	GRACE		
	MOLPA		
	NILON	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	NAXIV		
	ILTAS		
	GOIANIA VOR/DME (GOI)		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	KOGMA BRASILIA VOR/DME (BSI)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UM671			
	MELO VOR (MLO) AKNEN	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MONTEVIDEO
	AKNEN OBLAD	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	CURITIBA
	ISOGU	TTRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME	
	COVER DO SUL VDCXS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	NADAR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	GLOVE OSAMU	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	RONUT ANISE	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UM674			
	TABOGA DVOR/DME (TBG) MILAT TOKUT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	PANAMA
	TOKUT TUMACO VOR/DME (TCO)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BOGOTA
	TUMACO VOR/DME (TCO) ENSOL INTAG CONDORCOCHA PAKOK EKUMO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	GUAYAQUIL
	EKUMO ROBIG VUKID BOBUG ATOGO GALGO LIMA DVOR/DME	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	LIMA
UM776			
	CONDORCOCHA VOR/DME	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	GUAYAQUIL
	PUMTA GELAR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	TERAS	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	TERAS IQUITOS VOR/DME (IQT)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	LIMA
UM778			
	ELORZA NDB (EZA*) PALIR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	MAIQUETIA

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	PALIR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BOGOTA
	ATATU	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	SAO GABRIEL "SGC" VOR/DME-NDB		
UM782			
	ARNAL	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	PANAMA
	LONET		
	AGUJA		
	AGUJA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BARRANQUILLA
	XOGEN		
	XOGEN	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BOGOTA
	BARRANCABERMEJA "EJA" VOR/DME		
	LONAX	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	MITU VOR/DME (MTU)		
	MITU VOR/DME (MTU)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	AMAZONICA
	ABIDE		
	MULIP		
	ROUSE		
	MEDLE		
	JOUDT		
	GLINT		
	PINUP		
	SIMON		
	ISOKI		
	SIDUM		
	PARDO		
	MUGEP		
	KUMIR		
	ANPOS	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	BRASILIA
	CUIABA VOR/DME (CIA)		
	SIRIA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	TOMBO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	CURITIBA
	ALBEX		
	POXET		
	MEVIL		
UM784			
	LIMPO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	AMAZONICA
	MINUT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	PANOL	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	KILEV		
	KILEV		LA PAZ
	ALBEG	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	OBKUL		
	DIBUG		
	LOKOX		
	GUVAS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	SAVRA		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	PALIV		
	BOLET	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	PILCO		
	PILCO	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	GETRA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	RESISTENCIA
	RESISTENCIA VOR/DME (SIS)		
UM787			
	CORO VOR/DME (CRO)		
	LOKUR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MAIQUETIA
	REBIM		
	REBIM	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BARRANQUILLA
	ROPOL		
	ROPOL		
	NELUR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	PANAMA
	KIKOL		
	TELAX		
UM788			
	CONGONHAS VOR/DME (CGO)		
	CURSE		
	PARANAGUA NDB (PNG)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	PAKOV		
	DELAY	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	NAFIL	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	CURITIBA
	MOVER		
	PENSO		
	ASDEK		
	BAKER		
	MUNOR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	ISOBU		
	BAGE V0R (BGE)		
UM789			
	IQUIQUE NDB UCU		
	CALAMA VOR/DME	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	ANTOFAGASTA
	LOA		
	KADAT		
	KADAT		
	JUJUY VOR/DME (JUJ)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	MIMEX	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	CORDOBA
	IMBER		
	BOKEN		
	VINOS		
	VINOS		
	AKPEL	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	RESISTENCIA
	AKPEL		
	KALOM		
	ASUNCION VOR/DME (VAS)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	ASUNCION

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UM791			
	KOGMU KOGNA	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	**ATLANTICO**
	KOGNA KIGUG KOGDO	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**AMAZONICA**
	KOGNO KOGNU ISUPI ESDAB	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**RECIFE**
	ISUBA ABUCU ILNER SALNU ESMEM KIKAD ISUGI ABASE KIGUK KODSO EPKIM CAMPINA ISUKU RECIFE VDREC	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
UM792			
	CONGONHAS VDCGO CURSE PARANAGUA NBPNG	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CURITIBA**
	PAKOV DELAY	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	NAFIL MOVER	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	PENSO ASDEK EAGLE MUMIL NEBID AKNEN	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL**	
	AKNEN MELO VOR (MLO) AROMO TELAK CARRASCO VO/DME (CRR)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**MONTEVIDEO**
UM793			
	LIMA DVOR/DME (LIM) ASIA VOR/DME (ASI)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	ALAMO		LIMA
	LAKUN	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	AREQUIPA VOR/DME (EQU)	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	OLGAS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	KOMPA		
	KOMPA	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	LA PAZ
	LA PAZ-VOR (PAZ)		
	DAKOG		
	TEDOK		
	COCHABAMBA-VOR (CBA)		
	VAREB		
	SANSO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	VIRU VIRU–VOR (VIR)		
UM795			
	COLBY	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	PANAMA
	ENPAN		
	OGRUL		
	LA PALMA VOR/DME (PML)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ILTUR		
	ILTUR	TTRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BOGOTA
	BOKAN		
	BOKAN	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	GUAYAQUIL
	PUMTA		
	LOBOT	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	LOBOT	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	LIMA
	KUSKU		
	PUPMI		
	RELOR		
	GAXIX		
	MULAM	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	LIMA DVOR/DME (LIM)		
UM796			
	MENE MAUROA VOR/DME (MAU)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	MAIQUETIA
	MARACAIBO VOR/DME (MAR)		
	AKNIL		
	AKNIL	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BARRANQUILLA
	ISIMO		
	ISIMO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	PANAMA
	PAKOP		
	ALGEN		
	PADUR		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UM799			
	TABON VOR/DME (TBN) DILOK ASIMO	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**SANTIAGO**
	ASIMO SIBOX	**RAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL**	**CORDOBA**
	LA RIOJA VOR (LAR) KAKAN CATAMARCA VOR/DME(CAT)	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	PUBER	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL**	
	PUBER MUDUL GAVEX UBRIX VINOS	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	VINOS GETRA AKNEL	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**RESISTENCIA**
	AKNEL EGEXO ILPUR REMEK	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	**ASUNCION**
	REMEK ESDER	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	**CURITIBA**
	DARIO ARGOS	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	CANOP	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	TOSAR	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	TOSAR ESTER	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	**BRASILIA**
	SIRIA	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL**	
	ISUKA LISAN ANGOL SAMAR DIMUB KOGTU EGOLA TERES POLAN BERNA ELDOR RONAL ZELAN ALVAR	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	ALVAR TEREB ISOBI GEDOG GIRAL URUGU	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME**	
	INTEL		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	RICAR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	AMAZONICA
	BELIS		
	GEDIR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	
	KOGNI		
	VUKER		
	EPKOL		
	ISKAB		
	ISIXU		
	ILSUD		
	NADIR		
	ESLEB		
	BUVMU		
	KOGNO		
	MASVA		
	ESLEL		
	EGBIR		
	EGIMI		
	MOVGA		
UN741			
	NANIK	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	ATLANTICO
	DIKEB		
	PUGSU		
	JOBER		
	JOBER	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	RECIFE
	FORTALEZA VOR/DME (FLZ)		
	SALNU		
	ARMAN	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	NEBIV		
	BISSA		
	DALMA		
	ILNOS		
	ILPUR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	HAMBU		
	CARDO	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	CARDO	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	BRASILIA
	GOLFO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	DOLTU		
	LISBO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	TRES MARIAS VOR (TRM)		
	REINA		
	UNIDO		
	GAXEV		
	VERME		
	ZANET		
	PIRASSUNUNGA VOR/DME (PIR)		
	GRADE		
	OROKA		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	OROKA BETEL EGITO GERAL FLORI DARCI MADRI	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**CURITIBA**
	SERGI VERBO PERNA NOBEL EKOGA LOBOR BAGE VOR (BGE) ISALA	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL**	
	ISALA OGLAP	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**MONTEVIDEO**
	DURAZNO VOR/DME (DUR) PONPA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	PAPIX PAPIX EZEIZA VOR/DME (EZE)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**EZEIZA**
UN857			
	EZEIZA VOR/DME EZE LA PLATA VOR PTA DORVO	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**EZEIZA**
	DORVO PABOT LOMID ANDAN MELO VOR (MLO) OGRUN	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	**MONTEVIDEO**
	OGRUN ABELA	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**CURITIBA**
	TORON PORTO ALEGRE VOR/DME (POR)	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	JUICE EGBIP	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL**	
	EKUBI DEUCA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	FEITO AKNUB	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	BITAK KOGBA MARICA VDMRC		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	KIGOL ISOLI KOKPI KIGUV DOGSU	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	DOGSU SASBU DAGEL	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	BRASILIA
	DAGEL PORTO SEGURO NBSGR BIDEV EKUGO ESLIB MEDIT RUBEN AMBET FERNANDO VDFNO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	RECIFE
	NEURA	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	NEURA PUGUN NOISE ERETU	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	ATLANTICO
UN866			
	BONSUCESSO VOR/DME (BCO) SORAI TRIVI VISTA KIKAX KODMO KIGUB KODNU PENTE QUARU	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	BRASILIA
	RUBIC	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	RUBIC SPINO	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	MANPI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	TROVA ADEMI BANGU	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	RECIFE
	EDITE KIGUK MOSSORO VDMSS MAGNO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	MAGNO OBKUT DEKON	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	ATLANTICO
UN873			
	TASIL ORARO INTOL	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	ATLANTICO
	INTOL FEMUR	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	IBAGA		RECIFE
	NATAL VDNTL SEVIL EPKIM VACAR EVPAB	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	AVILA TOMAS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	ADOLF BORBA IRUMO KODSA DEDOR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ELEFA GONZA BUXER	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL	
	BUXER FERMA MORGA EVPAD GAVUP	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME	BRASILIA
	GAVUP MEDIA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	CURITIBA
	BARBACENA NDB	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	

TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE
TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE
TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE

RUTAS RNAV ARGENTINA

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UT 103			
	VURGI		
	GEMIL	**TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE**	
	OTAGI		
	MOUNT PLEASANT VOR TACAN MTP		
	MOSKA		
	KABES		
	LOLAN		
	MIPAT		
	BOGOR	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	EZEIZA
	POSTI	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	TANDIL VOR/DME DIL		
UT 105			
	C. RIVADAVIA VOR/DME CRV	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH DME/DME PARTIAL COVERAGE**	COMODORO RIVADAVIA
	ELADA	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	PAKAL		
	SEMGA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	EKOPA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	EZEIZA
	RAXUS		
	NEUQUEN VOR/DME NEU		
UT 106			
	TRE	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	COMODORO RIVADAVIA
	UDIMA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	OTADO	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	EZEIZA
	NEUQUEN VOR/DME NEU		
UT 108			
	VIEDMA VOR VIE		COMODORO RIVADAVIA
	UDENA	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	
	ORIGI		
	KOTON		
	GUDUX	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	RIO GRANDE VOR/DME GRA		
UT 109			
	VIEDMA VOR VIE		COMODORO RIVADAVIA
	KAMAD	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	
	ORIKA		
	SJU		
	IRAVU	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	RIO GALLEGOS VOR/DME GAL		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UT 650			
	ESITO	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	MENDOZA
	TERON	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	CORDOBA
	VOR/DME CBA		
UT 652			
	ALBAL ESITO PAPIR SOLER	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	MENDOZA
UT 653			
	ROSARIO VOR/DME ROS	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	EZEIZA
	MARCOS JUAREZ VOR MJZ TEREX ILRUS KALEN	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	CORDOBA
	PAMAL	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	MENDOZA
	SAN JUAN VOR/DME JUA		
UT 654			
	EZEIZA VOR/DME EZE GEBEM TORUL SIKAR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	EZEIZA
	BIXIM EDRON	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	
	RAXUS EKEBA VULON	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	S.C. DE BARILOCHE VOR/DME BAR		
UT 655			
PORTO VELHO VOR/DME (PVH)	NEUQUEN VOR/DME NEU	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	EZEIZA
	BUVIM	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	
	EGOVI	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	ASADA		
UT 657			
	ESQ UDIMA	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	COMODORO RIVADAVIA
	KIMID	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	EZEIZA
	BAHIA BLANCA VOR/DME BCA		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UT 658			
	ESQ	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	COMODORO RIVADAVIA
	DAKAX		
	BOKUK	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	
	AKVUL	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	RIO GALLEGOS VOR/DME GAL		
UT 659			
	DAKAX	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	COMODORO RIVADAVIA
	IMBAV		
	ASADO		
	EL CALAFATE VOR/DME ECA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	EL TURBIO NDB BIO		
UT 662			
	DIL	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	EZEIZA
	SIGUL	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	
	PUGLI	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	COMODORO RIVADAVIA
	OGRAX		
	ESNAS		
	IRAVA		
	LOBOS	**TRAMO CON COBERTURA DME/DME PARCIAL /SEGMENT WITH DME/DME PARTIAL COVERAGE**	
	ERUPO	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	RIO GRANDE VOR/DME GRA		

RUTAS RNAV BRASIL

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	FORTALEZA VDFLZ		FIR RECIFE
	KIKAD	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ESLIT		
	JUAZEIRO NBJZR	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	KIKAB		
	BERTI		
	HABIT		
	TROVA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	NIDSA		
	OFITO		
	LIBRA		
	MILTA		
	FERMA	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR BRASILIA
	GRUFF		
	KIGOK	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	ESMAP	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	PORTO VDPCX	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	FIR CURITIBA
UZ2			
	BRASILIA VDBSI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BRASILIA
	DOMLI		
	PANDI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	ISONU		
	BETAR	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	SOLDO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	FIR RECIFE
	IRULU		
	ACENA	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	KIGUT		FIR AMAZONICA
	UCROK	TTRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	PORPI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ISKAB		
	ISULO		
	SAO LUIS VDSLI	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UZ3			
	BELEM VDBEL	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**FIR AMAZONICA**
	PIRES		
	PADAM	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	IMPERATRIZ VDYTZ	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	ILSOS		
	RICAR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	LOVIS	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME**	
	SOLDO	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME**	**FIR RECIFE**
	OTELO		
	NECTO		
	NEGAR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	CARVA		
	APINO	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME**	
	1HATCH	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME**	**FIR BRASILIA**
	GOLFO		
	POSBI		
	POSMA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	GEDOK		
	CONFINS VDCNF		
UZ4			
	SAO LUIS VDSLI		**FIR AMAZONICA**
	MOLRI	**TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE**	
	ISIXU		
	ESBUT	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	ORBAD		
	ANDER	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME**	**FIR RECIFE**
	EKUGO		
	EKOXO	**TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE**	
	BARKA		
	VAMIL		
	OPLUK		
	ZORZA	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME**	
	DAMEX	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	GROIN	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME**	
	RESUS		
	PACAS	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	PERLA		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	CARDO	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
			FIR BRASILIA
	TEMOV	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	CONFINS VDCNF		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	B HORIZONTE VDBHZ		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR CURITIBA
	DEJAN		
	TOKIM	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	PIRAI VDPAI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
UZ5			
	PORTO ALEGRE VDPOR		FIR CURITIBA
	DO SUL VDCXS	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	PENSO		
	CLUNG PERNA PUNTO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	BOLIP	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	SIPOR MINOT CRYPT GROVE	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	BAURU NBBRU		
	ENACT		
			FIR BRASILIA
	HARDY ASTOB	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	PASTE	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	FRAIL BEANO PAGUE IRULA	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	LUZIANIA VDLUZ		
	BRASILIA VDBSI		
	ILSUL FLINT		
	PAROL TELMA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
			FIR RECIFE
	ISUSI		
	OTELO ILSUG BARKA	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	KODSI		
	ILNEM		
	GUEST		
	TERESINA VDTRS		
UZ6			
	PIRAI VDPAI		FIR CURITIBA
	TOKIM	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	EGBES		
			FIR BRASILIA
	ARENA		
	SORAI		
	MAVIK		
	NINDI		
	UNIDO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	KUNOS		
	CROWD		
	ISOPI		
	BRASILIA VDBSI		
	ATYLA		
	IRULI		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	TERES		
	KOLKI	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	NABOL		
			FIR AMAZONICA
	ISTAR	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	TAROP		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	NINKA		
	VIBOT		
	MALVI		
	UTPAM		
	MANAUS VDMNS	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	KOGMU		
	PABUX		
	ARVOT		
	KOKSA		
	VAGAN		
UZ7			
	MACAPA VDMCP		FIR AMAZONICA
	INDOB		
	KOGVU	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	ILPER		
	BELEM VDBEL		
	NAXOT		
	RIXOM	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	VUKER		
	UCROK		
	ORBAD	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	LICOR		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	FIR RECIFE
	TERESINA VDTRS		
	IMBUD		
	BASIL		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	PUREU ARMAN OBGEL ESLIT ISUKU LITUL EDITE OPSUS	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	VACAR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	NEUMA	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	RECIFE VDREC	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
UZ8			
	CUIABA VDCIA		FIR BRASILIA
	KOKLI ISUKA	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	MALMU	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	MABMA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
UZ9			
	MANAUS VDMNS		FIR AMAZONICA
	KOKMU MAMGI	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	NISLA	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	ESLAX DARLO KOKNA GAXAG GAVUX OPLUG ESLUR KOKNI GEDOG ILNOM OPLOP LOVIS	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	IRULU	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR RECIFE
	ILSUG	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	OPLUK	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	OPRET	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	BIRTI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ILNOS GAVUN EPKIM	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	MANPI NIDSA	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	KOKNU	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	KODSA	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	SALVADOR VDSVD		
UZ10			
	PORTO VDPCX		FIR CURITIBA
	ESLUM	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
			FIR BRASILIA
	SASTI		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	FLIRT	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	FIR RECIFE
	HAVEM	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	DRINK		
	BLOCK	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	SALVADOR VDSVD		
	AZOTE		
	ZIPAR		
	ILNOT		
	NEUMA	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ISUKU		
	RUMBA		
	NATAL VDNTL		
UZ11			
	MANAUS VDMNS		FIR AMAZONICA
	KOGPI	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	SIGEP		
	ESDAS		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	EVNUL		
	ILTAN	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	TENAP		
	PADIL		
	KOGRU		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	KOGPO		
	MARABA VDMRB	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	KOVTI		
	KEVOS		
	MOTPA		
	ILSOS		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	GEDIR		
	ESDAG	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR RECIFE
	KOKBO		
	EKUGO		
	ILNEM		
	KOKTI		
	EVNOM		
	GAXEX		
	NEBIV		
	EVNOR		
	KIKAB		
	EVNUM		
	BANGU		
	OBGAS		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	EVPAB		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ILNOT		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	RECIFE VDREC		
UZ12			
	MANAUS VDMNS	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR AMAZONICA
	KOGRO		
	KUBID		
	MAVBA		
	ESMED		
	ESLEX		
	ISOMI		
	EKUGI		
	MOMVI		
	ESMAM		
	GAXAG		
	KOGSA		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	OPLOT		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	PADAM		
	KOKBI		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	RIXOM		
	EPKOL		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	PORPI		
	ESBUT		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	SASLA		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	FIR RECIFE
	ESDAB		
	KOGSU		
	FORTALEZA VDFLZ		
UZ13			
	CONFINS VDCNF	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BRASILIA
	SIDOL		
	LISBO		
	AFTER		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	BLUES		
	ORATE	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	FLASH		
	PEDAL		
	PIANO		
	PAROL		
	PANDI		
	NATIO		
	RUSTE		
	ARUKI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	FIR AMAZONICA
	TEREB		
	UGUTO		
	OPLUG	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	KOGRU		
	ANGUK		
	ESMAM		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	RESIN		
	ANSOX		
	TIRIOS NBTIR		
UZ14			
	SALVADOR VDSVD	**TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE**	**FIR RECIFE**
	ABODE		
	BLESS	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME**	
	CRATE		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	**FIR BRASILIA**
	GRUFF		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	ISUVU		
	EVNOL	**TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE**	
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	**FIR CURITIBA**
	PERUM		
	BARBACENA NBBBC	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	TOKIM		
UZ16			
	PORTO SEGURO NBSGR	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**FIR RECIFE**
	AMENT		
	HAVEM	**TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE**	
	BRIDE		
			FIR BRASILIA
	GRUFF	**TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE**	
	MORGA		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	FAITI		
	DOTBA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	MADAM		
	B HORIZONTE VDBHZ		
	SELDO		
	MOPDA		
	DOBDU		
	NINDI		
	GAXEV		
	BACON		
	SARSU		
	CORVO		
	UBERLANDIA VDULD		
UZ17			
	SALVADOR VDSVD	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	**FIR RECIFE**
	ELEFA		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	OFITO		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	SPINO		
	APORT	**TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE**	
	HAMBU		
	PERLA		
	NIMBO		
	MALBA		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	APINO		
	OCELO	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR BRASILIA
	BLUES		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	FORMOSA VDFRM		
UZ18			
	FORTALEZA VDFLZ		FIR RECIFE
	ABUCU	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	BASIL		
	EVNOM	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	CADET		
	ISUGU		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	OPRET		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	DAMEX		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	NECTO		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	KORAN		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR BRASILIA
	KOGPU		
	PEDAL		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	FORMOSA VDFRM		
UZ19			
	SALVADOR VDSVD	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	FIR RECIFE
	ADOLF		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	FROTI		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	BANGU		
	LITUL	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	OPABA		
	ISUGI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	FORTALEZA VDFLZ		
UZ20			
	SALVADOR VDSVD	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	FIR RECIFE
	BORBA		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	FLOCK		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	ADEMI		
	HABIT	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	PETROLINA VDPTL		
	BISSA		
	NEFRO		
	CADET		
	KOKTI		
	PACHO		
	TERESINA VDTRS		
	ESTEP		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
			FIR AMAZONICA
	SASLA		
	ILSUD		
	PABID		
	SAO LUIS VDSLI		
	KOKPU		
	KOKRA		
	KOGMU		
UZ21			
	SOROCABA VDSCB		FIR CURITIBA
	BETEL		
	BAURU NBBRU	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	EQUIV		
	MUGOT		
	MEVIL		
	PUKIL		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR BRASILIA
	KOXIS		
	MAMGU		
	MALMU	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	KODMU		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	ANGOL		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	ILSOT		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	ESKES		
			FIR AMAZONICA
	FROCK		
	NASAL	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	RELOT		
	OPLIM		
	POLEN		
	ADUST		
	BIGOT		
	CHECK	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	MOTOR		
	NIDLA		
	BIVUT		
	VUMPI		
UZ22			
	SIDAK	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	FIR CURITIBA
	ARGOS		
	CAMPO GRANDE VDCGR		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	BRAKE		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	BUTNA		
	VULTO		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	DAKEM		
	EQUIV		
	RORAX		
			FIR BRASILIA
	HARDY		
	FOSSE	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	ARARAQUARA NBAAQ		
	PIRAssUNUNGA VDPIR		
UZ24			

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	SANTAREM VDSTM		FIR AMAZONICA
	EKUGI	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	TENAP		
	NEBAN		
	NELOS		
	GAXAG		
	ORAVU		
	BOMAL		
			FIR BRASILIA
	ELDOR		
	EGBAV		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	NANAR		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	BRASILIA VDBSI		
UZ25			
	IMPERATRIZ VDYTZ	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	FIR AMAZONICA
	MOTPA		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	INTEL		
	OPLOP	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	AZOIC		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	FIR BRASILIA
	ISURO		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	NATIO		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	DOTKA		
		TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	BRASILIA VDBSI		
UZ26			
	BRASILIA VDBSI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BRASILIA
	BRAZE		
	RUSTE	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	PALMAS VDPMS		
	EGALE		
			FIR AMAZONICA
	ILNOM	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	GIRAL		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	MOPIM		
	ESNER	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	KOVTI		
	LEMIS		
	OPLOT		
	BROKE		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	KODSU		
	KEVAD	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	BELEM VDBEL		
UZ27			
	MOSSORO VDMSS		FIR RECIFE
	ABASE	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	OPABA		
	ISUKU	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	EVNUM		
	BERTI		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	PETROLINA VDPTL		
	DALMA		
	BIRTI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	GROIN		
	NEGAR		
	PALMO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	SAPSA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	FIR BRASILIA
	FLASH	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	FORMOSA VDFRM	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
UZ29			
	MOXOB	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR BRASILIA
	ISOPA		
	GARCAS VDBAG		
UZ39			
	TOSAD	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR CURITIBA
	KOGTI		
	ARVOR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
UZ40			
	BRASILIA VDBSI	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BRASILIA
	EDNAR		
	MILIX		
	PAPES		
	OPRUX	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	KOGTU	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR AMAZONICA
	OBGES		
	KOGTO		
	KOGPA		
	ISIXO		
	ESKES		
	ISOMU		
	ESDAG		
	KOGVA		
	ARPAR	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	ISOKI	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	ILTAR		
	KOGVI		
	ISOLU		
	PORTO VELHO VDPVH		
UZ41			
	OTONI	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR AMAZONICA
	KOGVO		
	KOGVU	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	ILMAN		
	KOKBA	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	KODSU		
	PIRES	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	KOKBI		
	ILNES	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	KOGNI KIGUT	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	KOKBO	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	EKOXO KODSI ISUGU KODMI DALMA KODVI	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR RECIFE
	TROVA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	KOKBU	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	KOKDA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	KOGBU	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	SALVADOR VDSVD	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
UZ43			
	SIROS	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	FIR AMAZONICA
	KOKDI MASVU GAXAG KOKDO		
	KOGPO KOLGI	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	KOKNI ISOBI KOKLO	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	PALMAS VDPMS ISURO ISONU ISUSI KOGPU	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	FIR BRASILIA
	SAPSA MOPLA OCELO	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	NIDNA	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME	
	DOLTU KOKLU KOKMO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	
	CONFINS VDCNF		

RUTAS RNAV COLOMBIA

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	KILER	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	FIR BARRANQUILLA
	GELMO		
	ANRON	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	FIR BOGOTA
	ANKIN		
	TULUA "ULQ" VOR/DME		
UQ102			
	KILER		FIR BARRANQUILLA
	LODOR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	MUDUM		
	LOS CEDROS "LCE" VOR/DME		
	ASODI		
	BOKAN		
UQ103			
	CUCUTA "CUC" VOR/DME	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	FIR BOGOTA
	ELABU		
	DOBLI		
	PTO LEGUIZAMO "PLG" VOR/DME		
UQ104			
	KIKAS	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	FIR BOGOTA
	LOBUL		
	BOKAN		
UQ105			
	KILER	**TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE**	FIR BARRANQUILLA
	EKATI		
	BUTAL	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
UQ106			
	BUSMO	**TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE**	FIR BOGOTA
	PTO LEGUIZAMO "PLG" VOR/DME		
UQ107			
	ILTUR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	FIR BOGOTA
	MARIQUITA "MQU" VOR/DME		
UQ108			
	OTAMO	**TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE**	FIR BARRANQUILLA
	BIBIL		
	GEKAR	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	ILVIR	TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE	FIR BOGOTA
	MITU "MTU" VOR/DME-NDB		
UQ109			
	DAKMO	TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE	FIR BOGOTA
	EDRAN	TRAMO CON COBERTURA DME/DME	
	ANPIX	TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE	
	MITU "MTU" VOR/DME-NDB		
UQ110			
	KADED	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BOGOTA
	LIVEK		
	GEDIM		
	PTO LEGUIZAMO "PLG" VOR/DME		
UQ111			
	SOACHA "SOA" VOR/DME	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BOGOTA
	MARTU		
	PABON	TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE	
UQ112			
	ARORO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BOGOTA
	VASIL		
UQ113			
	TULUA "ULQ" VOR/DME	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BOGOTA
	BOKAN		
UQ114			
	DAKMO	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BOGOTA
	DAGUR		
	EDVIL	TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ILTEN		
	ASAPA		
UZ002			
	BARRANCABERMEJA "EJA" VOR/DME	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	FIR BOGOTA
	OPNIR		FIR BARRANQUILLA
	LOLUD		

RUTAS RNAV CHILE DOMÉSTICAS

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UT100			
	PUERTO AGUIRRE VOR/DME PAR		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	PUNTA ARENAS
	SATIN INT		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	VELAT INT		
	KILAK INT		
		TRAMO CON COBERTURA DME/DME/SEGMENT WITH DME/DME COVERAGE	PUERTO MONTT
	PUERTO NATALES VOR/DME PNT		
	PUNTA ARENAS VOR/DME NAS		
UT101			
	VENTANAS VOR/DME VTN		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	PUERTO MONTT
	MORSA		
UT102			
	PUERTO MONTT VOR/DME MON		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	GUTIN INT		
	ARGOS INT		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	PUERTO MONTT
	BALMACEDA VOR/DME BAL		
	PARET INT		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	BETRI INT		
	VELAT INT		
	KILAK INT		PUNTA ARENAS
		TRAMO CON COBERTURA DME/DME/SEGMENT WITH DME/DME COVERAGE	
	PUERTO NATALES VOR/DME PNT		
UT106			
	ANTOFAGASTA VOR/DME FAG		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	MACKE INT		
		TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	ANTOFAGASTA
	SILEN INT		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	SELMO INT		
		TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	EMBAL INT		
	KABIL INT		
	TABON VOR/DME TBN		
	SANTIAGO VOR/DME AMB		
		TRAMO CON COBERTURA DME/DME/SEGMENT WITH DME/DME COVERAGE	SANTIAGO
	LINER INT		
	RECIN INT		
	TEREV INT		
	LENOS INT		
		TRAMO CON COBERTURA DME/DME/SEGMENT WITH DME/DME COVERAGE	PUERTO MONTT
	PUERTO MONTT VOR/DME MON		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
UT108			
	SANTIAGO VOR/DME AMB		
	ESCOT INT	**TRAMO CON COBERTURA DME/DME/SEGMENT WITH DME/DME COVERAGE**	SANTIAGO
	TEVAL INT	**TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	VALDIVIA VOR/DME VLD		PUERTO MONTT

UT112			
	SANTIAGO VOR/DME AMB		
	LINER INT	**TRAMO CON COBERTURA DME/DME/SEGMENT WITH DME/DME COVERAGE**	SANTIAGO
	PINTO INT		
	TEMUCO VOR/DME TCO		PUERTO MONTT

RUTAS RNAV ECUADOR

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	GUAYAQUIL VOR/DME ROGEN MANTA VOR/DME	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	FIR GUAYAQUIL
	MIBAR LIXAS	**TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE**	

RUTAS RNAV PERÚ DOMÉSTICAS

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	LIMA DVOR/DME (LIM)	TRAMO CON COBERTURA DME/DME/SEGMENT WITH DME/DME COVERAGE	
	TORDO		
	BODET	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ETEBA		
	PTO.MALDONADO VOR/DME (PDO)	TRAMO CON COBERTURA DME/DME/SEGMENT WITH DME/DME COVERAGE	
UT220			
	LIMA DVOR/DME (LIM)	TRAMO CON COBERTURA DME/DME/SEGMENT WITH DME/DME COVERAGE	
	ASIA VOR/DME (ASI)		
	ALAMO	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	LAKUN		
	AREQUIPA VOR/DME (EQU)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ORALO		
UT222			
	LIMA DVOR/DME (LIM)	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	ASIA VOR/DME (ASI)		
	PISCO VOR/DME (SCO)		
	RACAN		
	SIHUAS VOR/DME (UAS)		
	AREQUIPA VOR/DME (EQU)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	OLGAS		
	KOMPA		
UT224			
	LIMA DVOR/DME (LIM)	TRAMO SIN COBERTURA DME/DME/SEGMENT WITHOUT DME/DME COVERAGE	
	ASIA VOR/DME (ASI)		
	PISCO VOR/DME (SCO)		

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME -DME/DME Coverage Analysis Results	FIR
	ESIRA		
	ATICO NDB (ACO)	TRAMO CON COBERTURA DME/DME PARCIAL/SEGMENT WITH PARTIAL DME/DME COVERAGE	
	ILO VOR (ILO)		
	TACNA VOR/DME (TCA)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	

UT226			
	MALVINAS VOR/DME (MLV)		
	ASEMO		
	DIKAB	TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE	
	ARTUX		
	KADEL		
	LIMA DVOR/DME (LIM)	TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE	

RUTAS RNAV URUGUAY

RUTA/ ROUTE	WP	RESULTADOS DE ANALISIS DE COBERTURA DME/DME - DME/DME Coverage Analysis Results	FIR
	LOBOR		
	BAGE VOR (BGE)	**TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE**	FIR CURITIBA
	ISALA		
		TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE	
	OGLAP	**TRAMO SIN COBERTURA DME/DME / SEGMENT WITHOUT DME/DME COVERAGE**	
	DURAZNO VOR/DME (DUR)		FIR MONTEVIDEO
	PONPA	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	
	PAPIX	**TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE**	
	EZEIZA VOR/DME (EZE)		FIR EZEIZA
UN857			
	LA PLATA VOR (PTA)		FIR EZEIZA
	DOVO		
	PABOT		
	LOMID	**TRAMO CON COBERTURA DME/DME / SEGMENT WITH DME/DME COVERAGE**	FIR MONTEVIDEO
	ANDAN		
	MELO VOR (MLO)		
	OGRUN	**TRAMO CON COBERTURA DME/DME PARCIAL / SEGMENT WITH PARTIAL DME/DME COVERAGE**	FIR CURITIBA
	ABELA		

Agenda Item 7: Operational implementation of new ATM automated systems and integration of the existing systems

7.1 The Meeting analyzed WP/21 – *Activities to be considered in the situational awareness action plan proposed for the SAM Region*, presented by the Coordinator of the Situational Awareness Project, and WP/22 – *Follow up on the interconnection of automated systems*, presented by the Secretariat.

Review to the Automation and Situational Awareness Programme

7.2 The Group examined the activities outlined in the Improvements in ATM situational awareness in the SAM Region Project, as well as the deliverables proposed within the activities of the Project.

7.3 The Project deliverables were modified, being the new ones for SAM/IG/9 meeting, the following:

a) Updating of the regional surveillance strategy for the implementation of systems in support of situational awareness improvements;
b) Regional coverage analysis to current surveillance systems;
c) Technical considerations guideline for ADS-B implementation;
d) Guideline in support of ATFM implementation; and
e) Guideline for the elaboration of SIGMET in graphic format.

7.4 The Meeting deemed it convenient that, with the aim of completing the drafting of the Technical considerations guideline for ADS-B implementation, consideration be given to obtain support from RLA/06/901 project for its elaboration, through the hiring of an CNS expert for a one-week period in April 2012.

7.5 In addition, a new deliverable for SAM/IG/10 meeting was considered: Technical considerations guideline for MLAT implementation.

7.6 The updated situational awareness is shown **Appendix A** to this part of the report.

Follow-up to the interconnection of automated systems

7.7 The Meeting examined the progress made in the interconnection of automated systems in the SAM Region, as follow-up to the regional action plan drafted in this regard by the SAM/IG Group and as per the activities specified in the Memoranda of Understanding (MoU) drafted and signed to date.

Interconnection of automated systems between Argentina and Brazil

7.8 The Meeting was informed that this interconnection, initially foreseen for October 2011, will be postponed until next year, taking in consideration the installation of the radar in Corrientes in December 2011, as well as the updating of the Curitiba ACC SAGITARIO system.

Interconnection of automated systems between Brazil and Uruguay

7.9 In follow-up to the MoU signed between the administrations of Brazil and Uruguay, the Meeting noted that the radar data interconnection activities will be carried out in 2012.

Interconexión de los sistemas automatizados entre Argentina and Chile

7.10 The Meeting was informed that interconnection activities will start on November 2011.

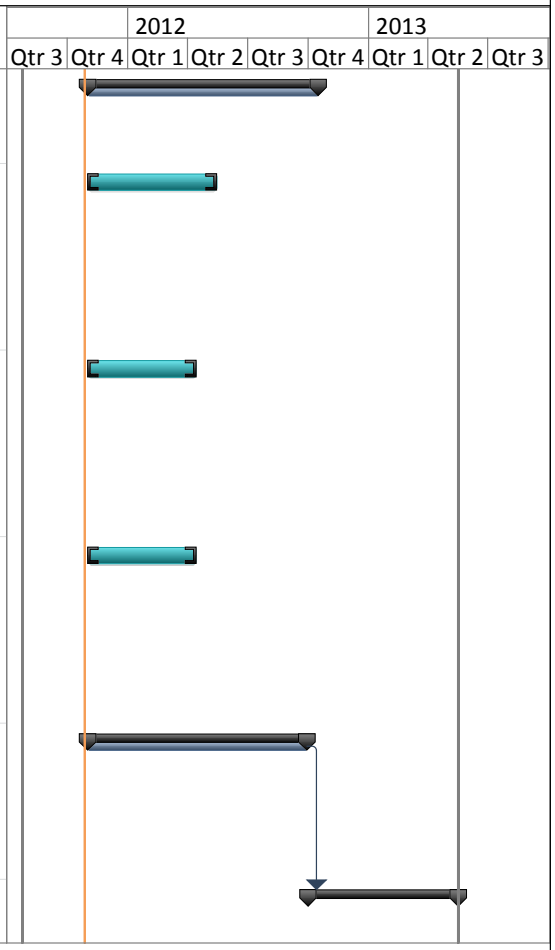
Interconnection of automated systems between Brazil and Venezuela

7.11 The Meeting noted that automated systems interconnection between Maiquetia ACC and Amazonico ACC was scheduled for July 2011 and that in mid-August 2011, ATECH personnel travelled to Venezuela with the aim of completing the activities taken under consideration in the MoU. Currently, both States' data bases configurations are ready, pending only the configuration of the REDDIG routers. It is expected that the interconnection will be completed by the end of 2011.

Review to the regional action plan for the interconnection of automated systems

7.12 The Meeting, on the basis of the information provided, examined the action plan shown in **Appendix B** to this part of the Report.

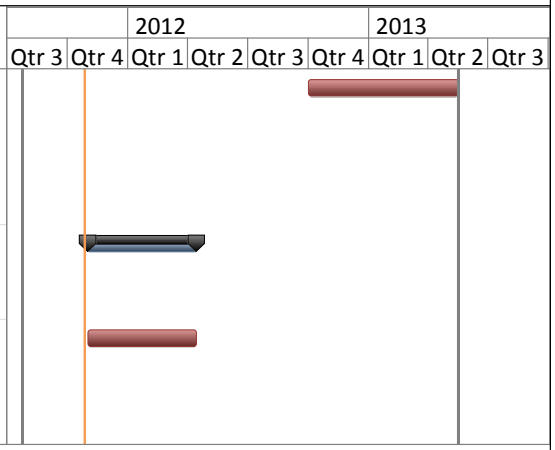
ID	Nombre de tarea	Start	Finish	Responsable de la tarea	Resource Names
1	**MEJORA A LA COMPRESION SITUACIONAL/ IMPROVEMENT OF SITUATIONAL COMPRESSION**	**Tue 01/11/11**	**Mon 15/10/12**		**Plan Sudamericano de Implantación basado en performance,Proyecto C del CNS/ATM/SG,Estrategia Regional**
2	**1. Evaluación de la infraestructura de vigilancia e identificación de mejoras a los sistemas de vigilancia / Assessment of the surveillance infrastructure and identification of improvements to surveillance**	**Tue 01/11/11**	**Mon 14/05/12**		
3	1.1 Entregable: Estrategia Regional para la Implantación del Sistema de Vigilancia Revisada./ Deliverable: Regional strategy for the implementation of surveillance system Revised.	Tue 01/11/11	Fri 13/04/12	Paulo Vila - PERU	
4	1.2 Entregable: Evaluación de la cobertura actual de los sistemas de vigilancia de la Región SAM./ Deliverable: Assessment of current coverage of surveillance systems in the SAM Region.	Tue 01/11/11	Fri 13/04/12	TBD	
5	**2. Elaboración de un plan regional para la implantacion del ADS-B y MLAT / Preparation of a Regional plan for ADS-B and MLAT implementation.**	**Tue 01/11/11**	**Fri 28/09/12**		
8	**3. Apoyo al grupo ATFM / Support to the ATFM Group**	**Mon 01/10/12**	**Thu 16/05/13**		



Proyecto: mejora conciencia
Fecha: Fri 28/10/11

Tarea	Hito externo	Informe de resumen manual
División	Tarea inactiva	Resumen manual
Hito	Hito inactivo	Sólo el comienzo
Resumen	Resumen inactivo	Sólo fin
Resumen del proyecto	Tarea manual	Fecha límite
Tareas externas	Sólo duración	Progreso

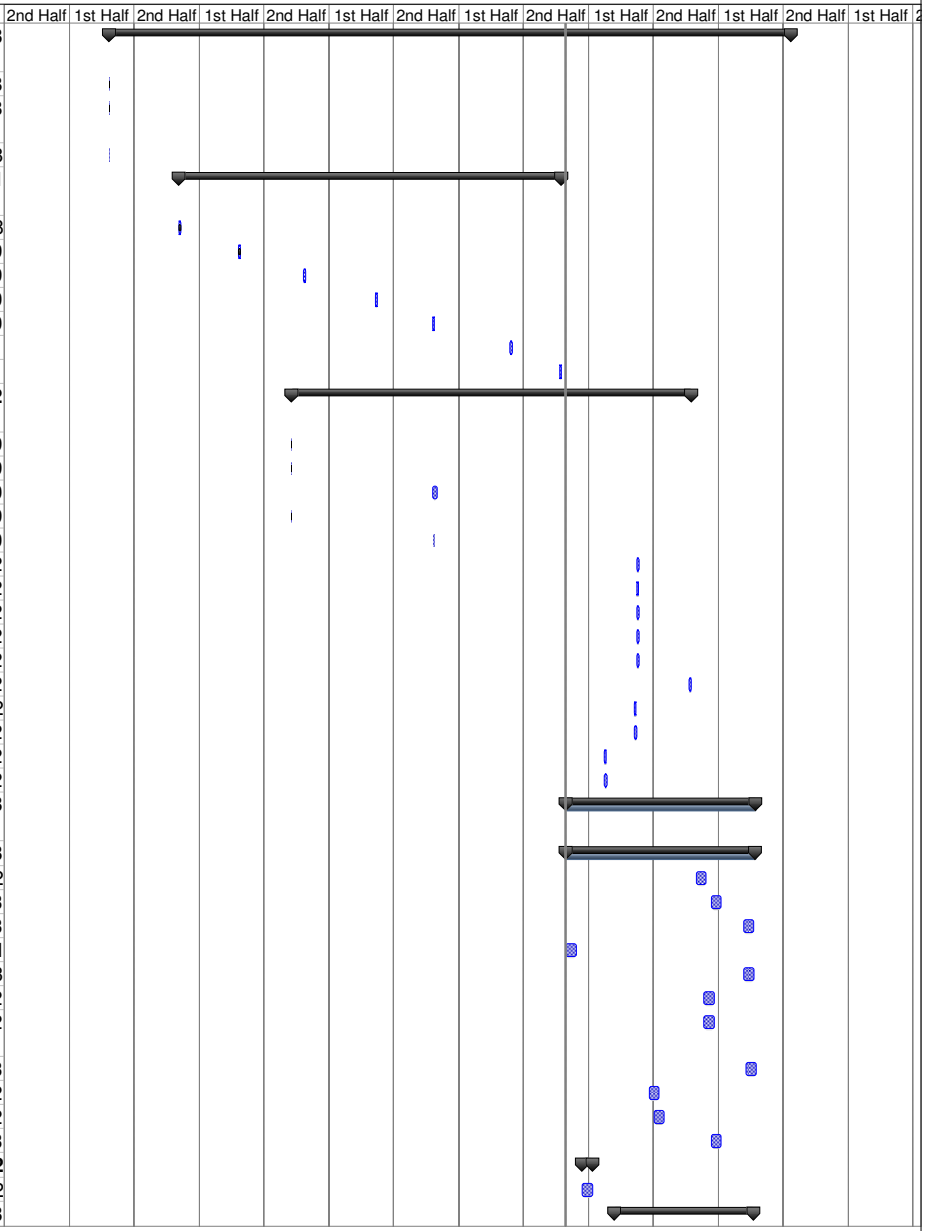
ID	Nombre de tarea	Start	Finish	Responsable de la tarea	Resource Names
9	3.1 Guia de consideraciones técnicas para el apoyo a la Implantación del ATFM. / Guidance on technical considerations for the support to	Mon 01/10/12	Thu 16/05/13	Marco Vidal-PERU	
10	**4. Disponibilidad del SIGMET en formato gráfico/Availability of SIGMET in graphic format.**	**Tue 01/11/11**	**Fri 13/04/12**		
11	4.1. Guía de orientación para elaborar SIGMET en formato gráfico./ Orientation guidance to prepare SIGMET in graphic	Tue 01/11/11	Fri 13/04/12	TBD	



Proyecto: mejora conciencia
Fecha: Fri 28/10/11

Tarea	Hito externo	Informe de resumen manual
División	Tarea inactiva	Resumen manual
Hito	Hito inactivo	Sólo el comienzo
Resumen	Resumen inactivo	Sólo fin
Resumen del proyecto	Tarea manual	Fecha límite
Tareas externas	Sólo duración	Progreso

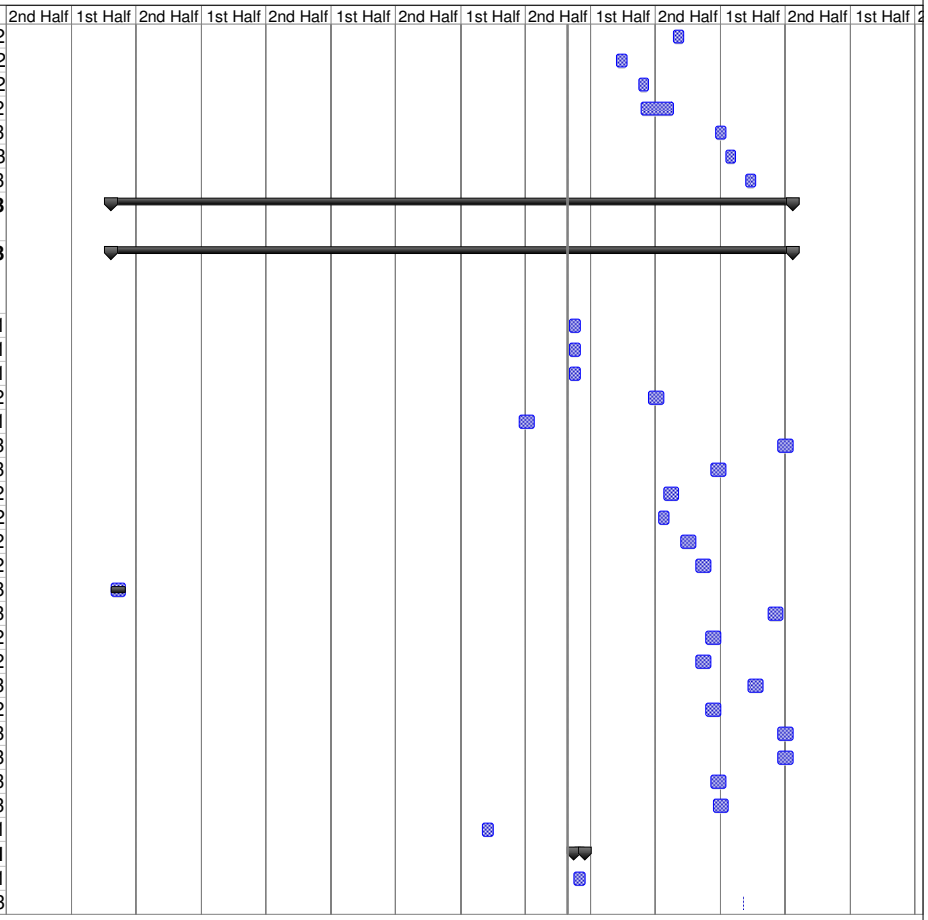
ID	Nome da tarefa	Duration	Start	Finish
1	**SAM Region Interconnection Plan / Plan de Interconexión Región SAM**	**1370 days**	**Mon 21/04/08**	**Mon 22/07/13**
2	Plan approval / Aprobación del Plan	1 day	Mon 21/04/08	Mon 21/04/08
3	Establishment of management team / Creación del equipo de gestión	1 day	Mon 21/04/08	Mon 21/04/08
4	Execution / Ejecución	1 day	Mon 21/04/08	Tue 22/04/08
5	**Coordination meetings / Reuniones de coordinación**	**769.88 days**	**Mon 03/11/08**	**Fri 14/10/11**
6	SAM/IG/2	5 days	Mon 03/11/08	Fri 07/11/08
7	SAM/IG/3	5 days	Mon 20/04/09	Fri 24/04/09
8	SAM/IG/4	5 days	Mon 19/10/09	Mon 26/10/09
9	SAM/IG/5	5 days	Mon 10/05/10	Fri 14/05/10
10	SAM/IG/6	5 days	Mon 18/10/10	Fri 22/10/10
11	SAM/IG/7	5 days	Mon 23/05/11	Mon 30/05/11
12	SAM/IG/8	5 days	Mon 10/10/11	Fri 14/10/11
13	**MoU establishment / Establecimiento de MoU**	**803 days**	**Wed 16/09/09**	**Mon 15/10/12**
14	Argentina - Uruguay	1 day	Wed 16/09/09	Wed 16/09/09
15	Argentina - Brasil	1 day	Wed 16/09/09	Wed 16/09/09
16	Argentina - Chile	10 days	Mon 18/10/10	Fri 29/10/10
17	Brasil - Uruguay	1 day	Wed 16/09/09	Wed 16/09/09
18	Brasil -Venezuela	1 day	Thu 21/10/10	Fri 22/10/10
19	Brasil Colombia	5 days	Mon 14/05/12	Mon 21/05/12
20	Brasil Peru	5 days	Mon 14/05/12	Fri 18/05/12
21	Colombia- Ecuador	5 days	Mon 14/05/12	Mon 21/05/12
22	ColombiaPanama	5 days	Mon 14/05/12	Mon 21/05/12
23	Colombia Venezuela	5 days	Mon 14/05/12	Mon 21/05/12
24	Peru Chile	5 days	Mon 08/10/12	Mon 15/10/12
25	Peru Colombia	5 days	Mon 07/05/12	Fri 11/05/12
26	Peru Ecuador	5 days	Mon 07/05/12	Mon 14/05/12
27	Paraguay Argentina	5 days	Mon 13/02/12	Fri 17/02/12
28	Paraguay Brasil	5 days	Mon 13/02/12	Mon 20/02/12
29	**Flight plan interconnection / Interconexión de plan de vuelo**	**381.13 days**	**Fri 28/10/11**	**Fri 12/04/13**
30	**OLDI**	**381 days**	**Fri 28/10/11**	**Fri 12/04/13**
31	EZEIZA-SANTIAGO	20 days	Mon 29/10/12	Sat 24/11/12
32	BOGOTA - GUAYAQUIL	20 days	Mon 10/12/12	Mon 07/01/13
33	BOGOTA - PANAMA	20 days	Mon 11/03/13	Mon 08/04/13
34	BOGOTA - BARRANQUILLA	21 days	Fri 28/10/11	Fri 25/11/11
35	BARRANQUILLA - PANAMA	21 days	Mon 11/03/13	Tue 09/04/13
36	SANTIAGO - CORDOBA	22 days	Mon 19/11/12	Wed 19/12/12
37	SANTIAGO - COMODORO RIVADÁVIA	22 days	Mon 19/11/12	Wed 19/12/12
38	AMAZÓNICO-BOGOTÁ	20 days	Mon 18/03/13	Mon 15/04/13
39	LIMA - SANTIAGO	20 days	Mon 18/06/12	Mon 16/07/12
40	LIMA - GUAYAQUIL	20 days	Mon 02/07/12	Mon 30/07/12
41	LIMA - BOGOTA	20 days	Mon 10/12/12	Mon 07/01/13
42	**DOC 44444**	**22 days**	**Mon 12/12/11**	**Wed 11/01/12**
43	AMAZONICO - MAIQUETIA	22 days	Mon 12/12/11	Wed 11/01/12
44	**AIDC**	**280 days**	**Mon 12/03/12**	**Mon 08/04/13**



Projeto: PLAN ACCIÓN INTERCONEX
Data: Fri 28/10/11

Tarefa	Tarefas externas	Manual Task	Finish-only		
Divisão	Etapa Tarefa	Duration-only	Andamento		
Etapa	Inactive Task	Manual Summary Rollup	Divisão		
Resumo	Inactive Milestone	Manual Summary			
Resumo do projeto	Inactive Summary	Start-only			

ID	Nome da tarefa	Duration	Start	Finish
45	CURITIBA-RESISTENCIA	21 days	Mon 20/08/12	Tue 18/09/12
46	CURITIBA - MONTEVIDEO	22 days	Mon 12/03/12	Wed 11/04/12
47	EZEIZA-CORDOBA	20 days	Mon 14/05/12	Mon 11/06/12
48	EZEIZA - MONTEVIDEO	65 days	Mon 21/05/12	Mon 20/08/12
49	LIMA - AMAZONICO	20 days	Mon 17/12/12	Mon 14/01/13
50	ASUNCIÓN - CURITIBA	20 days	Mon 14/01/13	Mon 11/02/13
51	ASUNCIÓN - EZEIZA	20 days	Mon 11/03/13	Mon 08/04/13
52	**Radar data exchange / Intercambio de datos radar**	**1370 days**	**Mon 21/04/08**	**Mon 22/07/13**
53	**Direct connection to centre - ASTERIX / Conexión Directa al Centro - ASTERIX**	**1370 days**	**Mon 21/04/08**	**Mon 22/07/13**
54	CORDOBA – SANTIAGO	22 days	Tue 01/11/11	Thu 01/12/11
55	EZEIZA - SANTIAGO	22 days	Tue 01/11/11	Thu 01/12/11
56	SANTIAGO - C. RIVADÁVIA	22 days	Tue 01/11/11	Thu 01/12/11
57	MENDOZA – SANTIAGO	30 days	Mon 11/06/12	Mon 23/07/12
58	EZEIZA – PUERTO MONTT	30 days	Mon 13/06/11	Mon 25/07/11
59	PUNTA ARENAS – C. RIVADAVIA	30 days	Mon 10/06/13	Mon 22/07/13
60	AMAZONICO – BOGOTA	30 days	Mon 03/12/12	Mon 14/01/13
61	CURITIBA – MONTEVIDEO	30 days	Mon 23/07/12	Mon 03/09/12
62	CURITIBA - RESISTENCIA	21 days	Mon 09/07/12	Tue 07/08/12
63	BOGOTA – GUAYAQUIL	30 days	Mon 10/09/12	Mon 22/10/12
64	BOGOTA – PANAMA	30 days	Mon 22/10/12	Mon 03/12/12
65	BOGOTA – BARRANQUILLA	30 days	Mon 21/04/08	Fri 30/05/08
66	BOGOTA – LIMA	30 days	Mon 13/05/13	Mon 24/06/13
67	BOGOTA – MAIQUETÍA	30 days	Mon 19/11/12	Mon 31/12/12
68	BARRANQUILLA – PANAMA	30 days	Mon 22/10/12	Mon 03/12/12
69	BARRANQUILLA – MAIQUETÍA	30 days	Mon 18/03/13	Mon 29/04/13
70	LIMA – SANTIAGO	30 days	Mon 19/11/12	Mon 31/12/12
71	LIMA – GUAYAQUIL	30 days	Mon 10/06/13	Mon 22/07/13
72	LIMA – AMAZONICO	30 days	Mon 10/06/13	Mon 22/07/13
73	ASUNCIÓN – CURITIBA	30 days	Mon 03/12/12	Mon 14/01/13
74	ASUNCIÓN – EZEIZA	30 days	Mon 10/12/12	Mon 21/01/13
75	MONTEVIDEO-EZEIZA	23 days	Tue 01/03/11	Fri 01/04/11
76	**ICD owner / ICD propietario**	**23 days**	**Mon 14/11/11**	**Thu 15/12/11**
77	AMAZONICO - MAIQUETIA	23 days	Mon 14/11/11	Thu 15/12/11
78	Inter-Centro ASTERIX 62,63 (TBD)	1 day	Mon 04/03/13	Tue 05/03/13



Projeto: PLAN ACCIÓN INTERCONEX
Data: Fri 28/10/11

Tarefa	Tarefas externas	Manual Task	Finish-only		
Divisão	Etapa Tarefa	Duration-only	Andamento		
Etapa	Inactive Task	Manual Summary Rollup	Divisão		
Resumo	Inactive Milestone	Manual Summary			
Resumo do projeto	Inactive Summary	Start-only			

Agenda Item 8: Implementation of the new flight plan format

Implementation of the new flight plan format in the SAM Region

8.1 The Meeting took note of the information presented in WP/10 and WP/30, as well as its Appendices A, B and C. In this respect, the Action plan for the implementation of the new flight plan format – Amendment 1 to the 15th edition of ICAO Document 4444 (PANS/ATN) in the SAM Region, was reviewed. The result of the review is shown in **Appendix A** to this part of the Report.

8.2 In this sense, the Meeting was informed that the Twelfth Meeting of Civil Aviation Authorities of the South American Region (RAAC/12), held in Lima, Peru, from 3 to 6 October 2011, formulated Conclusion RAAC/12-3 – *Implementation of Amendment 1 to the 15th Edition of ICAO Doc 4444 (new flight plan format) in the SAM Region*, with the aim that the aeronautical authorities take into account the current situation, and urge the implementation of pending activities.

Focal points

8.3 The Meeting examined the list of focal points presented, and the result of the review is shown in **Appendix B** to this part of the Report containing updated information of all SAM focal points. In this sense, the Meeting recalled the importance that States keep updated this information, taking into account the need for coordination among the States focal points for the implementation of Amendment 1 to the 15th Edition of the ICAO PANS/ATM (Doc. 4444).

8.4 In addition, with the aim of following-up the implementation activities of the new flight plan format, the Meeting considered fundamental the participation of all States focal points at the once a month via WEB conferences (phone-conferences), conducted through the "go to meeting" tool of the SAM Regional Office.

8.5 In this sense, the Meeting formulated the following tentative calendar for the next phone conferences with the focal points, until SAM/IG/9 meeting: 10 November 2011; 8 December 2011; 12 January 2012; 9 February 2012; 8 March 2012; 12 April 2012 and 3 May 2012.

National action plans for the implementation of the new flight plan format

8.6 The Meeting examined the situation of the States action plans for the implementation of Amendment 1, in follow-up to Conclusion SAM/IG/6-12 and verified that the following States had not presented their plans: Colombia, Ecuador and French Guiana (France). Taking in consideration the importance of the task in order that the Region successfully achieves a harmonious implementation, the Meeting proposed that the Secretariat send a reminder to the States that have yet to send it, so they draft their action plans and submit them to the ICAO SAM Regional Office, using as reference the action plan presented by Brazil and adopted by most of the SAM States.

8.7 In addition, with the aim of following-up the implementation activities of the new flight plan format, the Meeting deemed it fundamental that States continuously keep the Regional Office informed of the progress made in their activities, as well as on the changes in dates of their actions plans, until 15 December 2012, as established in the Action plan for the implementation of the new flight plan format in the SAM Region..

8.8 In this respect, Chile informed that its General Director of Civil Aviation had informed at the past RAAC/12 meeting that this implementation will bear an important financial impact on DGAC Chile. It has recently become known that the costs associated with this implementation ranges from 1.000.000 to 1.700.000 Euros. Upon such a financial impact, DGAC Chile will explore other options currently in the market. The ICAO SAM Regional Office will be duly informed on the degree of implementation that DGAC Chile will carry out as regards the new flight plan format.

8.9 In addition, Uruguay informed that, as consequence of changes in the management and to a decrease of operational staff at the Air Traffic Division, the compliance of some phases of the action plan for the implementation of amendment 1 to the PANS/ATM has been delayed and that, in this regard, the SAM Regional Office will be duly updated on the subject.

Second Workshop/Seminar for the system safety monitoring after the implementation of Version 01 of the ATS route network of the SAM Region and risk assessment following the implementation of Amendment 1 to the PANS ATM (FPL)

8.10 The Meeting took note of the results of the workshop/seminar of reference, which counted with the assistance of delegates from 6 States– Bolivia, Brazil, Paraguay, Peru, Uruguay and Venezuela, with a total of 23 participants, conducted in Lima, Peru, from 5 to 9 September 2011.

8.11 The presentations and rest of material produced in the workshop/seminar is published in the ICAO Regional Office WEB page:
http://www.lima.icao.int/MeetProg/mt_MeetingDocumentation.asp?wShortTitle=RNAV.11&wLanguage=S&wYear=2011

8.12 Taking in consideration that most of the SAM States had drafted their national action plans for the implementation of the new flight plan format, taking as reference the action plan for Brazil, and that the plans implementation strategy was oriented towards the updating of all national documentation, the safety assurance analysis, the analysis and implementation of changes in the automated systems and the training programme, the Meeting analyzed the implementation situation in the Region, in accordance with four modules (Legislation, Safety Assessment, Automated Systems and Training).

Legislation

8.13 In this part of the plans are the actions with regard to the review and updating of all domestic documentation, in the light of changes contained in Amendment 1 to the 15th Edition of ICAO PANS/ATM (Doc 4444). In this sense, the Meeting recalled Conclusion SAM/IG/7-7 with regard to the AIC publication for wide dissemination of the content of Amendment 1 to the 15th Edition of the ICAO PANS/ATM (Doc. 4444), including the important dates agreed upon, no later than 1 August 2011.

8.14 In follow-up to Conclusion SAM/IG/7-7, the Meeting verified that to date only Brazil, Chile, Paraguay, Peru and Uruguay had published their AIC. Panama informed it was in the process for its publishing. Taking in consideration the importance of the task for the meeting to successfully achieve a harmonious implementation, the Meeting proposed that the Secretariat send a reminder to all States that have not yet published it, to do so and inform of it to the ICAO SAM Regional Office.

Safety assessment

8.15 This part is dedicated to the actions related with safety assessment, taking into account the possible impacts in the operation, which will be assessed, decurrentes of the changes to be made and the associated risks, that might create the need for mitigating measures and establishing contingency plans.

8.16 In this sense, the Meeting analyzed the results on the subject at the seminar/workshop and reviewed the safety assessment for the implementation of the new flight plan format for the South American Region that was drafted and presented in WP/10. The result of the review is shown in **Appendix C** to this part of the Report.

8.17 The Meeting took note that the safety assessment has the aim of analyzing the implementation of Amendment 1 to Doc 4444 from the regional perspective, and will be of use to States who so require it, as reference material. It should be noted that this safety assessment does not substitute States responsibility in carrying out their own safety assessment, as established in the national action plans related with Amendment 1 to Doc 4444 and Conclusion SAM/IG/7-8 establishing that States draft their safety assessments for the implementation of Amendment 1 to the 15th Edition of the ICAO PANS/OPS (Doc. 4444) and submit it to the ICAO SAM Regional Office no later than 30 November 2011.

Automated systems

8.18 In this part of the plans, the actions related with the automated systems updated is dealt with, including the impact studies to measure the effort necessary to adequate the systems affected by the modifications contained in the Amendment and to elaborate the specifications required for the necessary updating to the systems.

8.19 In this sense, the manager of the Brazilian Automated Systems Module presented, as reference material for States who need a conversion table for its application during the transition phase which is being used for the updating of the automated systems, since some aspects are not totally clear in the ICAO implementation guide sent with State letter NA 13/2.1-09/9 of 6 February 2009 and this could generate message rejections. This guidance material is shown in **Appendix D** to this part of the Report.

Training

8.20 This part of the plans takes into consideration the actions directed towards the drafting of the training plan for the human resources required to know and apply the modified concepts, particularly the air traffic controllers and ARO/AIS operators.

8.21 In this sense, the Meeting requested Brazil to further detail on the strategy used in the training currently used in the country. In this respect, the Meeting was informed that the strategy is divided into three phases. The first phase includes the dissemination of all content modifications to the national regulations to be altered because of the application of Amendment 1, through the conduct of 4-hour seminars, planned to cover 100% of the operational personnel affected by the changes.

8.22 A second phase includes the dissemination of all contingency measures defined and of specific orientations for the transition phase, as regards the possible simultaneous use of the CURRENT and NEW flight plan format, in accordance with the strategy adopted for the application of Amendment 1. This will also be delivered through 4-hour seminars, planned to cover 100% of the operational personnel affected by the changes.

8.23 A third phase includes trainings focused on the changes made in the automated systems as regards the application of amendment 1 and that affect the operational process. The characteristics of these trainings, such as for example, duration and contend, must be established in coordination with the systems developers on the basis of what has been changed and that is not transparent to their users..

APPENDIX A

ACTION PLAN FOR THE IMPLEMENTATION OF THE NEW FLIGHT PLAN FORMAT – AMENDMENT 1 TO THE 15th EDITION OF ICAO DOCUMENT 4444 (PANS/ATM)

ACTIVITIES	ACTION BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
Approval of Amendment 1 to the 15th Edition of PANS/ATM – Doc 4444 – (*Procedures for air navigation services – air traffic management)* (ICAO State letter 13/2.1-08/50 of 25 June 2008)	SAM States	Take note of the Amendment	December2008	Completed
Guidelines for the inclusion of the flight plan information as per Amendment 1 to the 15th Edition of PANS/ATM- Doc 4444 (ICAO State letter AN 13/2.1-09/9 of 6 February 2009	SAM States	Take note of the ICAO guidelines	June 2009	Completed
Draft a regional strategy for the implementation of Amendment 1 to the PANS/ATM	RLA/06/901 project	Regional strategy for the implementation of Amendment 1 to the 15th Edition of the ICAO PANS-ATM - Doc 4444	October 2009	Completed. The strategy approved by SAM/IG/4 meeting for its adoption in the SAM Region was reviewed and approved for the CAR/SAM Regions at the meeting of the CNS/ATM Subgroup (March 2010)
Draft a national plan for the implementation of Amendment 1 to the PANS/ATM	SAM States	National plan for the for the implementation of Amendment 1 to the 15th Edition of the ICAO PANS-ATM - Doc 4444	End of April 2010 – Extension to 30 November 2010, for adjustments in accordance with models presented	The following States have not yet presented their action plans: Colombia, Ecuador, French Guiana (France).

ACTIVITIES	ACTION BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
Nomination of focal points for the coordination between ICAO and States in the implementation of Amendment 1 to the PANS/ATM	SAM States	SAM States focal points for the coordination between ICAO and States in the implementation of Amendment 1 to the PANS/ATM	7 May 2010	Completed. Updated in SAM/IG/8. See Appendix B to this Agenda Item.
Analyze the checklist of systems involved in the flight plan process to evaluate the impact of the implementation of the new flight plan format in the automated systems	SAM/IG meeting	Checklist of systems involved in the flight plan process and its impact on the new flight plan format	SAM/IG/5	Completed. Systems affected: flight plan format templates of AMHS terminals and flight plan processors (FDP).
Carry out an analysis on the impact of the implementation of the new flight plan format in the SAM States automated systems	SAM States	Impact of the implementation of the amendment in the automated systems	End of August 2010	Carried out to following States: Argentina, Brazil, Chile, Colombia, Ecuador, Guyana, Panama, Peru, Suriname, Uruguay and Venezuela
Preparation of a SAM seminar/workshop for the implementation of Amendment to the PANS/ATM	ICAO Secretariat	Seminar/Workshop for the Implementation of Amendment 1 to the PANS/ATM	Lima, Peru, 13 to 15 September 2010	Carried out with the participation of 41 delegates from 10 States (Argentina, Bolivia, Brazil, Chile, Panamá, Paraguay, Perú, Suriname, Uruguay and Venezuela; 1 international organization (IATA), 5 providers (Adacel Inc., Atech, Indra, Ineco-Tifsa and Radiocom Inc.)
Hold national meetings between providers and users when implementing Amendment 1 to the PANS/ATM	SAM States	Establishment of a national schedule of meetings for the implementation of Amendment 1 to the PANS/ATM	Necessary national meetings for 2010-2012	The number of national meetings would be determined by the States
Prepare user and service provider personnel on the implementation of Amendment 1 to the PANS/ATM	SAM States	Service provider and user personnel trained on Amendment 1 to the PANS/OPS, under a national training programme	October 2010-November 2012	

ACTIVITIES	ACTION BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
Hold second seminar/workshop for the SAM Region on the implementation of Amendment 1 to the PANS/ATM	ICAO Secretariat	second seminar/workshop for the SAM Region on the implementation of Amendment 1 to the PANS/ATM	Lima, Peru, 19-20 May 2011	Held with participation of 8 SAM States (Argentina, Bolivia, Brazil, Chile, Panama, Paraguay, Peru, Suriname and Uruguay), one air line representative (LAN Peru), industry representatives (Atech, Comsoft, Indra and ICAO representatives, totalling 36 participants
Conduct trials between systems with new flight plan processing capability	SAM States		End of June 2012	Trials should be held between 18 July 2011 until end of June 2012
Hold of a seminar/workshop for the evaluation of risk as consequence of the implementation of Amendment 1 to the PANS/ATM	RLA/06/901 project	Study with the safety assessment before the implementation of the new flight plan format	Lima, Peru, 5-9 September 2011	Conducted with the participation of 19 delegates from 6 States (Bolivia, Brazil, Paraguay, Peru, Uruguay and Venezuela)
Study the implementation of the transition to the new flight plan format (operation taking under consideration the current and new format) including contingency measures	RLA/06/901 project	Study the implementation of Amendment 1 to the PANS/ATM, during the transition phase with the contingency measures	SAM/IG/8	Coordination meeting planed for 21 to 23 May 2012
Publishing of transition actions, trials and other publications for users and interested parties	SAM States	Publishing of transition actions, trials and other publications for users and interested parties	End of March 2012	
Implementation of the new flight plan format in accordance with the strategy on the implementation of Amendment 1 to the 15th Edition of the PANS/ATM- Doc 4444	SAM States	Systems involved in the FPL process with capability to operate the new FPL format	End of March 2012	Conclusion SAM/IG/6-11 (AMHS until 31/12/2011 and FDP until 31/03/2012)

ACTIVITIES	ACTION BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
Implementation of activities permitting systems involved in the FPL to operate with the current and new FPL	SAM States	Systems involved in the FPL process with capability to act upon the current and new flight plan during the transition period	End of 2012	If the new plan is implemented before June 2012, same will be only used on a trial basis (national, intra- and inter-regional), continuing to operate with the current flight plan format. In addition, during this period, pre-operational trials can be carried out (national, intra- and inter-regional)
Keep the Regional Office informed on the progress of activities, as well as on date changes in the action plans	SAM States	Updated information of the action plan	Continuous process until 15/12/2012	
Implementation of operational phase with the current and new flight plan	SAM States	Systems involved in the FPL process operating with the current and new format	1 July 2012 to 15 November 2012	The new FPL format should not become operational before 1 July 2012

APPENDIX B/ APENDICE B

PUNTOS FOCALES PARA LA COORDINACIÓN DEL FORMATO DE PLAN DE VUELO / FOCAL POINTS FOR THE COORDINATION OF THE FLIGHT PLAN FORMAT

Estado/State Organization	Autoridad / Authority		E-mail	T / F
	Area	Nombre y título / Name and Title		
1	2	3	5	6
Argentina		Omar GouarnalusseDepartamento CNS de la Dirección Nacional de Servicio de Navegación Aérea y Aeródromo, ANAC	ogouarna@faa.mil.ar	T: + 54 11 4317 6667
Bolivia		Miguel Castillo Ochoa Jefe Unidad ATM/SAR, DGAC	mcastillo@dgac.gob.bo	T: +591 2 2444450/2114465 C:+ 591 72046745 F: +591 2 2114465
Brasil	CNS	Alessander de Andrade Santoro Oficial CNS Departamento de Control del Espacio Aéreo, DECEA	ddte7@decea.gov.br	T 5521 2101 6209
Chile		Marcial Vidal Arriagada Controlador de Tránsito Aéreo, DGAC	mvidal@dgac.cl	T: +56 2 290 4709
Colombia	PBN	Gladys Mercedes Roa de la Cruz AIS, UAEAC	gladis.roa@aerocivil.gov.co	T: +571 266 3693 +571 266 2514
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Paraguay		Liz Rocío Portillo Castellanos Sección Normas y Reglamentos, DINAC	nyrlrpc@dinac.gov.py lizroportillo@gmail.com	T: +595 21 205 365
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Estado/State Organization	Autoridad / Authority		E-mail	T / F
	Area	Nombre y título / Name and Title		
1	2	3	5	6
		Doris Kranenburg AIS/Maps and Charts and Communication	ais@cadsur.sr; do12burg@hotmail.com	Tel.: +597 498-898 Fax:+ 597 498-901
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APPENDIX C

INTERNATIONAL CIVIL AVIATION ORGANIZATION

SOUTH AMERICAN REGIONAL OFFICE

SAFETY ASSESSMENT FOR THE IMPLEMENTATION OF AMENDMENT 1 TO THE PANS/ATM (DOC 4444) RELATED TO THE NEW FLIGHT PLAN FORMAT

September 2011

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Executive Summary

1. The purpose of this document is to assess safety from the viewpoint of the South American region before Amendment 1 to the 15th Edition of ICAO's PANS-ATM (Doc 4444) takes effect with regard to the implementation of the new contents of the flight plan (NEW format) on 15 November 2012 and during the transition period starting on 1 July 2012, when airspace users are expected to use both the CURRENT and NEW formats.

2. The aim of this document is to serve States for reference purposes, as needed. It should be added here that this safety assessment does not release States from the responsibility for making their own assessments of safety as a result of the implementation of the new flight plan format, as stipulated in national action plans on the subject.

3. The ICAO guidelines for incorporating flight plan information pursuant to Amendment 1 to Doc 4444 were made known to the States at the SAM/IG meetings. The Implementation Group agreed to prepare an initial plan describing the amendment implementation strategy, together with an action plan determining the steps to be taken for the amendment's implementation on 15 November 2012. This action plan calls for the preparation of a safety assessment relating to the implementation of the new flight plan format.

4. The area covered in the safety assessment for the new flight plan format (FPL) extends to the borders of the SAM Region and encompasses the following FIRs: Antofagasta, Amazónica, Atlántico, Asunción, Barranquilla, Brazilia, Bogotá, Comodoro Rivadavia, Córdoba, Curitiba, Ezeiza, Georgetown, Guayaquil, La Paz, Lima, Maiquetía, Mendoza, Montevideo, Panama, Paramaribo, Puerto Montt, Punta Arenas, Recife, Resistencia, Rochambeau and Santiago.

5. The document describes the FPL system in the SAM Region and explains the hazard identification process and the consequences of implementing the new FPL format by analyzing aspects of the process for identifying risks for the implementation of the new flight plan format. The risks associated with implementation of the new flight plan format were then evaluated and mitigated and conclusions reached for the cited implementation.

6. It comes to an end by putting forward a series of recommendations for assessing operational risks associated with the implementation of the new FPL format that are intended for States and air navigation service providers.

7. From the description and examination of this safety study, it may be noted that the introduction and implementation of safety risk mitigation measures will ensure that these risks are reduced to an acceptable and, in some cases, a tolerable, level that will mean that the risk is controlled and that Amendment 1 to Doc 444 regarding the new flight plan format in the South American Region can be safely implemented. There are also some recommendations whose implementation is considered essential for keeping safety rates at an acceptable level. The HIRA form in Appendix A to Chapter 5 clearly spells out which tasks should be taken into consideration from a regional viewpoint by States and air navigation service providers in the South American Region.

Chapter 1: Prologue

1.1 Objective

1.1.1 The purpose of this document is to make a safety assessment from the viewpoint of the South American Region before Amendment 1 to the 15th edition of the ICAO Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444), related to the implementation of the new contents of the flight

plan (NEW format) as of 15 November 2012, becomes effective and during the transition period starting on 1 July 2012, when airspace users are expected to make use of both the CURRENT and NEW formats.

1.1.2 This document is also intended to serve States for reference purposes, when needed. It should be added here that this safety assessment does not release States from their responsibility for making their own evaluations of safety as a result of the implementation of the new flight plan format, as stipulated in national action plans on the subject.

1.1.3 Implementation of the new flight plan format will help to contribute directly to the accomplishment of the following Strategic Objectives of ICAO:

- **A. Safety —** *Enhance global civil aviation safety.*
- **C. Environmental protection and sustainable development of air transport –** *Promote harmonized and economically viable development of international civil aviation that does not unduly harm the environment.*

1.2 Scope

1.2.1 The safety assessment covered an area extending to the borders of the SAM Region and also considered several aspects of adjacent regions that could affect the implementation. The following FIRs were involved: Antofagasta, Amazonian, Atlantic, Asunción, Barranquilla, Brazilia, Bogotá, Comodoro Rivadavia, Córdoba, Curitiba, Ezeiza, Georgetown, Guayaquil, La Paz, Lima, Maiquetía, Mendoza, Montevideo, Panama, Paramaribo, Puerto Montt, Punta Arenas, Recife, Resistencia, Rochambeau and Santiago (see Figure 1).

1.3 General background information

1.3.1 ICAO informed the States in communication AN13/2.1-08/50, of 25 June 2008, about the publication of Amendment 1 to Doc 4444 (PANS-ATM), which serves to update ICAO's flight plan format to meet the needs of aircraft with advanced capabilities and the evolving requirements of automatic air traffic management (ATM) systems, while, at the same time, bearing in mind the compatibility of existing systems, human elements, instruction, cost and aspects of the transition.

1.3.2 On evaluating the creation of the new CNS/ATM Subgroup and its terms of reference and working programme, GREPECAS/15 examined the new flight plan model. Deeming it advisable to establish a CAR/SAM regional strategy for its implementation, it formulated Conclusion 15/35 "*Implementation of the new ICAO flight plan model,*" in which States were asked to take the necessary measures to prepare for the transition and the CNS/ATM Subgroup to create an auxiliary body to elaborate the strategy for that transition.

1.3.3 South American Region Implementation Group (SAM/IG) Meetings considered the amendment's possible impact on automated systems, in the light of PBN implementation. It was noted that the amendment in question is complex and involves other aspects in addition to PBN and the Group was of the opinion that a regional strategy needed to be adopted to modify automated ATC systems.

1.3.4 As a result of all of this, the SAM/IG Meeting agreed to include a task in the working programme of the SAM PBN Implementation Group, calling for its assessment of the implementation of Amendment 1 to the PANS/ATM. This activity was also to serve as a basis and reference for the work entrusted to the above-cited specific GREPECAS CNS/ATM/SG Task Force. This activity was accordingly included in the work to be accomplished from 2009 until the conclusion of the implementation under the auspices of SAM Regional Project RLA/06/901.

1.3.5 In the course of the SAM/IG Meetings, the ICAO Guidelines for incorporating flight plan information pursuant to Amendment 1 to ICAO's 15th edition of the Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444) were presented to the States. Based on discussions within the Implementation Group, it was agreed to draw up an initial plan, with a description of the strategy for implementing that amendment, together with an action plan that would spell out the measures to be taken for implementing the amendment on 15 November 2012 and during the transition period. That action plan calls for the preparation of a safety assessment relating to the implementation of the new flight plan format.

1.3.6 States in the SAM Region elaborated their action plans for implementing Amendment 1 to Doc 4444 based on the regional strategy and incorporating the various activities to be carried out during the implementation process.

1.3.7 ICAO has organized and conducted several different activities to help States with both the implementation process and the planning and elaboration of their action plans, as well as the performance of the tasks specified in those plans.

Chapter 2 Description of the SAM Region's flight plan system

2.1 General status of the SAM Region's flight plan system

2.1.1 The aim of the guidelines elaborated by ICAO for incorporating flight plan information in accordance with Amendment 1 is to help airspace users and air navigation service providers (ANSPs) make the flight plan changes to be incorporated as a result of Amendment 1 to Doc 4444 and to contribute to a coordinated global effort during the transition period to ensure its success by the date of application.

2.1.2 The guidelines do not amend any provision on complementing and accepting flight plans contained in Annex 2 — Rules of the Air or the PANS-ATM.

2.1.3 Amendment 1 to the 15th edition of the PANS-ATM, Doc 4444, basically stipulates the following changes:

1. Flight Plan

    a. Flight Plan Form: carriers and air traffic service units will observe all restrictions defined in aeronautical information publications (AIPs);
    b. Filing of the Flight Plan: changes in deadlines for filing flight plans;
    c. Item 7: Aircraft Identification: use of alphanumeric characters;
    d. Item 8: Flight Rules: specification of one or more changes in flight rules;
    e. Item 10: Equipment: changes in equipment and capability designations
    f. Item 13: Departure Aerodrome and Time
    g. Item 15: Route
    h. Item 16: Destination Aerodrome and Total Estimated Elapsed Time, Alternate Destination Aerodromes
    i. Item 18: Other Data

2. Air Traffic Service Messages

    a. Composition of CHG, CNL, DLA, DEP, RQP and RQS messages

2.1.4 The impact on ATM systems of the changes defined by ICAO, in the guidelines for implementing those changes and in the present scenario in the SAM Region, has been identified as affecting the regulatory, technical and operational fields, particularly those concerning the automated systems and operational personnel, air traffic controllers, flight plan operators, CNS experts and airspace users in general.

2.1.5 Insofar as the regulatory change is concerned, States should revise and adjust regulations concerning the application of Amendment 1 to Doc 4444 and the Operating Manuals of ATS and ARO/AIS units to bring them into line with the new operating procedures resulting from the implementation of Amendment 1.

2.1.6 In the technical area, the SAM Region today shows evidence of different degrees of technological evolution of ATM automation that can be classified into one of the following situations:

- SAM States possessing automated ACC systems (Flight plan and radar data processing): Argentina, Brazil, Chile, Colombia, Ecuador, French Guiana, Panama, Peru, Uruguay and Venezuela;
- States possessing automated ATM systems and that are currently updating those systems, like Brazil and Peru;
- States that have no automated ATM systems, but that will implement them shortly, like Guyana, Suriname and Paraguay; and
- States that have no automated ATM systems and that are not known to have any plans to acquire such systems in the short or medium term, such as Bolivia.

2.1.7 The AFTN is the principal means used in the Region today to transmit flight plans and is currently in transition to an AMHS system. All SAM States are expected to have AMHS systems installed by 2010. The communications system used to transmit AFTN information in the Region is the REDDIG.

2.1.8 There are many variables that need to be considered in the changes that will have a direct impact on operating personnel, particularly air traffic controllers and flight plan operators. That impact will be reduced if automated ATM systems are given the capacity to provide air traffic controllers with the necessary information for their air traffic planning and for sounding warnings whenever there is a change in the data filed in the Flight Plan.

2.1.9 In order to mitigate the impact, personnel must be given a significant amount of training in both the use of the new resources of the automated system and in manually processing Flight Plan data, as well as in making adjustments to the operating manuals.

2.1.10 A more specific analysis of those aspects can be found in the Strategy for Implementing Amendment 1 to the 15th Edition of the ICAO PANS-ATM (Doc 4444) in the CAR/SAM Regions (see **Appendix A**).

2.2 Status after implementation of the new Flight Plan format (FPL)

2.2.1 The changes in the Flight Plan format proposed in Amendment 1 to the PANS/ATM are able to meet the needs of aircraft with advanced capabilities and the evolving requirements of automated air traffic management (ATM) systems, while bearing in mind compatibility with existing systems, human factors, training, cost and aspects of the transition.

Appendix A to Chapter 2

STRATEGY FOR IMPLEMENTING AMENDMENT 1 TO THE 15TH EDITION OF THE ICAO PANS-ATM (DOCUMENT 4444) IN THE CAR/SAM REGIONS

(SAM/RA/02- Item 2 – Appendix B)

TABLE OF CONTENTS

1. Purpose

The purpose of this Document is to establish the strategy for implementing Amendment 1 to the 15th Edition of the ICAO PANS-ATM (Doc 4444) in the SAM Region, in response to conclusions GREPECAS 15/35 and SAM/IG/3-8.

2. General Considerations

ICAO, considering that:

- Dynamic management of the information will offer the most appropriate and integrated vision of the ATM situation in historical, present, planned or future terms and will provide a basis for decision-making by the entire ATM community;

- The *Global Air Traffic Management Operational Concept* (Doc 9854) calls for taking information management measures to support ATM operations by means of correct, quality and timely data; and

- ATM requirement N° 87 of the *Manual on Air Traffic Management System Requirements* (Doc 9882) defines the 4-D paths that will be used in traffic synchronization applications, in order to achieve ATM system performance objectives, and explains that both "ground" and "air" applications will be used extensively to create an efficient and safe air traffic flow during all flight phases.

ICAO informed the States in communication AN13/2.1-08/50, of 25 June 2008, about the publication of Amendment 1 to Doc 4444 (PANS-ATM), which updates the ICAO Flight Plan (FPL) format to meet the needs of aircraft with advanced capabilities and the evolving requirements of automated air traffic management (AFM) systems, while bearing in mind the compatibility with existing systems, human factors, instruction, cost, and aspects connected with the transition.

GREPECAS/15, on evaluating the creation of the CNS/ATM Subgroup and its terms of reference and working programme, examined the new model Flight Plan format and, considering that a CAR/SAM regional strategy should be established for its implementation, formulated Conclusion 15/35 "*Implementation of the new ICAO Flight Plan model.*" In that Conclusion, States are asked to take the necessary measures to prepare for the transition and the CNS/ATM//SG to create an auxiliary body to draw up the strategy for the transition.

The SAM/IG/2 Meeting evaluated the possible impact of this amendment on automated systems, in the light of PBN implementation. Inasmuch as the amendment in question was found to be complex and to involve other aspects, in addition to PBN, the Meeting was of the opinion that a strategy needed to be adopted to modify automated ATC systems.

Considering these elements, the Meeting agreed to include, within the working programme of the SAM PBN Implementation Group, the task of evaluating PBN implementation in the light of Amendment 1 to the PANS/ATM. This activity was to serve as support and background for the work entrusted to the above-cited GREPECAS CNS/ATM/SG Task Force. As a result, this task was included in the work to be done in the SAM Region in 2009 under the auspices of Regional Project RLA/06/901.

During the SAM/IG/3 Meeting, States were given the ICAO guidelines for incorporating the Flight Plan information called for by Amendment 1 to the 15th edition of ICAO Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444).

Conclusion SAM/IG/3-8 considered that the RLA/06/901 Project should elaborate an initial plan describing the strategy for implementing that amendment for presentation to the SAM/IG/4 Meeting.

3. Principles

The following aspects were considered in preparing this document:

1. the sovereign will of the States;

2. that it would serve SAM States as a guidance manual for preparing their action plans for implementation of the contents of Amendment 1 to Doc 4444.

4. Application

This document is applicable to all SAM States and specifically to all air navigator service providers and airspace users.

5. Reference documents

This strategy follows the recommendations made by ICAO in the following documents:

a) 15th edition of the ICAO PANS-ATM (Doc 4444)

b) Amendment 1 to the 15th Edition of Doc 4444;

c) Guidelines for incorporating Flight Plan information in keeping with Amendment 1 to the 15th edition of Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444) (State Letter AN 13/2.1-09/9 of 6 February 2009);

d) Final Report of GREPECAS 15; and

e) Final Reports of the SAM/IG meetings.

6. Analysis

6.1. Amendment 1 to the 15th Edition of Doc 4444;

ICAO considered that in order to meet the needs of aircraft with advanced capabilities and the evolving requirements of automated air traffic management (ATM) systems, Flight Plan formats needed to be updated.

It accordingly published Amendment 1 to the 15th Edition of PANS-ATM, Doc 4444, which basically makes the following changes:

3. Flight Plan

   a. Flight Plan Format: carriers and air traffic service units will observe all restrictions decided upon in aeronautical information publications (AIP);

b. Filing of the Flight Plan: changes in deadlines for filing flight plans;

c. Item 7: Aircraft Identification: use of alphanumeric characters;

d. Item 8: Flight Rules: specification of one or more changes in flight rules;

e. Item 10: Equipment: changes in equipment and capability designations;

f. Item 13: Departure Aerodrome and Time

g. Item 15: Route

h. Item 16: Destination Aerodrome and Total Estimated Elapsed Time, Alternative Destination Aerodromes

i. Item 18: Other Data

4.Air Traffic Service Messages

Composition of CHG, CNL, DLA, DEP, RQP and RQS messages

6.2. Implementation Guidelines

In its Letter AN 13/2.1-09/9, of 6 February 2009, ICAO defines the guidelines for incorporating Flight Plan information as called for by Amendment 1 to the Procedures for Air Navigation Services.

Generally speaking, ICAO stresses that the changes will have a pronounced impact on ANSP flight data processing systems that check and accept flight plans and associated messages, use Flight Plan data from screen presentations for controller reference purposes, use data for ANSP automation and facilitate communications among ANSPs during flights, and will also have consequences for airspace users.

Until a starting date is set for the application of changes in flight planning, the transition period is expected to run from 25 June 2008 to 15 November 2012.

It also acknowledges that the changes will be applied in keeping with the specific schedules of each ANSP and airspace user and will be based on their own individual needs, but that a certain degree of coordination will be required.

To conclude, it stresses that all parties involved in the issue must be in a position by 15 November 2012 to file and process flight information in keeping with the stipulations of Amendment 1 to the PANS-ATM.

The following considerations are presented in reference to the planning environment:

1. The present flight planning formats and ATS messages contained in the existing version of the PANS-ATM are defined as being CURRENT;

2. The flight planning formats and ATS messages specified in Amendment 1 to the PANS-ATM are defined as being NEW;

3. The ATM system should simultaneously support both CURRENT and NEW information for a certain period, in order to allow for time to deal with particular performance cases;

4. Amendment 1 does not alter the filing of flight plans by different means (individual filing of flight plans with each ANSP, filing of flight plans at a centralized location and their distribution by the ATM system), but the transition to implementation of Amendment 1 could impose some requirements during the transition period;

5. The Amendment makes changes in the contents of flight plan messages sent from one ANSP to another.

The contents of the ICAO guidelines are summarized as follows:

Guideline 1. Recommends that ANSPs have the capability to operate during the transition period using the two types of Flight Plan information, CURRENT and NEW. ANSPs will not be required to accept and process CURRENT data after 15 November 2012. This is applicable to situations in which some ANSPs and/or airspace users fail to apply the flight planning changes until the end of the transition period.

Guideline 2. Regional Planning and Implementation Groups are encouraged to plan and publish the changes sufficiently in advance of the application date. It considers that transition plans should bear in mind that airspace users will most likely be unable to make use of the new opportunities offered by the NEW information until ANSPs have made the transition and that even in that case the application of the NEW information could be limited if flights continue to involve ANSPs that have not yet made the transition.

Guideline 3. Explains that airspace users will decide whether to provide the ANSP with CURRENT or NEW information during the transition period, once the ANSP has reported that it is in a position to accept the NEW information.

Guideline 4. In the event that not all ANSPs have made the transition to use of the NEW information, airspace users should ensure that ANSPs that have not yet made the transition are given CURRENT information. It stresses its concern over the fact that ANSPs that use CURRENT information could misinterpret and reject information filed by airspace users more than 24 hours before flight time and that ANSPs that use NEW information may not be equipped to provide essential coordination to ANSPs that use CURRENT information.

Guideline 5. Reports that ICAO will maintain a website listing the capacity of each ANSP to accept CURRENT or NEW information. Each ANSP will inform its respective ICAO Regional Office about its capacity to accept the NEW information as soon as possible.

Guideline 6. Complementing Guideline 4, ANSPs that accept NEW information may convert the flight information into CURRENT information, for use in coordinating with adjacent ANSPs that have not yet made the transition.

6.3. Present scenario in the SAM Region

The SAM Region today shows evidence of the presence of different degrees of technological evolution in terms of ATM automation, which can be classified into one of the following situations:

- SAM States possessing automated ACC systems (Flight plan and radar data processing): Argentina, Brazil, Chile, Colombia, Ecuador, French Guiana, Panama, Peru, Uruguay and Venezuela. Many of the automated systems installed in the Region are based on the AIRCON (INDRA) solution, but using different versions.

- States possessing automated ATM systems and that are currently updating those systems, like Brazil and Peru;

- States that have no automated ATM systems, but will implement them in the short term, like Guyana, Suriname and Paraguay.

- States that have no automated ATM systems and that are not known to have any plans to acquire such systems in the short or medium term, such as Bolivia.

The implementation strategy should bear in mind the different degrees of evolution existing in the Region.

AFTN is the principal means used in the Region to transmit flight plans and is currently in transition to an AMHS system. All of the States in the SAM Region are expected to have installed AMHS systems by 2012. The means of communication used in the Region to transmit AFTN information is the REDDIG.

6.4. Impact

A macroanalysis is presented below of both the technical and operational impact on ATM systems, whether automated or not, and on the data communication systems, of the changes defined by ICAO, in the guidelines for implementing those changes and in the current scenario in the SAM Region.

6.4.1. Technical Impact

For States with no automated ATM systems, the changes in the new Flight Plan format will affect only AFTN or AMHS-based data communication systems, primarily in relation to the Human-Machine Interface (HMI) of the system terminals available at AIS offices or other specific sites for insertion into flight plans.

It should be stressed that changes in the Flight Plan format consist of the introduction of further options for filling in the Items in the format and that this could give rise to more errors in message creation by terminals, which do not have the capability to check data consistency, but only message syntax.

It is necessary to stress that those changes in the Flight Plan format introduce more options that could increase the likelihood of errors in filling it out.

For States possessing automated ATM systems, the changes will have a major technical impact, making adjustments necessary in at least the following subsystems: flight plan treatment, communication interfaces with other systems, control screen HMIs and recording and re-visualization.

These adjustments should take into account at least the following aspects:

- Make all of the changes called for in Amendment 1 and described in Item 6.1 of this Document;

- Give air traffic controllers all of the necessary information for air traffic planning and management, including warnings of changes in status of aircraft capacity;

- Make it possible to correctly transmit all Flight Plan information, whether CURRENT or NEW, to all control centres involved;

- Clearly define the sizes of the Items and their respective subdivisions, as well as the sequence of the data (for example: Data inclusion sequence for Item 10);

- Include the updating of all of the technical documentation of the system; and

- Carry out advance testing in order to validate the changes.

Therefore, the effort needed to change these systems should be considered, taking into account, as well, the problems inherent in technological obsolescence and insufficient technical training of maintenance personnel, which could create the greater financial expense of having to hire third parties and entail a larger risk of failure.

For States that are in the process of acquiring new automated systems, whether or not to replace existing ones, the impact will be felt on their specification, for they must be able to process the changes called for in the amendment.

Another important aspect is the need for ICAO to consider implementing a transition period during which ANSPs should have the capability to process both CURRENT and NEW information; this means adjusting their software so that it is able to recognize the information format that is being used.

6.4.2. Operational Impact

The changes will directly impact operating personnel, particularly air traffic controllers and flight plan operators.

Nonetheless, there are many variables that should be considered, among them the association of the data entered in different FPL Items (Items 10 and 18, for example), which could change in accordance with the aircraft status.

That impact will be less pronounced if the automated ATM system is given the capacity to provide air traffic controllers with the necessary information for air traffic planning and for issuing warnings whenever a change occurs in the scenario in regard to the data filed in the Flight Plan.

The operational difficulty existing during the transition period should also be considered, when it is important to have the capability of operating using both CURRENT and NEW information.

A clear and formal explanation of aspects not fully defined in Amendment 1 and in the guidelines is also necessary. A case in point is the use of COM/NAV in Item 10, where the letter S represents RTF VHF, VOR or ILS standard equipment, but does not refer to NDB.

In order to mitigate the impact, considerable staff training must be provided, both in the use of the new resources of the automated system and for manual Flight Plan data processing. Adjustments must also be made in the operating models and controversial matters must be clearly defined.

7. Implementation Strategy

7.1 Critical Criteria

The implementation of Amendment 1 in the SAM Region should consider the following aspects:

- Ensure that by 15 November 2012 all States and airspace users have made all of the changes called for in Amendment 1, and not just in some selected aspects of it;

- States that do not implement the amendment in its entirety before 15 November 2012 shall be obliged to publish those non-conformities in their AIPs as a "SIGNIFICANT DIFFERENCE." Furthermore, failure to implement the change will be considered a deficiency and will be included on the List of Deficiencies in the SAM Region; and

- Ensure that, as of 15 November 2012, all States and airspace users accept and disseminate only the information of the NEW Flight Plan format and associated ATS messages, and disable all processing capabilities of the CURRENT format.

7.2 Preparation

In order to successfully implement the changes, States in the SAM Region first need to prepare an action plan that will take account of the impact the change will have on their systems, giving due consideration to the aspects covered in this strategy.

To be successful, States, coordinated by the ICAO Regional Office and GREPECAS, need to elaborate their action plans based on the impact the changes will have on their systems and considering the changes, guidelines and critical criteria defined above.

Those plans should cover at least the following subjects:

- Classification of the degree of evolution of their systems;

- Detailed assessment of the technical and operational impact;

- Solutions for reducing the impact, together with their respective schedules for implementation and the responsible parties;

- Deadline for implementing the solutions;

- Tests for validating the solutions;

- Technical and operational training programmes; and

- Contingency measures.

Those plans should be presented at the SAM/IG/5 Meeting.

The ICAO SAM Regional Office will monitor the following tasks:

TASK	START	END	RESPONSIBLE PARTY
Ensure that automated system requirements include all changes made in the FPL format	2009	2012	Each State will indicate the responsible party
Ensure appropriate modification of automated ATM systems, in order to be able to analyze the information correctly and properly identify the order in which the messages are received, so that no mistakes are made in interpreting the data	2009	2012	Each State will indicate the responsible party
Comparative analysis of Flight Plan data processed in the NEW format with data processed using the CURRENT format.	2010	2011	Each State will indicate the responsible party

It is also necessary for the States to jointly agree on the definition of possible points that are not clearly explained in the amendment before taking measures to adjust their systems.

7.3 Transition

During this transition phase, it is important to:

- Follow GREPECAS' guidance;
- Observe the ICAO guidelines described in paragraph 6.2;
- Act jointly with the coordinator of the implementation;
- Conduct the activities specified in the action plans, in order to mitigate the technical and operational impact of the changes;
- Recognize that the advantages for airspace users will only become effective when the changes are jointly implemented.

The transition period in the SAM Region for giving ANSPs the capability to process data using both the CURRENT and NEW Flight Plan formats will run from 18 July 2011 to 15 November 2012.

Even so, States are urged to implement the NEW format between 18 July 2011 and 20 July 2012 and not to use the NEW format before the transition period.

States should, therefore, stay up-to-date in coordinating the evolution of their action plans and report any possible changes in date, deadlines and so forth.

In addition, airspace users should take steps to ensure the precise and proper adjustment of their systems in accordance with the NEW and CURRENT Flight Plan formats.

The coordinating body for the implementation will hold periodic meetings to evaluate the plans, which will conclude with the meeting scheduled for 15 June 2011, where the decision will be taken to start the transition.

Each State should nominate a person to serve as a liaison for the necessary coordination with ICAO and with other States during the transition phase for making changes in the new Flight Plan format.

7.4 Post-Transition

States should stop processing Flight Plans using the CURRENT format starting on 15 November 2012.

They should also ensure that ATM systems, whether automated or not, correctly process all information contained in the NEW Flight Plan format, and also provide support for their operation.

Occasional difficulties noted should be evaluated and resolved by the parties involved, ANSPs and/or airspace users.

8 Administrative Aspects

States should evaluate all documents concerned with the subject, including Operational Letters of Agreement, Contingency Plans and Operational Models.

This document accordingly establishes the following process for all purposes:

1. The holding of periodic meetings and discussions to identify requirements and preferential technical solutions, alternatives and options for implementing the new Flight Plan format;

2. The sharing of reports and technical documentation, plans and programmes that may be needed to ensure the successful and timely completion of these efforts.

3. Under the coordination of the ICAO Lima Office, the planning, technical coordination and performance of activities with other SAM States.

9 Financial Aspects

Participating States, as well as individual administrations, will be responsible for covering any financial obligation in paying for any direct or indirect expenses incurred in carrying out this strategy, including those of buying equipment and spare parts, training technical and operational personnel, and establishing lines of communication, among other things.

The cost of any possible updating of the REDDIG to handle an increase in traffic will the shared equally among all of the States involved.

States should create the necessary mechanisms for implementing this strategy, such as through ICAO Technical Cooperation Projects under the coordination of the ICAO SAM Office.

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Chapter 3: Hazard identification for the implementation of the new Flight Plan format

3.1 Introduction

3.1.1 The safety assessment was carried out in 7 stages or orderly steps, following the guidelines described in Doc 9859, the SMM Manual, as listed below:

Step 1: Preparation (or obtaining) of a full description of the system being evaluated and the environment in which it should operate.
Step 2: Identification of hazards and their consequences.
Step 3: Assessment of the risk, expressed in terms of its likelihood.
Step 4: Assessment of the risk, expressed in terms of its severity.
Step 5: Risk tolerance/index.
Step 6: Risk mitigation.
Step 7: Elaboration of safety assessment documents.

3.2 Analysis of the hazard identification process

3.2.1 A hazard is defined as a potential situation that could affect the acceptable level of safety. The materialization of a hazard has consequences that could have an impact on all spheres of operation, such as: technical aspects, loss of separation, increase in the service workload, etc. A clear understanding of the relationship between hazards and their consequences makes it possible to move on to the next stage, that of operational risk management, which is described in Chapter 4 of this document.

3.2.2 A regional workshop (SAM/RA/02) was planned and held on 5 to 9 September, in order to identify the hazards of implementing the new Flight Plan format. Participating in this workshop was a multidisciplinary panel of professionals and experts (see **Appendix A** to this Chapter) with a broad knowledge of and experience in the current FPL system and in the proposed changes, in safety management systems, human elements, automated systems and other areas of air navigation.

3.2.3 The hazard identification process is able to determine only the hazards that exist within a described system. For that reason, the system's coverage has been made broad enough to encompass all possible effects.

3.2.4 The effects on safety of a possible system loss or degradation will determine, in part, the characteristics of the operating environment of the new scenario or system to be implemented. For that reason, the description of that environment included all elements that could have a major impact on safety. Those elements vary from one case to the next; they could include, for example, the unique features of the system used in the State or the degree of automation of the ATS system and other related factors, which should be evaluated by States in making their own safety assessments.

3.3 Methodology for identifying hazards for the implementation of the new Flight Plan format

3.3.1 The methodology used is the one described in Doc 9859 (SMM Manual), which enables possible hazardous situations to be identified both logically and sequentially, thereby making it possible to determine the technical viability of implementing the new Flight Plan format in the SAM Region without impairing safety. A hazard identification and risk assessment (HIRA) form was adopted to document the process.

3.3.2 It is important to stress that the hazard identification process has enabled possible alternatives with a region-wide impact to be analyzed; these have ranged from alternatives with low incidence to the most probable scenario. As a result, "worst" conditions or contexts have been properly foreseen. It is also important to point out that the hazards recorded by this team of experts have been "believable," given the context and operational experience of all participants.

3.3.3 At the conclusion of the different discussion activities of the SAM/RA/02 Workshop, a registry of hazards was prepared, containing a description of each, duly validated by the panel of experts.

3.4 Hazard identification for the implementation of the new Flight Plan format

3.4.1 All possible sources of system failures were studied during the hazard identification stage. The following sources, among others, were considered:

a) equipment (design, physical and logical support);
b) operational environment;
c) regulatory elements, including their application, equipment certification, surveillance, etc.
d) human operators;
e) human-machine interface;
f) operational procedures and practices;
g) elements of defence, including factors like the supply of appropriate detection and warning systems, error tolerance of equipment and capability of equipment to recover from errors and failures;
h) maintenance procedures;
i) communication, including means, terminology and language;
j) organizational elements, like resource allocation, operational pressures, etc.

3.4.2 During the hazard identification process, answers were specifically sought to questions like: "how could personnel interpret this procedure erroneously?" or "how could a qualified person misuse this new function or this new system (voluntarily or involuntarily) within the sphere of action of the implementation of the new FPL format?" or "What could turn out badly during the transition period or after the implementation of Amendment 1?" and so forth.

3.5 Description of the hazards analyzed by the SAM/RA/02 panel

3.5.1 The following hazards for the implementation del new Flight Plan format were identified:

a) Failure to comply with agreements reached for the implementation of Amendment 1.
b) Inadequate planning by ATCO in accordance with the contents of the New Flight Plan format.
c) Loss, in the transition period, of Flight Plan information/data during the handling of Associated Messages between FIRs that apply and do not apply Amendment 1.
d) Loss of information and/or flight information during the processing of Repetitive Flight Plans (RPL).

3.5.2 The specific components defined during the workshop as causes of hazards were determined for each of these hazards, as follows:

Hazard 1: Failure to comply with agreements reached for the implementation of Amendment 1

a) Lack of an Action Plan for implementing Amendment 1.
b) Lack of human resources.
c) No motivation to make the change.
d) Lack of Technological resources (equipment and software to support the processing of flight plans)
e) Lack of economic resources (training budget; technological implementation);
f) Lack of corporate communication and communication with users.

Hazard 2: Inadequate planning by ATCO, in accordance with the contents of the New Flight Plan format.

a) Lack of, or inadequate, regulations for the filing, approval and processing of the Flight Plan and associated messages (RPL, FPL, CPL and CHG, DLA and CNL)
b) Inadequate interpretation by ATCO of the new CPL data/information;
c) Inadequate application by ATCO of the new CPL data/information;
d) Failures in the presentation of CPL data in the flight progress strips.
e) Failures in the presentation of CPL data on the runway label.
f) Inadequate interpretation by ARO-AIS in the processing of the Flight Plan and of associated messages.
g) Inadequate interpretation and/or application of the new Flight Plan format by flight operations officers and crews.
h) Software failure in the processing of the Flight Plan and associated messages.
i) Inadequate disclosure of the implementation of the new Flight Plan format.

Hazard 3: Loss, in the transition period, of Flight Plan information/data during the handling of Associated Messages between FIRS that apply and do not apply Amendment 1.

a) Inadequate filling out in the NEW and CURRENT formats of Flight Plans and associated messages;
b) Inadequate interpretation of the NEW and CURRENT contents during the Flight Plan acceptance process;
c) Failure in the (automated or manual) conversion from the CURRENT to the NEW format of the Flight Plan and associated messages;
d) Software failure in the processing of Flight Plans that present the DOF for associated messages;
e) Failure in compliance with the sequence established in Amendment 1 for introducing data/information in Item 18 while generating/transmitting the FPL.
f) Failure in the conversion of DOF data and route descriptions with course and distance for FIRs that do not apply Amendment 1.
g) Failure in the updating of the ICAO FITS site with respect to the implementation status of Amendment 1 to Doc 4444.
h) Failure in access to the ICAO FITS site with regard to the implementation status of Amendment 1 to Doc 4444.

Hazard 4: Loss of flight information and/or data during the processing of Repetitive Flight Plans (RPL)

a) Incompatibility between the new data/information of Flight Plan Item 10 (equipment and capabilities) and RPL Box Q; and

b) Failure in the order in which the data/information is filled out in RPL Box Q.

3.6 Conclusions reached in identifying hazards and judging the consequences for the implementation of the new Flight Plan format

3.6.1 After identifying the hazards and the specific components of those hazards, the different scenarios and consequences stemming from each of those hazards were analyzed.

3.6.2 Among the consequences examined by the workshop, one of the most critical aspects noted was the reduction of aircraft separation with an operational error ranging from low to moderate severity. In most of the cases studied, there was a significant increase in the workload of the ATC and of air traffic controllers (ATCO) that could result in a potential flight delay, with repercussions and disadvantages that could have a negative impact on the system.

3.6.3 The Working Group later identified the current defences/existing requirements for each hazard. These defences were evaluated in terms of regulations, existing terminology and, if relevant, existing instruction programmes. As a result, the following current defences/existing requirements were determined:

Regulations

a) Requirements for implementing Amendment 1 to the 15th Edition of ICAO Doc 4444.
b) Regulations for each providing State.
c) Action plan - Implementation of the new Flight Plan format with the application of Amendment 1 to the 15th Edition.
d) Guidance manuals for the elaboration of action plans for implementing Amendment 1.
e) Conclusions of regional meetings, seminars and workshops.
f) SAM table for conversion of the contents of Flight Plan Items 10 and 18 from the CURRENT to the NEW format.
g) Operational letters of agreement among ATC units.

Technology

a) Automated systems (Flight plan and radar data processing);
b) Flight plan communication and transmission media using AFTN
c) Flight plan communication and transmission media using AMHS
d) Digital network (REDDIG)

Training

a) Repeated refresher programmes
b) Training programmes in new systems

3.6.4 Once the hazards had been identified and their consequences determined, steps were taken toward the risk management process that will be discussed in the following chapter.

Appendix A to Chapter 3

List of experts who participated in the SAM/RA/02 Workshop

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VENEZUELA
Henry Iván Rodríguez Manrique

OACI / ICAO
Roberto Arca
Celso Figueiredo
Jorge Fernández
Onofrio Smarrelli

Chapter 4: Operational risk management process for the implementation of the new Flight Plan format

4.1 Introduction

4.1.1 During this stage of the process, the background elements defined in the previous chapter were analyzed and compared and, using this information, the methodology was applied to determine the associated level of risk. This stage of analysis was carried out in keeping with two variables defined as: ***likelihood*** of the occurrence of an event and the worst possible foreseeable scenario, seen as the ***severity or seriousness*** of an event, using a qualitative type analysis. The table of operational risks was then applied and subsequent actions, applicable by consensus of the panel of experts and that could efficiently minimize or contain operational risks associated with the implementation of the new Flight Plan format, were determined.

4.2 Aspects considered to determine the likelihood of risk

4.2.1 The table contained in the SMM Manual shown below and which is defined by ICAO as a tool for risk management analysis was employed for this stage of the study, together with some criteria applied by States in the Region that have experience in conducting safety assessments.

Table for determining the likelihood of an event

	Meaning	Value
Frequent	Likely to occur many times (has occurred frequently)	5
Occasional	Likely to occur some times (has occurred infrequently)	4
Remote	Unlikely to occur, but possible (has occurred rarely)	3
Improbable	Highly unlikely to occur (not known to have occurred)	2
Highly improbable	Almost inconceivable	1

4.2.2 This table is based on recorded data of operational experiences at the global level and is defined for each of the probabilities of an event's occurrence, in accordance with the associated quantitative details:

- Frequent: 1 to 10^{-3} per hour of flight
- Occasional: 10^{-3} to 10^{-5} per hour of flight
- Remote: 10^{-5} to 10^{-7} per hour of flight
- Improbable: 10^{-7} to 10^{-9} per hour of flight
- Highly improbable: + 10^{-9} per hour of flight

4.3 Aspects considered to determine the severity of risks associated with the implementation of the new Flight Plan format

4.3.1 It should be noted that this severity analysis constituted the fourth step of the operational risk assessment process, making it possible to determine the likelihood of an event in relation to its severity, which represents the essence of risk management.

4.3.2 All of the hazards and consequences identified in the preceding chapters were analyzed at this stage, with a view to determining the worst imaginable scenario and, using it as a reference point, identifying possible defences for promoting a stronger scenario able to tolerate operational errors.

4.3.3 The following table defined in the SMM Manual, together with some criteria applied by States in the Region, were used to determine this important risk management function:

Risk severity (seriousness)

Seriousness of the event	Meaning	Value
Catastrophic	-Destruction of equipment -Multiple deaths	
Hazardous	-Considerable reduction in safety margins, physical damage or such a heavy workload that operators are unable to perform their duties precisely and fully -Serious injuries -Major damage to equipment	B
Major	-Significant reduction in safety margins, reduction of the operator's skill in responding to adverse conditions due to an increased workload or as a result of conditions impeding his/her efficiency -Serious incident -Bodily injuries	C
Minor	-Interference -Operational limitations -Use of emergency procedures -Minor incidents	D
Insignificant	-Slight consequences	E

4.3.4 Once the **severity** of all identified consequences of hazards were judged and the results catalogued, in accordance with the risk assessment process, they were recorded in the HIRA table.

Chapter 5 Assessment and mitigation of operational risks associated with the implementation of the new FPL format

5.1 Introduction

5.1.1 The level of risk was determined at this stage of the process. It was gauged to determine its acceptability by comparing the various criteria listed in the tables. The aim was to evaluate the level of operational risk and to assign its respective tolerance rate, based on defences applied later. The idea has definitely been to reduce operational risk to an acceptable level (ALoS), while maintaining a realistic outlook in keeping with the Region's characteristics.

5.2 Criteria for mitigating operational risks

5.2.1 The acceptability of a risk will depend upon the result of the defences analyzed in the proposed scenario. For purposes of the implementation of the new Flight Plan format, the defences existing in the SAM Region were determined for each of the hazards identified (see paragraph 3.6 above).

5.2.2 The SAM/RA workshop used the table below to assess the safety risks, based on the current defences/existing requirements:

Safety risk assessment table

Risk probability	Risk Severity				
	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent 5	5A	5B	5C	5D	5E
Occasional 4	4A	4B	4C	4D	43
Remote 3	3A	3B	3C	3D	3E
Improbable 2	2A	2B	2C	2D	2E
Extremely improbable 1	1A	1B	1C	1D	1E

Figure 04 Pattern for risk tolerability assessment

5.2.3 Insofar as the concept of tolerable risk is concerned, there is an area between acceptable and inacceptable risks where the decision as to its acceptability is not clear and decisive. These latter risks belong to a category in which the risk may be tolerable if reduced as low as reasonably practicable (ALARP). Risks categorized as belonging in the intermediate area of the triangle of operational risk mitigation criteria (shown in the figure below) are marked as being acceptable, if the risk is mitigated. These risk levels may require taking a decision at the management level. Risks in this category are not classified as tolerable without careful consideration. Each case must be examined individually, as stated

in the previous chapters, in the light of the costs and benefits to be derived from implementation of the proposed changes.

Table of operational risk mitigation criteria

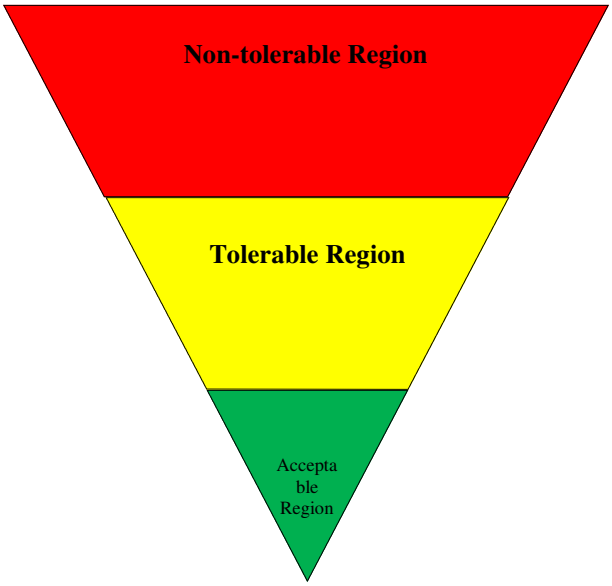
Suggested Criteria	Risk assessment rate	Suggested criteria
	**5A, 5B, 5C, 4A, 4B, 3A**	**Unacceptable under existing circumstances**
	5D, 53, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C	**Acceptable, based on risk mitigation. May require decision from the directorate**
	3E, 2D, 2E, 1A, 1B, 1C, 1D, 1E	**Acceptable**

Figure 5 Tolerability pattern of safety risk

After considering the above information and examining the current defences/existing requirements, the SAM/RA workshop classified each identified hazard in the following way:

Hazard 1: Failure to comply with agreements reached for the implementation of Amendment 1

Occasional (4) Minor (D) - Acceptable if the risk is mitigated.

Hazard 2: Inadequate planning by ATCO, in accordance with the contents of the New Flight Plan format

Remote (3) Major (C) - Acceptable if the risk is mitigated.

Hazard 3: Loss, in the transition period, of Flight Plan information/data during the handling of Associated Messages between FIRs that apply and do not apply Amendment 1.

Occasional (4) Minor (D) - Acceptable if the risk is mitigated

Hazard 4: Loss of information and/or flight data during the processing of Repetitive Flight Plans (RPL)

Frequent (5) Minor (D) - Acceptable if the risk is mitigated

5.2.4 In all cases, the classification of the safety risks, after the analysis described above and application of the tables on the assessment and mitigation of those risks, revealed them to be acceptable, provided that action was taken to mitigate those risks.

5.3 Description of measures for mitigating risks associated with the implementation of the new Flight Plan format in the SAM Region

5.3.1 Using the results of the analysis for reference purposes, at this stage of the process risk management was applied and the projected scenario in the region was examined.

5.3.2 To facilitate the analysis, the mitigating and defensive measures that must be incorporated in order to keep risks at an acceptable level and obtain effective and safe implementation of the new Flight Plan format are described in detail below. The residual risk foreseen after its implementation is presented, together with the mitigating measures to keep the risk at a controlled level. The causes or components of the hazards and their relationship to the mitigating measures to be implemented can be noted more clearly in the HIRA form (**Chapter 5, Appendix A**), as follows:

Hazard 1: Failure to comply with agreements reached for the implementation of Amendment 1

a) Drafting and complying with the Action Plan, which will make it possible to reduce the impact of cause 1;
b) Having trained human resources available to implement the Action Plan, which will make it possible to reduce the impact of cause 2;
c) The assistance of the ICAO Regional Office in helping States implement Amendment 1, which will make it possible to reduce the impact of causes 3 and 6;
d) Conducting seminars, workshops and courses and publishing bulletins and the web page that report on the change, which will make it possible to reduce the impact of causes 3 and 6;
e) Possessing the necessary technological and economic resources to implement the Action Plan, which will make it possible to reduce the impact of causes 4 and 5.

Residual risk: Improbable (2) Minor (D) -Acceptable

Hazard 2: Inadequate planning by ATCO, in accordance with the contents of the New Flight Plan format

a) Revising and adjusting regulations concerning the application of Amendment 1 to Doc 4444, which will make it possible to reduce the impact of causes 1 and 2;
b) Publishing the revised regulations far enough in advance to support the ATM community in the necessary training for implementing the contents of Amendment 1, which will make it possible to reduce the impact of causes 1 and 2*;*
c) Preparing and disseminating AICs that contain guidelines and procedures for implementing Amendment 1, which will make it possible to reduce the impact of causes 1 and 2;

d) Revising the Operational Manuals of the ATS and ARO/AIS units in order to adjust them to the new operational procedures stemming from the implementation of Amendment 1, which will make it possible to reduce the impact of causes 1 and 2;
e) Planning, preparing and carrying out the training envisaged in causes 2, 3, 6, 7 and 9, ensuring that objectives are fulfilled and, if necessary, promoting occasional corrections;
f) Evaluating whether the technical requirements already identified will ensure that causes 4, 5 and 8 do not arise and promoting occasional corrective technical measures;
g) Updating its software to satisfy the requirements identified for the implementation of Amendment 1, with a view to guaranteeing that causes 4, 5 and 8 do not arise; and
h) Conducting external and internal tests to ensure that causes 4, 5 and 8 do not arise.

Residual risk: Improbable (2) Major (C) -Acceptable if the risk is mitigated (controlled risk)

Hazard 3: Loss, in the transition period, of Flight Plan information/data during the handling of Associated Messages between FIRs that apply and do not apply Amendment 1.

a) Preparing and disseminating AICs that contain guidelines and procedures for implementing Amendment 1, which will make it possible to reduce the impact of causes 1, 2, 3 and 5;
b) Preparing an AIP Supplement containing guidelines and operational procedures for acceptance of the Flight Plan and the handling of associated messages during the transition period, which will make it possible to reduce the impact of causes 1, 2, 3 and 5;
c) Planning the implementation, dissemination and training of the ATM community in operational procedures for elaborating, accepting and handling Flight Plans and associated messages during the transition period, which will make it possible to reduce the impact of causes 1, 2, 3 and 5;
d) Preparing and displaying in the ARO/AIS rooms a checklist (conversion of data/information from the current to the new contents and a list showing the status of FIRs as to the application of the Amendment), in order to reduce errors in Flight Plan acceptance and handling, which will make it possible to reduce the impact of causes 1, 2, 3 and 5;
e) Making arrangements to provide access to the ICAO FITS website in the ARO/AIS rooms, which will make it possible to reduce the impact of causes 1, 2, 3 and 5;
f) Evaluating whether the technical requirements already identified ensure that causes 3 and 4 will not arise and promoting any occasional corrective technical measures;
g) Maintaining the necessary software to meet the identified requirements for implementing Amendment 1, with a view to ensuring that causes 3 and 4 do not arise;
h) Conducting external and internal tests to ensure that causes 3 and 4 do not arise;
i) Updating the automated systems, when appropriate, to put the data/information for Flight Plan Item 18 in the order established in Amendment 1, which will make it possible to reduce the impact of cause 5;
j) Establishing procedures for managing DOF information and route descriptions containing the course and distances when handling messages to FIRs that do not yet apply Amendment 1, which will make it possible to reduce the impact of cause 6;
k) Establishing an effective procedure for updating the FITS website, which will make it possible to reduce the impact of cause 7;
l) Establishing procedures to enable PSNA officials to immediately issue NOTAMs on any change in implementation status of the Amendment in national FIRs, which will make it possible to reduce the impact of cause 7; and
m) Establishing an alternative procedure for failure of access to the FITS website, which will make it possible to reduce the impact of cause 7.

Residual risk: Improbable (2) Minor (D) -Acceptable

Hazard 4: Loss of information and/or flight data during the processing of Repetitive Flight Plans (RPL)

a) Developing standardized procedures for conversion of RPL files produced by airline companies for dispatch to and insertion in automated air traffic control systems, which will make it possible to reduce the impact of cause 1; and
b) Developing standardized procedures for RPL handling that make it impossible not to fill in the RPLQ Box with the priority stipulated by Amendment 1 regarding Flight Plan Item18, which will make it possible to reduce the impact of cause 2.

Residual risk: Remote (3) Insignificant (E) -Acceptable

APPENDIX A TO CHAPTER 5

HAZARD IDENTIFICATION AND RISK MANAGEMENT (HIRA) FORM

Description of Hazard Nº 1	**Failure to comply with agreements reached for the implementation of Amendment 1**					
Causes	**Scenario**	**Current defences/Existing Requirements**	**Consequences associated with the hazard**	**Initial Risk Likelihood Severity**	**Mitigating Measures**	**Residual Risk Foreseen**
1) Lack of an Action Plan for implementing Amendment 1; 2) Lack of human resources; 3) No motivation to make the change; 4) Lack of technological resources (equipment and software to support the processing of flight plan); 5) Lack of economic resources (training budget; technological implementations); 6) Lack of corporate communication and communication with users.	1) Organizational structure of the States and rest of the aeronautical community; 2) Transition phase; and 3) Global application of Amendment 1 as of 15 Nov. 2012.	1) Requirements for implementation of Amendment 1 to the 15th Edition of ICAO Doc 4444. 2) Regulations for each providing State. 3) Action plan - Implementation of the new Flight Plan format through the application of Amendment 1 to the 15th edition. 4) Guidance manuals for preparing action plans for the implementation of Amendment 1. 5) Conclusions of the regional meetings, seminars and workshops.	1) Significant increase in the ATC workload. 2) Flight delays.	Occasional (4) Minor (D) Acceptable if the risk is mitigated	Cause 1 1/1 Elaborating and complying with the Action Plan, which will make it possible to reduce the impact of Cause 1; Cause 2 2/1 Having trained human resources available to implement the Action Plan, which will make it possible to reduce the impact of Cause 2; Causes 3 and 6 3/1 The assistance of the ICAO Regional Office in helping States implement Amendment 1, which will make it possible to reduce the impact of Causes 3 and 6; 4/1 Conducting seminars, workshops and courses and publishing bulletins and web pages that report on the change, which will make it possible to reduce the impact of Causes 3 and 6; Causes 4 and 5 5/1 Possessing the necessary	Improbable (2) Minor (D) Acceptable

					technological and economic resources to implement the Action Plan, which will make it possible to reduce the impact of Causes 4 and 5.	

HAZARD IDENTIFICATION AND RISK MANAGEMENT (HIRA) FORM

Description of Hazard Nº 2	**Inadequate planning by ATCO, in accordance with the contents of the New Flight Plan format**					
Causes	**Scenario**	**Current defences/Existing Requirements**	**Consequences associated with the hazard**	**Initial Risk Likelihood Severity**	**Mitigating Measures**	**Residual Risk Foreseen**
1) Lack of or inadequate regulations for the filing, approval and processing of the Flight Plan and associated messages (RPL, FPL, CPL and CHG, DLA and CNL); 2) Inadequate interpretation by ATCO of the new CPL data/information; 3) Inadequate application by ATCO of the new CPL data/information; 4) Failures in the presentation of CPL data in the flight progress strip;	1) Interface, during the transition period, between ATC units that apply and do not apply Amendment 1; 2) Controlled airspaces; 3) Sectors with a large volume of traffic.	1) Requirements for implementation of Amendment 1 to the 15th edition of ICAO Doc 4444. 2) Regulations of each providing State. 3) Action plan - Implementation of the new Flight Plan format through the application of Amendment 1 to the 15th edition. 4) Guidance manuals for preparing Action Plans for the implementation of Amendment 1. 5) Conclusions of regional meetings, seminars and workshops.	Reduction of aircraft separation with an operational error of low/moderate severity	Remote (3) Major (C) Acceptable if the risk is mitigated	<u>Causes 1 and 2</u> 1/2) Revising and adjusting regulations concerning the application of Amendment 1 to Doc 4444, which will make it possible to reduce the impact of causes 1 and 2; 2/2) Publishing the revised regulations far enough in advance to support the ATM community in the necessary training for implementing the contents of Amendment 1, which will make it possible to reduce the impact of causes 1 and 2*;* 3/2) Elaborating and disclosing AICs that contain guidelines and procedures for implementing Amendment 1, which will make it possible to reduce the impact of Causes 1 and 2*;* 4/2) Revising the Operational Manuals of the ATS and	Improbable (2) Major (C) Acceptable if the risk is mitigated

Description of Hazard Nº 2	**Inadequate planning by ATCO, in accordance with the contents of the New Flight Plan format**					
Causes	**Scenario**	**Current defences/Existing Requirements**	**Consequences associated with the hazard**	**Initial Risk Likelihood Severity**	**Mitigating Measures**	**Residual Risk Foreseen**
5) Failures in the presentation of CPL data on the runway label; 6) Inadequate interpretation by ARO-AIS in the processing of the Flight Plan and of associated messages; 7) Inadequate interpretation and/or application of the new Flight Plan format by flight operations officers and crew; 8) Software failure in the processing of the Flight Plan and associated messages. 9) Inadequate disclosure of the implementation of the new Flight Plan format.		6) Automated systems 7) Media for communication and transmission of flight plans. 8) Digital network (REDDIG) 9) Repetitive refresher programmes and training programmes in new systems			ARO/AIS units in order to adjust them to the new operational procedures stemming from the implementation of Amendment 1, which will make it possible to reduce the impact of Causes 1 and 2; <u>Causes 2, 3, 6, 7 and 9</u> 5/2) Planning, preparing and carrying out the training envisaged in causes 2, 3, 6, 7 and 9, ensuring that the objectives are fulfilled and, if necessary, promoting the adoption of occasional corrections; <u>Causes 4, 5, and 8</u> 6/2) Evaluating whether the technical requirements already identified will ensure that causes 4, 5 and 8 do not arise and promoting occasional corrective technical measures; 7/2) Updating its software to satisfy the requirements identified for the implementation of Amendment 1, with a view to guaranteeing that causes 4, 5 and 8 do not arise; 8/2) Conducting external and internal tests to ensure that causes 4, 5 and 8 do not arise.	

HAZARD IDENTIFICATION AND RISK MANAGEMENT (HIRA) FORM

Description of Hazard Nº 3	**Loss, in the transition period, of Flight Plan information/data during the handling of Associated Messages between FIRs that apply and do not apply Amendment 1,**					
Causes	**Scenario**	**Current defences/Existing Requirements**	**Consequences associated with the hazard**	**Initial Risk Likelihood Severity**	**Mitigating Measures**	**Residual Risk Foreseen**
1) Inadequate filling out of the Flight Plan and associated messages in the NEW and CURRENT formats; 2) Inadequate interpretation of the NEW and CURRENT contents during the Flight Plan acceptance process; 3) Failure in the (automated or manual) conversion from the CURRENT to the NEW format of the Flight Plan and associated messages; 4) Software failure in the processing of Flight Plans that present the DOF for associated messages; 5) Failure in compliance with the sequence established in	1)Handling of Flight Plans and associated messages regarding international flights between FIRs that apply and do not apply the NEW content; 2) Coordination of the traffic between FIRs in adjacent States; 3) Controlled airspace; 4) Sectors with high traffic density; and 5) States with a low level of automation	1) Requirements for implementation of Amendment 1 to the 15th Edition of ICAO Doc 4444; 2) Regulations of each providing State; 3) Action plan - Implementation of the new Flight Plan format through the application of Amendment 1 to the 15th Edition of the ICAO PANS-ATM (Doc 4444); 4) Guidance manuals for preparing Action Plans for the implementation of Amendment 1; 5) Conclusions of regional meetings, seminars and workshops;	Significant increase in ATC workload	Minor (4) Occasional (D) Acceptable if the risk is mitigated	Causes 1. 2, 3 and 5 1/3) Elaborating and disclosing AICs that contain guidelines and procedures for implementing Amendment 1, which will make it possible to reduce the impact of causes 1, 2, 3 and 5; 2/3) Elaborating an AIP Supplement containing guidelines and operational procedures for acceptance of the Flight Plan and the handling of associated messages during the transition period, which will make it possible to reduce the impact of causes 1, 2, 3 and 5; 3/3) Planning the implementation, disclosure and training of the ATM community in operational procedures for elaborating, accepting and handling Flight Plans and associated messages during the transition period, which will make it possible to reduce the impact of causes 1, 2, 3 and 5; 4/3) Preparing and displaying in the ARO/AIS rooms a checklist (conversion of data/information	Improbable (2) Minor (D) Acceptable if the risk is mitigated

Description of Hazard Nº 3	Loss, in the transition period, of Flight Plan information/data during the handling of Associated Messages between FIRs that apply and do not apply Amendment 1,					
Causes	**Scenario**	**Current defences/Existing Requirements**	**Consequences associated with the hazard**	**Initial Risk Likelihood Severity**	**Mitigating Measures**	**Residual Risk Foreseen**
Amendment 1 for introducing data/information in Item 18 while generating/transmitting the FPL. 6) Failure in the conversion of DOF data and route descriptions with course and distance for FIRs that do not apply Amendment 1. 7) Failure in the updating of the ICAO website (FITS) with respect to the implementation status of Amendment 1 to Doc 4444. 8) Failure in access to ICAO's website (FITS) with respect to the implementation status of Amendment 1 to Doc 444.		6) SAM Conversion Table from the CURRENT to the NEW contents of Flight Plan Items 10 and 18; 7) Automated systems; 8) Flight Plan communication and transmission media; 9) Digital network (REDDIG); 10) Repeated refresher programmes and training programmes in new systems			from the current to the new contents and a list showing the status of FIRs as to the application of the amendment), in order to reduce errors in Flight Plan acceptance and handling, which will make it possible to reduce the impact of causes 1, 2, 3 and 5; 5/3) Making arrangements to provide access to ICAO's FITS website in the ARO/AIS rooms, which will make it possible to reduce the impact of causes 1, 2, 3 and 5; <u>Causes 3 and 4</u> 6/3) Evaluating whether the technical requirements already identified ensure that causes 3 and 4 will not arise and promoting any occasional corrective technical measures; 7/3) Maintaining the necessary software to meet the identified requirements for implementing Amendment 1, with a view to ensuring that causes 3 and 4 do not arise; 8/3) Conducting external and internal tests to ensure that causes 3 and 4 do not arise;	

Description of Hazard Nº 3	Loss, in the transition period, of Flight Plan information/data during the handling of Associated Messages between FIRs that apply and do not apply Amendment 1,					
Causes	**Scenario**	**Current defences/Existing Requirements**	**Consequences associated with the hazard**	**Initial Risk Likelihood Severity**	**Mitigating Measures**	**Residual Risk Foreseen**
					Cause 5 9/3) Updating the automated systems, when appropriate, to put the data/information for Flight Plan Item 18 in the order established in Amendment 1, which will make it possible to reduce the impact of cause 5; Cause 6 10/3) Establishing procedures for managing DOF information and route descriptions containing the course and distances when handling messages to FIRs that do not yet apply Amendment 1, which will make it possible to reduce the impact of cause 6; Cause 7 11/3) Establishing an effective procedure for updating the FITS website, which will make it possible to reduce the impact of cause 7; 12/3) Establishing procedures to enable PSNA officials to immediately issue NOTAMs on any change in implementation status of the Amendment in national FIRs, which will make it possible to reduce the impact of cause 7; 13/3) Establishing an alternative	

Description of Hazard Nº 3	Loss, in the transition period, of Flight Plan information/data during the handling of Associated Messages between FIRs that apply and do not apply Amendment 1,					
Causes	**Scenario**	**Current defences/Existing Requirements**	**Consequences associated with the hazard**	**Initial Risk Likelihood Severity**	**Mitigating Measures**	**Residual Risk Foreseen**
					procedure for failure of access to the FITS website, which will make it possible to reduce the impact of cause 7.	

HAZARD IDENTIFICATION AND RISK MANAGEMENT (HIRA) FORM

Description of Hazard Nº 4	Loss of information and/or flight data during the processing of Repetitive Flight Plans (RPL)					
Causes	**Scenario**	**Current defences/Existing Requirements**	**Consequences associated with the hazard**	**Initial risk Likelihood Severity**	**Mitigating measures**	**Residual Risk Foreseen**
1) Incompatibility between the new data/information of Flight Plan Item 10 (equipment and capabilities) and RPL Box Q; and 2) Failure in the order in which the data/information is filled out in RPL Box Q.	1) RPL importation for automated systems; 2) Handling of RPL lists among States that signed the RPL Letter of Agreement; and 3) Large percentage of the daily RPL movement.	1) Requirements for implementation of Amendment 1 to the 15th Edition of ICAO Doc 4444. 2) Action Plan – Implementation of the new Flight Plan format through the application of Amendment 1 to the 15th edition. 3) Guidance manuals for preparing Action Plans for the	Significant increase in the ATCO workload	Frequent (5) Minor (D) Acceptable if the risk is mitigated	<u>Cause 1</u> 1/4) Developing standardized procedures for conversion of RPL files produced by airline companies for dispatch to and insertion in automated air traffic control systems, which will make it possible to reduce the impact of cause 1; <u>Cause 2</u> 2/4) Developing standardized procedures for RPL handling that make it impossible not to fill in the RPLQ Box with the priority stipulated by Amendment 1 regarding Flight Plan Item18, which will make it possible to reduce the impact of cause 2.	Remote (3) Insignificant (E) Acceptable

Description of Hazard Nº 4	**Loss of information and/or flight data during the processing of Repetitive Flight Plans (RPL)**					
Causes	**Scenario**	**Current defences/Existing Requirements**	**Consequences associated with the hazard**	**Initial risk Likelihood Severity**	**Mitigating measures**	**Residual Risk Foreseen**
		implementation of Amendment 1; and 4) Repetitive Flight Plan Letters of Agreement.				

Chapter 6 Recommendations stemming from the safety assessment for the implementation of the new Flight Plan format

6.1 Introduction

6.1.1 This Chapter sets out the recommendations resulting from the qualitative study made by experts during the SAM/RA/02 workshop to determine the level of risk associated with the implementation of the new Flight Plan format.

The conclusion to be reached from what has been described and examined in this safety study is that the introduction and implementation of mitigating measures could keep safety risks at an acceptable and, in some cases, tolerable level. This means that the risk is controlled and that the implementation in the South American Region of Amendment 1 to Doc 4444 regarding the new Flight Plan format would be operationally safe. Some recommendations whose implementation is considered essential for keeping safety rates at an acceptable level are spelled out below. The HIRA Form in Appendix A to Chapter 5 clearly stipulates the tasks that, from the regional viewpoint, should be considered by States and air navigation service providers in the South American Region.

6.2 Recommendations

6.2.1 The commitment of States and Organizations in the Region, whether civil aviation authorities (DGCA), air navigation service providers (ANSP), air carriers or airspace users, is of basic importance for achieving the level of safety needed to implement Amendment 1 to Document 4444 with regard to the new Flight Plan format. What is needed is an extremely strong commitment from all parties involved to the execution of the Regional Action Plan and particularly of the national plans for implementing the new Flight Plan format.

6.2.2 **Civil aviation authorities** need to closely follow-up on and continuously monitor the preparatory activities that air navigation service providers, air carriers and different airspace users should carry out, providing coordination and assisting all actors in the process whenever necessary. They must also commit to develop, approve and publish, by the appropriate deadlines defined in the Regional and national Action Plans, the standards, regulations, advisory circulars and other documentation containing guidelines and procedures for implementing Amendment 1, so that the ATM community is able to comply with the agreements entered into at the regional and global levels.

6.2.3 They must also have sufficient trained human resources and the necessary technological and economic means to implement the Action Plan as appropriate. As an additional measure, authorities, when needed, should hold seminars, workshops and courses, publish bulletins and post sufficient information in their websites containing the expected changes and necessary documentation.

6.2.4 **Air navigation service providers** (ANSP) should carefully perform the activities stipulated in the Action Plans and, insofar as regulations are concerned, update the Operational Manuals of the ATS and ARO/AIS units, in order to bring them into line with the new operational procedures stemming from the implementation of Amendment 1. They should also prepare checklists to simplify the task of ARO/AIS personnel of replacing the CURRENT contents with the NEW information and a list specifying the Flight Plan application status in the FIRs. An in-depth analysis should be conducted, as well, of the internal operational letters of agreement within the ANSs and ATC units and with units of adjacent States. In this connection, the letters of application of repetitive flight plans should be revised and standardized procedures developed for their treatment, as needed. For the transition period, ANSPs should draw up contingency plans and procedures to deal with sudden changes in the implementation status of Amendment 1.

6.2.5 When needed, they should update their software to put the sequence established in Amendment 1 in the proper order and in that way meet the requirements identified in that Amendment and fulfill the technical requirements to ensure its safe implementation.

6.2.6 ANSPs should take action, in the area of personnel training, to plan the execution, disclosure and training of the ATM community in the operational procedures for filling out, elaborating, accepting and handing Flight Plans and associated messages during the transition period.

6.2.7 The **ICAO South American Regional Office,** for its part, will continue to offer full support for the implementation of Amendment 1 to Doc 4444 by organizing regional events and facilitating the participation of States, ANSPs, air carriers and users in general. It must also make the necessary changes, together with States that have problems in implementing Amendment 1, in the mechanisms for assistance, whether they be specific missions or staff training. In addition, it should establish an effective alternate procedure for acceding to the FITS website in order to update the status of execution of the Action Plan for implementing the new Flight Plan format.

6.2.8 Although this safety assessment is aimed at States and service providers, **air carriers and airspace users** are a key player in the execution and fulfillment of Amendment 1 and as such should promote and apply the new Flight Plan format, in keeping with the Region's Action Plan. For that reason, it is important for the air carriers and airspace users involved to take the necessary measures to provide for mitigating action and measures in the areas of regulation, technology and personnel training, with a view to facilitating the implementation of the new Flight Plan format during both the transition period and as of the 15 November 2012 final deadline, after which only the NEW Flight Plan format will be accepted.

6.2.9 To repeat, the purpose of this safety assessment is to serve States for reference purposes. It should be stressed that this safety assessment in no way releases States from their obligation to make their own assessment of safety as a result of the implementation of the new Flight Plan format, as stipulated in national action plans on the subject.

6.2.10 In ending, it is recommended that the observations made and conclusions reached in this assessment of safety for the implementation of Amendment 1 to Doc.4444 should be conserved as part of the Region's safety library and should make it possible to jointly define the baseline for recording improvements suggested in the future with regard to risk management and the level of safety achieved by the SAM Region.

Appendix A Chapter 6

Definitions

Control Area: A controlled airspace extending upwards from a specified limit above the earth. The concept of Control Area also covers airways and the TMA.

Area Control Centre: A unit established to provide air traffic control service to controlled flights in areas under its jurisdiction.

Flight Plan: Specified information provided to air traffic service units, relative to an intended flight or portion of a flight of an aircraft.

CURRENT Flight Plan: Current flight planning and ATS message formats defined in the existing version of the PANS-ATM

NEW Flight Plan: Flight planning and ATS message formats specified in Amendment 1 to the PANS-ATM

Filed Flight Plan: The Flight Plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes.

Current Flight Plan: The Flight Plan, including changes, if any, brought about by subsequent clearances.

Acronyms

ACC	Area Control Centre
AFTN	Aeronautical Fixed Telecommunication Network
AIC	Aeronautical Information Circular
AIM	Aeronautical Information Management
AIS	Aeronautical Information Service
AIP	Aeronautical Information Publication
ALARP	As Low As Reasonably Practicable
ALoS	Acceptable Level of Safety
AMHS	Automatic Message Handling System
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATM	Air Traffic Management
ATS	Air Traffic Service
ARO	Air Traffic Services Reporting Office
CHG	Message to Change
CNL	Message to Cancel
CNS	Communications, Navigation and Surveillance
DEP	Departure Message
DLA	Delay Message
DEL	En Route Delay Message
DOF	Date of Flight
FIR	Flight Information Region
FITS	Flight Plan Implementation and Tracking System
FPL	Filed Flight Plan Message
GREPECAS	CAR/SAM Planning and Implementation Group
HIRA	Hazard Identification and Risk Assessment Form
ICAO	International Civil Aviation Organization
HMI	Human-Machine Interface
NOTAM	Notice to Airmen
PANS	Procedures for Air Navigation Services
PBN	Performance-Based Navigation
REDDIG	Digital network
RQP	Request Flight Plan
RQS	Request Supplementary Flight Plan
SAMIG	SAM Implementation Group
SAMRA	Workshop on the Safety Assessment of the South American Region
SMM	Safety Management Manual

Agenda Item 9: Other business

Measurement of environment benefits from operation improvements

9.1 The Global Air Traffic Management Operational Concept (Doc 9854), endorsed by the 11th Air Navigation Conference (2003) describes the expectations of the ATM community in 11 key performance areas. One of them is environment, and the endorsed vision is that the ATM system should be environmentally sustainable.

9.2 At the 37th Assembly (2010), resolution A37-19 calls upon the States to develop and implement procedures to reduce aviation emissions.

9.3 The purpose of this paper is to propose a mechanism to estimate and report the environment benefits accrued from operational improvements aligned with the Assembly Resolutions in force and also to propose an annual environmental report outlining the operational improvement benefits as an indication of positive environmental stewardship.

9.4 It is a generally accepted fact that climate change can pose threats to life on our planet. The aviation world has long recognized this reality as well as the benefits that air transportation brings to world development.

9.5 The aviation industry's wish to grow in a sustainable manner coupled with the global desire to reduce the impact of aviation on climate change has triggered several actions by the ATM community, such as investing in new technologies and applying new concepts to reduce emissions from aviation.

9.6 The experience of the ATM community in applying Standards and Recommended Practices as well as Procedures for Air Navigation Services has already set in motion several plans to address the aviation impact on climate change.

9.7 Against a background of increasing concern regarding the impact of aircraft engine emissions on the environment, ICAO has been considering what steps could be taken by the international aviation community to control and measure emissions.

9.8 Implementation of operational improvements will generally have benefits in areas such as improved airport and airspace capacity, shorter cruise, climb and descend times through the use of more optimized routes, and an increase of unimpeded taxi times. These improvements have the potential to reduce fuel burn and lower levels of pollutants.

9.9 Calculation of aviation emissions is dependent on several different factors including the number and type of aircraft operations, the type and efficiency of the aircraft engines, the type of fuel used, the length of flight, the power setting, the time spent at each stage of flight, and the location (altitude) at which exhaust gases are emitted.

9.10 Specifically for operational improvements benefit analyses, it is necessary to have data that can reflect the operational changes.

9.11 The main purpose of this paper is to request the estimation and reporting of fuel savings resulting from national or regional operational improvements through the use of a simple but globally endorsed tool (ICAO Fuel Savings Estimation Tool -IFSET) specifically designed for this purpose, which does not require any specific user skills.

9.12 The tool is not intended to replace the use of detailed measurement or modelling of fuel savings, where those capabilities exist. Rather, it is provided to assist those States or ANSPs without such facilities to estimate the benefits from operational improvements. Details on the tool will be provided further.

9.13 To estimate and report fuel savings from operational improvements it is proposed the creation or identification of a group dedicated to the measurement process with proposed terms of reference detailed in the **Appendix A** to this part of the report (corresponds to WP/25, Appendix A).

9.14 It is also proposed that all States/ANSPs in the region start reporting the benefits as they plan or implement any type of operational improvement. After the estimation, it is proposed that the results are sent to ICAO as soon as the analysis are finalized but not later than quarterly using the tool or the form proposed in **Appendix B** to this part of the report (corresponds to WP/25, Appendix B) to be compiled in a single document.

9.15 The data collected will be used to produce an annual global environmental report by the ICAO HQ outlining the operational improvement benefits as an indication of positive environmental stewardship.

APPENDIX A

AIR TRAFFIC MANAGEMENT MEASUREMENTS WORKING GROUP

1. Terms of reference

a) To follow-up the implementation of the ATM operational improvements in the Regional Air Navigation Plan (ANP) or in national plans and to place special emphasis on identifying and estimating the fuel savings accrued from the corresponding improvements.

b) To carry out permanent coordination with various PIRGs contributory bodies in order to ensure appropriate integration of all tasks contributing to the estimation of environment benefits related to the implementation of the ANP or national operational improvements.

c) To harmonize, at a regional level, the estimation of the environment benefits from operational improvements in order to reach consistent results.

d) Taking into consideration the material prepared by ICAO, develop proposals to keep and upgrade the ICAO Fuel Savings Estimation Tool (IFSET) if deemed necessary.

2. Work programme

TASK NUMBER	TASK DESCRIPTION	PRIORITY	DATE	
			START	END
M1	To identify operational improvements to be measured	A	TBD	TBD
M2	To establish the baseline for comparison	A	TBD	TBD
M3	To define the future scenario for environment benefits estimation	A	TBD	TBD
M4	To estimate the environment benefits accrued from the identified operational improvements	A	TBD	TBD
M5	To inform the estimated benefits to ICAO	A	TBD	TBD

3. Priority

A High priority tasks, on which work should be speeded up.

B Medium priority tasks, on which work should commence as soon as possible, but without detriment to priority **A** tasks.

C Tasks of lesser priority, on which work should commence as time and resources allow, but without detriment to Priority **A** and **B** tasks.

APÉNDICE B / APPENDIX B

TABLE TO REPORT ENVIRONMENTAL BENEFITS FROM OPERATIONAL IMPROVEMENTS

Region	State	Baseline fuel burn (Kg)	Baseline CO2 emissions (Kg)	Op. Improvement	Savings-Fuel (Kg)	Savings-CO2 (Kg)	Savings-Fuel-%	Savings CO2-%	Tool
SAM		1	3.16	RNAV in FIR and TMA	7182902	22697970.32	7182902	7182902	IFSET
SAM			3.16			3.16	#DIV/0!	1	IFSET
			3.16			3.16	#DIV/0!	1	
			3.16			3.16	#DIV/0!	1	
			3.16			3.16	#DIV/0!	1	
			3.16			3.16	#DIV/0!	1	
			3.16			3.16	#DIV/0!	1	
			3.16			3.16	#DIV/0!	1	
			3.16			3.16	#DIV/0!	1	
			3.16			3.16	#DIV/0!	1	
			3.16			3.16	#DIV/0!	1	
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			3.16			3.16	#DIV/0!	1	