



SAM/IG/9

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**  
**South American Office**

**Regional Project RLA/06/901**

**Ninth Workshop/Meeting of the SAM Implementation Group**  
**(SAM/IG/9)**

**FINAL REPORT**

**Lima, Peru, 14 to 18 May 2012**

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## **HISTORY OF THE MEETING**

### **ii-1 PLACE AND DURATION OF THE MEETING**

The Ninth Workshop/Meeting of the SAM Implementation Group (SAM/IG/9) was held at the premises of the ICAO South American Regional Office in Lima, Peru, from 14 to 18 May 2012, 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 the presence of Mr. Vincent Galotti, Deputy Director, Safety Standardization & Infrastructure Air Navigation Bureau, ICAO, who presented the new ASBU methodology (aviation system block upgrades).

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

The Meeting agreed to hold its sessions from 09:00 to 16:30 hours, with appropriate breaks. The work was done with the Meeting as a Single Committee, Working Groups and Ad-hoc Groups.

Mr. Luiz Ricardo de Souza Nascimento, delegate from Brazil, 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. Likewise, the Secretariat had the support of Messrs. J Sres. Fernando Hermoza, Carlos Antonioli, Ron Fischer, Luiz Roberto Barbosa Medeiros, Obdulio Gouarnalusse, Alessander de Andrade Santoro and Alfredo Harvey Palomino, 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.

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**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:  | Aviation System Block Upgrade (ASBU)  |
| Agenda Item 10: | Other business  |

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**ATTENDANCE**

The meeting was attended by 53 participants from 9 States of the SAM Region Argentina, Bolivia, Brazil, Chile, Colombia, Panama, Paraguay, Perú, and Venezuela, one State from the NACC Region, United States, 2 International Organizations, CANSO and IATA, and three International Companies, ATECH, Boeing and Thales Air Systems. The list of participants is shown in page iii-1.

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**LIST OF CONCLUSIONS**

<b>No.</b>	<b>Title of the Conclusion</b>	<b>Page</b>
Conclusion SAM/IG/9-1	Air traffic data collection in the upper airspace	2-2
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Conclusion SAM/IG/9-3	National PBN implementation Plan	3-2
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**SAM/IG/9**  
**LISTA DE PARTICIPANTES / LIST OF PARTICIPANTS**

**ARGENTINA**

1. Guillermo Cocchi
2. Obdulio Gouarnalusse

**BOLIVIA**

3. César Varela Carvajal
4. Reynaldo Cusi Mita

**BRASIL**

5. Luiz Ricardo de Souza Nascimento
6. Athayde Licério Vieira Frauche
7. Alessandro de Andrade Santoro
8. André Eduardo Jansen
9. Juárez Franklin Gouveia
10. Alexander Luiz Dutra Bastos
11. Marcus Luiz Pogianelo
12. Neverton Alves de Novais
13. Alice Miori Irokawa
14. Luiz Roberto Barbosa Medeiros

**CHILE**

15. Ricardo Bordalí Cauvi
16. Darío Retamal

**COLOMBIA**

17. Harlen Mejía
18. Juan Oswaldo Hernández

**ESTADOS UNIDOS**

19. Ronald Andrés Fischer

**PANAMÁ**

20. Iván De león

**PARAGUAY**

21. Roque Díaz Estigarribia
22. José Luis Chávez
23. Liz Rocío Portillo

**PERÚ**

24. Paulo Vila
25. Fernando Hermoza

26. Rufino Galindo Caro
27. José Rubira Chauca
28. Enrique Escalante Marcotti
29. Johnny Ávila Rojas
30. Marco Vidal Machiavello
31. Jaime Contreras Benito
32. Juan Pablo Portilla Venero
33. Alfredo Harvey Palomino
34. Victor Zavaleta Ahon
35. Raúl Anastacio Granda
36. Antonino Márquez Rondón
37. Jorge García Villalobos

**VENEZUELA**

38. Alfredo Dávila Alfonzo
39. Sergio Lara Martínez

**BOEING/JEPPESEN**

40. Demetrius Zuidema

**IATA**

41. John Marlon Ferrer Olivares
42. Mariela Valdés Piña
43. Gabriel Rozzi
44. Raymundo Hurtado
45. Carlos Calamante
46. Carlos Cirilo

**THALES AIR SYSTEMS**

47. Ludmilla Gonzales

**ATECH**

48. Eno Siewerdt

**CANSO**

49. Javier A. Vanegas

**OACI / ICAO**

50. Onofrio Smarrelli
51. Celso Figueiredo
52. Roberto Arca
53. Jorge Fernández

**Agenda Item 1: Follow up to conclusions and decisions adopted by SAM/IG meetings**

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

1.1 The meeting analysed the conclusions and the series of activities, 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 shows the status of compliance of the conclusions and pending activities formulated by the implementation group 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 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
<b>1. ATS Routes Implementation</b>							
1-1	That States examine: a) Impact of RNAV routes implementation in the 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.	<ul style="list-style-type: none"> <li>Analyse airspace</li> <li>Evaluate national and international fleet</li> <li>Evaluate ATS</li> <li>Coordinate with authorities involved</li> <li>Coordinate with adjacent States, if necessary</li> </ul>	<ul style="list-style-type: none"> <li>Adequate information will be available to execute PBN action plan.</li> <li>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</li> </ul>	SAM/IG/7	States	RO/ATM RO/AIM	<b>COMPLETED</b>
1-2	Route RNAV VOR CRR/VOR FNO (UM 661)	<ul style="list-style-type: none"> <li>Coordinate the implementation.</li> <li>Issue AIC.</li> <li>Train personnel.</li> <li>Amend CAR/SAM ANP</li> </ul>	Route implemented	TBD Information from Brazil is pending	States Secretariat	RO/ATM RO/AIM	<b>COMPLETED</b>
1-3	UM 662 Guayaquil – Madrid	<ul style="list-style-type: none"> <li>Coordinate the implementation.</li> <li>Issue AIC.</li> <li>Train personnel.</li> <li>Amend CAR/SAM ANP</li> </ul>	Route implemented	Agreement with FAV Venezuela is pending SAM/ATSRO/4	States Secretariat	RO/ATM RO/AIM	<b>VALID</b> (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	<ul style="list-style-type: none"> <li>• Coordinate the implementation.</li> <li>• Issue AIC.</li> <li>• Train personnel.</li> <li>• Amend CAR/SAM ANP</li> </ul>	Route implemented	Implementati on agreement on 24 September 2009	States Secretariat	RO/ATM RO/AIM	<b>COMPLETED</b> 24/09/09
1-5	Santiago-Miami	<ul style="list-style-type: none"> <li>• Coordinate the implementation.</li> <li>• Issue AIC.</li> <li>• Train personnel.</li> <li>• Amend CAR/SAM ANP</li> </ul>	Route implemented	Finalise coordination with States involved and IATA	States IATA Secretariat	RO/ATM RO/AIM	<b>COMPLETED</b> 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
<b>2. Optimisation of ATS routes in the SAM Region</b>							
2-1	<b>Conclusion SAM/IG/3-1 ATS Route Network Optimising in the South American Region</b> 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	<b>COMPLETED</b> 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	<ul style="list-style-type: none"> <li>• Collect necessary data.</li> <li>• Carry out safety assessment applying the methodology adopted.</li> </ul>	PBN will be implemented showing that agreed safety levels will be kept or maintained	SAM/IG/6	CARSAMM A	RO/ATM	<b>COMPLETED</b> 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.	<ul style="list-style-type: none"> <li>• ANSPs will Establish coordination mechanism with military authorities</li> <li>• Discuss matters such as location, altitudes, and VALIDity periods of special use airspaces.</li> </ul>	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	<b>COMPLETED</b> 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.	<ul style="list-style-type: none"> <li>• Known data</li> <li>• Availability of information required for monitoring of environmental protection.</li> </ul>	SAM/IG/9	States	N/A	<b>VALID</b> Check fuel savings estimate chart. Permanent task.
2-5	Prepare a measurable plan of performance, including gas emissions safety, efficiency, etc.	<ul style="list-style-type: none"> <li>• Check available tools to carry out this task</li> <li>• Prepare a measurable plan</li> </ul>	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	<b>VALID</b> 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	<b>Conclusion SAM/IG/3-2 Data Collection</b> 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 <b>1-31 July 2009</b> and send them to the SAM Regional Office before <b>30 September 2009</b> . b) use a sample consistent with the <b>form and the instructions for completing the form</b> , contained in <b>Attachment 2 to Appendix B</b> to this part of the report, using the EXCEL format.	<ul style="list-style-type: none"> <li>The Secretariat should send a letter to States</li> <li>States should collect information as agreed.</li> <li>States should send information to the Regional Office.</li> <li>Information received must be assessed</li> </ul>	A data base containing: <ul style="list-style-type: none"> <li>movement in ATS routes per FIR</li> <li>movement between pairs of cities,</li> <li>peak hours</li> <li>movement in TMA</li> <li>FL most used</li> <li>air operators and type of aircraft used.</li> </ul>	SAM/IG/5	Regional Office States RLA/06/901	RO/ATM RO/AIM CARSAMMA	<b>COMPLETED</b> 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	<ul style="list-style-type: none"> <li>States shall determine entry/exit points of main TMAs</li> <li>Shall present information at SAM/IG/4</li> </ul>	Adequate information will be available to prepare Version 1 of ATS routes network	SAM/IG/4	States	RO/ATM	<b>COMPLETED</b> 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	<b>COMPLETED</b> 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	<b>COMPLETED</b>
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	<b>COMPLETED</b>
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 CARSAMM A	<b>COMPLETED</b> Safety plans for RNAV5 and ATSRO are presented in WP/13 and 03, respectively.
2-12	<b>Conclusion SAM/IG/4-1 – SAM routes network point of contact</b> 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	<b>COMPLETED</b>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2-13	<b>Ref para. 2.1 of SAM/IG/5 Report</b> 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	<b>COMPLETED</b> 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	<b>Ref Para. 2.7 SAM/IG/5 Report</b> 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	<b>COMPLETED</b> ATS routes network that were not coordinated or that required further coordination were transferred to Version 02 of the ATS routes network.
2-15	<b>Ref Para. 2.8 SAM/IG/5 Report</b> 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	<b>COMPLETED</b> 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	<b>Ref Para. 2.10 SAM/IG/5 Report</b> 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	<b>COMPLETED</b> The process of coordination of Phase 1 was <b>COMPLETED</b> and Version 01 of the ATS routes network was implemented in March 2011
2-17	<b>Ref. para. 2.13 SAM/IG/5 Report.</b> 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	<b>COMPLETED.</b> 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	<p><b>Conclusion SAM/IG/6-1</b>  <b>Application of further actions to reduce the risk and risk rate resulting from the SAM ATS routes network optimisation safety plan</b></p> <p>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.</p>	Implement ulterior actions as required	Safe implementation of Version 01 of the ATS routes network.	March 2011	States	RO/ATM	<b>COMPLETED</b>
2-19	<p><b>Conclusion SAM/IG/7-1</b>  <b>ATS routes network optimisation programme of the South American Region, Phase 3, Version 02</b></p> <p>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.</p>	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	<b>VALID</b>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
<b>3. Implementation of Performance Based Navigation (PBN) in the SAM Region</b>							
3-1	<b>SAM/IG/1-1 CAR/SAM PBN Roadmap</b> 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.	<ul style="list-style-type: none"> <li>• Shall facilitate implementation at a regional level</li> <li>• Each State should comply with the actions agreed in the PBN Roadmap</li> </ul>	States will have a National en-route, TMA and APP PBN implementation Plan.	SAM/IG/3	States	N/A	<b>COMPLETED.</b> States adopted the PBN roadmap.
3-2	<b>Conclusion SAM/IG/2-1 PBN implementation Programme for en-route operations</b> 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 <b>Appendix B</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	<b>COMPLETED</b> States have received model action plans for TMA and APP, and except for 4 States of the Region, all States have prepared their national implementation plan.
3-3	<b>Conclusion SAM/IG/2-4 PBN Implementation Model for TMA and Approach</b> 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 <b>Appendix E</b> 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	<b>COMPLETED</b> States have received the action plan models for TMA and approach. All SAM States but 4 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	<b>COMPLETED</b>
3-5	<b>Conclusion SAM/IG/3-3 PBN Implementation National Plans</b> 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	<b>VALID</b> 11 States in the SAM Region presented their national PBN plan for its harmonization. States that have updated their plans will send them for the Regional Office. It is expected that the 3 remaining States (Ecuador, French Guiana, 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	<p><b>Conclusion SAM/IG/2-3 Survey on the Fleet Navigation Capacity</b></p> <p>That States conduct a survey on the fleet navigation capacity, using, to that end, the form contained in <b>Appendix D</b> to this part of the Report, and send the information collected to the ICAO South American Regional Office, on the following dates:</p> <p>a) Aircraft operating commercial flights, which have more than 5 700 kg. of MTOW – 15 February 2009</p> <p>b) Aircraft operating commercial flights, which have less than 5 700 kg. of MTOW – 15 May 2009</p> <p>c) Other aircraft registered in the Region – 15 August 2009.</p>	<ul style="list-style-type: none"> <li>States must carry out this survey.</li> <li>Secretariat should upload Form of SAM/IG/2 Appendix 2 on Agenda item 2.</li> </ul>	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	<b>SUPERSEDED by Conclusion SAM/IG/4-3).</b>
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	<b>COMPLETED</b> 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	<b>COMPLETED</b>

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)	<b>COMPLETED</b> 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	<b>COMPLETED.</b> 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	<b>Conclusion SAM/IG/2-2 Initial AIC</b> 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.	<ul style="list-style-type: none"> <li>• Prepare AIC</li> <li>• Publish AIC</li> </ul>	Aeronautical community duly informed on States plans for RNAV 5 implementation.	SAM/IG/7	States	RO/ATM RO/AIM	<b>COMPLETED</b> at 23 October 2009. French Guyana, Guyana, and Suriname had not implemented yet. In postponing the implementation for 22 September 2011, States <b>must publish a new AIC before 18 November 2010</b>
3-12	<b>Ref. para. 3.9 of SAM/IG/5 Report</b> 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	<b>COMPLETED</b> SUPP AIP Model was prepared and submitted for consideration of the meeting through WP/08.
3-14	<b>Ref. 3.11 of SAM/IG/5 Report.</b> 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	<b>COMPLETED</b> 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	<b>Conclusion SAM/IG/5 – Training programme and documentation for air traffic controllers and AIS operators</b> 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	<b>COMPLETED</b>
3-16	<b>Ref. 3.15 of SAM/IG/5 Report.</b> 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	<b>COMPLETED</b> See WP/04.
3-17	<b>Conclusion SAM/IG/5-4 Implementation of Continuous Descent Operations</b> 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	<b>VALID</b> 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	<b>Conclusion SAM/IG/6-2</b> <b>Application of subsequent actions to reduce the RNAV5 safety plan risk and the resulting risk rate</b> 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	<b>COMPLETED</b> States assessed ulterior actions and an analysis was made and is shown in <b>Appendix B</b> of Agenda Item 3.
3-19	<b>Para3.9 SAM/IG/6</b> 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	<b>VALID</b>
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	<b>COMPLETED</b>
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	<b>VALID</b> 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	<b>SUPERSEDED</b> (see <b>Conclusion SAM/IG/6-3</b> ) States should implement procedures to keep data base updated.
3-23	<b>Conclusion SAM/IG/6-3</b> <b>Forms CMA F5 and CMS F6</b> That SAM States take pertinent action in order to apply forms CMA F5 and CMA F6, attached as <b>Appendices A and B</b> to this part of the report, and send them to CARSAMMA as soon as the PBN approval of aircraft and operators is established.	<ul style="list-style-type: none"> <li>• Use Forms CMA F5 and CMA F6.</li> <li>• 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.</li> </ul>	Safe RNAV5 implementation	First Phase September 2011	States	RO/ATM	<b>VALID</b> 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	<b>Conclusion SAM/IG/6-4</b> <b>ENR 3.3 – Table model of the AIPs</b> That SAM States, in publishing in their AIPs RNAV routes, use the ENR table model shown in <b>Appendix D</b> to this part of the report.	Publish amendment in AIP	Safe RNAV5 implementation	September 2011	States	RO/ATM	<b>SUPERSEDED</b> <b>by</b> <b>Conclusion SAMIG/7-3</b> ENR 3.3 Table was modified and the new version was submitted for the consideration of States for its application.
3-25	<b>Conclusion SAM/IG/6-5</b> <b>Lateral navigation deviation reporting form</b> That SAM States take the corresponding action in order to use the monitoring programme and particularly lateral navigation deviation reporting form attached as <b>Appendix F</b> 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/	<b>VALID</b>
3-26	<b>Conclusion SAM/IG/6-6</b> <b>Publication of an AIC/NOTAM announcing the postponement of the RNAV5 implementation date in the SAM Region</b> 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	<b>COMPLETED</b> 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	<b>Para. 3.41 SAM/IG/6</b> 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 Implementation	RO/ATM	<b>COMPLETED</b> So far, 13 RNAV5 TELCONS have been carried out. Information on the result was presented at the SAM/IG/7 meeting. This task is included in the RNAV5 action plan. Further to implementation, 3 TELCONS were held. No issues regarding impact in operations were detected
3-28	<b>Conclusion SAM/IG/7-2 Implementation of RNAV-5</b> 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	<b>COMPLETED</b>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-29	<p><b>Conclusion SAM/IG/7-3</b>  <b>Documentation to be published for the implementation of RNAV-5</b>            That SAM States publish the following documentation no later than 22 September 2011, effective on 20 October 2011:</p> <p>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</p> <p>b) The ENR 3.3 Tables that correspond to RNAV routes, using the model shown in Appendix D to this part of the report.</p> <p>Note: Appendix E contains 4 examples that may be used as a reference by the States.</p>	<ul style="list-style-type: none"> <li>• prepare and control publication of AIP supplement</li> <li>• prepare tables ENR 3.3, as per approved model, and publish them.</li> </ul>	Supplement AIP and tables ENR 3.3 published	22 September 2011	States	RO/ATM RO/AIM	<b>COMPLETED</b>
3-30	<p><b>Conclusion SAM/IG/7-4</b>  <b>Publication of the trigger NOTAM</b>            That SAM States publish the trigger NOTAM no later than 13 October 2011, using the following model:</p> <p>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.</p>	Prepare and publish Trigger NOTAM, as per approved model	Trigger NOTAM published	13 October 2011	States	RO/ATM RO/AIM	<b>COMPLETED</b>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
<b>4. Standards and procedures for performance based navigation operations approval</b>							
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	<b>COMPLETED</b> 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	<p><b>Conclusion SAM/IG/3-4 Advisory Circulars CA 91-008, CA 91-009 and CA 91-010</b></p> <p>That States of the SAM Region:</p> <p>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 <b>Appendices B, C and D</b>, respectively to this part of the report; and</p> <p>b) publish the corresponding national regulations until <b>5 October 2009</b>.</p>	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	<b>SUPERSEDED by Conclusion SAM/IG/4-2</b>
4-3	<p><b>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</b></p> <p>That States of ICAO South American Region, according to the PBN implementation plans:</p> <p>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</p>	Publish Advisory circulars for aircraft and operators approval	Advisory circulars and Work Aids used for aircraft approval	SAM/IG/5	State	N/A	<b>COMPLETED</b>

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

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	<b>Ref Para. 3.8 of SAM/IG/5 Report.</b> Establish and keep up to date a record of approved aircraft and operators	<ul style="list-style-type: none"> <li>• Contact CARSAMMA to verify if it is possible to have available a PBN data base.</li> <li>• Review and present form for PBN approval and cancellation of approval</li> </ul>	<p>Data base coordinated with CARSAMMA</p> <p>Form for PBN approval and cancellation of approval implemented</p>	SAM/IG/6	CARSAMMA Secretariat	RO/ATM Expert RLA/99/901	<b>COMPLETED</b> 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	<b>Conclusion SAM/IG/5-2 PBN/RNAV5 seminars for operators</b> 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	<b>COMPLETED</b> States initiated their guidance programme to operators, task to be maintained active. Note: general aviation does not participate in these events.
4-7	<b>Conclusion SAMIG/5-3 Data Collection</b> 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	<b>COMPLETED</b>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
4-8	<p><b>Conclusion SAM/IG/4-5 Prediction Program for the FDE Availability</b> That:</p> <p>a) Progress be made in the study and application of the tool AUGUR (EUROCONTROL) by the States of the region.</p> <p>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.</p> <p>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</p>	<ul style="list-style-type: none"> <li>That ICAO contact Eurocontrol, FAA and other organizations in order to evaluate application of forecast FDE tools and related procedures</li> <li>Evaluate the possibility to lead a forecast development programme for FDE availability</li> </ul>	<p>Information related with FDE availability available</p> <p>Regional forecasting FDE availability programme</p>	SAM/IG/8	Regional Office	RO/CNS	<p><b>COMPLETED</b> 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. .</p>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	based in GNSS out of 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	<p><b>Conclusion SAM/IG/5-6</b></p> <p><b>Application of national standards for approval of operators and aircraft for PBN operations</b></p> <p>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.</p>	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	<p><b>COMPLETED</b></p> <p>States are completing the publication process of the corresponding national regulations</p>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
4-10	<b>Para 4.20 SAM/IG/5 Report</b> 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	<b>COMPLETED</b> Courses were provided at a regional and national level in PBN approval.
4-11	<b>Para 4.9 SAM/IG/6</b> 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	<b>VALID</b> 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	<b>Conclusion SAM/IG/2-6 ATFM Roadmap</b> That, a) the ATFM Roadmap in <b>Appendix B</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	<b>COMPLETED</b>
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	<b>COMPLETED</b>
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	<b>COMPLETED</b> Except for Suriname.
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	<b>COMPLETED</b> (SAM/IG/4-WP/10)

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-5	<p><b>Conclusion SAM/IG/3-5 Runway capacity of an international airport and ATC associated sector</b></p> <p>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:</p> <ul style="list-style-type: none"> <li>a) Amount of personnel trained for the exercise</li> <li>b) Methodology applied</li> <li>c) Result of the exercise, providing the declared capacity for each runway and ATC selected sector.</li> <li>d) Identification of problems found in the methodology applied.</li> </ul>	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	<p><b>VALID</b></p> <p>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. When the workshop held at the SAM Office from 24 to 28 October 2011 was completed, it was agreed to carry out additional e-distance training for students to become instructors. Such training is currently being carried out</p>
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	<b>COMPLETED</b> (SAM/IG/4-WP/05)

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-7	<b>Conclusion SAM/IG/4-5</b> <b>Guidance for the application of a common methodology for calculating airport and ATC sector capacity</b> 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	<b>COMPLETED</b> Guidelines were approved. SAM States have guidelines to carry out the corresponding calculation.
5-8	<b>Para 5.4 SAM/IG/5 Report</b> 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	<b>COMPLETED</b> With the assistance of Colombia and RLA/06/901 the ATFM manual was revised.
5-9	<b>Para 5.4 SAM/IG/5 Report</b> ATFM course	Carry out second ATFM course	Personnel from AAC trained in ATFM	SAM/IG/6	RLA/06/901	RO/ATM	<b>COMPLETED</b> Course was dictated in November 2010.
5-10	<b>Para 5.4 SAM/IG/5 Report</b> 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	<b>COMPLETED</b> The course was dictated in November 2010.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-11	<b>Conclusion SAMIG/5-7 ATFM Teleconferences in the SAM Region</b> That SAM States continue to hold weekly ATFM teleconferences between flow management units or flow management positions (FMU / FMP) to improve the exchange of information among participating States.	Implement ATFM teleconferences	Coordination between FMU/FMP carried out	SAM/IG/8	States	RO/ATM	<b>VALID</b> States maintain web conferences due to communication problems in TELCONs held. The use of SKYPE and go-to-meeting is planned. REDDIG II includes a speech communications sub-network to support this application.
5-12	<b>Para. 5.28 of SAM/IG/5 Report</b> 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	<b>COMPLETED</b> The course was dictated in March 2011.
5.13	<b>Para. 5.4 SAM/IG/6</b> 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	<b>COMPLETED</b> The manual was presented to the CNS/ ATM/SG/2 and its application in the CAR and SAM Regions was approved.



No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5.14	<b>Para. 5.5 SAM/IG/6</b> 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	<b>COMPLETED</b> 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	<b>Conclusion SAM/IG/6-7 Manual on Collaborative Decision-Making (CDM) for ATFM</b> That SAM States adopt the Manual on Collaborative Decision-Making (CDM) for ATFM shown in <b>Appendix B</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	<b>COMPLETED</b> CDM Manual was presented in the CNS/ATM/SG/2 Meeting and its use was also approved for CAR States.
5-16	<b>Conclusion SAM/IG/6-8 ATFM AIP SUPP/AIC MODEL</b> 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 <b>Appendix E</b> to this part of the report.	Prepare AIC	Harmonised publications in the SAM Region	December 2012	States	RO/ATM	<b>VALID</b>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
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	<b>COMPLETED</b>
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/10	States Regional Project RLA/06/901	RO/ATM RO/CNS	<b>VALID</b>
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/10	States	RO/ATM	<b>VALID</b>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
<b>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</b>							
6-1	<b>SAM/IG/1-5 - Adoption of Action Plan Models for the improvement of communications and surveillance systems for en-route and terminal area operations</b> 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	<b>COMPLETED</b> 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	<p><b>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</b></p> <p>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.</p>	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	<p><b>COMPLETED</b></p> <p>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.</p>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-3	<p><b>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</b></p> <p>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.</p>	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	<p><b>VALID</b></p> <p>During SAM/IG/8 meeting, updated information was received from Brazil and Guyana on CNS improvement plans</p>
6-4	<p><b>SAM/IG/4-10 - AMHS interconnection between Argentina-Chile, Argentina-Peru, Brazil-Colombia, Brazil-Peru, Chile-Peru and Colombia-Peru</b></p> <p>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:</p> <p>a) Use the model Memorandum of Understanding (MoU) shown in Appendix B to this part of the report;</p> <p>b) Complete the information in the MoU, taking into</p>	Interconnection of AMHS	<p>MoU for the implementation of AMHS systems between:</p> <ul style="list-style-type: none"> <li>• Argentina-Chile,</li> <li>• Argentina-Peru,</li> <li>• Brazil-Colombia,</li> <li>• Brazil-Peru, and</li> <li>• Colombia-Peru</li> </ul>	15 Dec 2012	SAM States/ Territory ICAO SAM Regional Office	RO/CNS RLA/06/901 project CNS experts	<p><b>VALID</b></p> <p>Updated information is shown under SAM/IG/8, Report on Agenda Item 6, Appendix E.</p>

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	<b>a) COMPLETED</b> <b>b) COMPLETED</b> 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	<b>Conclusion SAMIG/5-8 - Review of the SAM VOR/DME stations line-of-sight coverage database That the SAM States/Territory:</b> 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 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).	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	<b>COMPLETED</b> 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	<p><b>Conclusion SAM/IG/6-9 - Actions required for AMHS interconnection</b></p> <p>That SAM States, in view of the delays in the interconnection of the AMHS, proceed with the following actions:</p> <ul style="list-style-type: none"> <li>a) Require from their AMHS providers the necessary support to successfully end the necessary interconnections;</li> <li>b) Make necessary arrangements to train personnel in the interconnection tasks, with the aim of minimizing the dependency with their providers;</li> <li>c) Maximize pertinent coordination; and</li> <li>d) States that have not yet done so, complete the drafting and signature of the MoU.</li> </ul>	Interconnection of CNS systems	Interconnection of AMHS	End of 2013	SAM States	SAM States AMHS providers RO/CNS	<p><b>VALID</b></p> <p>Coordination has been carried out with providers to complete the interconnection</p>



No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-8	<b>Conclusion SAM/IG/6-10 - Review to the study for a new SAM digital network</b> That SAM States analyse 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	<b>COMPLETED</b> 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	<b>Conclusion SAM/IG/7-5 Review of the DME DME coverage in support of RNAV5 in the SAM Region</b> 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	<b>COMPLETED</b> 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	<b>Conclusion SAM/IG/7-6 Updating of the DME DME study</b> 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	<b>VALID</b>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
<b>7. Operational implementation of new ATM automated systems and integration of the existing systems</b>							
7-1	<p><b>SAM/IG/3-8 - Preparation of specific implementation plans for the interconnection of automated systems</b></p> <p>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:</p> <p>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 American Regions</p>	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	<p><b>VALID</b></p> <p>To date, the following MoUs for the interconnection of automated systems have been drafted and signed:</p> <ul style="list-style-type: none"> <li>• Argentina-Brazil,</li> <li>• Argentina-Chile;</li> <li>• Argentina-Uruguay;</li> <li>• Brazil-Uruguay; and</li> <li>• Brazil-Venezuela</li> </ul>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	(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	<b>SAM/IG/4-11 - Action plan for the implementation of Amendment 1 to Doc. 4444</b> 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 amendment, and send them	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	<b>SUPERSEDED</b> 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
	to the ICAO SAM Regional Office by 30 March 2010, for their presentation at SAM/IG/5 Meeting.						
7-3	<p><b>Conclusion SAM/IG/5-9 - Analysis on the impact of Amendment 1 to the PANS/ATM on the automated systems</b></p> <p>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.</p>	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	<p><b>COMPLETED</b></p> <p>Most SAM Sates have analysed the impact of the new FPL implementation in automated systems</p>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7-4	<p><b>Conclusion SAM/IG/6-12 - Action plan for the implementation of Amendment 1 to Doc. 4444</b></p> <p>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.</p>	States' drafting of action plan for the implementation of Amendment 1 to Doc 4444, 15 <sup>th</sup> Edition	Action plan for the implementation of Amendment 1 to Doc 4444, 15 <sup>th</sup> Edition	30 Nov 2011	SAM Sates	RO/CNS RO/ATM RO/AIM	<p><b>VALID</b></p> <p>Until SAM/IG/9 meeting, all SAM States have drafted and submitted their national action plans to the ICAO SAM RO. No action plan has been received from French Guiana (France)</p>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7-5	<p><b>Conclusion SAM/IG/6-13</b></p> <p><b>Establishment of the Implementation Group for the New flight Plan Format</b></p> <p>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.</p>	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 15 <sup>th</sup> edition of Doc 4444 in the SAM Region.	RO/CNS RO/ATM	<b>COMPLETED</b> 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	<p><b>Conclusion SAM/IG/7-7</b></p> <p><b>Publication of an AIC for a broad dissemination of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444)</b></p> <p>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 <b>1 August 2011</b>.</p>	Prepare and publish AIC	AIC published	1 August 2011	States	RO/CNS RO/ATM RO/AIM	<p><b>VALID</b></p> <p>Argentina, Bolivia, Brazil, Chile, Guyana, Paraguay, Panama, Peru, Suriname, Uruguay and Venezuela have published AICs</p>



No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7-7	<p><b>Conclusion SAM/IG/7-8 Safety assessment for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444)</b></p> <p>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 <b>30 November 2011</b>.</p>	Carry out safety assessment for the implementation of the content of 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	<p><b>VALID</b></p> <p>Brazil has completed the safety assessment. The rest of the States have started this activity</p>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7-8	<p><b>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)</b></p> <p>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.</p>	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	<p><b>VALID</b></p> <p>Brazil, Chile, Colombia, Paraguay and Peru have drafted a training programme. The rest of the States are in the process of its elaboration, even though they have started dictating training courses to those involved in the elaboration and processing of flight plans</p>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
8-1	<p><b>Conclusion SAM/IG/8-1 Updating to FASID Tables CNS 1Ba and CNS 1Bb</b></p> <p>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:</p> <p>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</p> <p>b) States of the Region send the results to their Tables review by mid-December 2011.</p>	<p>Circulation SAM States CNS Tables 1Ba and 1Bb for revision.</p> <p>Submission of revised tables to SAM Office.</p>	Updated CNS FASID Tables 1Ba and CNS 1Bb	<p>a) 10/11</p> <p>b) 12/11</p>	<p>a) Secretariat</p> <p>b) States</p>		<p><b>COMPLETED</b></p> <p>The Secretariat sent letter SA678 on 26 October 2011. Updating of tables by the following States: Brazil, Chile, Peru, Uruguay and Venezuela.</p> <p>As a result of this revision, it is expected for mid 2012 to initiate the amendment of these FASID tables for CAR/SAM Regions.</p>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
8-2	<p><b>Conclusion SAM/IG/8-2 Updating of FASID Table CNS 3</b></p> <p>That, with the aim of updating the information in FASID Table CNS 3:</p> <p>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</p> <p>b) States of the Region send the results to the Table review by mid-December 2011.</p>	<p>Circulation SAM States of CNS Table 3 for revision.</p> <p>Submission of revised tables to SAM Regional Office</p>	Updated FASID CNS Table 3	<p>a) 10/11</p> <p>b) 12/11</p>	<p>a) Secretariat</p> <p>b) States</p>		<p><b>COMPLETED</b></p> <p>The Secretariat sent letter SA678 on 26 October 2011.</p> <p>Updating of tables by the following States: Brazil, Bolivia, Chile, Colombia, Peru, Uruguay and Venezuela.</p> <p>As a result of this revision, it is expected for mid 2012 to initiate the amendment of these FASID tables for CAR/SAM Regions.</p>

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
8-3	<p><b>Conclusion SAM/IG/8-3 Implementation of a RAIM/FDE prediction system in the SAM Region</b></p> <p>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:</p> <p>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</p> <p>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.</p>	<p>a) Approval by RCC/5 of the acquisition of a common RAIM availability prediction service.</p> <p>b) Analysis of the most appropriate manner so that non-member States of RLA/06/901 contribute with the quota for the RAIM availability prediction service.</p>	<p>Acquisition approval of a RAIM availability prediction service in the SAM Region.</p> <p>Procedure for contribution quota for non-member States of RLA/06/901.</p>	<p>a) 12/11</p> <p>b) 10/12</p>	<p>a) RLA/06/901 Members</p> <p>b) States</p>		<p><b>VALID</b></p> <p>a) RCC/5 approved acquisition prior to survey to all SAM States.. The result of the survey and the action plan for implementation are presented in SAM/IG/9-WP/16</p> <p>b) Based on affirmative replies by most SAM States, the Secretariat, through TC will study the most appropriated manner</p> <p>c) The SAM/IG/9 meeting examined and approved the technical specifications and considered convenient that the bidding process start withough the participation of Guyana and French Guiana (France)</p>

## 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
<b>1-1</b> <b>SAM/IG/1-1</b> <b>CAR/SAM PBN</b> <b>Roadmap</b> 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 <b>Appendix C</b> to this part of the report.	YES	YES	YES	YES	YES	OG	--	YES	OG	YES	YES	YES	YES	YES	<b>PER:</b> Dec 2009
<b>1-1</b> That States examine: a) Impact of RNAV routes implementation in the airspace Aircraft fleet, Air traffic services, and b) Establish pertinent coordination so as to enable integrated, harmonious and timely implementation of more direct RNAV routes.	OG	OG	YES	YES	YES	OG	--	OG	OG	OG	YES	OG	YES	YES	<b>COL:</b> June <b>ECU:</b> Local coordination with corresponding area. <b>PAR:</b> SAM/IG 5 <b>PER:</b> Dec 2009 <b>VEN:</b> Mar.2010
<b>2-1</b> Implementation of RNAV routes	YES	YES	YES	YES	YES	YES	--	YES	YES	YES	YES	YES	YES	OG	<b>ECU:</b> Missing pronouncement of Venezuela in regard of the effective date for the implementation of the route Guayaquil / Madrid. <b>PER:</b> Chile and Peru in agreement with the part corresponding to their FIRs. RNAV5 Nov 2010.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
<b>2-3</b> <b>Conclusion</b> <b>SAM/IG/2-1</b> <b>PBN implementation</b> <b>Programme for en-route</b> <b>operations</b> 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 <b>Appendix B</b> to this part of the Report.	YES	YES	YES	YES	YES	--	--	YES	YES	YES	OG	YES	YES	YES	PER: Nov 2010
<b>2-10</b> <b>Conclusion SAM/IG/2-2</b> <b>Initial AIC</b> That States of ICAO SAM Region using as model the AIC presented in Appendix C to this part of the Report: a) publish in the AIRAC date of 9 April 2009 an Aeronautical Information Circular (AIC) informing the aeronautical community on their intention to implement RNAV 5 on 18 November 2010; b) reflect in this AIC the specific YEStuations within the airspace under their jurisdiction.	YES	YES	YES	YES	YES	YES	--	YES	YES	YES	YES	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
<b>2-12</b> <b>Conclusion</b> <b>SAM/IG/2-3</b> <b>Survey on the Fleet</b> <b>Navigation Capacity</b> That States conduct a survey on the fleet navigation capacity, using, to that end, the form contained in <b>Appendix D</b> 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.	YES	YES	YES	YES	YES	YES	--	YES	OG	YES	YES	OG	YES	YES	<b>COL:</b> Initially had same problem as Venezuela but after holding PBN seminars we have started the approval process. <b>PAR:</b> completed a) pending b) and c). <b>VEN:</b> 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.
<b>2-13</b> <b>1.2</b> 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	<b>PER:</b> carried out Jul 2009. Delivered to SAM Office.
<b>2-14</b> <b>Conclusion</b> <b>SAM/IG/2-4</b> <b>PBN Implementation</b> <b>Model for TMA and Approach</b> That States/Territories and International Organizations use the PBN Implementation Model for	YES	OG	YES	YES	YES	OG	--	YES	OG	YES	YES	OG	YES	YES	<b>ECU:</b> Developing <b>PER:</b> Dec 2009, this model is being used <b>SUR:</b> 15 Nov 2009 <b>VEN:</b> 18 Nov 2010



Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
TMA and Approach in the preparation of their PBN implementation programmes for TMA and Approach, shown in <b>Appendix E</b> to this part of the Report															
<b>3-1</b> <b>Conclusion SAM/IG/2-5</b> <b>Advisory Circular CA 91-002 and</b> <b>Job Aid for Aircraft and operators</b> <b>RNAV 5</b> <b>operational approval</b> 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 <b>Appendices A and B</b> , respectively, to this part of the Report. b) Publish respective national regulations up to April 2009.	YES	YES	YES	YES	YES	OG	--	OG	OG	YES	YES	--	YES	YES	<b>BRA and PAN:</b> publication is being harmonized with CA LAR. <b>ECU:</b> Coord. with OPS <b>COL:</b> Information circular was published and may be seen at the hyperlink: <a href="#">CI 5102-082-002</a> <b>PAR:</b> signature pending Oct. 2010 <b>PER:</b> Dec 2009

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
<b>3.5</b> <b>Conclusion SAM/IG/3-3</b> <b>PBN Implementation</b> <b>National Plans</b> That States of ICAO South American Region, present their PBN Implementation National Plans to SAM/IG/4 Meeting, using PBN Implementation Plan Model, shown in Appendix B of this part of the Report, as well as using the action plan models and information contained PBN Implementation Project TMA Operations and Short Term Approximations of SAM Region, approved by SAM/IG/2 Meeting.	YES	YES	YES	YES	YES					YES	YES		YES	YES	<b>BOL:</b> delivered Dec. 2009 <b>VEN:</b> finalised and delivered.
<b>4-2</b> <b>Conclusion SAM/IG/2-6</b> <b>ATFM Roadmap</b> That, a) the ATFM Roadmap in <b>Appendix B</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 analyses and actions deemed pertinent	OG	OG	YES	YES	YES	OG	--	OG	OG	YES	NO	OG	YES	YES	<b>ECU:</b> ATFM <b>PER:</b> Mar 2010

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
<b>4-5</b> INITIAL ATFM AIC Model	YES	YES	N/A	NO	YES	YES	--	YES	OG	YES	YES	OG	YES	YES	<b>BRA:</b> information published in the AIP. <b>GUY:</b> 22 Oct 2009
<b>Conclusion SAM/IG/3-1</b> <b>ATS Route Network Optimising in the South American Region</b> 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	<b>VEN:</b> pertinent actions taken
<b>Conclusion SAM/IG/3-4</b> <b>Advisory Circulars CA 91-008, CA 91-009 and CA 91-010</b> 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.	OG	YES	OG	YES	YES	OG	OG	OG	OG	YES	YES	OG	YES	YES	<b>BOL:</b> published in RAB91 <b>COL:</b> published the following information circular: <a href="#">CI-5102-082-008</a> <a href="#">CI-5102-082-009</a> <a href="#">CI-5102-082-010</a> <b>PAR:</b> in final process of publication. <b>VEN:</b> published in September 2010 CA RNAV5, RNP-1, RNP AR APCH and APV-BARO/VNAV

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
<b>3-5</b> <b>Conclusion SAM/IG/3-5</b> <b>Runway capacity of an international airport and ATC associated sector</b> 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.	OG	YES	YES	YES	YES	YES	--	--	--	YES	YES	--	NO	YES	<b>ECU:</b> has trained personnel and calculation Quito and Guayaquil airports <b>PAR:</b> has trained personnel and Airport calculation in Asunción airport. <b>VEN:</b> exercise requested was made, personnel from Venezuela has participated in ATFM training workshops <b>BOL:</b> training was provided to personnel in Viru Viru. <b>URU:</b> Continues with personnel problems. Support will be requested to the Regional Office to carry out activities.
<b>Conclusion SAM/IG/4-1</b> <b>– SAM routes network point of contact</b> 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	<b>BOL:</b> César Varela <b>URU:</b> Adriana San Germán Tel.5982 604 0408 Int 5204 asangerman@gmail.com <b>VEN:</b> Carlos Gonzalez and Pablo Rattia
<b>Conclusion SAM/IG/4-2</b> <b>Advisory Circulars for Aircraft approval and operators for RNP 10 operations, RNAV 5,</b>	OG	YES	OG	YES	YES	OG	OG	OG	OG	YES	YES	OG	YES	YES	<b>BOL:</b> published in RAB 91. <b>COL:</b> Following information circulars: <a href="#">CI-5102-082-001</a>

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
<b>RNAV 1 and 2, Basic RNP 1, RNP APCH, RNP AR APCH and APV/baro-VNAV</b> 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	--	--	--	--	--	----	--	--	--	<a href="#">CI-5102-082-002</a> <a href="#">CI-5102-082-003</a> <a href="#">CI-5102-082-008</a> <a href="#">CI-5102-082-009</a> <a href="#">CI-5102-082-010</a> <b>PAR:</b> in final process of publication. <b>VEN:</b> RNP10, RNAV2, RNP APP AR pending.
<b>Conclusion SAM/IG/4-3 Continued data collection about PBN Fleet Capacity in the South American Region</b> 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	OG	OG	OG	YES	YES	OG	OG	OG	OG	OG	NO	OG	YES	YES	<b>COL:</b> Had the same difficulties as Venezuela, and finally the information was collected. However, we believe this item should be considered as completed since it was pre-assessment and we are now in the implementation process. <b>VEN:</b> fruitless surveys have been carried out in view of the poor

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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 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.															knowledge that operators and aircraft owners have. A dissemination campaign is being carried out to enable improvement of data provided by the same.
<b>Conclusion SAM/IG/4-5- Guidance for the application of a common methodology for calculating airport and ATC sector capacity</b> 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	<b>BOL:</b> adopted Brazilian method. <b>VEN:</b> there is no sufficient personnel yet to comply this task in 100%, currently working on data collection.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
<b>Conclusion SAM/IG/4-11</b> <b>Action plan for the implementation of Amendment 1 to Doc. 4444</b> 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 amendment, and send them to the ICAO SAM Regional Office by 30 March 2010, for their presentation at SAM/IG/5 Meeting.	YES	YES	YES	YES	YES	--	--	YES	YES	YES	YES	YES	YES	YES	<b>Superseded</b> by Conclusion SAM/IG/6-12
<b>Conclusion SAM/IG/5-1</b> <b>Training programme and documentation for air traffic controllers and AIS operators</b> 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	<b>BOL:</b> PBN and ATC recurrent seminars were held. <b>COL:</b> 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. <b>URU:</b> Training was initiated. <b>VEN:</b> final training phase at the IUAC

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
<b>Conclusion SAMIG/5-2 PBN/RNAV5 seminars for operators</b> 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.	OG	YES	YES	YES	YES	OG	OG	OG	OG	YES	YES	OG	YES	YES	<b>BOL:</b> PBN seminars were carried out at all levels. <b>COL:</b> Several seminars were conducted for operators and several commercial operators have already started the process. It is suggested that the restrictions to be applied to uncertified operators as of 22 Sep 2011, be published. <b>URU:</b> August 2011 <b>VEN:</b> continuously.
<b>Conclusion SAMIG/5-3 Data Collection</b> That: a) SAM States collect data on flights conducted on domestic and international routes in the upper airspace (FL 245 or above) of the SAM Region during the period 1 to 15 July 2010, and send them to the SAM Regional Office before 13 August 2010; and b) That the sample be consistent with the form and the guidelines for completing the form described in Appendix B to this part of the Report, using the Excel format.	YES	YES	YES	YES	NO	--	--	OG	--	YES	YES	--	YES	YES	<b>VEN:</b> sent to the regional office and delivered during SAM/IG/6 Meeting
<b>Conclusion SAM/IG/5-4 Implementation of Continuous Descent Operations</b> That, recognizing the efficiency and environmental benefits of	OG	OG	OG	YES	O/G	--	--	OG	--	YES	NO	--	NO	NO	<b>Uru:</b> will request support of Regional Office to restructure airspace and procedures construction.



Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															
<b>Conclusion SAM/IG/5-5 Prediction Program for the FDE Availability</b> 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) Through the ICAO Regional Office, establish contact with the FAA, in order to receive guidance on the procedures for approval of a prediction	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	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.  Conclusion SAM/IG/8-3 - <i>Implementation of a RAIM/FDE prediction system in the SAM Region</i> , presents follow-up on the study and implementation of RAIM prediction availability

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Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
<b>Conclusion SAM/IG/6-1</b> <b>Application of further actions to reduce the risk and risk rate resulting from the SAM ATS routes network optimisation safety plan</b> 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	
<b>Conclusion SAM/IG/6-2</b> <b>Application of subsequent actions to reduce the RNAV5 safety plan risk and the resulting risk rate</b> 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	NO	--	YES	YES	
<b>Conclusion SAM/IG/6-3</b> <b>Forms CMA F5 and CMS F6</b>	YES	O/G	YES	YES	YES	--	--	--	--	O/G	NO	--	YES	YES	<b>BOL:</b> Approvals completed

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															
<b>Conclusion SAM/IG/6-4 ENR 3.3 – Table model of the AIPs</b> That SAM States, in publishing in their AIPs RNAV routes, use the ENR table model shown in Appendix D to this part of the report.	YES	YES	YES	YES	YES	--	--	--	--	YES	YES	--	YES	YES	<b>CHI:</b> As defined in SAM/IG/7
<b>Conclusion SAM/IG/6-5 Lateral navigation deviation reporting form</b> 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	
<b>Conclusion SAM/IG/6-6 Publication of an AIC/NOTAM announcing the postponement of the RNAV5 implementation date in the SAM Region</b> That SAM States take the corresponding action in order to publish an	YES	YES	YES	YES	YES	--	--	--	--	YES	YES	--	YES	YES	<b>CHI:</b> NOTAM

[illegible]

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Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															
<b>Conclusion SAM/IG/6-12</b> <b>Action plan for the implementation of Amendment 1 to Doc. 4444</b> 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..	YES	YES	YES	YES	NO	NO	NO	YES	YES	YES	YES	YES	YES	YES	The ICAO SAM RO received the action plan from French Guiana (France). In addition, it is important that all action plans be signed by the respective authorities; of the action plans received, very few have been signed.
<b>Conclusion SAM/IG/7-1</b> <b>ATS routes network optimisation programme of the South American Region, Phase 3, Version 02</b> That ICAO SAM States take pertinent actions to follow the guidelines and comply with established	--	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
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.															
<b>Conclusion SAM/IG/7-2 Implementation of RNAV-5</b> That SAM States implement RNAV-5 in continental airspace routes, on 20 October 2011, at 09:01 UTC.	YES	YES	--	YES	YES	--	--	--	--	YES	--	--	YES	--	
<b>Conclusion SAM/IG/7-3 Documentation to be published for the implementation of RNAV-5</b> 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	YES	YES	--	YES	YES	--	--	--	--	YES	--	--	YES	--	

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Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
update and distribute the DME coverage study to support RNAV-5.															
<b>Conclusion SAM/IG/7-7</b> <b>Publication of an AIC for a broad dissemination of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444)</b> 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 <b>1 August 2011</b> .	YES	NO	YES	YES	NO	NO	NO	YES	YES	YES	YES	YES	YES	YES	
<b>Conclusion SAM/IG/7-8</b> <b>Safety assessment for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444)</b> 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	O/G	N/A	YES	O/G	O/G	O/G	NO	O/G	O/G	O/G	O/G	O/G	O/G	O/G	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
the ICAO SAM Regional Office no later than <b>30 November 2011.</b>															
<b>Conclusion SAM/IG/7-9</b> <b>Development of the training programme for the implementation of Amendment 1 to the 15th Edition of ICAO PANS ATM (Doc 4444)</b> 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 <b>31 October 2011.</b>	O/G	O/G	YES	YES	YES	NO	NO	O/G	O/G	YES	O/G	O/G	YES	O/G	
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			NO		
<b>Conclusion SAM/IG/8-1 - Updating to FASID Tables CNS 1Ba and CNS 1Bb</b> That, in view of the implementation of new	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO	YES	NO	YES	YES	<b>Completed</b>

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															
<b>Conclusion SAM/IG/8-2 - Updating of FASID Table CNS 3</b> 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.	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO	YES	NO	YES	YES	<b>Completed</b>
<b>Conclusion SAM/IG/8-3 - Implementation of a RAIM/FDE prediction system in the SAM Region</b> That, in order for the FDE SAM Region to have a common service for predicting RAIM and FDE															In follow-up to this conclusion and to agreement reached at RCC/5 meeting, the ICAO SAM RO sent a State letter requesting SAM States opinion on the implementation of the RAIM prediction availability service

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
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.															through RLA/06/901. All States have replied minus Guyana. Practically all agree in the purchasing of the service.

### 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****SAM ATS Route Network Optimisation Programme – Phase 3, Version 2**

2.1 As indicated in the introduction to the ATS route network optimisation programme, upon request of the States and international organisations, the ICAO regular programme has focused on the optimisation of the ATS route network, amongst other implementation projects.

2.2 **Phase 1** of the route optimisation programme was completed on 20 October 2011 with the implementation of RNAV5, and **Phase 2** of the implementation of Version 1 of the SAM ATS route network was completed in March 2011.

2.3 **Phase 3**, which corresponds to the implementation of Version 2 of the SAM ATS route network, involves a complete restructuring of the route network to achieve a full integration of ATS routes, control sectors, TMAs, etc., applying the flexible use of airspace concept. Consequently, it is much more complex and requires much coordination and work at both State and regional level.

**Discussion**

2.4 During the SAMIG/8 note was taken on the improvements to the Action Plan proposed by the SAM ATSRO/3 meeting for the implementation of Phase 3, Version 2 of the programme, and agreed to support the following task through Regional Project RLA/06/901:

- a) Hiring of 2 experts for a period of 3 weeks to develop guidance material for the implementation of the flexible use of airspace concept, and to conduct a detailed study of the SAM ATS route network with a view to drafting Version 2 of the route network,

2.5 The terms of reference of the two experts involved in the mission cited in paragraph 2.1 a) of this part of the report were:

- To conduct a preliminary study of the SAM ATS route network with a view to drafting Version 2 of Phase 3 of the route network (project activity 1.10)
- To develop a guidance document on the flexible use of airspace concept (project activity 1.10).

2.6 These two activities were carried out from 12 March to 20 April 2012 at the ICAO South American Office, Lima, by Consultants Jorge Fernández and Tomás Yentz, the latter hired through Regional Project RLA/06/901, were in charge of executing these two activities with the assistance of the ATM and AIM/ATM/SAR officers of the SAM Regional Office.

2.7 The first objective was achieved by means of an analysis of the existing SAM ATS route network and the airspace optimisation programme for the region. Aircraft movement statistics were reviewed for August 2011, but were not sufficiently comprehensive and precise for the assigned task, reason why traffic movement collected in 2009 on occasion of the implementation of RNAV-5 in the

Region were used, applying a 6 % increase for 2010 and a similar figure for 2011. Based on this information, an assessment was made of the level of occupancy of the existing route network on the main traffic flows, and based on that definition; a proposal was made for consideration by the States, airspace users, and the regional ATM community in general.

2.8 The meeting noted that the fact that many States did not provide traffic movement data on time had a negative impact on the precision of the work. Consequently, the calculated increments should be considered as traffic growth estimates and it would be advisable to insist on States so as to adjust data to the precision required, and in this connection, approved the following Conclusion:

#### **Conclusion SAM/IG/9-1**

#### **Air traffic data collection in the upper airspace**

That the SAM Region States carry out a data collection of all flights in the upper airspace of their respective FIRs, between 01 and 31 August 2012, to be sent to the ICAO SAM Regional Office before 30 September 2012, using the form shown in **Appendix A** to this part of the report.

2.9 The second objective was achieved through an analysis of global application of the flexible use of airspace concept, taking into account Appendix O to Assembly Resolution A 37-15: Consolidated statement of continuing ICAO criteria and associated practices related specifically to air navigation, which specifically addresses civil/military air traffic coordination and cooperation, and the recommendations of the Global air traffic management forum on civil-military cooperation (2009).

2.10 Likewise, the regional manual was developed taking into account Circular 330-AN/189, which contains guidance and examples of good practices in civil-military cooperation. It recognises that the growing civil air traffic and military air missions would significantly benefit from a more flexible use of airspace, and recommends and provides guidance on best practices in civil-military cooperation that might be adopted by the States.

2.11 The result of the work was two documents: one containing an initial proposal of implementation and realignment of RNAV routes and elimination of a series of conventional routes to optimise the SAM ATS route network (**Appendix B** to this part of the report), and the other containing guidelines on the flexible use of airspace (**Appendix C** to this part of the report), which will be submitted to the consideration of the States of the Region for its use in airspace structure optimisation.

2.12 Both documents are related to ICAO strategic objectives concerning safety and environmental protection, and to the performance objectives of the regional air navigation implementation plan concerning airspace optimisation and the flexible use of airspace.



### **SAM ATS route network optimisation**

2.13 Regarding ATS route network optimisation, and taking into account the lessons learned during the implementation of Phase 2, Version 1 of the SAM ATS route network optimisation programme and the general planning principles established by the SAM Implementation Group (SAMIG), an assessment was made of the best possible paths for a series of RNAV routes, which ICAO submitted to the States of the Region for the implementation of Phase 3, Version 2 of the ATS route network.

2.14 Based on the analysis made, new paths are being proposed to reduce the number of nautical miles in said tracks, thus reducing fuel consumption and CO<sub>2</sub> emissions. The meeting was informed that the ICAO IFSET tool was used to calculate fuel currently used and fuel that would be saved with the implementation of the new paths.

2.15 In general terms and approximate figures within an initial and conservative analysis, it could be said that fuel consumption in one month of operation in the scenario assessed could be reduced by 1'440,500 kg, accounting for 1.536% of the total currently used. CO<sub>2</sub> savings would be in the order of 4'547,658.5 kg, accounting for 0.920% of the amount currently released. If fuel savings are converted to litres, and fuel price per litre is calculated at \$ 1.57, savings would reach a figure of \$2'713,902 per month.

2.16 In summary, the optimisation of the route network could reduce CO<sub>2</sub> emissions released into the atmosphere by approximately 54,572 tonnes per year.

2.17 Taking the aforementioned into account, the meeting observed that fuel savings was very promising even when the same was very conservative, in view that estimates only considered point-to-point paths from terminal to terminal were only considered and the analysis which implies paths within terminal areas of States and standardised entries and exits, were not taken into account.

2.18 The meeting, in analysing **Appendix B** which contains the preliminary report of the analysis on the optimisation of the SAM Region ATS routes network, deemed pertinent to carry out recommendations to States on the analysis of some routes; and

- a) Eliminate the routes which users considered unnecessary for the time being, as per fuel savings, traffic of the same and business plans of airlines.
- b) Request States to carry out for the SAM ATSRO/4 meeting the feasibility analysis of routes approved to proceed with the analysis programmed of the same and the provision of information on the RNAV/RNP entry and exit points of their terminal areas, in order to continue with the work scheduled.
- c) Request to the Project the support to hire two experts in a two-week period, to continue with the initial work enriched with the data provided by States in the SAM ATSRO/4 meeting of July 2012, and the air traffic data of August 2012.

- d) Request airline operators of information in the SAM ATSRO/4 meeting on routes that may be deleted, in addition to those mentioned in the study.
- e) Request airlines operators information at the SAM ATSRO/4 meeting, on those routes that may be deleted in addition to those mentioned in the study.
- f) Request ICAO Secretariat to consider inviting the main operators in the region to collaborate with their experts in the planning of operations, to assist to meetings for the development of the second stage of the work in this phase of routes optimisation, in order to create an improved optimisation group of the ATS routes network.
- g) Request States which so deem pertinent and advisable, for the planning of its airspace, the submission of an additional expert to work together with the experts hired and the operators.

2.19 Taking into account the above, the meeting emphasised the need for States to focus on this matter to complete the tasks detailed before July 2012 and present them in the SAM ATSRO/4 meeting, completing the analyses required.

2.20 The meeting in analysing the routes optimisation plan, adjusted it as required, and also considered necessary to encourage States to continue with paragraph 2.48 and further of the SAM ATSRO/3 meeting report, which analysed routes which were pending of implementation, taking into account the magnitude of the work to be carried out in the SAM Region ATS routes network.

2.21 On the other hand, the Meeting considered the request of Brazil, which, taking into account the magnitude and impact of the changes in the great routes optimisation projects, requested to divide implementation in stages, per routes packages in specific air traffic flows that are complex in air traffic volumes. In this connection, it was indicated that the improved group of experts could propose a series of stages when more information was available to complete the work scheduled.

### **Flexible use of airspace in the South American Region**

2.22 As part of the airspace optimisation programme, a recommendation was made to develop guidelines for the implementation of the ICAO flexible use of airspace concept in the South American Region (SAM/FUA guidelines).

2.23 In developing the guidelines, consideration was given to the relevant recommendations of the International Civil Aviation Organization, the Global Air Navigation Plan (Doc 9850), and the guidelines contained in the SAM Performance-Based Air Navigation System Implementation Plan (SAM-PBIP), which specify that an optimum, balanced, and equitable use of airspace by civil and military users would be expedited by strategic coordination and dynamic interaction, thus enabling optimum flight paths while reducing operating costs for airspace users and protecting the environment.

2.24 The SAM/FUA guidelines shown in **Appendix C** to this part of the report have been developed for use by SAM States, taking into account operational improvements and airspace optimisation initiatives undertaken in the SAM Region, and particularly the SAM ATS route network optimisation programme, which includes short- and medium-term initiatives on this matter.

2.25 The meeting approved in first instance and provisionally, the guidance manual of the FUA and requested States that for the SAM ATSRO/4 meeting they should indicate any adjustment to carry out so as to approve it at the forthcoming SAM/IG meeting as a final document.

### **Lessons learnt in the implementation of Brazil PBN – RNAV5 routes and TMA procedures**

2.26 The meeting noted that after the actions of Brazil for the implementation of RNAV5 routes, as well as in the first TMA PBN implementations, some lessons learnt were assessed, which may guide airspace planners and procedures designers for future implementations, as well as for further phases of these projects. In this connection, the meeting was informed on the lessons learnt in the following areas:

#### **Integrated airspace concept**

2.27 Actions foreseen as regards airspace planners team and procedures designers, reduce the impacts caused in view of the lack of coordination during the preparation of procedures for en-route and TMA navigation.

2.28 The concept enables the integral gate-to-gate development of en-route and TMA procedures optimisation. The participation of elements of ATC bodies enabled a better understating of the plan concept, local needs and therefore the development of all procedures for a specific location served by the routes network. In addition, there was an optimisation of aerodromes procedures, especially those related to approach operations, taxis and aircraft departing.

2.29 The result was an increase in productivity and quality of procedures drafting, and it was translated into a time reduction of the distances taken and therefore a reduction in CO<sub>2</sub> emissions.

#### **Collaborative decisions**

2.30 The project enable collaborative decision-making with the participation of the central air traffic control body (DECEA), regulators (ANAC), airlines, ATC bodies and airport management.

2.31 The concept was more easily available to minimise impact in the applicable dates.

#### **Safety assessment**

2.32 Participation of safety elements enabled the analysis of the project in order to mitigate impacts in application, especially those related to the execution of other projects in Brazil, such as AIM, the new radar system, reconfiguration of the FIRs and automation of the development of air navigation procedures

## **Training**

2.33 Participation of safety elements, of ACC controllers and APP involved, enabled an improvement in training planning, with the introduction of two different phases: in first place, with the phase of validation of scenarios and simulation in real time, and further, with controllers training based on procedures already validated.

2.34 This training in advance to the date of entry into force of the procedures, enabled a minor impact on air traffic, with the introduction of PBN concept, as well as eventual changes in procedures, based on controllers training before the publication of users procedures. These simulation procedures in real time have enabled the number of NOTAM published regarding changes in procedures.

## **Statistical data**

2.35 All airspace planning requires reliable air traffic statistical data. This data is extremely important for the creation of the main traffic flows and TMA entry and exit gates.

2.36 States must encourage the creation of a reliable data base, in order to have a real knowledge of the current and future demand. With samples of less than 10 years, the forecast of future demand is compromised.

2.37 In addition, there was a need for dissemination in the TWR, APP and ACC regarding quality of data achieved by controllers. Many of the samples had to be discarded since they were incomplete or wrong.

## **Aircraft certification and crew**

2.38 Participation of regulators and airlines in collaborative decision-making is very important to minimise the impact caused by aircraft certified and non-certified in the same airspace.

2.39 Delays in the application of RNAV5 showed the importance of an effective participation of regulators. Only the percentage expected of RNAV aircraft certified and crew for each flight phase, and with the risk analysis of safety elements, the civil aviation authority will be able to decide on the PBN application and the best effective date for procedures.

## **Environment**

2.40 With the introduction of the new PBN concept, together with CDO concept, there was a greater efficiency and economy in the application of air navigation procedures, and therefore a minor impact on the environment.

2.41 The most significant example on a minor impact on the environment (green airports) was the development of procedures for the Santos Dumont international airport in Rio de Janeiro. It was possible to introduce the CDO concept with stabilised 3° descent and the application of the RNP-AR procedure.

2.42 This procedure reduced the amounts of CO<sub>2</sub> and enabled a greater accessibility to the airport and reduced the noise impact of aircraft in approach in the neighbour community of the airport.

### **The use of parallel routes**

2.43 With the application of RNAV routes, in the area comprised between Brasilia, Belo Horizonte, Rio de Janeiro and Sao Paulo TMA, there was an increase in the airspace capacity and the reduction of conflict points in routes.

2.44 This concept was more efficient with the introduction of the TMA integrated concept with the four corner concept, which enabled a better use of the air traffic flow of the main airports in the TMA involved. Only after the establishment of the TMA entry and exit gates, was it possible to plan routes between pairs of airports.

### **Flexible use of the airspace**

2.45 The flexible use of the restricted civil/military airspace enabled a greater airspace capacity at times in which it is not used due to the previously mentioned restriction. There was a better coordination between military and civil bodies to enable drafting of routes within these airspaces.

2.46 Thus, at times where there is no restriction, the use of these RNAV is allowed. The result was a great reduction in the distance and flight time, and reduction in CO<sub>2</sub> emissions.

### **DME/DME analysis**

2.47 The study of the DME/DME coverage area was made. This study enabled the use of RNAV routes (en-route and TMA) through DME/DME sensors. Therefore, the aircraft with no GNSS capacity but with DME/DME capacity could carry out procedures in which there was coverage.

2.48 The result was an increase in the percentage of aircraft capacity within the same airspace and the reduction in the controllers and pilots workload due to the reduction of radar vectors procedures.

### **Simulations**

2.49 The use of simulations in accelerated time, in real time, and the flight, demonstrated to be effective in a phase prior to the implementation of future scenarios. Simulation in accelerated time permitted more scenarios to be analysed, in order to obtain the best case. Simulation in real time enabled to measure control capacity benefits and workload reduction.

2.50 Through flight simulation a greater delimitation was possible and particularly for approach and departure, designed for efficiency improvements. It was possible to achieve operational efficiency with the use of great gradients during departure, in order to avoid levelled flight.

### **Integrated PBN implementation phases**

2.51 The division in phases of the integrated PBN concept in the proximities, en-route and TMA in different dates, was the decision that caused less impact in air traffic control.

2.52 The introduction of the PBN concept in airport proximities of the most important airports (i.e. Rio de Janeiro and Sao Paulo) was established in two phases: in first place the introduction of the routes network and in second place with TMA procedures. This decision was taken on the basis of a great amount of changes in the corresponding procedures.

2.53 However, with the introduction of new RNAV5 routes, there was a need to adapt existing procedures (SID/STAR). In this stage all procedures have been restructured in the aerodrome located in the polygon of new routes, for a total of approximately 350 procedures.

2.54 In the second phase, foreseen for 2013, only procedures for Rio de Janeiro and Sao Paulo TMA will change, to some 200 RNAV/RNP procedures.

2.55 The meeting considered the contribution of Brazil positive, and deemed it appropriate to share with all States of the Region these lessons learnt during the phases of planning and implementation of en-route and TMA RNAV procedures in order to reach the objectives recommended by ICAO and minimise impact on air traffic.

### **Implementation of RNP entry and exit procedures for the Tocumen airport**

2.56 The meeting took note that the Civil Aviation Authority of Panama, together with the Aviation Company of Panama (COPA), had drafted agreements in order to design RNAV procedures for the most important airport in the State.

2.57 The meeting was also informed that, in assessing the results reached with the implementation of RNAV procedures in Panama, studies were made for the creation of the RNP AR APCH procedures for the Tocumen Airport, complying with the PBN National Plan. Thus, Panama has developed and implemented 100% of the procedures required at short term within the TMA (approaches to all runway ends and exit procedures) and is working in RNAV approaches for international airports within the country, complying this phase in most of them.

2.58 The implementation of RNAV approaches in the main airport of the country has enabled a greater number of operations within the same period, which is expected to increase in the forthcoming months with the application of RNP AR procedures. Operations per hour have reached an average of thirty-four during the period of greater movement, thus complying with itineraries more effectively. This has resulted in benefits for all airlines.

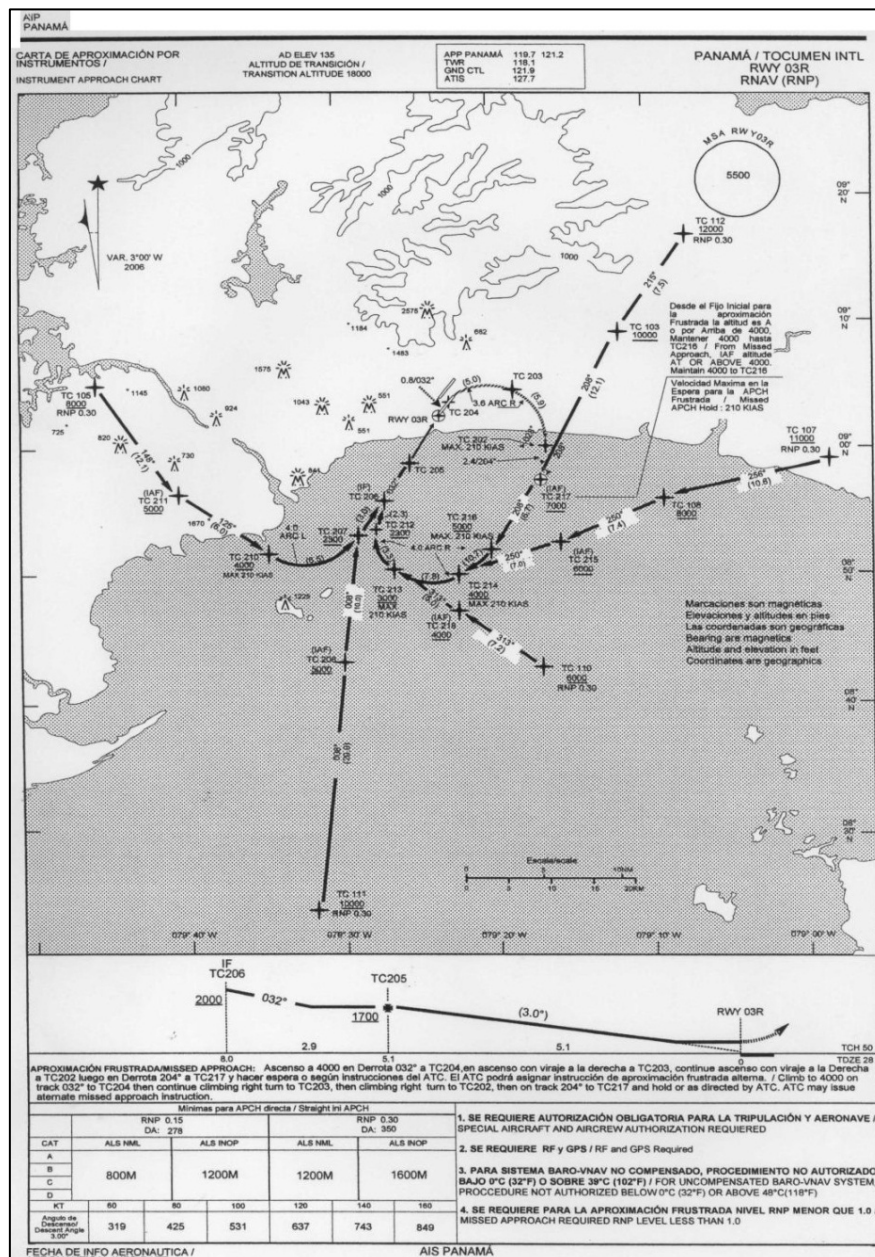
2.59 Aircraft fleet using national airspace is represented in 74% by commercial international flights (B737, EA320, E190, etc.), which are the main users of RNP procedures; 21% by commercial domestic operations, and 5% by private and training flights within the national territory. The most representative activity in the segment of international flights is the Hub of the Americas, starred by the Panamanian Company COPA Airlines, which carries out more than 100 daily operations.

2.60  
as follows:

The final product of the RNP AR APCH approaches designs for the Tocumen Airport is

RNAV (RNP) 03R      RNAV (RNP) Y 03L      RNAV (RNP) Z 21R  
RNAV (RNP) Z 03L      RNAV (RNP) 21L  
RNAV (RNP) DP 03L      RNAV (RNP) DP 03R

### RNAV (RNP) 03R approach chart



2.61 Flight validation was made using as guidance SAM/IG/6-WP/28 presented by Panama, which contemplates the contents of PANS-OPS, Volume II, Part I, Section 2, Chapter 4.4.6 and by FAA Notice 8620.67 - Flight Validation.

2.62 Flight validations were made by COPA aircraft, with the participation of Safety Inspectors of the Panamanian AAC, procedures designers and aeronautical technical personnel, achieving approval of all procedures drafted.

2.63 The meeting took note of this information with approval, and decided to include it in the report, to serve as guidance material for States in process of implementation of RNP AR APCH procedures.

**Agreement between LAN Argentina and the administrations of Argentina and Bolivia**

2.64 The meeting took note that, within the scheme of realignment-implementation of RNAV international routes. The administrations of Argentina and Bolivia committed to study the feasibility of the following routes to inform their conclusions to the SAM ATSRO/4 meeting.

- a. Route EZE-MIA 1: Modify UL417 connecting VOR PAR direct to the position UBRIX, eliminating the segment VOR ERE-UBRIX generating a saving of 32.850 Kg of fuel and 103.7 Tn of annual CO<sub>2</sub> at a rate of one flight per day.
- b. Route EZE-MIA 2: create a new path between VOR GUA and VOR VIR which shall enable a reduction of 17NM, which means 82.125 of fuel savings and 259.2 Tn of annual CO<sub>2</sub> at a rate of one flight per day.
- c. Route SCL-EZE: Create the route NEBEG-RODIK generating 15NM reduction in distance and 140.400Kg of fuel savings and 442.2 Tn of annual CO<sub>2</sub> at a rate of 1800 flights per year.
- d. Route EZE-GRU: Modify path of UN857 and UM 671 joining VOR PTA (Argentina) with VOR RDE (Brazil) thus saving 45.360,0 Kg of fuels and 142,88 Tn of annual CO<sub>2</sub> at a rate of 720 flights per year.

2.65 Finlay, under this matter, the meeting reviewed and updated the action plan for routes network optimisation, shown in **Appendix D** to this part of the report.



## APPENDIX A

# FORM FOR COLLECTING AIR TRAFFIC MOVEMENT DATA

[illegible]

## GUIDANCE FOR COMPLETING THE DATA COLLECTION FORM

### 1. Introduction

- This form is to be used for collecting data for obtaining an air traffic movement sample for planning the optimisation of the SAM ATS route network in the upper airspace of the SAM Region (FL 245= UNL)
- The form must be completed in **EXCEL** format so that all events (*i.e.*, traffic movements) occurred during each day of the period requested are introduced in chronological order **in a single file (without blank lines or spaces or intermediate titles)**.
- Data will correspond to daily air traffic movement of all IFR flights in the established airspace volume during the period requested, by FIR, and in all FIR routes or route segments, as well as IFR flights conducted outside of ATS routes.

### 2. Completion of Excel template fields

- Field 1 "FIR IDENTIFICATION"  
Insert the ICAO designator contained in Doc 7910.  
Example: **SBBS, SUMU, SAEU**.
- Field 2 "DATE"  
Insert only **numeric characters** as follows: **dd/mm/yy**  
Example: For 1 September 2009, insert **01/09/09**.
- Field 3 "CALL SIGN"  
Insert a maximum of **7 alphanumeric characters, with no spaces or hyphens**.  
Examples: **AAL906, PTLCN, VRG8764**.
- Field 4 "TYPE OF AIRCRAFT"  
Insert the ICAO designator contained in **Doc 8643**.  
Examples: for Airbus A320-211, insert **A320**; for Boeing B747-438, insert **B744**.
- Field 5 "AD ORIGIN" (aerodrome of origin)  
Insert the ICAO designator contained in **Doc 7910**.  
Examples: **SBGR, SCEL, SAEZ**.

- Field 6 “AD DESTINATION” (aerodrome of destination)  
Insert the ICAO designator contained in **Doc 7910**.  
Examples: **S BSP, SULS, SAEZ**.
  - Field 7 “TIME OF ENTRY TO FIR”  
Insert numeric characters as follows: hh:mm.  
Examples: for 1 hour and 9 minutes, insert 01:09; for 12 hours and 23 minutes, insert 12:23.
  - Field 8 “LEVEL” (flight level at the point of entry to the FIR)  
Insert **3 numeric characters** that correspond to the flight level during the first flight segment.  
Example: for FL 290, insert 290.
  - Field 9 “ATS ROUTE 1” (first ATS route at the point of entry to the FIR)  
Insert a maximum of **5 alphanumeric characters, with no spaces or hyphens**.  
Examples: **UA301, UB689**
  - Field 10 “ROUTE CHANGE FIX” (fix at which the aircraft leaves ATS route 1 to enter ATS route 2)  
Insert a maximum of 5 alphanumeric characters related to the fix where the route was changed.  
Examples: POKON, KUBEK, BAQ.
  - Field 11 “ATS ROUTE 2” (ATS route following the change at the fix specified in Field 10)  
Insert a maximum of **5 alphanumeric characters, with no spaces or hyphens**.  
Examples: **UA301, UB689**
- Note: If the ATS route changes more than once, complete as many Fields 10 and 11 as necessary.
- Field 12 “TIME OF EXIT FROM FIR”  
Insert numeric characters as follows: hh:mm.  
Examples: for 1 hour and 9 minutes, insert 01:09; for 12 hours and 23 minutes, insert 12:23.
  - Field 13 “REMARKS”  
Insert important information related to a particular flight.

### Apéndice / Appendix B

#### Planilla de Rutas analizadas en la Región SAM Table of SAM Region routes analysed

01	Buenos Aires /Sao Paulo (Unidireccional)		
Ruta actual /Current route (FliteStar)		UA 305 UN857 UM671 RONUT	Notas/Notes
Distancia actual Current distance		898 NM	
*Número de vuelos mensuales *Number of monthly flights		722	
*Tipo de aeronave más utilizada *Type of most used aircraft		A320, A330, B735, B737, B738, B744, B763, MD88, LJ45	
Trayectoria propuesta Trajectory proposed		Desde/From WPA1 S34.38.54.59/W57.43.23.69 a/to ASONO	Desde un nuevo punto a 20 NM Sur de PAPIX WPA1 (S34 38.54.59 / W57.43.23, 69) o a partir de DORVO a ASONO (TMA Sao Paulo) From a new point at 20NM South of PAPIX WPA1 S34 38.54.59 / W57.43.23, 69) or as of DORVO to ASONO (Sao Paulo TMA).
Distancia de trayectoria propuesta Distance of proposed trajectory		837 NM	
Millas reducidas Reduced miles		61	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-249600/787987,2	
Estados involucrados States involved		Argentina, Brazil, Uruguay	
Observaciones Remarks		Esta ruta se corresponde con la solicitada por LAN/This route corresponds to the route requested by LAN/This route corresponds to the route requested by LAN	
*De acuerdo a información disponible/As per available information			
Esta ruta atiende un flujo importante de operaciones entre Buenos Aires y Sao Paulo, por lo que sería interesante implantar una paralela saliendo de un punto a 20 NM Sur de PAPIX, denominado WPA1 en la siguiente coordenada (S34 38.54.59 / W57.43.23,69) o en otra variante a partir de la posición DORVO a ASONO en TMA Sao Paulo			
This route serves an important flow of operations between Buenos Aires and Sao Paulo; therefore it would be interesting to implement a parallel leaving a point at 20NM South from PAPIX, named WPA1 in the following coordinate (S34 38.54.59 / W57.43.23,69) or in another variation as of DORVO to ASONO in Sao Paulo TMA			

02	Sao Paulo/Buenos Aires (Unidireccional)		
Ruta actual /Current route (FliteStar)		UM788, UN741	Notas/Notes
Distancia actual Current distance		930	
*Número de vuelos mensuales *Number of monthly flights		777	
*Tipo de aeronave más utilizada *Type of most used aircraft		A320, A330, A332, B735, B737, B738, B744, B763, MD88, LJ45	
Trayectoria propuesta Trajectory proposed		CURSE TMA SAO PAULO A PAPIX TMA <u>SAEZBAIRES</u>	
Distancia de trayectoria propuesta Distance of proposed trajectory		914	CGO/EZE
Millas reducidas Reduced miles		16	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-65500/ 206783,5	
Estados involucrados States involved		Argentina, Brazil, Uruguay	
Observaciones Remarks		Esta ruta se corresponde con la solicitada por LAN/This route corresponds to the route requested by LAN	
*De acuerdo a información disponible/As per available information			
Como ruta paralela de llegada desde Sao Paulo a Buenos Aires, el ahorro de milla no es muy preponderante como la ruta de salida anteriormente propuesta pero en definitiva contribuye en el ahorro, el trayecto propuesto es de posición CURSE en la TMA SAO PAULO directo a PAPIX punto de ingreso a la TMA <u>SAEZ BAIRES</u>			
As parallel route for arrival from Sao Paulo to Buenos Aires, the saving of miles is not so predominant as the exit route previously proposed, but definitely contributes in the savings, the segment proposed is position CURSE in Sao Paulo TMA direct to PAPIX, entry point to <u>SAEZ-BAIRES</u> TMA.			

03	Rio/Buenos Aires		
Ruta actual /Current route (FliteStar)		UN857,UM534, UN741	Notas/Notes Ruta bidireccional hasta SBPA, luego unidireccional a Rio
Distancia actual Current distance		1090	
*Número de vuelos mensuales *Number of monthly flights		572	
*Tipo de aeronave más utilizada *Type of most used aircraft		A320, A319, A318, B735, B738, CR9	
Trayectoria propuesta Trajectory proposed		EZE/DORVO/BITAK/EFS	
Distancia de trayectoria propuesta Distance of proposed trajectory		1083	
Millas reducidas Reduced miles		7	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-49100/ 155008,7	
Estados involucrados States involved		Brazil, Uruguay, Argentina	
Observaciones Remarks			
*De acuerdo a información disponible/As per available information			
<p>Esta ruta es bidireccional hasta Porto Alegre. Luego unidireccional de sur a norte. La pregunta es ¿Cómo se planifican los vuelos de Rio a BsAs?</p> <p>Por tanto una opción aplicable sería: saliendo de Bs As a la posición DORVO y directo a BITAK punto de ingreso para Rio en el sector, podría servir también como ruta alterna de Carrasco a Rio. El flujo de tránsito es relativamente alto y el ahorro en millas es representativo comparado con el número de operaciones.</p> <p>This route is bi-directional up to Porto Alegre. Then Uni-directional from South to North. The question is: how are flights planned from Rio de Janeiro to Buenos Aires?</p> <p>Therefore, an option to be applied would be: leaving Buenos Aires to position DORVO and direct to BITAK entry point for Rio de Janeiro in the sector, could serve also as alternate route from Carrasco to Rio. The traffic flow is relatively high and the savings in miles is representative compared to the number of ooperations.</p>			

Nota: Los operadores deberán efectuar un estudio analizando esta propuesta en contraposición con los beneficios de mayor fluidez en el tráfico usando la Ruta establecida UM 661 y Brasil deberá analizar la factibilidad de instrumentar Salidas y Entradas standarizadas para la Ruta UM 661 a los Principales Aeropuertos laterales a esta Ruta.

Note: operators should carry out a study analysing this proposal against benefits of greater air traffic flow using the route established UM661 and Brazil whould analyse the feasibilit to implement standard entries and exits for rute UM661 to the main lateral airports of this route.

04	Mdeo/ Sao Paulo (Unidireccional)		
Ruta actual /Current route (FliteStar)		UM540, UM671,	Notas/Notes
Distancia actual Current distance		852	
*Número de vuelos mensuales *Number of monthly flights		224	
*Tipo de aeronave más utilizada *Type of most used aircraft		A320, B744, CRJ9	
Trayectoria propuesta Trajectory proposed		CRR/KILUM/WPU2/ANISE /RDE/CGO	Realign/realign UM661 a/to WPU1 (33°50'34.51"S 54°37'5.03"W) unidireccional Sur/Norte a ANISE uni- directional South/North to ANISE.
Distancia de trayectoria propuesta Distance of proposed trajectory		843	
Millas reducidas Reduced miles		9	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-16900/ 53353,3	
Estados involucrados States involved		Uruguay, Brazil	
Observaciones Remarks		Ruta paralela 20 NM, a la opción 04-B / Parallel route 20 NM to option 04-B.	
*De acuerdo a información disponible/As per available information			
Alternativa "B": eliminar UM 540 y establecer una nueva Ruta con la siguiente trayectoria: UM661 hasta coordenadas 33.49.5S/54.36.9W (WPU2) de allí Unidireccional SUR/NORTE directo a ANISE. Ventaja: esta nueva ruta es paralela (20 NM lateral) a la ruta de llegada en el tramo NEROK/ TELAK (Distancia 784 NM CRR a ANISE)			
Alternative "B": eliminate UM540 and establish a new route with the following trajectory: UM661 up to coordinates 33.49.5S/54.36.9W (WPU2) from there on, uni-directional South/Nort direct to ANISE. Advantage: this new route is parallel (20 NM lateral) to the arrival route in segment NEROK/TELAK (Distance 784 NM CRR to ANISE).			

05	Mdeo/ Rio de Janeiro		
Ruta actual /Current route (FliteStar)		UM540, UN857,	Notas/Notes
Distancia actual Current distance		989	
*Número de vuelos mensuales *Number of monthly flights		67	
*Tipo de aeronave más utilizada *Type of most used aircraft		CRJ9	
Trayectoria propuesta Trajectory proposed		UM661 O UN857 luego de TELAK a NEROK	
Distancia de trayectoria propuesta Distance of proposed trajectory		986	
Millas reducidas Reduced miles		3	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-700/ 2209,9	
Estados involucrados States involved		Uruguay, Brazil	
Observaciones Remarks			
*De acuerdo a información disponible/As per available information			
En este trayecto puede utilizarse la RNAV existente, UM661 para posterior ingresar por una STAR o por la UN857 hasta interceptar la trayectoria de la ruta entre TELAK a NEROK y seguir por ésta a Rio. The existing RNAV route UM661 may be used in this segment to further enter through a STAR or UN857 until intercepting trajectory of route between TELAK to NEROK and follow it up to Rio.			



06	Sao Paulo/ Santiago (Unidireccional)		
Ruta actual /Current route (FliteStar)		UL310, UM400, UA307, UA306	Notas/Notes
Distancia actual Current distance		1419	
*Número de vuelos mensuales *Number of monthly flights		332	
*Tipo de aeronave más utilizada *Type of most used aircraft		A319, A320, B738, B763, B773	
Trayectoria propuesta Trajectory proposed		Ruta Unidireccional, sentido DORMI a <del>UMKAL</del> / Unni-directional route, direction DORMI to <del>UNMKAL</del>	
Distancia de trayectoria propuesta Distance of proposed trajectory		1402	
Millas reducidas Reduced miles		17	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-70500/ 222568,5	
Estados involucrados States involved		Brazil, Uruguay, Argentina, Chile	
Observaciones Remarks		Propuesta basada en pedido de Brazil para disponer de rutas paralelas de TMA Sao Paulo/Rio y al pedido de LAN en esos tramos Proposal based on request from Brazil to have parallel routes from Sao Paulo/Rio TMA and te request of LAN in these segments.	
*De acuerdo a información disponible/As per available information			
Nueva Ruta Unidireccional, sentido Sao Paulo a Santiago entre posición DORMI a <del>UNKAL</del> <del>UMKAL</del> , sirviendo de salida de la TMA San Paulo o Rio, además tanto Brazil como LAN han solicitado el trayecto en cuestión, puede apreciarse de hecho un ahorro 17 NM del trayecto actualmente utilizado y la RNAV propuesta New uni-directional route, direction Sao Paulo to Santiago between position DORMI to <del>UNKAL</del> <del>UMKAL</del> , serving as exit to Sao Paulo or Rio TMA, in addition both Brazil and LAN have requested the referred segment, there is in fact a saving of 17 NM of segment currently used and the RNAV proposed.			

[Nota: Brasil deberá analizar el impacto en los flujos Curitiba-Sao Pablo](#)

[Argentina deberá analizar la re-alineación de la Ruta UM400 a partir de Córdoba y si es más conveniente la trayectoria ~~UMKAL~~/VOR CBA.](#)

[Note: Brazil shall analyse the impact in air traffic flows Curitiba-Sao Paulo.](#)

[Argentina shall analyse realignment of route UM400 as of Córdoba, if more appropriate path ~~UMKAL~~/VOR CBA.](#)

07	Santiago/ Sao Paulo (Unidireccional)		
Ruta actual /Current route (FliteStar)		UA307, UM400, UW6, UM548, UW47	Notas/Notes
Distancia actual Current distance		1441	
*Número de vuelos mensuales *Number of monthly flights		344	
*Tipo de aeronave más utilizada *Type of most used aircraft		A319, A320, B735, B765, B773	
Trayectoria propuesta Trajectory proposed		Ruta Unidireccional, de NEBEG a ASONO/ REKIR/ UM400 Uni-directional route from NEBEG to ASONO.	<a href="#">Considerer ALBAL para otros tipos de aeronaves /</a>  <a href="#">Consider ALBAL for other types of aircraft.</a>
Distancia de trayectoria propuesta Distance of proposed trajectory		1422	
Millas reducidas Reduced miles		19	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-81600/ 257611,2	
Estados involucrados States involved		Brazil, Uruguay, Argentina, Chile	
Observaciones Remarks		Propuesta basada en pedido de Brazil para disponer de rutas paralelas de TMA Sao Paulo/Rio y al pedido de LAN en esos tramos Proposal base don request from Brazil to have parallel routes from Sao Paulo/Rio TMA and upon request of LAN in these segments.	
*De acuerdo a información disponible/As per available information			
Nueva Ruta Unidireccional, de NEBEG a ASONO. Se eliminaría UM400 tramo REKIR Córdoba y se mantiene UM400 de REKIR a Rio o de lo contrario realignar y extender la UM400 hasta NEBEG y hacerlo unidireccional con sentido Santiago-Rio De este modo se estaría satisfaciendo las demandas de usuarios y reordenando el flujo de los tránsitos permitiendo un mejor aprovechamiento de las trayectorias.			
New uni-directional roue from NEBET to ASONO. UM400 segment REKIR Córdoba would be eliminated and UM400 from REKIR to Rio would be maintained, otherwise realign and extend UM400 up to NEBET and make it uni-directional with direction Santiago-Rio. Thus, demands from users would be met and the air traffic flow would be ordered enabling a best use of trajectories.			

[Nota: Argentina deberá analizar la posibilidad del tramo VOR CBA/ ASONO](#)

[Note: Argentina shall analyse the possibility of the segment VOR CBA/ ASONO.](#)

08	Buenos Aires/Santiago	
Ruta actual /Current route (FliteStar)	UA306,	Notas/Notes
Distancia actual Current distance	637	
*Número de vuelos mensuales *Number of monthly flights	773	
*Tipo de aeronave más utilizada *Type of most used aircraft	A319, A320, B738, B763, B773	
Trayectoria propuesta Trajectory proposed	Trayectoria directa de NUXIM a UMKAL	
Distancia de trayectoria propuesta Distance of proposed trajectory	635	
Millas reducidas Reduced miles	2	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-19100/ 60298,7	
Estados involucrados States involved	Argentina, Chile, Uruguay	
Observaciones Remarks		
*De acuerdo a información disponible/As per available information		
Esta ruta será de utilidad tanto para las salidas de BsAs como de Carrasco. Saliendo de Carrasco por la UA306 hasta posición NUXIM, luego la ruta propuesta hasta UMKAL.		
This route will be useful both for exits from Bs. As. as in Carrasco. Leaving Carrasco through UA306 up to position NUXIM, then the route proposed up to UMKAL.		

Nota: Argentina deberá estudiar la factibilidad de esta Ruta junto con los operadores.

Note: Argentina shall study with the operators the feasibility of this route.

09	Santiago/ Buenos Aires		
Ruta actual /Current route (FliteStar)		UM424	Notas/Notes
Distancia actual Current distance		630	
*Número de vuelos mensuales *Number of monthly flights		773	
*Tipo de aeronave más utilizada *Type of most used aircraft		A319, A320, B738, B763, B773	
Trayectoria propuesta Trajectory proposed		ALBAL a ASADA	
Distancia de trayectoria propuesta Distance of proposed trajectory		628	
Millas reducidas Reduced miles		2	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-19100/ 60298,7	
Estados involucrados States involved		Argentina, Chile	
Observaciones Remarks		Realignar y extender UM424	
*De acuerdo a información disponible/As per available information			
Realignar la UM424 desde posición ALBAL a posición ASADA evitando pasar por VOR SRA (San Rafael), así se obtiene una ruta más directa representando por lo menos un ahorro de 2NM. Esta ruta será de utilidad para entrada a Montevideo. Extendiendo la UM424 hasta posición DORVO para el ingreso al TMA Carrasco o como segunda opción desde ASADA a TIGRE.			
Realign UM424 from ALBAL to ASADA avoing SRA VOR (San Rafael), thus obtaining a more direct route representing at least a saving of 2NM. This route would be useful for the entry to Montevideo. Extending UM424 up to DORVO for entry to Carrasco TMA or as a second choice from ASADA to TIGRE.			

[Nota: Argentina deberá estudiar la factibilidad de esta Ruta junto con los operadores.](#)

[Note: Argentina shall study with the operators the feasibility of this route.](#)

10	Lima/ Sao Paulo (Unidireccional)	
Ruta actual /Current route (FliteStar)	UM415, UW50, UA304, UA320	Notas/Notes
Distancia actual Current distance	1884	
*Número de vuelos mensuales *Number of monthly flights	205	
*Tipo de aeronave más utilizada *Type of most used aircraft	A319, A320	
Trayectoria propuesta Trajectory proposed	EGLAS, VIRU VIRU, BAURU a TMA Sao Paulo	
Distancia de trayectoria propuesta Distance of proposed trajectory	1876	
Millas reducidas Reduced miles	8	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-20100/ 63455,7	
Estados involucrados States involved	Brazil, Bolivia, Perú	
Observaciones Remarks	Las distancias no contemplan tramo Sao Paulo a Rio Distances do not contemplate segment Sao Paulo to Rio	
*De acuerdo a información disponible/As per available information		
La ruta podría iniciarse en EGLAS a la salida del TMA Lima directa a VOR ViruViru luego a VOR BAURU llegando a la TMA Sao Paulo. Posteriormente el tramo interno en la TMA Sao Paulo, debería ser analizado por sus planificadores. Esta ruta también servirá a La Paz, Santa Cruz y Cochabamba por medio de SID y STAR.		
The roue could be initiated in EGLAS at the exit of Lima TMA direct to ViruViru VOR, then to BAURU VOR arriving to Sao Paulo TMA. Further the internal segment in Sao Paulo TMA should be analysed by their planners. This route would also serve La Paz, Santa Cruz and Cochabamba through SID and STAR.		

NOTA: El Grupo de expertos del Proyecto deberán volver a recalcular las distancias porque podría haber más diferencias positivas.

Los operadores deberán analizar esta Ruta considerando Rutas de escape en Cordillera, despresurización, un solo motor operativo, condiciones de turbulencia etc.

Bolivia analizará viabilidad tomando en consideración las Zonas restringidas afectadas y las Rutas domésticas desde Cochabamba. Bolivia deberá proveer en caso positivo el punto de Salida en caso de utilizarla como Ruta troncal.

Note: the Group of Experts of the Project shall again calculate distances because there could be more positive differences.

Operators shall analyse this route taking into consideration exit/escape routes in the mountains, depressurization, one engine in operation, turbulence conditions, etc.

Bolivia shall analyse feasibility, taking into consideration restricted areas affected and domestic routes from Cochabamba. Bolivia shall provide if positive, the entry point in case it is used as a trunk route.

11	Sao Paulo/Lima		
Ruta actual /Current route (FliteStar)		UW50, UM415, UA304, UA320	Notas/Notes
Distancia actual Current distance		1883	
*Número de vuelos mensuales *Number of monthly flights		205	
*Tipo de aeronave más utilizada *Type of most used aircraft		A319, A320	
Trayectoria propuesta Trajectory proposed		VOR SCB a VOR ASIA	Realineamiento de la UM415 de SCB a ASIA / Realignment of UM415 from SCB to ASIA.
Distancia de trayectoria propuesta Distance of proposed trajectory		1879	
Millas reducidas Reduced miles		4	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-10000/ 31570	
Estados involucrados States involved		Brazil, Bolivia, Perú	
Observaciones Remarks		No contempla distancia Rio - Sao Paulo	
*De acuerdo a información disponible/As per available information			
La UM 415 actualmente con su configuración, tiene una extensión de 1842NM Realineando la UM 415 desde el VOR SOROCABA directo a VOR ASIA y una STAR Lima (Distancia 1777NM +54 1831NM), se obtiene un ahorro de 11 NM NOTA: Tanto si se implementa una nueva RNAV o se realinea la UM 415 pueden servir también a La Paz, Santa Cruz (Viru Viru) y Cochabamba mediante conexiones con SID y STAR Esta Ruta también servirá a Rio, La Paz, Santa Cruz y Cochabamba por medio de SID y STAR			
UM415 has an extensión of 1842 NM with its current configuration. By realigning UM415 from SOROCABA VOR direct to ASIA VOR and a Lima STAR (Distance 1777NM +54 1831NM), a saving of 11 NM is obtained. Note: both if a new RNAV route is implemented or UM415 is realigned, may serve La Paz, Santa Cruz (Viru Viru) and Cochabamba through connections with SID and STAR. This route would also serve Rio, La Paz, Santa Cruz and Cochabamba through SID and STAR.			

NOTA: Bolivia analizará viabilidad tomando en consideración las Rutas domésticas desde Cochabamba.

Note: Bolivia shall analyse feasibility, taking into consideration domestic routes from Cochabamba.

12	Sao Paulo/Bogotá		
Ruta actual /Current route (FliteStar)		UM782, UL655	Notas/Notes
Distancia actual Current distance		2368	
*Número de vuelos mensuales *Number of monthly flights		230	
*Tipo de aeronave más utilizada *Type of most used aircraft		B767	
Trayectoria propuesta Trajectory proposed		Reorganizar flujo de transito utilizando rutas existentes	UM782, UL655
Distancia de trayectoria propuesta Distance of proposed trajectory		NO HAY REDUCCIÓN	
Millas reducidas Reduced miles			
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		0/0	
Estados involucrados States involved		Brazil, Colombia	
Observaciones Remarks		Modificar la dirección de la UM782 desde PARDO hacia el Norte como bidireccional, ya lo es en FIR Bogotá/ Modify direction of UM782 from PARDO to the North as Bi-directional, it already is in Bogota FIR.	
*De acuerdo a información disponible/As per available information			
Parecería que no es necesaria una ruta paralela a las rutas mencionadas ya que existen varias rutas RNAV que podrían utilizarse. Se propone reorganizar el flujo y utilizar las rutas existentes. Se sugiere estudiar la posibilidad de modificar la dirección de la UM 782 desde PARDO hacia el norte como bidireccional. (ya es bidireccional en la FIR Bogotá) Haciendo la reorganización se obtendrá una reducción de entre 10 y 18 NM. Las UM 782 y UL 655 son dos rutas que SALEN de TMA Sao Paulo y van a Centroamérica y Cali respectivamente (sigue hacia Centroamérica).			
A parallel route to those mentioned would not seem to be necessary, since there are several RNAV routes that could be used. It is proposed to reorganize the flow and use existing routes. It is suggested to study the possibility to modify direction UM782 from PARDO to the north as bi-directional (it is bi-directional already in the Bogota FIR). A reduction of 10 to 18NM will be obtained through the reorganization. UM782 and UL655 are two routes leaving Sao Paulo TMA and go to Central America and Cali respectively (follows to Central America).			

13	Sao Paulo/ Caracas		
Ruta actual /Current route (FliteStar)		UL304, UW27, UM417	Notas/Notes
Distancia actual Current distance		2408	
*Número de vuelos mensuales *Number of monthly flights		49	
*Tipo de aeronave más utilizada *Type of most used aircraft		B738	
Trayectoria propuesta Trajectory proposed		UM417 MIQ, TUY, BRU	Realinear MIQ, TUY, Baurú. Realign MIQ, TUY, Baurú
Distancia de trayectoria propuesta Distance of proposed trajectory		2388	
Millas reducidas Reduced miles		20	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-12000/ 37884	
Estados involucrados States involved		Brazil, Venezuela	
Observaciones Remarks			
*De acuerdo a información disponible/As per available information			
Será interesante analizar la posibilidad de realinear y extender la UM417 de modo a obtener mayor y mejor aprovechamiento del tramo existente, así mismo observar el sentido de circulación del tránsito para optimizar los resultados. It will be interesting to analyze the possibility to realign and extend UM417 so as to obtain greater and better advantage of the exsiting segment, and also to observe the air traffic circulation direction to optimize the results.			

NOTA: Brasil estudiará la posibilidad de la Salida a utilizar.

Note: Brazil shall study feasibility of exit point to be used.



14	Asunción/Bs As	
Ruta actual /Current route (FliteStar)	UA556, UW64, UW65, UW11	Notas/Notes
Distancia actual Current distance	587	
*Número de vuelos mensuales *Number of monthly flights	400	
*Tipo de aeronave más utilizada *Type of most used aircraft	A320, B727, B738, F900	
Trayectoria propuesta Trajectory proposed	WPY1 (26° 4'18"S 057°35'54"W) a/to VOR GUA	Bidireccional/ Bi-directional
Distancia de trayectoria propuesta Distance of proposed trajectory	577	
Millas reducidas Reduced miles	10	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-49100/ 155008,7	
Estados involucrados States involved	Argentina, Paraguay	
Observaciones Remarks	Analizar la posibilidad de eliminar la UA556 con un periodo de evaluación de tres meses/ Analyse the possibility to eliminate UA556 with a three-month period assessment.	
*De acuerdo a información disponible/As per available information		
Con vistas a mejorar las trayectorias y atendiendo la cantidad de operaciones en este tramo, considerar la opción de eliminar la UA556 o realinearla y convertirla en RNAV.		
With a view to improve trajectories and attending the amount of operations in this segment, consider the possibility to eliminate UA556 or realign it and convert it into RNAV.		

NOTA: Argentina analizará la propuesta y factibilidad con los usuarios de la Ruta.

Note: Argentina shall analyse proposal and feasibility with users of this route.

15	Lima/Monteideo		
Ruta actual /Current route (FliteStar)		UL550, UW7, UA558, UW8, UB555	Notas/Notes
Distancia actual Current distance		1823	
*Número de vuelos mensuales *Number of monthly flights		54	
*Tipo de aeronave más utilizada *Type of most used aircraft		A319, A320	
Trayectoria propuesta Trajectory proposed		UL550/VOR TUC/ VOR ERE/ NIMBO	Bidireccional/ Bi-directional
Distancia de trayectoria propuesta Distance of proposed trajectory		1790	
Millas reducidas Reduced miles		33	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-25100/ 79240,7	
Estados involucrados States involved		Perú, Chile, Argentina, Uruguay	
Observaciones Remarks			
*De acuerdo a información disponible/As per available information.			
En esta trayectoria propuesta se ...			
In this trajectory proposed ...			

NOTA: Argentina analizará la propuesta y factibilidad con los usuarios de la Ruta.

Note: Argentina shall analyse proposal and feasibility with users of this route.

|

16	Lima/Asunción		
Ruta actual /Current route (FliteStar)		UA320	Notas/Notes
Distancia actual Current distance		1387	
*Número de vuelos mensuales *Number of monthly flights		62	A partir del 20 de marzo Taca está realizando Vuelos diarios Lima – ASU - Lima
*Tipo de aeronave más utilizada *Type of most used aircraft		A319	
Trayectoria propuesta Trajectory proposed		VOR VAS/ VOR EQU/ UM793/ VOR ASIA/LIMA	Del/From VOR VAS a/to WPY2 (24°47'48.00"S 058°17'42.00"W) a/to PILCO (Punto de Transferencia/Transference point FIR Resistencia/ La Paz) al/to VOR AREQUIPA y se empalma con la/and connects with UM793 hasta/to VOR ASIA y de allí a/and thereon to LIMA.
Distancia de trayectoria propuesta Distance of proposed trajectory		1368	
Millas reducidas Reduced miles		19	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-14500/ 45776,5	
Estados involucrados States involved		Perú, Bolivia, Argentina, Paraguay	
Observaciones Remarks		*Al tiempo de la toma de muestra, no existían vuelos, ahora se cuenta con 62 vuelos mensuales/ *When the sample was taken, no flights existed, now there are 62 monthly flights.	
*De acuerdo a información disponible/As per available information			

17	Lima/Foz Iguacu	
Ruta actual /Current route (FliteStar)	UA320, UM548	Notas/Notes
Distancia actual Current distance	1553	
*Número de vuelos mensuales *Number of monthly flights	62	
*Tipo de aeronave más utilizada *Type of most used aircraft	A319, DC10	
Trayectoria propuesta Trajectory proposed	<del>VOR-ASIA</del> VAMUT/ BITUR	Bidireccional/Bi-directional de/from LIMA al/to <del>VOR-ASIA</del> VAMUT a la Posición/to position BITUR de la TMA FOZ (STAR para SGES, SBFI, SARI)
Distancia de trayectoria propuesta Distance of proposed trajectory	1528	
Millas reducidas Reduced miles	25	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-19000/ 59983	
Estados involucrados States involved	Perú, Bolivia, Paraguay, Brazil	
Observaciones Remarks	*Al tiempo de la toma de muestra, no existían vuelos regulares, actualmente se registran vuelos de carga entre SPIM/SGES y de pasajeros entre SPIM/SBFI. Igualmente esta ruta puede servir a Asunción, Cataratas y Guaraní. * When the simple was obtained, no regular flights existed, currently there are freight flights between SPIM/SGES and passengers from SPIM/SBFI. Likewise this route may serve Asunción, Cataratas and Guaraní.	
*De acuerdo a información disponible/As per available information.		

NOTA: Perú informa que la Salida sería por la posición PERLA.

Note: Peru informs that exit would be through position PERLA.

19	Lima/Buenos Aires		
Ruta actual /Current route (FliteStar)		UL550, UA558, UW24	Notas/Notes
Distancia actual Current distance		1715	
*Número de vuelos mensuales *Number of monthly flights		570	
*Tipo de aeronave más utilizada *Type of most used aircraft		A319, A320, B738, B763, B773	
Trayectoria propuesta Trajectory proposed		UL550/ VOR CALAMA/ <del>VOR</del> <a href="#">ASIAVAMUT</a>	
Distancia de trayectoria propuesta Distance of proposed trajectory		1707	
Millas reducidas Reduced miles		8	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-56000/ 176792	
Estados involucrados States involved		Perú, Chile, Argentina	
Observaciones Remarks		También se sugiere analizar el realineamiento de la UL550, VOR Calama a ASIA, en el descenso, afectaría a Zona Restringida San Juan de Marcona. It is also suggested to analyse the realignment of UL550, Calama VOR to ASIS in the descent, it would affect the restricted area of San Juan de Marcona.	
*De acuerdo a información disponible/As per available information.			

20	Buenos Aires/Bogotá		
Ruta actual /Current route (FliteStar)		UB689, UA301, UL417, UW8,	Notas/Notes
Distancia actual Current distance		2551	
*Número de vuelos mensuales *Number of monthly flights		44	
*Tipo de aeronave más utilizada *Type of most used aircraft		A332, A342, B763, MD11	
Trayectoria propuesta Trajectory proposed		VOR ROSARIO/Posición MORRO	
Distancia de trayectoria propuesta Distance of proposed trajectory		2549	
Millas reducidas Reduced miles		2	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-2200/ 6945,4	
Estados involucrados States involved		Argentina, Bolivia, Brazil, Colombia	
Observaciones Remarks			
*De acuerdo a información disponible/As per available information.			

NOTA: Argetina analizará la factibilidad de la Ruta con los operadores.

Note: Argentina shall analyse proposal and feasibility with users of this route.

21	Buenos Aires/GUAYAQUIL/Quito		
Ruta actual /Current route (FliteStar)		UW5, UL550, UG436, UL780	Notas/Notes
Distancia actual Current distance		2337	
*Número de vuelos mensuales *Number of monthly flights		22	
*Tipo de aeronave más utilizada *Type of most used aircraft		B737	
Trayectoria propuesta Trajectory proposed		VOR ROSARIO/ Posición CANOA	Realineamiento/ Realignment
Distancia de trayectoria propuesta Distance of proposed trajectory		2300	
Millas reducidas Reduced miles		37	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-10000/ 31570	
Estados involucrados States involved		Argentina, Chile, Perú, Ecuador	
Observaciones Remarks			
*De acuerdo a información disponible/As per available information			

NOTA: Los Estados involucrados y los operadores deberán estudiar la factibilidad de la Ruta

Note: States involved and operators shall study feasibility of the route.



22	SANTIAGO/BOGOTÁ		
Ruta actual /Current route (FliteStar)		UG551, UL300	Notas/Notes
Distancia actual Current distance		2339	
*Número de vuelos mensuales *Number of monthly flights		140	
*Tipo de aeronave más utilizada *Type of most used aircraft		A332, A342, B763, MD11	
Trayectoria propuesta Trajectory proposed		VOR TABON/ Posición MORRO	
Distancia de trayectoria propuesta Distance of proposed trajectory		2296	
Millas reducidas Reduced miles		43	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-73800/ 232986,6	
Estados involucrados States involved		Chile, Perú, Brazil, Colombia	
Observaciones Remarks			
*De acuerdo a información disponible/As per available information.			

NOTA: Los Estados involucrados y los operadores deberán estudiar la factibilidad de la Ruta y además se deberá verificar la distancia de la misma.

Note: States involved and operators shall study feasibility of the route and also the distance of the same must be studied.

23	SAO PAULO/ QUITO		
Ruta actual /Current route (FliteStar)		UM776, UA321, UB554, UZ8, UL201,	Notas/Notes
Distancia actual Current distance		2377	
*Número de vuelos mensuales *Number of monthly flights		70	Solo se registran vuelos de carga/ Only freight flights are registered
*Tipo de aeronave más utilizada *Type of most used aircraft		B744, B763, MD11	
Trayectoria propuesta Trajectory proposed		QUITO/BAURÚ	Ruta Bidireccional/ Bi-directional route
Distancia de trayectoria propuesta Distance of proposed trajectory		2332	
Millas reducidas Reduced miles		45	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-38600/ 121860,2	
Estados involucrados States involved		Ecuador, Perú, Brazil, Bolivia	
Observaciones Remarks		Esta ruta es casi paralela con la ruta SAO PAULO /BAURU/ GUAYAQUIL Considerar eliminación o extensión de la UL776, QUITO/ IQUITOS. This route is almost parallel to route SAO PAULO /BAURU/ GUAYAQUIL. Consider elimination or extension of route UL776, QUITO/ IQUITOS.	
*De acuerdo a información disponible/As per available information.			

**NOTA:** Brasil analizará la llegada y salida en BAURU.

**Note:** Brazil shall analyse entry and exit in BAURU.

24	LIMA/CARACAS		
Ruta actual /Current route (FliteStar)		UM414, UG427, TOSAL	Notas/Notes
Distancia actual Current distance		1502	
*Número de vuelos mensuales *Number of monthly flights		272	
*Tipo de aeronave más utilizada *Type of most used aircraft		A319, A320, A321, A343, B733, B762, B763	
Trayectoria propuesta Trajectory proposed		UM414/ AMBEX/ DAVEX/ UL216	Realineamiento de la UM414 o la creación de una nueva RNAV/ Realignment of route UM414 or creation of a new RNAV route
Distancia de trayectoria propuesta Distance of proposed trajectory		1486	
Millas reducidas Reduced miles		16	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-53400/ 168583,8	
Estados involucrados States involved		Perú, Colombia, Venezuela	
Observaciones Remarks		Implantar nueva ruta RNAV o realinear la UM414, desde posición AMBEX a DAVEX/ Implement new RNAV route or realign UM414 from AMBEX to DAVEX.	
*De acuerdo a información disponible/As per available information.			

NOTA: Venezuela estudiará esta Ruta con la opción de Puerto Cabello.

Note: Venezuela shall study this route with the option of Puerto Cabello.

26	ASUNCIÓN/SANTA CRUZ	
Ruta actual /Current route (FliteStar)	UA321	Notas/Notes
Distancia actual Current distance	559	
*Número de vuelos mensuales *Number of monthly flights	80	
*Tipo de aeronave más utilizada *Type of most used aircraft	A320, B732	
Trayectoria propuesta Trajectory proposed	<del>VOR VAS/VOR</del> <del>VIRUKELA/PORGO</del>	
Distancia de trayectoria propuesta Distance of proposed trajectory	553	
Millas reducidas Reduced miles	6	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-6300/ 19889,1	
Estados involucrados States involved		
Observaciones Remarks	Paraguay, Bolivia <a href="#">analizarán la eliminación de la Ruta UA321. Will analyse elimination of route UA321.</a>	
*De acuerdo a información disponible/As per available information.		

27	LIMA/GUAYAQUIL	
Ruta actual /Current route (FliteStar)	UG436, UL780,	Notas/Notes
Distancia actual Current distance	626	
*Número de vuelos mensuales *Number of monthly flights	<a href="#">204125</a>	
*Tipo de aeronave más utilizada *Type of most used aircraft	A319, B763, LJ45	
Trayectoria propuesta Trajectory proposed	CANOA/GALGO	
Distancia de trayectoria propuesta Distance of proposed trajectory	613	
Millas reducidas Reduced miles	13	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-32500/ 102602,5	
Estados involucrados States involved	Perú, Ecuador	<a href="#">Perú y Ecuador analizarán su factibilidad.</a> <a href="#">Peru and Ecuador shall analyse its feasibility.</a>
Observaciones Remarks		
*De acuerdo a información disponible/As per available information.		

29	LIMA/BOGOTÁ	
Ruta actual /Current route (FliteStar)	UL305, W16	Notas/Notes
Distancia actual Current distance	1036	
*Número de vuelos mensuales *Number of monthly flights	<a href="#">662390</a>	
*Tipo de aeronave más utilizada *Type of most used aircraft	A319, A320, B732, B735, B752, B762, B763. MD11	
Trayectoria propuesta Trajectory proposed	AMV <b>B</b> EX/MORRO	
Distancia de trayectoria propuesta Distance of proposed trajectory	1014	
Millas reducidas Reduced miles	22	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	<del>-178600/-563840,2-</del>	<a href="#">recalcular</a>
Estados involucrados States involved	<a href="#">Perú, Colombia</a>	
Observaciones Remarks		
*De acuerdo a información disponible/As per available information.		

30	BOGOTÁ/QUITO/GUAYAQUIL	
Ruta actual /Current route (FliteStar)	UQ104, UA550, UG438	Notas/Notes
Distancia actual Current distance	394	
*Número de vuelos mensuales *Number of monthly flights	309	NILL
*Tipo de aeronave más utilizada *Type of most used aircraft	NILL	
Trayectoria propuesta Trajectory proposed	COLTA/MORRO	
Distancia de trayectoria propuesta Distance of proposed trajectory	388	
Millas reducidas Reduced miles	6	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-53400/ 168583,8	
Estados involucrados States involved	Colombia, Ecuador	<a href="#">Analizar la factibilidad.</a> <a href="#">Analyse feasibility.</a>
Observaciones Remarks	Analizar la posibilidad de transformar la UA550 en RNAV/ Analyse the possibility to convert US550 into RNAV.	
*De acuerdo a información disponible/As per available information.		

31	PANAMÁ/LIMA		
Ruta actual /Current route (FliteStar)		UM674	Notas/Notes
Distancia actual Current distance		1285	
*Número de vuelos mensuales *Number of monthly flights		<a href="#">250</a>	
*Tipo de aeronave más utilizada *Type of most used aircraft			
Trayectoria propuesta Trajectory proposed		Mantener ruta	
Distancia de trayectoria propuesta Distance of proposed trajectory			
Millas reducidas Reduced miles			
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		0/0	
Estados involucrados States involved			
Observaciones Remarks		No sería necesario modificar la ruta actual/ It would nt be necessary to modify current route.	
*De acuerdo a información disponible/As per available information.			

32	PANAMÁ/BOGOTÁ		
Ruta actual /Current route (FliteStar)		UA317	Notas/Notes
Distancia actual Current distance		410	
*Número de vuelos mensuales *Number of monthly flights		NILL	
*Tipo de aeronave más utilizada *Type of most used aircraft		NILL	
Trayectoria propuesta Trajectory proposed		NILL	
Distancia de trayectoria propuesta Distance of proposed trajectory			
Millas reducidas Reduced miles			
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		0/0	
Estados involucrados States involved		<a href="#">Panamá, <del>Venezuela</del>, Colombia</a>	<a href="#">Colombia analizar factibilidad Colombia shall analyse feasibility.</a>
Observaciones Remarks		Evaluar si será pertinente convertir la UA317 en RNAV, no habría ventaja en reducción de millas/ Evaluate if it would be pertinent to convert UA317 into RNAV, no advantage in miles reduction would exist.	
*De acuerdo a información disponible/As per available information.			

33	PANAMÁ/CARACAS		
	Ruta actual /Current route (FliteStar)	UA553	Notas/Notes
	Distancia actual Current distance	750	
	*Número de vuelos mensuales *Number of monthly flights	229	
	*Tipo de aeronave más utilizada *Type of most used aircraft	B722, B727, B732, B737, B738	
	Trayectoria propuesta Trajectory proposed	MUBAR/PUERTO CABELLO (PBL)	
	Distancia de trayectoria propuesta Distance of proposed trajectory	745	
	Millas reducidas Reduced miles	5	
	Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-26900/ 84923,3	
	Estados involucrados States involved	<a href="#">Panamá, Venezuela y Colombia</a>	<a href="#">Venezuela y Colombia analizar factibilidad. Colombia and Venezuela analyse feasibility.</a>
	Observaciones Remarks		
*De acuerdo a información disponible/As per available information			

34	PANAMÁ/SAO PAULO		
	Ruta actual /Current route (FliteStar)	UA317, UL201	Notas/Notes
	Distancia actual Current distance	2756	
	*Número de vuelos mensuales *Number of monthly flights	<a href="#">NILL60</a>	
	*Tipo de aeronave más utilizada *Type of most used aircraft	NILL	
	Trayectoria propuesta Trajectory proposed	Se sugiere analizar extender la UL201 de MITU a ITAGO	
	Distancia de trayectoria propuesta Distance of proposed trajectory	2742	
	Millas reducidas Reduced miles	14	
	Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-37800/ 119334,6	
	Estados involucrados States involved	<a href="#">Panamá, Brasil y Colombia</a>	<a href="#">Colombia analizar factibilidad Colombia analyse feasibility.</a>
	Observaciones Remarks	Se sugiere analizar la Extensión de la UL201 de MITU hasta <a href="#">ITAGOISAKU</a> , Reducción de millas no es significativa	
*De acuerdo a información disponible/As per available information			



35	PANAMÁ/SANTIAGO		
Ruta actual /Current route (FliteStar)		UM674, UL302UL 780	Notas/Notes
Distancia actual Current distance		2618	
*Número de vuelos mensuales *Number of monthly flights		59170	
*Tipo de aeronave más utilizada *Type of most used aircraft		B737, B738 ,B744	
Trayectoria propuesta Trajectory proposed		REPAL/TABON	
Distancia de trayectoria propuesta Distance of proposed trajectory		2590	
Millas reducidas Reduced miles		28	<a href="#">Recalcular ahoros</a>
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-69400/ 219095,8	
Estados involucrados States involved		Panamá, Colombia, Ecuador, Perú, Chile	
Observaciones Remarks			
*De acuerdo a información disponible/As per available information			

36	PANAMÁ/BS AS		
Ruta actual /Current route (FliteStar)		UA558, UW8	Notas/Notes
Distancia actual Current distance		2894	
*Número de vuelos mensuales *Number of monthly flights		109	
*Tipo de aeronave más utilizada *Type of most used aircraft		B737, B738	
Trayectoria propuesta Trajectory proposed		REPAL/VOR PAR	
Distancia de trayectoria propuesta Distance of proposed trajectory		2858	
Millas reducidas Reduced miles		36	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-116500/ 367790,5	
Estados involucrados States involved		Panamá, Colombia, Ecuador, Perú, Brazil, Bolivia, Argentina	<a href="#">Panamá está de acuerdo. Demás Estados involucrados analizar factibilidad./ Panama is in agreement. The rest of States should analyse feasibility.</a>
Observaciones Remarks		Esta ruta serviría también a para Montevideo, insertando un punto en la intersección con la UM400, a 47 NM sur de CERES En una segunda opción analizar la UB555 (ver Mdeo/Lima) si se mantiene esta la ruta Panamá/Mdeo, puede interceptar Paraná y luego UB555 a Mdeo. This route would also serve for Montevideo, inserting a point in the intersection with UM400, 47NM South from CERES. In a second option, analyse UB555 (see Mdeo/Lima) if this route Panama/Mdeo is maintained, it may intercept Paraná and then UB555 to Mdeo.	
*De acuerdo a información disponible/As per available information.			

37	SANTIAGO/CARACAS	
Ruta actual /Current route (FliteStar)	UL216, UL309	Notas/Notes
Distancia actual Current distance	2659	
*Número de vuelos mensuales *Number of monthly flights	NILL	
*Tipo de aeronave más utilizada *Type of most used aircraft	B763	
Trayectoria propuesta Trajectory proposed	TABON/DAVEX	
Distancia de trayectoria propuesta Distance of proposed trajectory	2640	
Millas reducidas Reduced miles	19	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	-3700/ 11680,9	
Estados involucrados States involved	Chile, Bolivia, Brazil, Colombia, Venezuela	
Observaciones Remarks		
*De acuerdo a información disponible/As per available information.		

38	CARACAS/QUITO		
Ruta actual /Current route (FliteStar)		UA550	Notas/Notes
Distancia actual Current distance		965	
*Número de vuelos mensuales *Number of monthly flights		NILL	
*Tipo de aeronave más utilizada *Type of most used aircraft		NILL	
Trayectoria propuesta Trajectory proposed		MORRO/VOR PBL	
Distancia de trayectoria propuesta Distance of proposed trajectory		950	
Millas reducidas Reduced miles		15	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		-30100/ 95025,7	
Estados involucrados States involved		Venezuela, Colombia, Ecuador	<a href="#">Estados estudiar factibilidad</a> <a href="#">States shall study feasibility.</a>
Observaciones Remarks		Analizar si se implementa, también se puede extender la nueva RNAV de Quito a Bogotá desde MORRO a VOR PBL (950 NM)/ Analyse if it is to be implemented, the new RNAV may also be extended from Quito to Bogotá from MORRO to PBL VOR (950 NM).	
*De acuerdo a información disponible/As per available information .			

39	CARACAS/BOGOTÁ		
Ruta actual /Current route (FliteStar)		UA550	Notas/Notes
Distancia actual Current distance		571	
*Número de vuelos mensuales *Number of monthly flights		594	
*Tipo de aeronave más utilizada *Type of most used aircraft		A319	
Trayectoria propuesta Trajectory proposed			
Distancia de trayectoria propuesta Distance of proposed trajectory		571	
Millas reducidas Reduced miles			
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		0/0	
Estados involucrados States involved			
Observaciones Remarks		No hay ventaja operativa, considerar transformar UA550 en RNAV/ No operational advantage, consider converting UA550 into RNAV.	
*De acuerdo a información disponible/As per available information.			

40	BARRANQUILLA/MAIQUETÍA	
Ruta actual /Current route (FliteStar)	UA552	Notas/Notes
Distancia actual Current distance	465	
*Número de vuelos mensuales *Number of monthly flights	36	
*Tipo de aeronave más utilizada *Type of most used aircraft	A330, A319	
Trayectoria propuesta Trajectory proposed	NILL	
Distancia de trayectoria propuesta Distance of proposed trajectory		
Millas reducidas Reduced miles		
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	0/0	
Estados involucrados States involved	Colombia, Venezuela	
Observaciones Remarks	No será necesaria nueva ruta, analizar conversión a RNAV la UA552/ No new route will be necessary, convert UA552 to RNAV	
*De acuerdo a información disponible/As per available information		

41	CARACAS/BSAS		
Ruta actual /Current route (FliteStar)		UL793	Notas/Notes
Distancia actual Current distance		2784	
*Número de vuelos mensuales *Number of monthly flights		86	
*Tipo de aeronave más utilizada *Type of most used aircraft		A319, B735	
Trayectoria propuesta Trajectory proposed		DAVEX/PAR	
Distancia de trayectoria propuesta Distance of proposed trajectory		2637	
Millas reducidas Reduced miles			
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		155000/ 489335	
Estados involucrados States involved		Venezuela, Brazil, Bolivia, Paraguay, Argentina	
Observaciones Remarks		Actualmente no hay ruta directa/Currently there is no direct route.	
*De acuerdo a información disponible/As per available information.			

42	GUAYAQUIL/MADRID		
Ruta actual /Current route (FliteStar)		UA550	Notas/Notes
Distancia actual Current distance		1369NM	Hasta limite/Up to boundary FIR Maiquetía/Piarco/
*Número de vuelos mensuales *Number of monthly flights		62	
*Tipo de aeronave más utilizada *Type of most used aircraft		B763	
Trayectoria propuesta Trajectory proposed		CARTE/DAREK	
Distancia de trayectoria propuesta Distance of proposed trajectory		1345	
Millas reducidas Reduced miles		24	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>			
Estados involucrados States involved		Ecuador, Colombia, Venezuela,	
Observaciones Remarks		Actualmente no hay ruta directa/Currently there is no direct route.	
*De acuerdo a información disponible/As per available information.			

43	SAO PAULO/GUAYAQUIL	
Ruta actual /Current route (FliteStar)	UM656, UM655, UB554, UA321, UM665	Notas/Notes
Distancia actual Current distance	2392	
*Número de vuelos mensuales *Number of monthly flights	NILL	
*Tipo de aeronave más utilizada *Type of most used aircraft	NILL VOR BAURÚ/ CANOA	
Trayectoria propuesta Trajectory proposed	2329	
Distancia de trayectoria propuesta Distance of proposed trajectory	63 Nnnn/Tons//nnnn/Tons.	
Millas reducidas Reduced miles	Brazil, Bolivia, Perú, Ecuador	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>		
Estados involucrados States involved		
Observaciones Remarks		<a href="#">Equipo de expertos volver a analizar la Ruta. Experts team analyse again the route.</a>
*De acuerdo a información disponible/As per available information.		

<b>44</b>	<b>SAO PAULO/GUAYAQUIL, QUITO</b>	
<b>Ruta actual /Current route (FliteStar)</b>	<b>UM656, UM655, UB554, UA321, UM665</b>	<a href="#">Notas/Notes</a>
Distancia actual Current distance	<a href="#">2392</a> <a href="#">Notas/Notes</a>	
*Número de vuelos mensuales *Number of monthly flights	<a href="#">2392</a>	
*Tipo de aeronave más utilizada *Type of most used aircraft	NILL NILL	
Trayectoria propuesta Trajectory proposed	VOR BAURÚ/ PARDO/CANOA	
Distancia de trayectoria propuesta Distance of proposed trajectory	Ruta alterna solicitada por LAN. 2378 Alternate route requested by LAN. 2378	
Millas reducidas Reduced miles	14	
Reducción de Combustible/ CO <sub>2</sub> aproximado Fuel Savings / approximate CO <sub>2</sub>	Nnnn/Tons//nnnn/Tons.	
Estados involucrados States involved	Brazil, Perú, Ecuador	<a href="#">Brasil y Ecuador estudiar factibilidad. Brazil and Ecuador analyse feasibility.</a>
Observaciones Remarks	Esta trayectoria fue solicitada por LAN/ This trajectory was requested by LAN.	
*De acuerdo a información disponible/As per available information		







# **APÉNDICE APPENDIX C**



Project RLA 06/901

Assistance for the implementation of a regional ATM system based on  
the ATM operational concept and the corresponding  
technological support for communications, navigation,  
and surveillance (CNS)

**GUIDANCE FOR THE IMPLEMENTATION OF FLEXIBLE  
USE OF AIRSPACE (FUA) CONCEPT IN THE SOUTH  
AMERICAN REGION**

First Edition  
April 2012

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# **Guidance for the Implementation of Flexible Use of Airspace (Fua) Concept in the South American Region**

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## PREFACE

The Guidance for the Implementation of the Flexible Use of Airspace (FUA) Concept at ICAO South American Region (Guidance FUA / SAM) is published by the ICAO's South American Regional Office on behalf of ICAO's South American Regional Implementation Group (SAMIG). It considers the different aspects that States should take into account for the coordination and cooperation between civil and military air traffic, recognizing that the airspace is a common resource of civil and military aviation, that allows to achieve safety, consistency and efficiency of civil aviation and to meet military air traffic requirements through the implementation of dynamic airspace.

The Regional Office, on behalf of SAMIG shall publish revised versions of the SAM/FUA Guidance needed to keep a duly updated document.

You can request copies of the SAM/FUA Guidance at:

ICAO's SAM OFFICE LIMA, PERU		
E-mail	:	<a href="mailto:mail@lima.icao.int">mail@lima.icao.int</a>
Website	:	<a href="http://www.lima.icao.int">www.lima.icao.int</a>
Tel:	:	+511 6118686
Fax	:	+511 6118689
Address	:	P.O. Box 4127, Lima 100, Peru
Contact e-mail	:	<a href="mailto:cfigueiredo@lima.icao.int">cfigueiredo@lima.icao.int</a> <a href="mailto:rlarca@lima.icao.int">rlarca@lima.icao.int</a>

This edition (*Version 0.0*) includes all other revisions and amendments as of April 2011. Subsequent amendments and corrigenda shall appear in the Amendment and Corrigenda Record Table, pursuant to the procedure set forth below.

*The publishing of amendments and corrigenda is announced regularly through correspondence with the States and International Organisations, and at the ICAO's Regional South American Office website, mandatory reference for those who use this publication. Blank cells are meant to facilitate note-taking.*

## RECORD OF AMENDMENTS AND CORRIGENDA

[illegible][illegible]

## ACRONYMS AND ABBREVIATIONS

ACC	Area Control Centre
AD	Aerodrome
ADIZ	Air Defence Identification Zone
AIP	Aeronautical Information Publication
AMC	Airspace Management Cell (AMC)
ANSP	Air Navigation Service Provider
ASM	Airspace Management
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATS	Air Traffic Services
AUP	Airspace Utilization Plan
CADF	Centralised Airspace Data Function
CBA	Cross Border Area
CBP	Customs and Border Protection
CDM	Collaborative Decision Making
CDR	Conditional Route
CFMU	Central Flow Management Unit
CNS/ATM	Communication, Navigation and Surveillance/Air Traffic Management
CRAM	Conditional Route Availability Message
ENR	En route
EUROCONTROL	European Organisation for the Safety of Air Navigation
FAA	Federal Aviation Administration
FAUP	Forecast Airspace Utilization Plan
FIR	Flight Information Region
FMU/FMP	Flow Management Unit/Flow Management Position
FUA	Flexible Use of Airspace
FUUP	Forecast Update of the Utilization Plan
GAT	General Air Traffic
GEN	General
GNSS	Global Navigation Satellite System
GPI	Global Plan Initiatives
LOA	Letter of Agreement
MOA	Military Operation Area
MOU	Memorandum of Agreement
MSL	Mean Sea Level
NextGen	Next Generation
NOTAM	Notice to Airmen
PANS	Procedures for Air Navigation Services
PBN	Performance-Based Navigation
PIRG	Planning and Implementation Regional Group
PFF	Performance Framework Form
RPA	Remotely Piloted Aircraft
RPAS	Remotely Piloted Aircraft System
RPS	Remotely Piloted Station
SAR	Search and Rescue
SARPS	Standards and Recommended Practices



SAM-PBIP	Performance-Based Implementation Plan for SAM Region
SESAR	Single European Sky ATM Research
SMS	Safety Management Systems
SUA	Special Use Airspace
SUPPS	Regional Supplementary Procedures
TRA	Temporary Reserved Areas
TSA	Temporary Segregated Areas
UAS	Unmanned Aircraft System
UIR	Upper Flight Information Region

## APPLICABLE DEFINITIONS IN THIS SAM/FUA GUIDANCE

**Remotely Piloted Aircraft.** Aircraft whose pilot is not on board.

**Temporary Reserved Area (TRA).** Airspace temporarily reserved and allocated for the specific use of a particular user during a determined period of time, through which other flights may pass with permission from air traffic control (ATC).

**Temporary Segregated Area (TSA).** Airspace temporarily reserved and allocated for the exclusive use of a specific user during a determined period of time, through which no other flights may pass.

**Cross Border Area (CBA).** Reserved or segregated airspace established for specific operational requirements on international borders.

**Air traffic service unit.** A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

**Segregated Airspace.** Airspace of specific dimensions allocated for the exclusive use of a user or users.

**Remote Pilot Station (RPS).** A station from which the pilot remotely operates the flight of an unmanned aircraft.

**Air Traffic Flow Management (ATFM).** A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that AT capacity is utilised to the maximum extent possible, and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

**Airspace Management (ASM).** Process whereby airspace options are selected and applied in order to meet the airspace users' needs.

**Air Traffic Management (ATM).** The dynamic, integrated management of air traffic and airspace (including air traffic services, airspace management and air traffic flow management) under safe, cost-effective, and efficient conditions by providing facilities and seamless services in collaboration with all stakeholders and incorporating ground and on-board features.

**Global Plan Initiatives (GPI).** They are designed to support the planning and implementation of performance objectives in ICAO Regions.

**Performance-Based Navigation (PBN).** Performance-based area navigation requirements applicable to aircraft operating along an ATS route, on an instrument approach procedure, or in a designated airspace.

**Standards and Recommended Practices (SARPS).** The Council adopts standards and recommended practices pursuant to Articles 54, 37 and 90 of the Convention on International Civil Aviation and are defined as follows:

*Standard.* A standard is a specification of physical characteristics, configuration, material, performance, personnel or procedure, whose uniform application is recognized as necessary for the safety or regularity of international air navigation which contracting States shall comply pursuant to the Convention; in case

compliance is not possible, notification to the Council is mandatory, as set forth in Article 38 of the Convention.

*Recommended practice.* A recommended practice is a specification of physical characteristics, configuration, material, performance, personnel or procedure, whose uniform application is deemed convenient for safety, regularity or efficiency of international air navigation which contracting States shall comply pursuant to the Convention.

**Remote pilot.** Person remotely operating the flight controls of a remotely piloted aircraft during flight.

**Procedures for Air Navigation Services (PANS).** Procedures adopted by the Council, including general operational procedures that are not considered mature enough to be adopted as international standards and recommended practices, or more permanent texts that are inappropriate or too detailed to be included in an Annex.

**Regional Supplementary Procedures (SUPPS).** Operational procedures that supplement the Annexes and PANS developed largely through ICAO's regional air navigation meetings to meet the needs of a specific ICAO region. It addresses issues related to safety and consistency of international air navigation. They are published in a single document for all regions. ICAO's Regional Supplementary Procedures (SUPPS) are part of the air navigation plan prepared by the Regional Air Navigation Conferences (ANC) to meet those needs in certain areas not covered by global provisions. They complement the requirement exhibition for facilities and services contained in the air navigation plan publications.

**Collaborative Decision-Making (CDM).** A process whereby all ATM decisions, except for ATC tactical decisions that are based on the exchange of all relevant information for transit operations between civilian and military parties.

**Flight Information Region (FIR).** An airspace of defined dimensions within which flight information service and alerting service are provided.

**Conditional Route (CDR).** A non-permanent ATS route or part of it that can be planned and used under special conditions.

**ATM security.** Contribution of the ATM system to the protection of civil aviation, safety, and national defence, law enforcement and protection of the ATM system against security threats and vulnerabilities.

**Air Traffic Services (ATS).** A generic term meaning variously, flight information, alerting, air traffic advisory, air traffic control services (area control, approach control or aerodrome control services).

**Customs and Border Protection Services (CBP).** Protect the State by preventing illegal entry of persons and goods while facilitating legitimate travelling and trade.

**Unmanned Aircraft System (UAS).** Aircraft and its associated elements operated without a pilot on board.

**Remotely Piloted Aircraft System (RPAS).** Configurable set of elements consisting of a remotely piloted aircraft, its remote pilot station(s), the mandatory command and control links, and any other system element required at some point during the flight operation.

**Air Traffic Management.** A system that provides ATM through the integration of human resources, information technology, and facilities, in collaboration with the support of ground-, air-, and/or space-based communications, navigation and surveillance.

**Global Navigation Satellite System (GNSS).** A worldwide position and time determination system that includes one or more satellite constellations, aircraft receivers and system integrity monitoring, augmented as necessary to support the required navigation performance for the intended operation.

**Flexible Use of Airspace (FUA).** Concept of airspace management based on the principle that airspace should not be designated as exclusively military or civilian, but as a continuous space that meets the requirements of all users to the extent possible.

**Danger area.** An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

**Prohibited area.** An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited.

**Restricted area.** An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions.

## 1 Preamble

### 1.1 Objective

1.1.1 The Guidance for the Implementation of the Flexible Use of Airspace in ICAO's South American Region (SAM/FUA Guidance) has been designed to help ensure that the States of the Region have the applicable regional procedures, in harmonic fashion.

1.1.2 The development of the guidance has been taken into consideration the recommendations of the International Civil Aviation Organization in this regard, the Global Air Navigation Plan (Doc 9850) and the guidelines set forth in the Performance-Based Implementation Plan for the SAM Region (SAM-PBIP) which states that the optimal, balanced and equitable use of airspace by civil and military users, shall be facilitated through both strategic coordination and dynamic interaction, thus allowing the implementation of optimal flight paths, reducing operating costs of airspace users while protecting the environment.

### 1.2 Scope

1.2.1 The SAM/FUA Guidance has been developed to be used by SAM States in the FIRs under their jurisdiction, taking into account the operational improvements and airspace optimization initiatives in the short and medium term, and particularly in accordance with ATS route network optimization in the SAM Region.

## 2 Global background

2.1 Annex 2 - *Rules of the Air*, contains rules concerning flight and aircraft manoeuvring within the scope of Article 12 of the Convention, and provisions for coordination with military authorities for reasons of integrity and territorial sovereignty of a State, whereas Annex 11 - *Air Traffic Services*, contains provisions concerning the need to coordinate with military authorities or units, mainly to the extent that State aircraft activities may affect civilian operations and *vice versa*.

2.2 In addition, the *Procedures for Air Navigation Services - Air Traffic Management* (PANS-ATM, Doc. 4444) contain procedures applicable to other in-flight contingencies, such as lost or unidentified aircraft, that require coordination with military authorities, and describe procedures for the implementation of special military operations.

2.3 Information on coordination requirements between military units and air traffic services can also be found in the *Manual concerning safety measures relating to military activities potentially hazardous to civil aircraft operations* (Doc 9554) and in the *Air traffic services planning manual* (Doc 9426).

2.4 Likewise, the *Global Air Navigation Plan* (Doc 9750) proposes 23 initiatives (GPI) oriented to the implementation of the ATM operational concept. GPI 1 refers precisely to the "*Flexible use of airspace*" (**APPENDIX B**)

*Note: In light of the new aviation system block upgrade (ASBU) methodology fostered by ICAO, the Global Air Navigation Plan shall be updated and the current global plan initiatives (GPI) shall be inserted in the different modules of each block proposed in this methodology.*

2.5 The *ICAO Global Air Traffic Management Operational Concept* (Doc 9854) describes the services required to operate the global air traffic system in the near future and beyond, and lists the requirements to provide more flexibility for users, maximize efficiency, and increase system capacity, while improving safety. Integral parts of these elements are interoperability and military system operations.

2.6 *Appendix O of Assembly Resolution A 37-15: Consolidated statement of continuing ICAO policies and associated practices related specifically to air navigation* (**APPENDIX B**)

2.7 The resolution states, among other things, that the joint use of airspace and some facilities by civil and military aviation will be provided in such a way so as to attain safety, regularity and efficiency of civil aviation and to meet the requirements of military air traffic, and promotes the dissemination of best practices and the adoption of follow-up action building upon the success of the *Global air traffic management forum on civil-military cooperation* (2009) with the support of the civil and military stakeholders.

2.8 The Forum recognized that most ICAO Regions had made great progress in airspace management and military-civilian cooperation; however, it recognized the need to further improve cooperation between authorities and with air navigation service suppliers. It was suggested that, in order to promote cooperation, military representatives should participate at ICAO meetings, seminars and other relevant events as part of State delegations.

2.9 Upon summarizing the results of the Forum, the following was stated:

- a) Peace and stability are essential conditions for social and economic development;
- b) Trust and mutual understanding are key requirements for collaboration between civil and military authorities;
- c) The safety, security and efficiency are common civil and military values;
- d) For civil aviation, efficiency means greater capacity, less delays, and a reduction in costs, fuel consumption and emissions;
- e) For military aviation, efficiency means mission efficacy (in times of peace and crisis) and realistic training, together with greater capacity, less delays and a reduction in costs, fuel consumption and emissions;
- f) Cooperation and coordination require communication;
- g) Civil-military cooperation is essential at national, regional and international level;
- h) Airspace is a continuum and a limited common resource for all civil and military users;
- i) Better knowledge and application of flexible use of airspace principles are a good basis for civil-military coordination of ATM;
- j) Civil-military interaction is essential to optimize the safe and efficient use of airspace for all users, and the global aviation community must properly resolve gaps;
- k) The integration of UAS is a challenge as well as an opportunity for the growth of the aviation system;
- l) Civil-military cooperation and coordination are essential, both in times of peace and crisis;
- m) A global civil-military approach to security and incident management is needed, taking into account positive experiences that can help improve the system;
- n) Greater efforts are needed, not only within the context of flexible use of airspace, but also in terms of standards and compatible procedures and global interoperability of ATM systems; and
- o) Good collaboration requires communication, education, good relationships and trust.

2.10 Finally, in response to the agreements reached at the 2009 Global air traffic management forum on civil-military cooperation, ICAO and civil and military experts developed Circular 330-AN/189, which contains examples of good practices in civil-military cooperation and recognizes that growing civil air traffic and military air missions would benefit significantly from a more flexible use of airspace, and recommends and provides guidance on best practices in civil-military cooperation that could be adopted by States.

### 3 Regional background

3.1 Civil-military cooperation and coordination in the South American Region have traditionally been based on a dialogue between civilian and military authorities with the view to making better use of airspace for both and improving cooperation for the use and integration, where possible, of their respective air traffic control facilities.

3.2 The States of the South American Region, taking into account the provisions of the Global Air Navigation Plan, the ATM operational concept and the conclusions of the Caribbean and South American Regional Planning and Implementation Group (GREPECAS), developed the Performance-Based Air Navigation System Implementation Plan for the SAM Region (SAM-PBIP), a plan that was approved for regional implementation through *Conclusion RAAC/12-1 Performance-Based Air Navigation System Implementation Plan for the SAM Region (SAM PBIP)* of the Twelfth Meeting of Directors of Civil Aviation (RAAC/12) of the SAM Region held in October 2011 (**APPENDIX C**)

3.3 The main gap identified in the current system is the lack of a policy and procedures for the flexible use of airspace, which hampers airspace design and management by not allowing the application of an optimal airspace structure and the use of optimum flight paths. The limitations that have been identified include the existence of permanently reserved airspace, primarily for military purposes, and inadequate airspace planning, which prevents direct flights between airports of origin - destination and/or city pairs.

3.4 The period considered by the SAM PB ANIP runs from 2012 to 2018 and the expected evolution is based on the Global Plan Initiatives that apply to en-route operations, TMA operations, and air operations in general.

3.5 ATM planning has been based on seven global aspects, for which the respective performance framework forms (PFF) have been developed. One of these aspects is the Flexible Use of Airspace, which has been identified as (PFF SAM/ATM 04 **APPENDIX D**). This activity identified the following benefits for the ATM community, which should be attained through operational and technical activities aligned with this performance objective:

- a) Improved civil/military coordination and cooperation strengthens airspace safety;
- b) It allows for a more efficient ATS route structure, reducing miles flown and fuel consumption and, consequently, CO<sup>2</sup> emissions into the atmosphere;
- c) It increases airspace capacity; and
- d) Increased availability of reserved airspace at times when there is no activity by the users of such airspace.

Note: In light of the new aviation system block upgrade (ASBU) methodology fostered by ICAO, the SAM Region will have to update the SAM PB ANIP, as well as the PFFs that will be replaced by the air navigation report forms (ANRF).

3.6 As part of regional activities and in order to improve civil/military coordination and cooperation and in response to Assembly Resolution A 37-15, ICAO organized the Seminar on Civil/Military Coordination and

Cooperation and flexible use of airspace in the NAM, CAR and SAM Regions, which was held on 16-19 August 2011, in Lima, Peru.

3.7 This seminar was attended by civil and military authorities, that had the opportunity to exchange views, receive valuable information on activities being carried out worldwide. As a result of the discussions, they issued a series of recommendations that should be implemented by the States and ICAO as appropriate:

- a) Support to the holding of an event as a follow-up to the Global Civil-Military Cooperation Forum (2009);
- b) The seminar requested ICAO to coordinate the drafting of regional guidelines on civil-military cooperation for the CAR/SAM regions;
- c) The seminar recommended to make arrangements for civil-military work at regional level;
- d) States are encouraged to apply the Flexible Use of Airspace (FUA) principles (Annex 11 - Air Traffic Services, Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM, Doc 4444) and Circular 330-An/189 Civil-Military Cooperation in Air Traffic Management);
- e) ICAO is requested to develop guidance material on the Flexible Use of Airspace (FUA);
- f) The participation of military authorities at ICAO meetings is recommended (Resolution A37-15, Appendix O: Coordination and Cooperation of Civil and Military Air Traffic);
- g) The ICAO NACC and SAM Regional Offices are requested to organize a workshop on ATM crisis management; and
- h) CAR/SAM States, whenever possible, should establish a liaison office for civil-military coordination within their Civil Aviation Department in order to facilitate coordination between civil and military sectors.

## 4 Rationale

4.1 As world economies grow, demand for air travel multiplies; thus, airspace and airport capacity must increase to meet this demand. Traditional methods of increasing capacity have reached the end of their possibilities, so new, improved methods and concepts will be needed to maximize existing capacity and increase it where possible.

4.2 In the context of the ATM Operational Concept, airspace management (ASM) is the process whereby options for the use of airspace are selected and applied to meet user needs. The objective of ASM is to achieve a more efficient use of airspace, taking into account actual needs and, whenever possible, to avoid permanent segregation of airspace.

4.3 There are several and sometimes conflicting interests regarding the use of airspace, so ASM is a complex exercise. Additionally, there are also activities that require the reservation of a certain volume of airspace for its exclusive or special use (SUA) for defined periods of time due to the characteristics of its flight profile, the importance of its operations or the risks involved by the operations to be performed in said space and the need to separate them effectively and safely from other types of aeronautical activities.

4.4 Airspace management should be based on the following principles and strategies:



- a) all available airspace should be managed in a flexible manner;
- b) airspace management processes should incorporate dynamic flight paths and provide optimal operational solutions;
- c) when conditions require segregation, based on different types of operations and/or aircraft, the size, shape and time zones of said airspace should be determined to minimize impact on operations;
- d) the use of airspace should be coordinated and monitored to meet the different requirements of all users and minimize operational limitations;
- e) Airspace reservation should be planned in advance, making dynamic changes where possible. The system must also be able to meet unexpected last minute requirements; and
- f) The complexity of operations may limit the degree of flexibility.
- g) According to the guidelines established in the SAM PBIP, the optimal, balanced, and equitable use of airspace by civil and military users shall be facilitated through both strategic coordination and dynamic interaction, allowing for the establishment of optimal flight paths while reducing operating costs for airspace users.

4.5 The flexible use of airspace must also include airspace over high seas within the jurisdiction of the FIR, considered without detriment to the rights and obligations of Member States under the Convention on International Civil Aviation (Chicago Convention) of 7 December 1944 and its Annexes.

## 5 **Basic guiding principles of civil-military coordination and cooperation**

5.1 The concept of flexible use of space should basically consider the following guiding principles:

- a) coordination and cooperation between civil and military authorities shall be organized at strategic, pre-tactical and tactical management level by establishing letters of operational agreement and/or special procedures for a given activity, aimed at increasing airspace safety and capacity and improving the efficiency and flexibility of air operations;
- b) consistency among airspace management, air traffic management, air traffic flow and management, and air traffic service functions must be established and maintained to ensure efficient planning, distribution and use by all users at the three airspace management levels (strategic, tactical and pre-tactical);
- c) airspace reservation for exclusive or specific use of certain user categories shall be temporarily applied only during limited periods of time depending on actual use and it shall be disregarded as the activity that motivated it ceases to be, and it shall follow the procedures set forth in ICAO documents and Annexes as well as those prescribed in the Letters of Operational Agreement and/or special procedures.
- d) air traffic service units and users will make the best possible use of available airspace,
- e) coordination and collaborative decision-making by ATS, ATFM units, and effective application of the flexible use of airspace concept must be consistent and permanent during the strategic, pre-tactical and tactical phases of airspace management; and
- f) Adequate resources should be allocated for an effective implementation of the flexible use of airspace concept, taking into account both civil and military needs.

## **6 General guidelines for the implementation of the FUA concept**

6.1 SAM States should establish policies on the use of temporarily or permanently reserved airspace in order to avoid the adoption of airspace restrictions as much as possible.

6.2 The process of implementing the Flexible Use of Airspace should start with an assessment of restricted, prohibited and danger airspace that affect or could affect air traffic. To this end, this paper provides an initial analysis from a regional perspective.

6.3 If they have not done it yet, States should implement the Civil/Military Coordination and Cooperation Committees or a similar body, aimed at assessing the various of airspace management and air traffic control issues that somehow affect civil and military activities.

6.4 The relevant aviation authority should encourage the development of the necessary letters of operational agreement between ATS and military units or other users for the dynamic and flexible use of airspace, avoiding restrictions on the use of airspace, thus meeting the needs of all users.

6.5 In cases where airspace restriction is inevitable, the letters of agreement should specify that the activation of airspace reservation should not extend beyond the time required. This will require the development of paths that permit the dynamic re-routing of aircraft to avoid such airspaces.

6.6 The aforementioned paths should be published in the AIP in order to alert users of the need to consider said possible deviations in flight planning.

6.7 Appropriate measures should be taken to improve the effectiveness of air traffic flow management in order to assist existing operational units ensure efficient flight operations.

6.8 The implementation of the FUA requires convincing the users of reserved airspace, mainly the military authorities of the States involved, that their needs will be met, regardless of the application of airspace restrictions. Thus, seminars/meetings with the authorities will be essential to demonstrate the importance of optimized use of airspace.

## **7 National policies for the implementation of the FUA concept**

7.1 FUA is an airspace management concept based on the principle that airspace should not be designated as exclusively military or civilian, but as a continuum that meets the maximum possible requirements of all users.

7.2 The effective and harmonized implementation of the flexible use of airspace in the volume of airspace under consideration requires precise civil-military coordination rules and dynamics, taking into account the needs of all users and the nature of their various activities, avoiding permanent reservation inasmuch as possible and optimizing its flexible use, without detriment to the privileges and defense responsibilities of Member States.

7.3 In order to accomplish that stated above, the effectiveness of civil-military coordination procedures must be based on rules and procedures for the efficient use of airspace by all users, which should be reflected in the Letters of Operational Agreement between the military authorities and Air Traffic Services (ATS), and on some basic guiding principles.

7.4 The objective of establishing common policies for SAM States responds to the need to ensure a uniform and harmonized implementation of the provisions on the adoption of the flexible use of airspace concept.

7.5 The States should, if they have not done it yet, insert the text on the application of the flexible use of airspace concept in their national legislation. The purpose of regulating FUA is to support the concept of an operating airspace that is increasingly integrated into the framework of the common transport policy and to establish common design, planning and management procedures to ensure an efficient and safe air traffic management.

7.6 The legislation should reinforce the need for coordination and cooperation between civil and military authorities, especially for the allocation and efficient use of airspace for military purposes, including the criteria and principles that should govern said allocation and use, particularly its opening to civilian flights.

7.7 National legislation should include a safeguard clause enabling States to suspend the application of the standard if so required for national military purposes. **APPENDIX E** contains a sample of a national standard, as reference.

## **8 Analysis of the use and management of Restricted, Prohibited, Danger and Special use areas**

8.1 In order to achieve a comprehensive ATS route network that serves the interests of all users, including commercial, military, general, sports aviation, and unmanned aircraft systems (UAS), it will be necessary to analyze all restricted, prohibited and danger areas that have been implemented in each State in order to apply the flexible use of airspace concept.

8.2 This work is not intended to eliminate or arbitrarily reduce the special use airspace assigned, but rather, through the implementation of collaborative decision making (CDM), find the best options that may satisfy all airspace users and ensure that the needs identified are met, regardless of the application of airspace restrictions.

8.3 The States should analyze the different cases in which, for safety reasons, it would be necessary to establish procedures or letters of agreement to avoid tactical airspace management, as this implies the adoption of real-time decisions by the control service. While tactical management should be included in every action plan, this should be the tool of last resort, as it is not possible to apply the most appropriate solution when time is scarce and data to consider are varied.

8.4 Note was taken of the existence of permanently reserved airspace, primarily for military purposes, in a way that could prevent proper airspace planning, not allowing direct flights between airports of origin - destination and/or city pairs, as well as operations at inappropriate flight levels and/or speeds that prevented aircraft from maintaining optimum flight profiles, and major ground and/or en-route system delays.

8.5 SAM States should establish policies on the use of temporarily or permanently reserved airspace, to avoid, as much as possible, the adoption of airspace restrictions, and to consider and integrate the unmanned aircraft systems (UAS) into its air navigation system, which adds a new component to the aviation system that should start being considered.

8.6 There is a high percentage of special use airspace that should be analyzed within the context of civil/military cooperation in each particular State. There are 124 published prohibited areas, 421 restricted areas, 41 danger areas and 83 special areas in the Region, including volcanic areas and other special areas for aerial sports and recreational activities (**APPENDIX F**).

8.7 In order to proceed to assess the Restricted, Prohibited, Hazardous and Special use areas, the States could use as a model the form in **APPENDIX G**.

8.8 The purpose of the form is to identify the type of area or special use airspace, the lateral dimension in square kilometers and the vertical dimension with upper and lower limits, the period of use, the nature of the activity, the body or entity responsible for activating the area, the impact on the current design of airspace and finally, if planning could be potentially affected by the area.

## **9 Establishment of the Civil/Military Coordination and Cooperation Committee**

9.1 ICAO Standards and Recommended Practices (SARPs), the recommendations and conclusions of different events on Civil/Military coordination and cooperation that have been approved for regional application aim at mutual cooperation between civil and military authorities; however, not every State has a formal civil/military coordination and cooperation committee.

9.2 In order to ensure FUA implementation, each State should establish a civil/military coordination and cooperation committee or similar body to assess opportunities for implementing Special Use Airspace (SUA). It is noteworthy that success of this initiative depends on the committee having the power to ensure the use of airspace by all users according to their specific needs, while avoiding, inasmuch as possible, the permanent reservation of airspace that would lead to a limited use of airspace when not being used.

9.3 These civil/military coordination and cooperation committees ensure coordination of decisions on civil and military airspace management and air traffic control issues at all levels, and are essential for the implementation of an ATS route network that meets the current requirements of airspace users.

9.4 Civil/military coordination and cooperation committees should include representatives of civil and military aviation and other airspace users as needed.

9.5 For these civil/military coordination and cooperation committees to be established, civil aviation administrations must propose terms of reference or objectives for that committee and then agree on a work program based on those terms of reference. States may consider the following aspects, *inter alia*:

- a) Achieve civil-military coordination and optimum joint use of airspace with the highest degree of safety, regularity and efficiency of international civil air traffic;
- b) Develop national policies regarding flexible use of airspace (FUA);
- c) Review and provide the necessary links between civil ATS units and the relevant air defense military units to ensure day-to-day integration or segregation of civil/military air traffic operating in the same airspace segments;
- d) Review the existing ICAO provisions on cooperation and civil/military coordination;
- e) Consider the special use of airspace in order to validate the actual use and reach agreement on the joint use of airspace;
- f) Establish procedures for joint and flexible use of airspace;
- g) Develop and implement security measures related to military activities potentially hazardous for civil aircraft operations;
- h) Prepare and sign letters of operational agreement between civil and military ATS units for air traffic management in the airspace concerned;
- i) If prohibited, restricted and danger areas need to be maintained, make sure that they conform to Annexes 2 and 15 and that the following principles are applied:
  - i) Pay due attention to the need of not hampering the safe and economical operation of civil aircraft operations;
  - ii) Provide appropriate intermediate areas within the designated area, based on the time and size of the activities to be conducted;
  - iii) Use of standard ICAO terminology to define the areas;

- j) Analyse and determine at regular intervals if it is still necessary to keep prohibited, restricted and danger zones;
- k) Develop appropriate arrangements and procedures for establishing a temporary reservation of airspace, and
- l) Other aspects that civil and military authorities consider should be analyzed in the context of the civil/military coordination and cooperation committee or body they deem most appropriate.

9.6 Based on the flexible use of airspace achieved through the civil/military coordination and cooperation committee, airspace planners in the States should develop proposals for the implementation, realignment or elimination of routes that would significantly influence the development of the ATS route network, taking into account the possibility of offering better flight profile to users and a possible reduction in airspace complexity.

9.7 The establishment of a civil/military cooperation and coordination committee to manage the application of the flexible use of airspace concept is absolutely necessary and it must be managed taking into account all users, applying guiding principles aligned with the flexible use of airspace concept.

## 10 Letters of Operational Agreement between civil and military ATS units

10.1 As provided in the PANS/ATM (Doc 4444), the Letters of Operational Agreement between civil and military ATS units may define agreements and procedures for the flexible use of airspace, and should specify, *inter alia*, the following points:

- a) The horizontal and vertical boundaries of the airspace concerned;
- b) The classification of airspace available for use by civil air traffic;
- c) The units or authorities responsible for airspace handover;
- d) Airspace handover conditions to the ATC unit concerned;
- e) Airspace handover conditions from the ATC unit concerned;
- f) Airspace availability periods;
- g) Any limitations on the use of the airspace in question; and
- h) Any other relevant procedures or information.

10.2 A sample Letter of Operational Agreement between civil and military authorities is shown in **APPENDIX H**

## 11 Airspace management within the scope of FUA

11.1 The flexible use of airspace is an airspace management concept based on the principle of accommodating all the users of that space to the extent possible, considering effective communication, cooperation and the necessary coordination to ensure the security, safety, efficiency and environmental sustainability.

11.2 This concept includes strategic (Level 1), pre-tactical (Level 2), and tactical (Level 3) self-management functions that are independent but closely linked, and that are to be carried out in a coordinated manner to ensure an efficient use of airspace.

11.3 When several aviation activities with different requirements take place in the same airspace, coordination must be aimed at the safe conduct of flights and the optimum use of available airspace.

11.4 The systematic application of this concept should be taken into account for the optimization of the route network, especially for the definition of scenarios with non-permanent or conditional routes.

11.5 In addition, some SAR activities, exercises or military operations may require coordination and cooperation with more than one State at a given moment, and the establishment of civil/military cooperation and coordination committees in every State acquires greater importance in these cases.

11.6 The support of traffic flow management (ATFM) units to air operations is crucial to provide the necessary conditions for mitigating possible adverse effects on civil aviation.

#### 11.7 **Strategic Management of Airspace (Level 1)**

11.7.1 To ensure the strategic management of airspace within the scope of FUA, civil and military air traffic service providers should perform at least the following functions:

- a) Ensure the implementation of flexible use of airspace at the strategic, tactical and pre-tactical levels;
- b) Review the needs of users on a regular basis;
- c) Review and approve the activities that require reservation or restriction of airspace;
- d) Define temporary airspace structures and procedures to offer multiple reservation options and routes;
- e) Establish criteria and procedures for the creation and use of adjustable lateral and vertical boundaries of the airspace needed to accept variations in flight paths and short-term changes in flights;
- f) Assess national airspace structures and the route network in order to plan flexible airspace structures and procedures;
- g) Determine the conditions under which the responsibility for separating civil and military flights will rest on civil and military ATS units or on the controlling military units;
- h) Establish and provide users with airspace structures in close cooperation and coordination with neighboring member States when the corresponding airspace structures have major repercussions on cross-border traffic or on the boundaries of flight information regions, with a view to ensuring an optimum use of airspace for all users;
- i) Establish mechanisms for consultation between persons or agencies and all interested parties and organizations, in order to properly meet user needs;
- j) Include the corresponding air traffic flow management (ATFM) units in the planning and implementation of the FUA concept from the beginning;
- k) Develop, assess and periodically review the procedures, coordination and performance of operations within the flexible use of airspace concept;
- l) Establish mechanisms for storing data about the requests, allocation and actual use of airspace for subsequent analysis and planning of activities;
- m) Make sure that the areas designated for training, recreation, ATC sectors, route network, arrival and departure procedures are implemented and published on a timely basis, in coordination with the requirements of all airspace users, taking into account ICAO strategic objectives.

## **11.8 Pre-tactical Management of Airspace (Level 2)**

11.8.1 The civil and military units should ensure the introduction of appropriate support systems, preferably automated, that will allow timely communication of airspace availability to all users involved, special airspace management units, if any, air traffic service providers, and all the corresponding parties and organizations by airspace managers.

11.8.2 Military control units and air traffic service units should inform each other of any change in the planned activation of airspace in a timely and efficient manner, and inform all the users involved about the actual status of airspace.

## **11.9 Tactical Management of Airspace (Level 3)**

11.9.1 Tactical ASM should take place at the level of ATS and military control units. Safety procedures for coordination and cooperation between these agencies should be established to allow direct, real-time communication of relevant information in order to resolve specific traffic situations in the same volume of airspace and in adjacent airspaces to where civil and military controllers provide services.

11.9.2 Information should be available to civil and military controllers and military control units through a quick exchange of flight data, including aircraft position and flight intention, particularly when required for security reasons.

11.9.3 When civil and military controllers are providing services in the same airspace, there should be highly reliable direct communications between civil and military ATS units to resolve specific traffic situations. If minimum levels of safety are required, ATC civil units and military control units shall exchange flight data, including aircraft position and flight intention.

### **Post-operation analysis (Level 4)**

11.9.4 The SAM region deemed it advisable to add a level of post-operation analysis to this process in order to assess the operations performed, communications, and possible safety gaps that may have been identified so as to ensure continuous improvement of civil-military coordination and cooperation.

11.9.5 A report registry can be created at this level to help the different stakeholders and the training section to focus on activities that will improve operations.

## **12 Flexible and adjustable airspace structures and procedures**

12.1 Circular 330 -AN 189, in addressing this issue, states that the FUA concept may be based on the potential offered by flexible and adjustable structures and procedures, which are especially suitable for the assignment and temporary use of conditional routes, temporary reserved areas (TRA), temporary segregated areas (TSA) and cross border areas (CBA).

12.2 The FUA concept thus complements organizing airspace with a series of flexible structures as defined below:

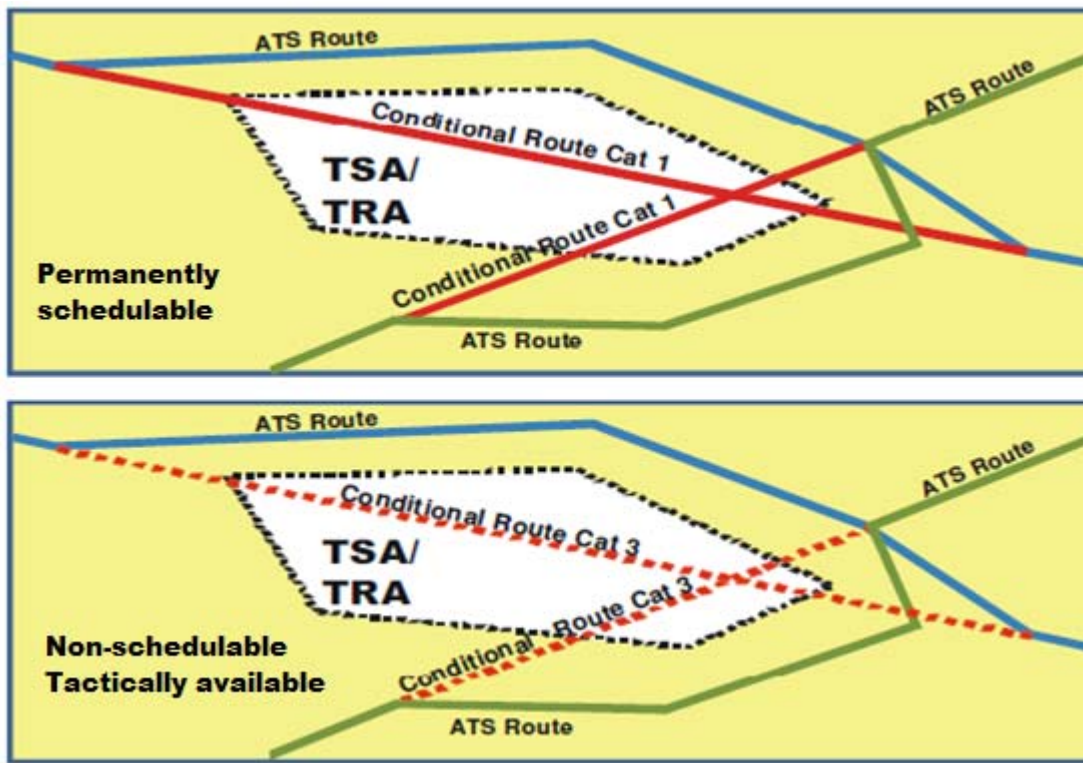
12.2.1 Conditional Route (CDR): Non-permanent ATS route (see Figure 1) or portion thereof that can be planned and used under specified conditions. According to their foreseen availability and flight planning possibilities, and the level of activity expected from the associated TSA, conditional routes can be divided into the following categories:

- a) Category one (CDR1): permanently schedulable;
- b) Category two (CDR2): non-permanently schedulable; and
- c) Category three (CDR3): not schedulable.

12.2.2 Temporary reserved area (TRA): A TRA (see Figure 1) is airspace temporarily reserved and allocated for the exclusive use of a user during a determined a period of time, through which other flights can operate with ATC permission.

12.2.3 Temporary segregated area (TSA): A TSA (see Figure 1) is airspace temporarily reserved and allocated for the exclusive use of a specific user during a determined period of time, through which no other flight traffic is allowed.

12.2.4 Cross border area (CBA): A CBA (see Figure 2) is a reserved or segregated airspace established on international borders to meet specific operational requirements. CBAs are established for purposes of instruction and military training and for other flights operating on both sides of a border. Since CBAs are not bound to national borders, they can be defined so as to benefit both civil and military aviation. CBAs in combination with conditional routes crossing them improve airspace structure in border areas and help improve the ATS route network. Before establishing CBAs, political, legal, technical, and operational agreements between the States concerned are required. Formal agreements for the establishment and use of CBAs should take into account sovereignty, defense, law, operations, the environment, and search and rescue.





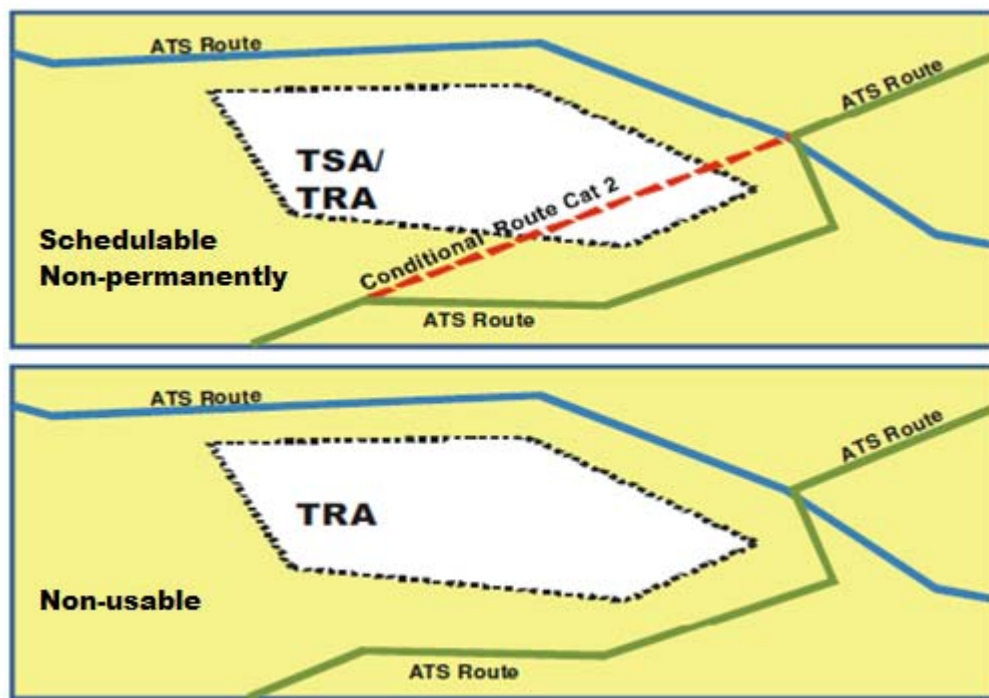


Figure 1

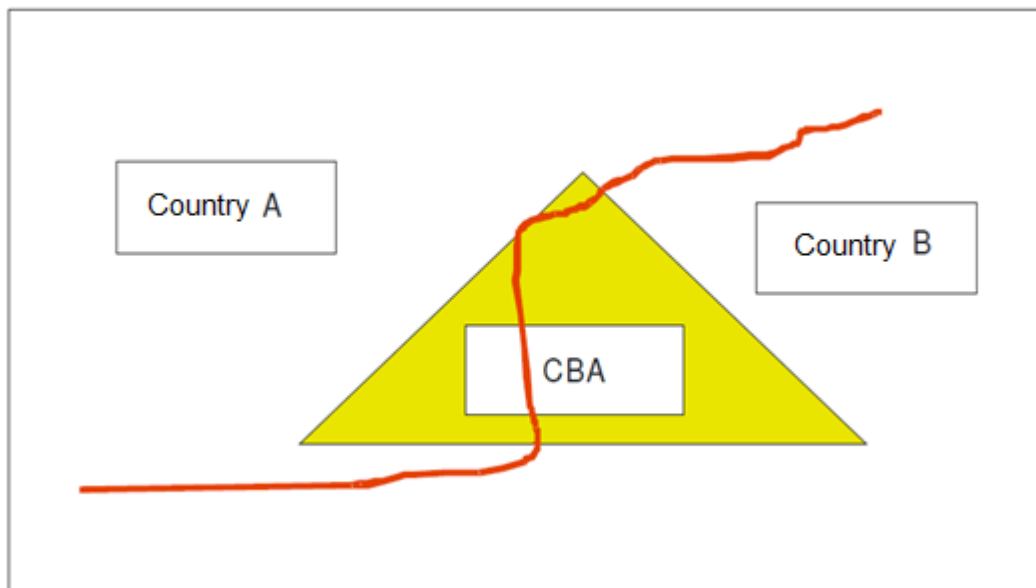


Figure 2

12.2.5 Airspace management cell (AMC): A national joint civil/military unit responsible for managing on a day-to-day basis or upon request (pre-tactical phase) the allocation of airspace in accordance with requests from users (ACC, FMU / FMP, management units and other military zones and accredited agencies).

12.2.6 There is no experience in the South American Region with this type of conditional routes. Therefore, the establishment of modes of employment of non-permanent routes should be assessed in light of experiences elsewhere in the world. The Region should take action on this issue and establish criteria for defining the scenarios where non-permanent routes are to be applied.

12.2.7 It would be interesting for States to begin implementation by adopting some procedures used in other Regions. To this end, **APPENDIX I** contains concepts and procedures of the European Region.

### 13 **Safety assessment**

13.1 During the safety management process and before introducing any change in the implementation of FUA, it is important to conduct a safety assessment that includes hazard identification and risk assessment and mitigation in accordance with SMS procedures.

13.2 In a stage following the operational phase, an assessment will be made of issues identified, inspection and audit findings, SMS analyses, which may produce important information that should be used for continuous airspace optimization.

13.3 Therefore, the reports of joint actions in the flexible use of airspace as well as the analysis by a multidisciplinary group of experts are of great importance for the analysis of lessons learned, with a view to improving the procedures and rules applied to optimize safety and the flexible use of airspace.

### 14 **Information management**

14.1 Good information management is critical to the successful implementation of the FUA concept; thus the critical importance of timely distribution and accuracy of information transmitted to civil and military controllers concerning airspace status and specific air traffic conditions that directly affect safety, efficacy and efficiency of operations.

14.2 In relation to the above, timely access to updated information on airspace status is vital for all parties wishing to use the available airspace structures for preparing or modifying their flight plan.

14.3 In accordance with the provisions of the AIS Manual (Doc 8126), the AIP is divided into three parts, Part 1 - General (GEN), consisting of administrative and explanatory information that is not of such importance or significance that requires the issuance of a NOTAM, Part 2 - En route (ENR), containing information on the airspace and its utilization, and Part 3 - Aerodromes (AD), with information on aerodromes / heliports and their utilization.

14.4 In light of the above, all aspects of the flexible use of airspace should be included in Part 2 ENR.

14.5 Section 3 - ATS routes, in Part 2, ENR includes detailed lists of all ATS routes established within the territory covered by the AIP, whether they are part of ICAO regional air navigation agreements or used only for domestic traffic. Where applicable, a description of the routes or portions thereof where special procedures are required to eliminate or reduce the need for interceptions should be included. The relevant special procedures should also be included. Particularly in ENR 3.5, *Other routes*, a description of other specifically designated routes that are mandatory within specified areas is required.

14.6 In order to comply with the provisions of Doc 8126, conditional routes (CDR) will be published in ENR 3.5.

14.7 Furthermore, in accordance with the AIS Manual, Section ENR 5.2 *Military exercise and training areas and air defense identification zone* (ADIZ), there shall be a description, as appropriate, of the areas established for the military exercise and training taking place at regular intervals and of the ADIZ zone.

14.8 In view of the above, this Section will contain temporary segregated areas, with the geographical coordinates of boundaries, upper and lower limits, and the system and the means established to announce the initiation of activities, together with all relevant information on civil flights.

## 15 Seminars/meetings

15.1 State administrations, working with air navigation service providers (ANSPs) and with the military authorities, should take steps to create the political will, establish institutional arrangements, bringing together civil and military authorities nationwide, set goals, apply practical and operational measures, and finally, make the necessary changes to make all this possible.

15.2 The seminars, meetings, and other similar events will raise awareness among all stakeholders about the need to achieve these common objectives for the benefit of international civil aviation.

## 16 Collaborative Decision Making (CDM)

16.1 Decision-making (CDM) is the process whereby all ATM decisions, except for ATC tactical decisions, are based on the exchange of all relevant information for traffic operations between civil and military parties. States and service providers should adopt CDM principles, with the participation of military planners as a means to support ASM.

16.2 CDM brings together airlines, civil aviation and military authorities and airports, in an effort to improve ATM through the exchange of information and data, and improved automated decision-support tools.

16.3 The collaboration philosophy may become an aviation standard. CDM allows the exchange of information and facilitates decision-making processes to ensure that stakeholders receive timely and accurate information essential to plan their operations, whether civil or military.

16.4 For example, accurate estimates of arrival or departure times can improve the processing of aircraft, apron services, the allocation of stands and exit gates, ATC and ATFM. The involvement of military airspace users and planners in national or regional airspace planning ensures proper planning, both in time and size, which not only benefits military aviation but also minimizes conflicts with civil traffic.

16.5 With decisions based on the sharing of accurate information, CDM improves predictability in case of unforeseen problems or events. If properly implemented, CDM also leads to an optimum use of airspace, with benefits for all participants in the system.

16.6 For CDM implementation, the use of the Manual on collaborative decision making that was approved for regional implementation by the SAMIG/6 Meeting, Conclusion SAMIG/6/7 is suggested. The *CDM Manual for South America (SAM)* is posted at the following address of the ICAO South American Regional Office: <http://www.lima.icao.int/eDocuments/ATM/ATFM/4CDM%20Manual%20Spa.pdf>

16.7 The CDM Manual describes methods and procedures to manage the Collaborative Decision Making process to be applied in the SAM Region. The purpose of this paper has been to provide assistance to SAM States in reaching a common understanding of the collaborative Decision Making (CDM) process with a view to the application of this methodology, which seeks the participation of all parties involved in ATFM in the implementation of equitable measures among ATM system users.

## 17 Action Plan for the implementation of the FUA concept

17.1 As a reference and to assist SAM States in the implementation of the FUA concept, a model action plan has been developed, as shown in **APPENDIX J**. This action plan has been developed taking into account ICAO indications as well as the activities of the PFF SAM/ATM 04 of the SAM PB ANIP.

17.2 The action plan identifies some of the tasks to be executed by SAM States, starting with the establishment of a policy for developing standards related to the FUA concept, if it has not been done yet. It also encourages States to establish a high-level national civil-military coordination body, to conduct a uniform and collaborative national airspace planning process, taking into account the needs of all users as well as national security, defense and police requirements. It also invites States to establish rules and procedures of communication, negotiation and setting of priorities for civil-military coordination.

17.3 Furthermore, it encourages States to start assessing their special use airspace as soon as possible to verify the suitability and possibility of an early dynamic use or modification of such airspace for its use by civil aviation. It also defines some tasks for the establishment and publication of procedures for activities that require airspace reservation and restriction, and for the establishment of frame agreements or letters of operational agreement, as applicable, between civil and military authorities to facilitate coordination.

17.4 Finally, it includes tasks related to the need of establishing a system for periodically reviewing airspace requirements, organization and management, and conducting a timely risk assessment by applying the SMS methodology to ensure that changes in the system maintain and/or improve the agreed safety levels.

.....O.....

## **APPENDICES**

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## **APPENDIX A**

### **GPI - Flexible Use of Airspace**

**Scope: Optimized, balanced and equitable use of airspace by civil and military users, facilitated by strategic coordination and dynamic interaction**

**Components associated to the operational concept: AOM and AUO**

#### **Strategy description**

Airspace use could be optimized through dynamic interaction of civil and military air traffic, including real-time coordination among civil and military controllers. This needs system support, operational procedures, and appropriate information on the position and intentions of civil traffic.

The flexible use of airspace concept (FUA) is based on the principle that the airspace should not be designated as purely civil or military, but, instead, it should be a continuous space in which the requirements of all users are met inasmuch as possible. The flexible use of airspace should translate into the elimination of extended temporarily or permanently restricted airspace segments or special use airspace.

In those cases in which it is still necessary to reserve airspace for specific individual uses, thus blocking airspace of a given size, an attempt should be done to do it on a temporary basis. Airspace should be cleared immediately after the operations that gave rise to such restrictions have been completed.

Greater benefits associated to FUA implementation can be achieved through cooperation among States, which may require regional and sub-regional agreements since reserved airspace is frequently established along critical flight paths along national borders.

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## **APPENDIX B**

### **Assembly Resolution A 37-15**

#### **A37-15: Consolidated statement of continuing ICAO policies and associated practices related specifically to air navigation**

*Whereas* in Resolution A15-9 the Assembly resolved to adopt in each session for which a Technical Commission is established a consolidated statement of continuing policies related specifically to air navigation up to date as at the end of that session;

*Whereas* a statement of continuing policies and associated practices related specifically to air navigation as they existed at the end of the 36th Session of the Assembly was adopted by the Assembly in Resolution A36-131, Appendices A to W inclusive;

*Whereas* the Assembly has reviewed proposals by the Council for the amendment of the statement of continuing policies and associated practices in Resolution A36-13, Appendices A to W inclusive, and has amended the statement to reflect the decisions taken during the 37th Session; and

*Whereas* the statement of continuing policies in Resolution A36-13 is hereby superseded:

*The Assembly:*

**1. Resolves that:**

- a) the Appendices attached to this resolution constitute the consolidated statement of continuing air navigation policies and associated practices of the Organization as they exist at the close of the 37th Session of the Assembly; and
- b) the practices associated with the individual policies in the appendices constitute guidance intended to facilitate and ensure implementation of the respective policies; and

**2. Declares that this resolution supersedes Resolution A36-13 with its Appendices A to W inclusive.**

## **APPENDIX O TO ASSEMBLY RESOLUTION A 37-15**

### **Coordination and cooperation of civil and military air traffic**

*Whereas* the airspace is a resource common to both civil and military aviation and given that many air navigation facilities and services are provided and used by both civil and military aviation;

*Whereas* the Preamble of the *Convention on International Civil Aviation* stipulates that signatories thereto had “agreed on certain principles and arrangements in order that international civil aviation may be developed in a safe and orderly manner and that international air transport services may be established on the basis of equality of opportunity and operated soundly and economically”;

*Whereas* Article 3 a) of the Convention states that “the Convention shall be applicable only to civil aircraft, and shall not be applicable to state aircraft” and Article 3 d) requires that “contracting States undertake, when issuing regulations for their state aircraft, that they will have due regard for the safety of navigation of civil aircraft”;

*Recognizing* that growing civil air traffic and mission-oriented military air traffic would benefit greatly from a more flexible use of airspace used for military purposes and that satisfactory solutions to the problem of cooperative access to airspace have not evolved in all areas;

*Whereas* the flexible use of airspace by both civil and military air traffic may be regarded as the ultimate goal, improvement in civil/military coordination and cooperation, offers an immediate approach towards more effective airspace management; and

*Recalling* that the ICAO Global ATM Operational Concept states that all airspace should be a usable resource, any restriction on the use of any particular volume of airspace should be considered transitory, and all airspace should be managed flexibly:

*The Assembly resolves that:*

1. the common use by civil and military aviation of airspace and of certain facilities and services shall be arranged so as to ensure the safety, regularity and efficiency of civil aviation as well as to ensure the requirements of military air traffic are met;
2. the regulations and procedures established by Contracting States to govern the operation of their state aircraft over the high seas shall ensure that these operations do not compromise the safety, regularity and efficiency of international civil air traffic and that, to the extent practicable, these operations comply with the rules of the air in Annex 2;
3. the Secretary General shall provide guidance on best practices for civil/military coordination and cooperation;
4. Contracting States may include, when appropriate, representatives of military authorities in their delegations to ICAO meetings; and
5. ICAO serves as an international forum that plays a role in facilitating improved civil/military cooperation, collaboration and the sharing of best practices, and to provide the necessary follow-up activities that build on the success of the Global Air Traffic Management Forum on Civil/Military Cooperation (2009) with the support of civil/military partners.

### **Associated practices**

1. Contracting States should as necessary initiate or improve the coordination and cooperation between their civil and military air traffic services to implement the policy in Resolving Clause 1 above.
2. When establishing the regulations and procedures mentioned in Resolving Clause 2, the State concerned should coordinate the matter with all States responsible for the provision of air traffic services over the high seas in the area in question.
3. The Council should ensure that the matter of civil and military coordination and cooperation in the use of airspace is included, when appropriate, in the agenda of divisional and regional meetings, in accordance with Resolving Clauses 3, 4 and 5 above.

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## APPENDIX C

### Conclusion RAAC/12-1 Performance-based Air Navigation Implementation Plan for the SAM Region (SAM PBIP)

The States of the ICAO South American Region and the international organisations involved:

- a) approve the Performance-based Air Navigation Implementation Plan for the SAM Region shown in **Appendix A** (*i.e. RAAC 12 Report*), for its implementation at regional level;
- b) encourage those States that have not done so to prepare their national performance-based air navigation plan in accordance with the guidelines contained in the cited implementation plan; and
- c) request the ICAO South American Regional Office to review Project RLA 06/901 in order to align it with the performance objectives established in the cited implementation plan.

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## APPENDIX D

REGIONAL PERFORMANCE OBJECTIVE: <u>SAM/ATM 04</u> FLEXIBLE USE OF AIRSPACE					
Benefits					
Safety		• Enhanced civil/military coordination and cooperation reinforces airspace safety			
Environment protection and sustainable development of air transport		• Permits a more efficient ATS route structure, reducing miles flown and fuel consumption, and thus CO2 emissions into the atmosphere. • Increases airspace capacity. • Increased availability of reserved airspace when there is no activity by airspace users.			
Metrics					
• Percentage of implemented civil/military coordination committees or similar organisations • Number of implemented civil/military cooperation and coordination agreements • Reduction in the number of permanently reserved airspaces					
Strategy 2012 – 2018					
OC ATM COMPO-NENTS	TASKS		START-END	RESPONSIBLE PARTY	STATUS
AOM AUO CM	a)	prepare guidance material on civil/military coordination and cooperation for the establishment of policies, procedures and national regulations	(*) - 2012	Regional Project States	In progress
	b)	evaluate the number and size of reserved airspaces	(*) – 2012	States	In progress
	c)	establish civil/military coordination committees or similar organisations	(*) - 2012	States	In progress
	d)	make arrangements for permanent linkage and close cooperation between civil ATS units and the appropriate military units, as well as with reserved airspace users	(*) - 2012	States	In progress
	e)	establish, when required by ANSPs, procedures for coordinating temporary reserved airspace through the issuance of NOTAMs or specific real-time reservation activation/deactivation procedures	(*) – 2013	States	Valid
	f)	develop a strategy and work programme for the implementation of flexible use of airspace, through a stage-based approach, starting with a more dynamic sharing of reserved airspace	2012 - 2018	Regional Project States	Valid
	g)	track progress during implementation	(*) – 2013	GREPECAS	In progress
Link to GPI	GPI/1: Flexible use of airspace; GPI/18: Aeronautical information. (*) Indicates that this task was started before the the scheduled date.				

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## APPENDIX E

### Example of national regulation for the implementation of flexible use of airspace

#### Preamble

Appendix O to Assembly Resolution A 37-15: *Consolidated statement of continuing ICAO policies and associated practices related specifically to air navigation* refers specifically to coordination and cooperation between civil and military air traffic. Hence, it recognizes that airspace is a common resource for civil aviation and military aviation and that a large number of air navigation facilities are available to, and used by, both civil and military aviation.

This resolution also states, among other aspects, that the shared use of airspace and certain facilities by both civil and military aviation will be arranged in such a way as to achieve safety, regularity and efficiency of civil aviation and meet the requirements of military air traffic.

Taking into account the organization of military aspects under its responsibility, XXX (*Name of State*) shall guarantee the sound application of the flexible use of airspace concept described by ICAO within the airspace under its responsibility to facilitate airspace and air traffic management.

#### Objective

The purpose of this standard is to define guidelines for the application of the flexible use of airspace (FUA) concept within Flight Information Regions (FIR) XXXX, XXXX (*name of FIR(s)*) to facilitate its use and harmonize its application within the context of airspace management (ASM) and air traffic management (ATM).

#### Background

The flexible use of airspace is a concept developed by the International Civil Aviation Organization (ICAO) that is being developed by the SAM Implementation Group (SAMIG) of the ICAO South American Region. FUA is an airspace management concept based on the principle that airspace should not be used exclusively for military or civil purposes but rather should be a continuous space in which the requirements of users are met as far as possible.

Likewise, it is recognized that the shared use of airspace and certain facilities by both civil and military aviation will be such that it will be possible to achieve safety, regularity and efficiency of civil aviation and meet the requirements of military air traffic, and encourages the dissemination of best practices.

#### Scope

These regulations establish a number of parameters to ensure better cooperation and coordination among civil and military entities responsible for managing the airspace under the responsibility of XXX (*name of State*).



## **FUA Principles**

An FUA concept should be based on the following principles:

Coordination among civil and military authorities shall be articulated at a strategic, pre-tactical and tactical level in order to increase safety and airspace capacity, and improve the efficiency of air operations.

Consistency should be established and maintained between ASM, air traffic flow management (ATFM), and ATS at the three ASM levels.

Airspace reservation should be temporary, applied only during limited periods of time, and based on actual use of the airspace.

Wherever possible, the FUA concept should be applied beyond national borders or flight information region (FIR) boundaries.

## **Strategic Airspace Management**

In order to ensure full application of the FUA concept at the ASM strategic level, it is necessary to establish airspace structures, develop coordination and airspace management procedures, and establish cross-border coordination and separation standards for civil and military flights.

Strategic airspace management is known as FUA Level 1.

## **Pre-tactical Airspace Management**

An ASM entity should be established for the allocation of airspace in accordance with the conditions and procedures agreed at the strategic level.

In XXX (*State*), civil and military authorities are jointly responsible for airspace management. Therefore, the ASM entity shall be a joint civil-military unit. If necessary, the unit can also be established by two or more States. XXX (*name of State*) shall provide entities with the appropriate ASM support systems to ensure a timely and efficient process.

Pre-tactical airspace management is known as FUA Level 2.

## **Tactical Airspace Management**

Tactical ASM should be carried out at the level of ATS units and military control units. Through special coordination and communication procedures, airspace data can be exchanged on a timely basis so that the airspace allocated to the pre-tactical level may be activated, deactivated or reassigned in real time. Updated airspace status should be communicated to all affected users.

When civil and military controllers provide services in the same airspace, direct and highly reliable communications should be available between civil and military ATS units in order to resolve specific traffic issues. If minimum safety levels are required, civil ATCs and military control units can exchange flight data, including aircraft position and flight intention data.

Tactical airspace management is known as FUA Level 3.

#### **Post-operation analysis (Level 4)**

At this level, an assessment shall be made of the mechanisms and processes used for management, creating a registry of reports on aspects that could be improved and lessons learned. This analysis will help to improve FUA processes and management, and material will be available to train all parties with a view to improving operations.

#### **Safety Assessment**

Within the safety management processes, and before introducing any change to the implementation of flexible use of airspace, it is necessary to perform a safety assessment for hazard identification and risk analysis and mitigation in accordance with SMS procedures.

#### **Temporary Suspension**

When the application of the FUA concept generates major operational difficulties, XXX (*Name of State*) may temporarily suspend such application provided the ATM community is immediately informed thereof.

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## APPENDIX F

### Prohibited, restricted and danger areas in the SAM Region

Country	PA	RA	DA	Others	Remarks
Argentina	15	50	1	N/A	
Bolivia	1	23	NIL	N/A	
Brazil	44	228	11	N/A	
Chile	12	32	9	78 areas of volcanic activity	Chile has defined climb areas for weather balloons (5) as prohibited areas.
Colombia	5	11	NIL		
Ecuador	2	11	1	N/A	Ecuador has designated SANGAY volcano area as a danger area.
French Guiana	1	4	9		
Guyana	1	NIL	NIL		
Panama	4	2	4	4 and 1 ADIZ	Panama has designated other areas for air sports and recreational activities
Paraguay	2	9	3	N/A	
Peru	14	22	NIL	N/A	
Suriname	2	1	NIL	N/A	
Uruguay	19	4	2	N/A	
Venezuela	6	36	2	N/A	
<b>TOTAL</b>	<b>126</b>	<b>432</b>	<b>42</b>	<b>83</b>	

PA: Prohibited Area

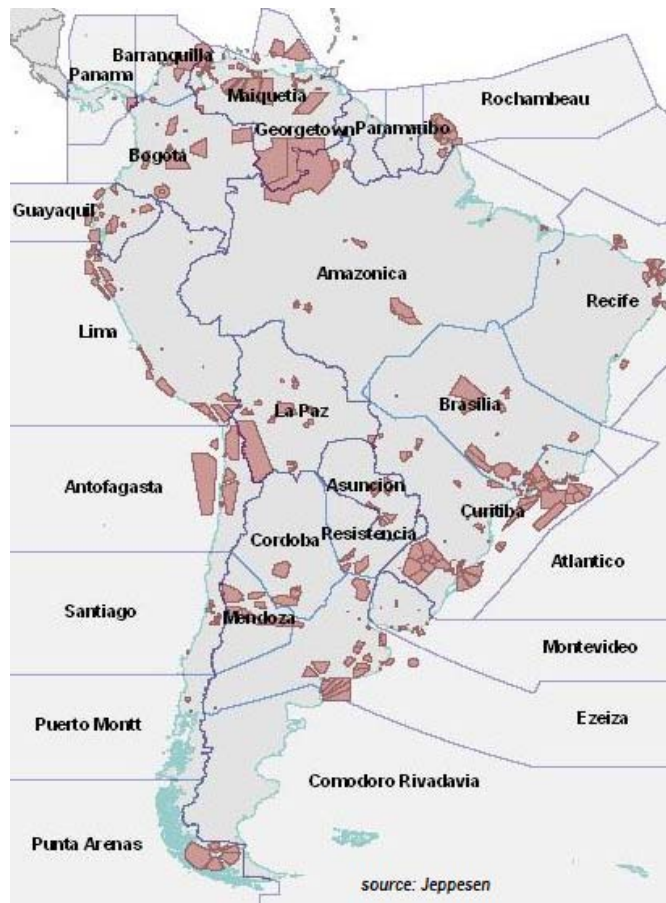
RA: Restricted Area

DA: Danger Area

N/A: Not applicable

NIL: Nothing

## Prohibited, restricted and danger areas in the SAM Region



In the South American Region, there are 26 FIRs covering 38'565,578 km2.

Prohibited, restricted and danger areas in the ICAO South American Region

- 628 special use airspaces
- 683 in total, including special areas, such as volcanic, training and others areas
- 2'121,753 km2 in total, defined as special use areas

**11.9% of the continental area**

## APPENDIX G

### Sample Form on the use and management of restricted, forbidden and danger areas and special use airspace in the SAM Region

**Country:** \_\_\_\_\_

**FIR:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Type of area or special use airspace (1)	Size (2)		Period of use (3)	Nature of the Activity (4)	Managed by (5)	Does it affect current operation? (6)	Does it affect ANSP planning? (7)	Remarks (8)
	Lateral in Km <sup>2</sup>	Vertical limit						

Instructions to complete the form:

1. Type of area or special use aircraft: insert prohibited, restricted, danger area or special use area (recreational, farming activities, etc.).
2. Size: Insert lateral dimension in square kilometers, and vertical dimension indicating upper and lower limits
3. Period of use: Insert the area activation schedule or period, if applicable.
4. Nature of the activity: Insert detailed information of the activity carried out in the area (parachuting, training, etc.).
5. Managed by: Insert the name of the organization or person responsible for area activation.
6. Does it affect current operation? Insert information regarding the impact on the current design of the area.
7. Does it affect ANSP planning? Indicate if ANSP planning may be potentially affected by the area
8. Remarks: Insert additional information that the State should take into account.

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## APPENDIX H

### Sample of Letter of operational agreement for joint use of restricted areas

(ref. ICAO Circular 330 and Doc 9433)

SUBJECT: Procedures for drawing up the letter of operational agreement for joint use of restricted areas (identify the area or areas related to the LoA)

EFFECTIVE DATE: (insert date).

In accordance with ICAO regulations and procedures and national regulations (insert national reference), the procedures for the use of restricted areas (identify the list of Restricted/Danger Areas on which the LoA is based) are hereby established by (identify civil ATS units) and (identify military units)

Airspace under (identify civil or military units responsible, as required) jurisdiction is exhibited in Annex 1 to this LoA.

*At least the following shall be included in Annex 1:*

- a) Horizontal and vertical limits of the corresponding airspace;*
- b) Classification of airspace available for civil air traffic;*
- c) Units or authorities responsible for airspace handover;*
- d) Conditions for airspace handover to the corresponding ATC unit;*
- e) Conditions for airspace handover from the corresponding ATC unit;*
- f) Airspace availability periods;*
- g) Any limitations on the use of the corresponding airspace; and*
- h) Any other appropriate procedures or information.*

This letter revokes or supersedes the Letter of operational agreement (if any) for joint use of restricted areas (insert previous agreements) dated (insert date).

1. Personnel of (identify the coordinating unit) shall act as liaison between the user and the control body.



2. The user shall:

- 2.1. Coordinate activation/release periods of (identify the area or areas related to the LoA) with (identify ATC units to coordinate with)
- 2.2. Notify (identify unit) at least 30 minutes prior to the activation of airspace above (identify flight level or altitude expressed in feet, as appropriate) in area (identify the area(s) related to the LoA)
- 2.3. Notify (identify unit) at least 2 hours prior to the activation of airspace during periods other than those published in the (identify the area(s) related to the LoA) AIP
- 2.4. Notify (identify unit) at least 30 minutes prior to the activation of airspace (identify flight level or altitude expressed in feet, as appropriate) in area (identify the area(s) related to the LoA)
- 2.5. Notify (identify unit) at least 48 hours prior to the activation of airspace in (identify the area(s) related to the LoA).
- 2.6. Release the (identify the area(s) related to the LoA), as appropriate, above (identify flight level or altitude expressed in feet, as appropriate) to (identify unit) when the area is not being used for the designated purpose.
- 2.7. Release the (identify the area(s) related to LoA), as may be appropriate, at maximum required altitudes above (identify flight level or altitude expressed in feet, as appropriate) to (identify unit) due to a traffic emergency situation. The release of airspace to (identify unit) shall be done within 30 minutes after the request is transmitted.

3. The control body shall:

- 3.1. Exhaust all possible traffic management procedures before requesting user to release the airspace, as specified in paragraph 2 g.
  - 3.2. Return (identify the area(s) related to the LoA) promptly to the user once the traffic emergency situation has been resolved.
  - 3.3. Be responsible for issuing the appropriate NOTAMs for the airspace being use above (identify flight level or altitude expressed in feet, as appropriate)
  - 3.4. Notify (identify unit) of airspace release periods of (identify the area(s) related to the LoA).
  - 3.5. Submit in writing, upon written requested from the user, the reasons for requesting the recovery of airspace in restricted areas.
4. The (identify unit) shall be responsible for issuing the appropriate NOTAMs for the airspace being used (identify flight level or altitude expressed in feet, as appropriate)
  5. During periods in which airspace is released to the control body, (the user) shall authorize traffic under instrument flight rules (IFR), visual flight rules (VFR) in and throughout the (identify the area(s) related to the LoA)
  6. The decision to recover airspace from a restricted area shall be made by supervisory staff of the control body.

Note: Non-supervisory staff of (identify unit) may act as liaison with the user for the release/recovery of (identify the area(s) related to the LoA)

7. Communication between (the user) and (the control body)

7.1. In order to enable effective coordination between the units concerned regarding the procedures established in this LoA, the means of communication described in Appendix 2 will be used and/or implemented.

7.2. These means of communication shall enable communication within (insert time as necessary) seconds and shall have an automatic recording system.

8. Revisions

8.1. This LoA will be revised when the procedures contained therein or in its appendices are affected by amendments to ICAO SARPS, regional supplementary procedures or regional plans, or when the corresponding ATS units implement new communication facilities.

8.2. The body implementing new communication systems is responsible for initiating coordination with the counterpart body.

8.3. If the amendment only affects part of the Appendices, the new amendment may be inserted without modifying the LoA upon agreement between the parties. The effective date of the amendment shall be agreed between the parties.

(ORIGINAL DOCUMENT SIGNED BY) User Representative

(ORIGINAL DOCUMENT SIGNED BY) Control Body Representative

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## **APPENDIX I**

### **Procedures applicable in Europe for the Flexible Use of Airspace (Ref. Spain AIP)**

#### **INTRODUCTION**

The flexible use of airspace (FUA) concept is based on that airspace no longer being considered as military or civil airspace but rather as one single continuum that is used flexibly in accordance with day-to-day needs. Consequently, any necessary airspace segregation shall be only temporary.

There are three levels of airspace management:

- Level 1 - Strategic: where long-term planning of the national airspace and airspace structure management policy is defined through a joint civil/military process.
- Level 2 – Pre-tactical: where management is done on a day-to-day basis, on the day before operations, and temporary allocation of airspace is done through the Airspace Management Cell (AMC), which collects and analyses all airspace requests and decides airspace allocation on a daily basis.
- Level 3 - Tactical: where airspace use is managed in real time.

#### **FLEXIBLE AIRSPACE STRUCTURES**

The FUA concept complements airspace organization into a series of flexible structures as defined below:

- Temporary Segregated Areas (TSA): airspace of predefined dimensions established in response to civil and military needs that may require temporary reservation of airspace. TSAs are described in ENR 5.2. The AMC manages TSAs at the pre-tactical level the day before operations. They are activated during the period published in the AUP.
- Manageable Danger and Restricted Areas: military areas that, while maintaining their D or R concept, can be managed and allocated by the AMC in the same way as TSAs during the periods of time published in section ENR 5.1.
- Conditional Routes (CDR): non-permanent ATS routes or portions thereof that can only be planned and used under certain specific conditions within the periods of time published in the description of the Conditional Route. Each CDR published in section ENR 3.5 is associated to an alternative route.

CDRs are divided into three categories according to their possible use in the flight plans:

CDR 1 - they are established at the strategic phase (Level 1). They are available most of the time, so they can be permanently included in the flight plans (RPL and FPL). Every day, the AUP and CRAM are distributed with the CDR1 routes that are being closed. The RPLs affected by temporarily closed routes shall be cancelled and a new FPL containing item 15, the published alternate route corresponding to each unavailable CDR1, will be filed. If it is known sufficiently in advance that it will be closed, then it will also be included in the FAUP (AUP forecast issued 30 days in advance of the day of operation). If a CDR1 must be closed to traffic on a short notice, ATC will instruct flights to use alternate routes in the tactical phase.

CDR 2 – they are managed at the pre-tactical phase (Level 2). They cannot be permanently planned. CDR2s may only be included in the FPL, according to the conditions published daily, on the day before operations, though the Conditional Route Availability Message (CRAM). The AMC will issue an AUP forecast (FAUP).

CDR 3 they are managed at the tactical phase (Level 3). They cannot be planned in flight plan. They can only be used subject to ATC clearance, following civil-military coordination. CDRs cross Temporary Segregated Areas (TSA) or Manageable Danger and Restricted Areas. The periods of time during which such routes or route segments are classified as CDR 2 or CDR 3 must coincide with the activity periods of the areas crossed. One same ATS route segment may be conditional 1, 2, or 3 in different periods of times. In Spain, the ATS route is used normally outside of the periods of time and vertical limits published as CDR.

## **AIRSPACE MANAGEMENT UNITS**

### **Airspace Management Cell (AMC)**

It is a national joint civil/military unit responsible for day-to-day management (pre-tactical phase) and temporary allocation of airspace according to the requirements of airspace users (ACC, FMP, military area managing units and other approved agencies). It prepares the Forecast Airspace Use Plan (FAUP) 30 days before the operation. The day before the operation, it prepares the Airspace Use Plan (AUP). In exceptional circumstances, between day D-30 and day D-1, authorized agencies can make modifications to the FAUP, which shall be reflected in the corresponding AUP message.

### **Centralized Airspace Data Function (CADF)**

CADF is a EUROCONTROL unit that collects, analyzes and consolidates all information related to CDRs, as provided by national AMCs through the “Airspace Use Plan” (AUP). The day before operations, the CADF prepares and issues a list of available CDRs through the Conditional Route Availability Message (CRAM)”

## **PUBLICATION OF INFORMATION ON THE AVAILABILITY OF FLEXIBLE STRUCTURES**

### **Forecast Airspace Use Plan (FAUP)**

Every day, the AMC prepares a “Forecast Airspace Use Plan” (FAUP) 30 days before the day of operations. This information will be disseminated through the CFMU, the NOP website and Aena’s air navigation website, or through the most effective means available at any time. It is prepared before 1400 hours UTC and is valid for 24 hours starting at 0600 hours UTC of the day of operation. Any exceptional changes that may be introduced will be included in the corresponding AUP.

### **Update of the Forecast Airspace Use Plan (FUUP)**

The AMC may issue an “Update to the Forecast Airspace Use Plan” (FUUP) to amend the FAUP. It will have the same means of distribution as the FAUP. The FUUP will be disseminated before 0900 UTC of day D-29, and will have the same validity period as the original FAUP to which it refers.

### **Airspace Use Plan (AUP)**

The AMC sends the "Airspace Use Plan (AUP)" through the CIAM (CFMU Interface for airspace managers) to the CFMU/CADF before 1400 UTC of the day before the operation, with a validity period of 24 hours starting at 0600 UTC of the next day. The AUP may contain variations to the FAUP. The AUP has the following sections:

A) – List of available CDR 2s.

B) - List of permanent ATS routes and temporarily closed CDR1s.

C) – List of active TSAs and manageable R and D areas.

Example of AUP:

**LECBUIR**

No.	Route-Portion	FL Block	Validity Period	Remarks
1	UG850: VLC-RESTU	F350-F460	14:30 - 15:30	----
2	UH300: ADX-CLS	F250-F460	12:30 - 14:30	----

**LECMUIR**

No.	Route-Portion	FL Block	Validity Period	Remarks
1	UA31: CJN-ASTRO	F250-F460	12:30 - 15:00	----
2	UA31: CJN-ASTRO	F250-F460	22:00 - 22:59	----
3	UA31: CJN-ASTRO	F250-F460	05:00 - 06:00	----

B) Closed ATS routes and Category 1 CDR.

**LECMUIR**

No.	Route-Portion	FL Block	Validity Period	Remarks
1	UG25: STG-KORET	F245-F300	09:00 - 11:30	----

C) Active TSA and AMC Manageable R & D Areas.

**LECMUIR**

No.	Route-Portion	FL Block	Validity Period	Remarks	Resp. Unit
1	TSA 28 STG	F245-F300	09:00 - 11:30	----	LECMZAMC

## Updated Airspace Use Plan (UUP)

The AMC issues the “Updated Airspace Use Plan (UUP)”, which amends the AUP. It has the same format and addressees as the AUP. It makes reference to the number of the AUP it is updating and includes any changes that may occur on the day of operations. It is issued before 0900 UTC on the same day of operations. It has a validity period of 18 hours from 1200 UTC of that day to 0600 UTC of the following day.

## Conditional Route Availability Message (CRAM)

The “Conditional Route Availability Message (CRAM)” is issued by the CADF to aircraft operators, ARO, ACC/FMP, AMC of the ECAC area and to the CFMU at 1500 UTC of the previous day of operations and is valid for 24 hours starting at 0600 UTC of the next day. The CRAM is transmitted through the AFTN or SITA and is available on CFMU terminals. It contains the list of airway segments classified as CDR2 that will be available for the period indicated in the message. For security reasons, information published by the AIS on the CDR1s and permanent ATS routes that are closed for specific periods is repeated in the CRAM.

Example of CRAM:

GG LEANZDZX  
041524 EUCHZMTA  
PART 001 OF 008  
CRAM VALID FROM 05/01/1998 06:00 TO: 06/01/1998 06:00 RELEASED: 04:15

A) CDR TYPE 2 AVAILABILITY:

1	UA10	TRA F200-590	RESIA (LSAZUIR) 0700-1230
2	UA23	ELVAR F245-255	BEJ (LPPCUIR) 0600-0600
3	UA31	CJN F250-460	ASTRO (LECMUIR) 0600-0730
4		F250-460	1330-2359
5	UA41	SRN F200-590	FRANE (LSAGUIR) 0600-0730

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93	UZ917	KRH F250-290	ADENU (EDUUUIR) 0600-0600
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B) ATS ROUTE AND CDR TYPE 1 CLOSURE:

1	UG15	TRT F310-350	VIBER (EDBBUIR) 0730-0930
2		F310-350	1100-1230
3		F310-350	1345-1600
4	UG102	HAM F310-350	FLD (EDBBUIR) 0730-0930
5		F310-350	1100-1230
6		F310-350	1345-1600

## APPENDIX J

### Model of Action plan for the flexible use of airspace (FUA)

NATIONAL PERFORMANCE OBJECTIVE XXX					
Flexible use of airspace (FUA)					
Benefits					
Safety	<ul style="list-style-type: none"><li>Improved civil/military coordination and cooperation reinforces airspace safety.</li></ul> <i>Note: include other benefits as necessary)</i>				
Environmental protection and sustainable development of air transport	<ul style="list-style-type: none"><li>Allows for a more efficient ATS route structure, reducing miles flown and fuel consumption, and thus CO2 emissions into the atmosphere.</li><li>Increases airspace capacity</li><li>Greater availability of reserved airspace at times where there is no activity by the users of this airspace.</li></ul> <i>Note: include other benefits as necessary)</i>				
Metrics					
<ul style="list-style-type: none"><li>Percentage of special use areas (SUA) coordinated for the application of the FUA concept</li><li>Number of letters of operational agreements on civil/military coordination and cooperation</li><li>Permanent reduction of the amount of reserved airspace.</li><li><i>Note: include other metrics as necessary</i></li></ul>					
Strategy 2012 – 2018					
*Activity	Start	End	Responsible party	Remarks	
1. Establish policies and develop standards on FUA (subtasks)					
2. Establish a national high-level committee for civil-Military cooperation and coordination (subtasks)					
3. Sign a memorandum of understanding (MOU) between civil and military authorities (subtasks)					
4. Hold seminars/meetings with civil and military authorities and reserved airspace users to show the importance to airspace use optimization (subtasks)					
5. Evaluate, in an early stage, all restricted, prohibited and danger areas that affect or could affect air flow in order to reduce them as much as possible (subtasks)					
6. Develop a medium-term uniform and collaborative national airspace planning process, taking into account					



all user needs and national security, defense and police requirements (see subtasks)				
7. Implement an airspace management cell (AMC) to conduct an effective coordination in real time (subtasks)				
8. Adopt adequate measures to improve the efficacy of traffic flow management, by developing conditional routes (CDR) that allow dynamic rerouting of aircrafts to avoid special use airspace (subtasks)				
9. establish regulations and procedures to communicate, negotiate and determine priorities for civil-military coordination (subtasks)				
<b>10. Establish, when required by ANSPs, procedures to coordinate temporary reserved airspace</b> through the issuance of NOTAMs or specific real-time reservation activation/deactivation procedures (subtasks)				
11. Draft the necessary letters of operational agreement between ATS units and military units or other users for the activation of restricted airspace when necessary (subtasks)				
12. Manage information in order to establish and publish in the AIP the CDR routes and the procedures for activities requiring airspace reservation and restriction (subtasks)				
13. Carry out the safety assessment and risk analysis when FUA measures are introduced (subtasks)				
14. Establish a system to periodically revise airspace requirements, organization and management (subtasks)				
15. Assess training requirements for FUA application and provide the courses that are deemed necessary (subtasks)				
16. Track progress during FUA implementation (subtask)				
* Activity: Indicates the activities required for achieving the performance objective. * End: Insert the date when the task ends. * Responsible party: Insert the name of the unit/person responsible for carrying out the task. * Remarks: Insert any remarks that may help understand the purpose of the task.				

## **LIST OF SUBTASKS TO ACHIEVE THE FUA PERFORMANCE OBJECTIVE**

*Note: Tasks included here are for reference only, and are not exhaustive.*

### **1 - Subtasks to establish policies and draw up FUA-related regulations**

1. Analyze national documentation and verify if there are any regulations or policies related to the flexible use of airspace.
2. If there are no regulations, revise global and regional documentation as reference material
3. Draft the corresponding standard.
4. Submit the standard to the consideration of the corresponding authorities to check compliance with current legislation.
5. Review remarks that may have been identified in the previous item.
6. Finish the document
7. Submit the document to the aeronautical authority for approval.
8. Take all corresponding action for its inclusion in the national legislation, if applicable.

### **2- Subtasks to establish a High-Level Committee for Civil-Military Cooperation and Coordination**

1. Select the person or group of persons in charge of developing the task and the Committee Secretariat.
2. Evaluate ICAO current provisions related to civil-military cooperation and coordination.
3. Analyze national regulations and status concerning civil-military coordination and cooperation.
4. Draft the terms of reference and committee objectives.
5. Develop a work program
6. Evaluate who is eligible to participate in the National Committee (civil/military aviation representatives, and/or other airspace users, where necessary)
7. Send invitations for the first Meeting of the Civil/Military Coordination and Cooperation Committee
8. Hold the first Meeting of the Committee
9. Submit the terms of reference and work program to the Committee for its consideration.
10. Approve the terms of reference and work program.
11. Set meeting schedule based on the work program.

### **3- Subtasks to draft the Memorandum of Understanding (MOU)**

1. Review national regulations related to Civil-military coordination.
2. Evaluate previous global and national experiences
3. Draft the MOU
4. Submit the MOU for consideration by national authorities for review.
5. Review all observations made to the document, if applicable.
6. Submit MOU to the consideration of the high level Committee for civil-military cooperation and coordination.
7. Approve the MOU
8. Take appropriate actions for MOU to come into effect.

### **4 – Subtasks to hold seminars and meetings with civil and military authorities, and reserved airspace users**

1. Evaluate the need for seminars related to FUA
2. Evaluate the need to hold meetings with the parties involved in the FUA concept.
3. Prepare a plan of activities regarding seminars and/or meetings.

4. Prepare material for seminars on FUA
5. Prepare material and documentation for holding meetings on FUA.
6. Coordinate the development of activities with all the parties involved.
7. Send invitations for scheduled activities.
8. Carry out the activity
9. Prepare a report with the results of the activities
10. Submit the results of the activities, as established.
11. If necessary, track results and their implementation in terms of time and form.

#### **5- Subtasks to evaluate, in an early stage, all restricted, prohibited, and danger areas that affect or could affect circulation**

1. Review national regulations related to the implementation of prohibited, restricted, and danger areas.
2. Analyze all restricted, prohibited, and danger areas that have been implemented in each State, using the sample form for the use and management of restricted, prohibited, and danger areas and special use airspace in the SAM Region contained in Appendix F.
3. Consider in the analysis the unmanned aircraft systems (UAS)
4. Verify if it is possible to reduce, eliminate or modify SUA structure
5. Identify those SUAs that may be used dynamically by applying the FUA concept.
6. Analyze different scenarios in order to apply strategic airspace management.
7. Analyze different scenarios in which, due to safety, it may be necessary to establish procedures or conventions to avoid tactical airspace management.
8. Establish guidelines, in an early stage, to allow timely and foreseeable access to restricted or reserved airspace, in order to maximize benefits.
9. Take appropriate action in order to authorize dynamic use of special use areas.

#### **6- Subtasks to develop a uniform and collaborative national airspace planning process regarding FUA**

1. Analyze ICAO regulations regarding CDM.
2. Evaluate national regulations on CDM, and if there are none, establish the criteria for their application (See CDM SAM).
3. Identify the areas that will participate in airspace planning.
4. Verify that FMUs and/or FMPs are represented.
5. Analyze airspace structure taking into account user needs, especially national security, defense and police requirements.
6. Identify special use airspace at national level that may prevent flexible use of airspace.
7. Create national plans to optimize airspace structure taking into account the application of the FUA and CDO concepts.
8. Review national plans to optimize airspace structure in accordance with FUA and CDO, where applicable.
9. Propose to the corresponding planning area the adjustments necessary to accommodate national, defense and police requirements.
10. Verify that all proposals are incorporated into the national air navigation plan of the State.

#### **7- Subtasks to implement the airspace management cell (AMC)**

1. Analyze the need to establish an AMC for the management of special use airspace in the pre-tactical and tactical phase.
2. Define activities that AMC will carry out when coordinating civil/military/police operations including the following:
  - a) Granting of authorizations for aircraft overflights
  - b) Coordination of unusual military traffic in airspace

- c) Real-time coordination of SUA activation/release periods with ATC units
- d) Application of the FUA concept in daily operations
- e) Management of conditional routes (CDR) in close cooperation with ATC units.
- f) Drafting of the Forecast Airspace Use Plan (FAUP)
- g) Drafting of the Airspace Use Plan (AUP).
- 3. Establish agreements between ATC and AMC units.
- 4. Develop applicable procedures.

## **8 - Subtasks to adopt suitable measures to improve the efficiency of traffic flow management**

- 1. Evaluate the application of conditional routes at global and regional level
- 2. Review national special use airspace planning that may affect the efficiency of civil operations.
- 3. Identify the SUAs that may be appropriate for implementing the CDRs.
- 4. In coordination with parties involved in CDM, develop conditional routes (CDR) for dynamic rerouting of aircraft to avoid special use airspace.
- 5. Training ATC staff on the application of CDR routes and procedures for coordination and cooperation with the areas involved.
- 6. Publish CDR routes in the AIP
- 7. Insert CDR routes and all associated procedures in the operational manuals.
- 8. Set the date(s) for CDR implementation.
- 9. Perform risk management before CDR implementation
- 10. Track CDR application

## **9- Subtasks to establish regulations and procedures to communicate, negotiate, and determine priorities for civil-military coordination**

- 1. Evaluate existing State regulations and procedures.
- 2. Analyze means of communication between ATC and military units.
- 3. Establish means of communication
- 4. Develop applicable procedures.
- 5. Define the criteria to be used for determining civil-military coordination priorities
- 6. Submit these criteria to the consideration of involved parties for approval.
- 7. Include primary and secondary means of communication in letters of operational agreement.
- 8. Include applicable procedures in the letters of operational agreement.
- 9. Train ATC and military personnel on the use of applicable means and procedures.
- 10. If necessary, publish all corresponding procedures in the AIP
- 11. Implement the means of communication and procedures.
- 12. Periodically check the operation of the means of communication.
- 13. Periodically check if procedures meet airspace user requirements, and if civil-military coordination is being carried out effectively.

## **10 – Subtasks to establish procedures to coordinate temporary reserved airspace (TRA)**

- 1. Verify TRA coordination procedures at national level.
- 2. If there are no procedures, define such procedures, including real-time activation/release.
- 3. Check if temporary reservation is done through NOTAM or through real-time specific reservation activation/deactivation procedures.
- 4. Submit procedures to the consideration of the parties involved.
- 5. Following their approval, include TRA coordination procedures in the letters of operational agreement between ATC and military units.
- 6. Train ATC and military staff on the implementation of TRA coordination procedures.
- 7. If necessary, publish all corresponding procedures in the AIP

8. Implement procedures
9. Periodically check if procedures meet TRA coordination requirements and if coordination is carried out effectively.

#### **11 – Subtasks to draft Letters of Operational Agreement between ATS units and military units or other users**

1. Assess current procedures for the activation of restricted airspace when so required
2. Agreements and procedures for flexible use of airspace may be established in the Letters of Operational Agreement, which shall include the following items:
  - a) horizontal and vertical limits of the airspace concerned;
  - b) the classification of the airspace available for use by civil air traffic;
  - c) units or authorities responsible for airspace handover;
  - d) conditions for airspace handover to the ATC unit concerned;
  - e) conditions for airspace handover from the ATC unit concerned;
  - f) airspace availability periods
  - g) any limitations on the use of the airspace concerned; and
  - h) any other relevant procedures or information.
3. Train ATC and military personnel on the use of the LoA.
4. If necessary, publish all corresponding procedures in the AIP
5. Implement the LoA
6. Periodically review the LoA to verify that it effectively meets civil-military coordination requirements.

#### **12- Subtasks for managing information in order to establish and publish CDR routes in the AIP, and procedures for activities requiring reserved and restricted airspace**

1. Negotiate with the corresponding AIS office.
2. Check the time required for the relevant information to be duly published
3. Coordinate with the AIS office the establishment of a publication timetable and the dates in which information must be available in the AIS
4. Check information before publication to ensure its accuracy.
5. Check that information is being published in accordance with national regulations.
6. Verify that publication dates are effectively met

#### **13- Subtasks to carry out the safety assessment and the risk analysis when FUA measures are introduced**

1. Contact the local safety office
2. Verify the time required to perform the safety assessment of FUA procedures and measures to be implemented.
3. Coordinate with the local safety office who will perform the risk analysis
4. Supply all the information needed by the safety office
5. Participate as an observer during risk analysis sessions.
6. Verify that the outcome meets the level of safety agreed by the State.
7. Communicate the outcome to the corresponding State authorities
8. Verify that risk mitigation actions are executed before FUA measures and/or procedures become effective.
9. Track FUA measures and procedures implemented to ensure that safety is not affected.

#### **14- Subtasks to establish a system to periodically review airspace requirements, organization and management**

1. Create a strategy to periodically review airspace requirements, organization, and management.

2. Submit this strategy to the Civil- Military Cooperation and Coordination Committee.
3. Approve the strategy
4. Implement appropriate action to comply with the strategy approved.
5. Verify compliance with the objective established in the strategy.

#### **15- Subtasks to assess training requirements for the application of FUA and to provide the necessary courses**

1. Evaluate national regulations and other documentation related to personnel training.
2. Verify if current documentation contains adequate material for FUA to be successfully implemented.
3. Analyze the topics that shall be included in the courses concerning FUA
4. Coordinate with the corresponding Civil Aviation Training Centre (CATC) the inclusion in the curriculum of topics related to FUA.
5. Coordinate with CATC the specific training and seminars that would be required for FUA implementation.
6. Assist the CATC in all matters related to FUA.
7. Verify that training related to FUA is being provided effectively.

#### **16- Subtasks to track progress during the implementation of FUA**

1. Strictly monitor progress in the implementation of FUA in the State.
2. Verify the results of all processes related to FUA.
3. Inform the Civil-Military Cooperation and Coordination Committee of all aspects that might prevent the effective implementation of the FUA
4. Take appropriate measures to overcome obstacles for the implementation of the FUA.
5. Verify that measures taken will overcome the difficulties encountered.

### **REFERENCE DOCUMENTS**

- Convention on International Civil Aviation (The Chicago Convention)
- Annex 2, - *Rules of the air*,
- Annex 11 –*Air Traffic Services*,
- PANS-ATM, Doc. 4444 - *Procedures for Air Navigation Services — Air Traffic Management*
- Doc. 9554 -*Manual concerning Safety Measures Related to Military Activities Potentially Hazardous to Civil Aircraft Operations*
- Doc. 9426 –*Air Traffic Services Planning Manual*
- Doc. 9750 –*Global Air Navigation Plan*
- Doc. 9854 – *ICAO Global Air Traffic Management Operational Concept*
- Doc. 8126 – *AIS Manual*
- Assembly Resolution A 37-15 - Consolidated statement of continuing ICAO policies and associated practices related specifically to air navigation.
- Reports of Air Navigation Regional Meetings for the CAR/SAM Regions (CAR/SAM RAN)
- Global Air Traffic Management Forum on Civil/Military Cooperation (2009)
- Circular 330-AN/189 – *Civil-Military Cooperation in Air Traffic Management*
- GREPECAS meetings– Caribbean and South American Regional Planning and Implementation Group
- Performance-Based Air Navigation System Implementation Plan for the South American Region (SAM-PBIP)
- CDM Manual for the SAM Region
- ATFM Manual for the CAR/SAM Regions
- SAMIG Meeting Reports
- RAAC Meeting Reports - Meeting of Civil Aviation Directors
- Report of the Seminar on Civil/Military Coordination and Cooperation and flexible use of airspace for the NAM, CAR, and SAM Regions (2011)

- Spain AIP
- Regulation 2150/2005 - Common Rules for the Flexible Use of Airspace European Commission
- Single European Sky -European Organization for the Safety of Air Navigation (EUROCONTROL)
- NextGen –Federal Aviation Administration (FAA)

**APPENDIX D (REVISED 16/05/12)**

**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
<b>1. Phase One – RNAV-5 Implementation</b>					
1.1.	RNAV-5 implementation in the SAM Region	<b>Apr 2008</b>	<b>Oct 2011</b>	<b>Regional Project RLA/06/901</b>	<b>Completed</b> Implemented on 20 October 2011
<b>2. Phase Two – Implementation of Version 1 of the SAM ATS Route Network</b>					
Activity		Start	End	Responsible party	Observations
2.1.	<b>Conduct a Feasibility Study for Optimising the SAM Route Network</b>	March 2009	Apr 2009	Regional Project RLA/06/901	<b>Completed</b>
2.2.	<b>Airspace Concept</b>				
2.2.1	Collect traffic data to understand air traffic flows	June 2008	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901) States	<b>Completed</b> 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)	<b>Completed</b> Task 1.3 of the RNAV-5 Implementation Project



			States IATA	
2.2.3	Determine the gateways of the main TMAs in the SAM Region	SAM/IG/3	SAM/IG/4	States  <b>Completed</b> 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)  <b>Completed</b> 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: <ul style="list-style-type: none"> <li>• Indicate the domestic and international ATS routes that should be eliminated, in accordance with their use;</li> <li>• Propose the volume of exclusionary airspace for RNAV-5 application</li> <li>• Indicate the “conventional” RNAV routes that should be eliminated or replaced by RNAV routes in the exclusionary RNAV-5 airspace.</li> <li>• Indicate the RNAV routes that should be realigned, in accordance with the gateways of the main SAM TMAs (see 2.2.3).</li> <li>• Describe in detail the proposed new SAM route network, based on the analysis of the aforementioned items.</li> <li>• Describe in detail the interface between the SAM route network and the CAR route network.</li> <li>• Propose the initial draft Proposal of Amendment to the CAR/SAM ANP</li> </ul>	SAM/IG/4	March 2010	SAM/PBN/IG (Project RLA/06/901)  <b>Completed</b> 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	<p><b>Completed</b></p> <p>This task requires the hiring of 1 expert in order to carry out required assessment applying SMS.</p> <p>This requirement will be presented to the RLA/06/901 RCC meeting.</p> <p>One person two weeks</p>
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	<p><b>Completed</b></p> <p>This task requires the approval of the RCC meeting, in order to be able to count with RLA/06/901 support.</p> <p>Further to SAM/IG/5</p>
<b>2.3 Implementation of Version 1 of the SAM ATS Route Network</b>					
2.3.1	Process the proposal of amendment to the CAR/SAM Air Navigation Plan	TBD		SAM Regional Office	<p><b>Completed</b></p> <p>Shall depend on the decisions to be adopted by the routes workshop of 2.2.6</p>
2.3.2	Publish version 1 of the SAM ATS Route Network	TBD		States	<p><b>Completed</b></p> <p>Shall depend on the decisions adopted in the routes workshop of 2.2.6.</p>
2.3.3	Entry into effect of version 1 of the SAM ATS Route Network	TBD			<b>Completed</b>
<b>3. Phase Three – Implementation of Version 2 of the SAM ATS Route Network</b>					
	<b>Activity</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Observations</b>
3.1.	<b>Flexible Use of Airspace</b>				

3.1.1.	Develop guidance material for the application of the Flexible Use of Airspace concept, including: <ul style="list-style-type: none"> <li>• Model for FUA LOA</li> <li>• Model for using non-permanent routes similar to that applied in EUROCONTROL (Conditional Routes – CDR).</li> <li>• Criterion for defining scenarios in which non-permanent routes are applied</li> <li>• Criterion for categorising non-permanent routes</li> <li>• Harmonised publication of non-permanent routes</li> <li>• Representation of non-permanent routes in aeronautical charts</li> </ul>	SAM/ATSRO/3	SAM/IG/9	SAM/PBN/IG (Project RLA/06/901)	<b>Completed</b>
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.	<b>Airspace Concept</b>				
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 a new request to States. Reply date September 2012.
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 IATA	<b>Completed</b> The information on RNAV5 approval was sent to CARSAMMA 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.	<p>Make a detailed study of the SAM ATS route network with a view to developing version 2 of the route network, including:</p> <ul style="list-style-type: none"> <li>• Determine necessary tools for the holding of the study mentioned in item 3.2.5 (Aeronautical Charts, specific software).</li> <li>• 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.</li> <li>• Indicate the ATS routes that should be eliminated in accordance with their utilisation;</li> <li>• Propose, if necessary, the extent of exclusionary airspace volume for RNAV-5 application</li> <li>• 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.</li> <li>• Indicate the RNAV routes that should be realigned in keeping with possible modifications to the gateways of the main TMAs in the SAM Region.</li> <li>• Detail possible scenarios for version 2 of the SAM route network and of control</li> </ul>	SAM/IG/7	SAM/IG/11	<p>SAM/PBN/IG (Project RLA/06/901)</p> <p>Hiring of two experts is programmed for a three-week period during second half of February 2012.</p> <p>The First draft for the analysis of States and operators was developed, support was requested to the Project, to continue with the study of Optimisation, through hiring of a 3-week period and 2 experts before March 2013, with the new air traffic data, to be collected on August 2012, and feasibility studies together with TMA modified to be presented in the Region.</p>

sectors, based on the analysis of the previous items				
<ul style="list-style-type: none"> <li>• Detail the interface between the SAM route network and the CAR route network</li> <li>• Propose the initial draft Proposal of Amendment to the CAR/SAM ANP.</li> <li>• Define the required safety assessment (qualitative or quantitative).</li> <li>• With the air traffic data, consider the possibility to implement RNAV5 parallel routes with adequate separation.</li> <li>• Prepare optimisation plan for restricted, prohibited, dangerous and reserved use in the SAM Region.</li> <li>• Application of CDO techniques.</li> </ul>				
3.2.6. Carry out a Seminar/Workshop/Meeting on Airspace Planning	ATSRO/3	September 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 September in Lima.
3.2.7. Carry out the Fourth ATS Routes Network Optimisation Workshop/Meeting for the SAM Region (SAM ATSRO/04)		July 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	July 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	
<b>3.3. Implementation of Version 2 of the SAM ATS Route Network</b>				
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			

**Agenda Item 3: Implementation of performance-based navigation (PBN) in the SAM Region****Follow up of the En-route PBN (RNAV5) action plan and definition of future PBN implementation activities in the SAM Region pursuant to ICAO Resolution A37-11**

3.1 The Meeting established the activities in the PBN en-route action plan to serve as guidance for States to ensure RNAV5 implementation, after a successful implementation on **20 October 2011**, and updated the status of the tasks that should have been complied on occasion of such implementation, and shall decide the PBN en-route (RNAV5) action plan, contained in **Appendix A** to this part of the report, must be considered completed, leaving only the tasks of a permanent nature that are already incorporated into the activities of States.

3.2 In revising the activities of the monitoring programme envisaged in the RNAV5 Action Plan after implementation on 20 October 2011, the meeting verified that this task is not being fulfilled in an effective manner by all States. In this regard, the meeting highlighted that ICAO Secretariat shall remind States and operators the importance to complete and send such forms to CARSAMMA on the 10<sup>th</sup> of each month, to comply with the verification of percentage of operations carried out by aircraft and operators with RNAV5 approval. Furthermore, States should circulate the forms amongst the operators that use their airspace with a view to also participate in the monitoring programme (the Form is shown in **Appendix B** to this part of the report).

3.3 Taking into account that the main objective of ICAO is to ensure the safe and efficient operation of the global air navigation system, the Eleventh Air Navigation Conference recommended that ICAO develop GNSS RNAV procedures for both fixed-wing and rotary-wing aircraft, to enable reduced operating minima in environments with numerous obstacles or other limitations.

3.4 The meeting noted that, in order to check the status of implementation of PBN and to make sure that States comply with the implementation plans defined by the Assembly, it should create a regional inventory of PBN-based approach procedures and en-route operations already implemented and/or foreseen for implementation.

3.5 Therefore, the model presented by the Secretariat, suffered a change in format, in order to reflect more clearly already implemented or being developed, in order to define action plans that reflect the commitments of States to compliance with Resolution A37-11 and also Regional Performance Framework Forms (PFF) of the SAM Region Performance-Based Air Navigation Implementation Plan (SAM PBIP). In order to collect information, the meeting formulated the following Conclusion:

**Conclusion SAM/IG/9-2****Regional inventory model for PBN-based en-route and terminal area approach and operations**

That States submit to the ICAO Regional Office the Regional inventory model for PBN-based en-route and terminal area approach and operations not later than **27 July 2012**, as per the model presented in **Appendix C** to this part of the report.

3.6 In order to carry out an updating of the information available to continue with the progress in PBN activities at a regional level, the meeting recalled that national PBN plans were delivered by States on 2009 and that an information paper should be prepared with the updated plans, based on the CAR/SAM PBN roadmap, taking into account the current phase of national implementation. As per the above, the meeting formulated the following Conclusion:

**Conclusion SAM/IG/9-3****National PBN implementation plan**

That States update their national PBN implementation plans and submit them to the forthcoming SAM/IG/10 Meeting.

**Implementation of PBN procedures in the Argentinean Republic**

3.7 The meeting took note that the Argentinean Aeronautical Authority (DGCTA), as per guidelines issued by ICAO, and taking into account collaborative Decision Making (CDM), will keep into account the necessary PBN procedures design to initiate this optimisation phase.

3.8 Therefore, the Meeting encouraged States and Operators to acknowledge this progress, keeping in mind that several of them are used by IATA operators of the different SAM States in their regional operations, with operational benefits.

**Support from IATA**

3.9 IATA offered support, in order to hire an expert to develop a PBN guidance material. This work will be carried out during the course of this year, at the ICAO South American Office in a date to be determined.

3.10 Also, IATA shall assess the possibility to hold a workshop on the CDO/CCO concept (Continuous Descent Operations/Continuous Climb Operations).



## 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)

<b>2</b>	<b>Safety assessment</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
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	<b>Completed</b>

<b>3</b>	<b>Establish a collaborative decision-making process (CDM)</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
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	<b>Completed</b> 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. All States: AIC have been issued with regard to RNAV5 implementation, as of 20 October 2011.

3 Establish a collaborative decision-making process (CDM)	Start	End	Responsible party	Remarks
3.2 Establish the implementation date	SAM/IG/1	SAM/IG/4	SAM/PBN/IG States	<p><b>Completed.</b></p> <p>18 November 2009 was established as tentative date.</p> <p>States analysed the feasibility of the tentative date in coordination with domestic operators and military authorities</p> <p>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).</p>
3.3 Establish the documentation format in the SAM PBN website	SAM/IG/1	SAM/IG/2	SAM Regional Office	<p><b>Completed</b></p>
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	<p><b>Completed.</b></p> <p>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.</p>

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)	<b>Completed</b> 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	<b>Completed</b>

<b>5</b>	<b>Aircraft and operator approval</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
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	<b>Completed</b>
5.2	Publish national regulations for the implementation of the RNAV-5 navigation specification	SAM/IG/2	SAM/IG/7	States	<b>Completed</b>
5.3	Approval of aircraft and operators	SAM/IG/3	Permanent	States	<p><b>Permanent</b></p> <p>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.</p> <p>States informed that there are still few requests for general aviation aircraft and operators approval</p> <p>States also informed that almost all commercial aircraft and operators (operators 121) are or are about to be approved until the date of implementation.</p>
5.4	Establish and keep up to date a registry of approved aircraft and operators	SAM/IG/3	Permanent	CARSAMMA States Regional Office	<p><b>Completed</b></p> <p>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.</p>

<b>5 Aircraft and operator approval</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
5.5 Verify the operation of the continuous monitoring programme (aircraft and procedures)	Sep 2011	Permanent	States	<b>Completed</b> 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	<b>Completed</b>
6.2	Finalize WGS-84 implementation	TBD	TBD	States	<b>Completed</b> 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)	<b>Completed</b>
6.4	Publish the AIC reporting PBN implementation plans	SAM/IG/2	SAM/IG/4	States	<b>Completed</b> 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)	<b>Completed</b>
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	<b>Completed</b> 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	<b>Completed</b> 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	<b>Completed</b> 4 States indicated that this task is completed. 2 States informed that the task is ongoing. 4 States indicated that the task was not completed. No information available from 4 States

<b>6</b>	<b>Standards and procedures</b>	<b>Start</b>	<b>End</b>	<b>Responsible party</b>	<b>Remarks</b>
6.9	Update the letters of agreement between ATS units (if necessary).	SAM/IG/5	October 2011	States	<b>Completed</b> 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 1 State. States present informed that adjustments have been made to letters of agreement.
6.10	Develop an amendment to regional documentation, if necessary	SAM/IG/3	June 2011	SAM/PBN/IG (Project RLA/06/901)	<b>Completed</b>
6.11	Submit a proposal of amendment to Doc. 7030, if necessary	SAM/IG/5	SAM/IG/6	SAM Regional Office	<b>Completed</b>



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	<b>Completed</b> 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)	<b>Completed</b>
7.3 Develop a training programme for regulators (aviation safety inspectors)	SAM/IG/4	SAM/IG/5	RLA/99/901 States	<b>Completed</b> 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	<b>Completed</b> 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	<b>Completed</b> 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. Since there is no national fleet. 1 state informed that the task is on-going. 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	<b>Completed</b> 9 States indicated that this task was completed. No information from 5 States.
8.2 Assess the percentage of aircraft and operators (non-exclusionary airspace)	SAM/IG/7	States	<b>Completed</b> 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	<b>Completed</b>
8.4 Publish trigger NOTAM	3 October 2011	States	<b>Completed</b> 9 States indicated that this task was completed. No information from 5 States.

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)	<b>Completed</b>
9.2 Implement a post-implementation en-route operations monitoring programme	October 2011	October 2012	States	<b>Valid</b> States must continue to send all the data to CARSAMMA as per the Conclusion
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)	<b>Pending</b> Expecting submission of data by some States.
<b>Pre-operational implementation date</b>	20 October 2011	20 October 2012		<b>Completed</b> 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. <b>20 October 2011.</b>
<b>Definitive implementation date</b>	20 October 2012			

**APPENDIX B****LATERAL/LONGITUDINAL NAVIGATION DEVIATION REPORTING FORM**

Report to the Caribbean and South American Monitoring Agency (CARSAMMA) any horizontal/longitudinal navigation deviation, including:

- 1) those caused by the ACAS/TCAS; and
- 2) those resulting from turbulence and/or contingencies

*NOTE: If there is **NO** lateral/longitudinal navigation deviation in the area of responsibility of the ATC body during the period in question, **Section I** STILL needs to be completed and this report sent to the CARSAMMA address listed below by the 10th of the following month.*

ATC unit/OPERATOR: \_\_\_\_\_

Please complete Section I or II, as applicable.

**SECTION I:**

**NO** lateral/longitudinal navigation deviations were reported in the month/year \_\_\_\_\_

**SECTION II:**

\_\_\_\_\_ report(s) of blunder errors and/or navigation deviations were filed with respect to the aircraft authorised to operate in PBN airspace. Deviation details are shown in the attached form(s).

(Please use a separate form for each deviation report.)

**SECTION III:**

Once completed, please send the report(s) to:  
Agencia de Monitorio del Caribe y Sudamérica (CARSAMMA)  
Assessoria de Segurança no Controle do Espaço Aéreo (ASEGCEA)  
PRAÇA SENADOR SALGADO FILHO, S/N – CENTRO  
20021-370 - RIO DE JANEIRO - RJ  
Telephone: (55-21) 2101-6358 Fax: (55-21) 2101-6358  
e-mail: [carsamma@decea.gov.br](mailto:carsamma@decea.gov.br)

**INSTRUCTIONS FOR COMPLETING THE FORM**

Complete each box, as numbered below, according to the following instructions:

1. DATE IN WHICH THIS FORM WAS COMPLETED.
2. ICAO LETTERS IDENTIFYING THE ATC UNIT OR OPERATOR.
3. TYPE OF DEVIATION (LATERAL OR LONGITUDINAL).
4. INSERT THE ICAO IDENTIFICATION LETTERS FOR THE AIRCRAFT OPERATOR, OR, IN THE CASE OF GENERAL AVIATION, INSERT "IGA".
5. INSERT THE AIRCRAFT CALL SIGN AND REGISTRATION.
6. INSERT THE AIRCRAFT TYPE ACCORDING TO ICAO DOC 8643; FOR EXAMPLE, FOR AIRBUS A320-211, INSERT A320; FOR BOEING B 747-438, INSERT B744.
7. DESCRIBE HOW WAS THE EVENT OBSERVED: WHETHER BY MODE C OR REPORTED BY THE PILOT, INDICATING FLIGHT LEVEL, IF APPLICABLE.
8. INSERT THE DATE OF OCCURRENCE.
9. INSERT THE TIME OF OCCURRENCE.
10. INSERT THE LOCATION OF THE OCCURRENCE (LATITUDE / LONGITUDE, FIX OR VOR RADIAL, AND NAUTICAL MILES FROM A POINT).
11. ROUTE ON WHICH THE EVENT OCCURRED (IN THE CASE OF DIRECT OR RANDOM FLIGHT, INSERT "DCT").
12. FLIGHT LEVEL ASSIGNED EN ROUTE.
13. TIME FLOWN INCORRECTLY, IN SECONDS.
14. IF THE OCCURRENCE INVOLVES ANOTHER AIRCRAFT, INSERT THE CALL SIGN, REGISTRATION, FLIGHT LEVEL, AIRCRAFT TYPE AND ROUTE.
15. DESCRIBE THE CAUSE OF THE DEVIATION, ACCORDING TO TABLE 1.
16. THE OBSERVED/REPORTED POSITION OF THE AIRCRAFT, CHOSING ONE OPTION WITH AN "X". INDICATE THE SOURCE OF INFORMATION (MODE C AND/OR THE PILOT).
17. THE MAGNITUDE (DISTANCE) OF THE LATERAL/LONGUITUDINAL DEVIATION, IN NAUTICAL MILES (NM).
18. BRIEF DESCRIPTION OF THE DEVIATION.
19. COMMENTS BY THE CREW, IF ANY.

**TABLE 1**

CAUSES OF THE LATERAL / LONGITUDINAL DEVIATION
<b>A</b> - Deviation due to meteorological conditions, when ATC clearance cannot be obtained before.
<b>B</b> - Deviation due to warning from the collision avoidance system (ACAS / TCAS).
<b>C</b> - Deviation due to unexpected event - contingency (engine failure, pressurisation failure).
<b>D</b> - Equipment control degradation or error, including incorrect operation of its FMS functions or navigation system (e.g., by error, the pilot operates the INS equipment incorrectly).
<b>E</b> - Incorrect information transcribed to the FMS (e.g., flight plan followed instead of the ATC clearance, or original authorisation instead of a new clearance issued by the ATC unit).
<b>F</b> - Error in the handover message between adjacent ATC units (coordination loop error).
<b>G</b> - Absence of ATC coordination (lack of coordination).
<b>1</b> - Failure reported to ATC in time to take action.
<b>2</b> - Failure reported to ATC too late to take action.
<b>3</b> - Failure reported/received by ATC.
<b>O</b> - Other.
<b>P</b> - Unknown.

**Notes:**

1. *There are data that must be reported by the pilot.*

2. (\*) *Error in the handover message between adjacent ATC units (coordination loop error):*

*Any error caused by a misunderstanding between the pilot and the controller with respect to the Mack number or the route to be followed. Such errors can result from ATC coordination loop errors or from a misinterpretation by the pilot of a clearance or clearance renewal. (Doc. 9689-NA/953, Manual on airspace planning methodology for the determination of separation minima.)*



Information contained in this form is confidential and will only be used for statistical safety analysis.

### LATERAL/LONGITUDINAL NAVIGATION DEVIATION FORM

Report of a navigation deviation to CARSAMMA, including those resulting from TCAS, turbulence, and contingencies.

1. Today's date:		2. ATC unit / operator:	
<b>DEVIATION DETAILS</b>			
3. <input type="checkbox"/> LATERAL ↔		<input type="checkbox"/> LONGITUDINAL ↗	
4. ACFT operator:	5. Call sign: Aircraft registration:	6. Type of ACFT:	7. Mode C observed: <input type="checkbox"/> Yes. ¿What level? <input type="checkbox"/> No.
8. Date of the occurrence:	9. UTC time:	10. Location of the occurrence (lat/long or fix):	
11. Designated route:			
12. Designated flight level:		13. Estimated duration of incorrect flight (seconds):	
14. Other traffic (if any):			
15. Cause of the deviation ( <i>brief title</i> ): (Examples: ATC coordination loop operational error, turbulence, weather, equipment failure)			
<b>DEVIATION</b>			
16. Observed/reported deviation *:  *Indicate the source of information: <input type="checkbox"/> Mode C <input type="checkbox"/> Pilot	To the left of the designated path: <input type="checkbox"/> To the right of the designated path: <input type="checkbox"/> Ahead of the estimated position: <input type="checkbox"/> Behind the estimated position: <input type="checkbox"/> ATS route inconsistent with the flight plan: <input type="checkbox"/>		17. Magnitude of the observed/reported lateral/longitudinal deviation, in nautical miles:  Lateral _____NM  Longitudinal _____NM
<b>NARRATION</b>			
18. Detailed Description of the Deviation (Please, evaluate the track flown by the aircraft and the cause of the deviation.)			
<b>19 – COMMENTS BY THE CREW (IF ANY)</b>			

After completing this form, please send the report(s) to:  
 Agencia de Monitoreo para el Caribe y Sudamérica (CARSAMMA)  
 Assessoria de Segurança no Controle do Espaço Aéreo (ASEGCEA)  
 PRAÇA SENADOR SALGADO FILHO, S/N – CENTRO 20021-370 - RIO DE JANEIRO - RJ  
 Telephone: (55-21)2101-6358 Fax: (55-21) 2101-6358  
 E-mail: [carsamma@decea.gov.br](mailto:carsamma@decea.gov.br)



## APÉNDICE / APPENDIX C

### Inventario regional de los procedimientos de aproximación y operaciones en ruta basados en la PBN REGIONAL INVENTORY OF PBN-BASED APPROACH AND EN-ROUTE PROCEDURES

#### Informe de avance de la implantación de la PBN PBN IMPLEMENTATION PROGRESS REPORT

*Nota/Note: Las metas toman en cuenta la Resolución A-37/11 de la Asamblea de la OACI y el Plan Regional SAM/ Goals take into account ICAO Assembly Resolution A-37/11 and the SAM Regional Plan*

#### Designación de puntos Focales PBN por Estado /Designation of PBN Focal Point per State

*Estado/Status:* (Nominado/a ser nominado)  
(Nominated/ To be Nominated)

*Punto Focal / Focal Point:* (Nombre, Cargo, E-mail, teléfono, fax)  
(Name, Designation, Mailing Address, Email, Phone, Fax)

#### **1. Operaciones de aproximación / Approach Operations**

##### **Aeropuertos Internacionales/International Airports**

##### **RNP APCH con Baro/VNAV RNP AR APCH /**

##### **RNP AR APCH with Baro/VNAV RNP AR APCH**

**Número de extremos de pista existentes: \_\_\_\_\_ / Number of existing runway ends: \_\_\_\_\_**

Estado de implantación por extremos de pista Status of implementation by runway ends	Número Acumulado Number accrued (a)	Porcentaje Percentage (b)	En proceso de implantación In implementation process (c)	Observaciones Remarks (d)
2012				
2014				
2018				

\*Ver leyenda para el llenado de la table/ See legend to fill in the table.

#### **Inventario de procedimientos implantados / Inventory of implemented procedures**

Procedimientos implantados Procedures implemented		Tipo de procedimiento/ Type of procedures		
(e)		RNP APCH solo LNAV RNP APCH LNAV only (f)	RNP APCH con Baro VNAV RNP APCH with Baro/VNAV (g)	RNP AR APCH (h)
2012				
2014				
2018				



**Aeropuertos Domésticos/Domestic airports****RNP APCH con BARO VNAV / RNAP AR APCH****RNP APCH with BARO VNAV / RNAP AR APCH****Número de extremos de pista existentes / Number of existing runway ends**

Estado de implantación por extremos de pista Status of implementation by runway ends	Número Acumulado Number accrued (a)	Porcentaje Percentage (b)	En proceso de implantación In implementation process (c)	Observaciones Remarks (d)
2012				
2014				
2018				

**Inventario de procedimientos implantados /Inventory of implemented procedures**

Procedimientos implantados Procedures implemented		Tipo de procedimiento/ Type of procedures		
(e)		RNP APCH solo LNAV RNP APCH LNAV only (f)	RNP APCH con Baro VNAV RNP APCH with Baro/VNAV (g)	RNP AR APCH (h)
2012				
2014				
2018				

**2. Operaciones de llegada y salida (SID/STAR) / Exit and entry operations (SID/STAR)**

Número de aeropuertos Internacionales existentes/ \_\_\_\_\_  
Number of existing International airports \_\_\_\_\_

Estado de implantación por aeropuerto Status of implementation by airport	Número Acumulado Number accrued (a)	Porcentaje Percentage (b)	En proceso de implantación In implementation process (c)	Observaciones Remarks (d)
2012				
2014				
2018				

**Inventario de rutas implantadas / Inventory of routes implemented**

Rutas implantadas Routes implemented		Tipo de ruta/ Type of route	
(e)		SID (f)	STAR (g)
2012			
2014			
2018			

### Número de Aeropuertos domésticos existentes / Number of existing domestic airports

Estado de implantación por aeropuerto Status of implementation by airport	Número Acumulado Number accrued (a)	Porcentaje Percentage (b)	En proceso de implantación In implementation process (c)	Observaciones Remarks (d)
2012				
2014				
2018				

### Inventario de rutas implantadas/ Inventory of routes implemented

Rutas implantadas Routes implemented		Tipo de ruta/ Type of route	
(e)		SID (f)	STAR (g)
2012			
2014			
2018			

*Nota(s):* Los Estados pueden incluir información sobre publicaciones recientes de nuevos procedimientos de aproximación PBN incluyendo el identificador del aeropuerto.

*Note(s):* (States may include information on recent publications of new PBN approach procedures including the airport identifier.)

#### Leyenda/Legend:

- 1) En la casilla “a”, ingrese el número acumulado de aproximaciones RNP APCH / RNP AR APCH o rutas SID/STAR implantadas/proyectadas por año (no considerar procedimientos publicados sólo LNAV) / In box “a” enter accumulated number of RNP APCH / RNP AR APCH approaches or SID/STAR routes implemented/projected per year (do not consider procedures published LNAV only);
- 2) En la casilla “b”, ingrese el porcentaje acumulado de aproximaciones RNP APCH AR APCH o rutas SID/STAR implantadas/proyectadas por año / In box “b” enter accumulated percentage of RNP APCH AR APCH approaches or SID/STAR routes implemented/projected per year;
- 3) En la casilla “c” ingrese el número de aproximaciones RNP APCH/ RNP AR APCH o rutas SID/STAR en proceso de implantación por año/ In box “c” enter number or RNP APCH/RNP AR APCH or SID/STAR routes in implementation process per year;
- 4) En la casilla “d” ingrese observaciones si son necesarias (ejemplo, aeródromos internacionales completados/ In box “d” enter remarks, if necessary (i.e. international aerodromes completed);
- 5) En la casilla “e”, ingrese el número de aproximaciones RNP APCH RNP AR APCH o rutas SID/STAR implantadas por año / In box “e” enter number of RNP APCH RNP AR APCH or SID/STAR routes implemented per year;

- 6) En la casilla “f” ingrese el número de aproximaciones RNP APCH sólo LNAV o rutas SID implantadas por año/ In box “f” enter number of RNP APCH LNAV only or SID routes implemented per year;
- 7) En la casilla “g” ingrese el número de aproximaciones RNP APCH con Baro/VNAV o rutas STAR implantadas por año/ In box “g” enter number of RNP APCH with Baro/VNAV approaches or STAR routes implemented per year.
- 8) En la casilla “h” ingrese el número de aproximaciones RNP AR APCH implantadas por año / In box “h” enter number of RNP AR APCH approaches implemented per year.

*Nota(s):* Los Estados pueden incluir información sobre publicaciones recientes de nuevos procedimientos PBN.

*Note(s):* (States may include information on recent publications of new PBN procedures)

### 3. Operaciones en ruta / En-route Operations

Especificaciones de Navegación Navigation Specification	Finalizado Completed (# de rutas/of routes)		En proceso de implantación In process of implementation (# de rutas/of routes)	
	Domestic	International	Domestic	International
RNAV 10				
RNAV 5				
RNAV 2				
RNP 4				
RNP 2				

*Nota(s):* Los Estados incluyen información de publicaciones recientes con las nuevas rutas PBN incluyendo los nombres de las rutas.

*Note(s):* (States include information on recent publications with new PBN routes including the name of the routes.)

### 4. Operaciones de descenso continuo-Operaciones de ascenso continuo (de ser aplicable)/ Continuous Descent Operations-Continuous Climb Operations( if applicable)

*Nota(s):* (Los Estados pueden incluir información sobre recientes publicaciones de nuevas STAR con CDO).

*Note(s):* (States may include information on recent publications of new STAR with CDO).

— fin / end —

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

**Progress in the work carried out within the scope of Regional Project RLA/99/901 as regards performance-based navigation matters**

**Background**

4.1 In view of the fact that during the meeting many States did not have sufficient AIR/OPS experts, each State was requested by the meeting to assess WP/05 presented under this agenda item, sending comments to the Secretariat not later than **18 June 2012**. Based on this information, the Secretariat shall circulate and *Addendum* to the final report, containing **Appendices A and B** to this part of the report.

**Approval of execution of conventional procedures based on radio navigation aids with RNP approved systems even though the radio navigation aid is out of service**

4.2 RNAV routes and some RNAV arrival and departure procedures as well as RNP approach procedures have already been officially published for major airports and at airports lacking conventional aids in Colombia as of 20 October 2011.

4.3 Also, main operators in Colombia are already RNAV/RNP approved under the PBN concept, there is a large number of airports and aerodromes throughout the Colombian territory, and many of them only have procedures based on conventional aids such as NDB, VOR/DME.

4.4 The group was informed that as from a technical study of aircraft operating in Colombia, specifically those FMS-equipped, revealed that some of these systems support procedures based on radio aids even if the such radio aids are out of service and even if the airborne equipment is inoperative.

4.5 In view of the above, the group analysed WP/15 presented by Colombia and considered that each State should carry out its own assessment of the information presented, if deemed pertinent, keeping in mind limitations of national regulations and technical-operational procedures.

4.6 Also, the meeting suggested that the Secretariat assess, together with experts of ICAO HQ, the information delivered by Colombia.

**Agenda Item 5: Air Traffic Flow Management Implementation (ATFM) in the SAM Region****Review of the ATFM action plan**

5.1 The SAM/IG/9 group meeting reviewed the Action plan for the implementation of ATFM at airports and the airspace (ATC sectors) of the Region, involving tasks to be performed by defined responsible parties, with defined completion dates. The action plan that was reviewed at that meeting is shown as **Appendix A** to this part of the report.

5.2 As a result of the analysis of the action plan for ATFM implementation, the meeting proposes the hiring of two experts, with the support of Regional Project RLA/06/901, for a week, in order to develop a practical guidance material for ATFM implementation, based on the ATFM Manual for the CAR/SAM Regions.

5.3 In view of the above, the guidance material shall contain an initial analysis of the problems encountered by States for the effective implementation of the ATFM in the Region, and also to propose a revised action plan compatible with the resources available in States.

5.4 The meeting encourages States towards progress in the implementation and consolidation of the ATFM in the SAM Region and taking into account the following tasks that should be contained in the action plan to be revised by experts:

- a) Use and effective application of the ATFM implementation manual in the SAM Region;
- b) CDM implementation in airports using the model of the Region:
  - i) Initiating this activity by airport in which each State requires to balance demand and capacity where in certain seasons or specific events has been or could be overcome; and
  - ii) Publication of actions taken and to be taken to this end.
- c) Application of manuals for estimations of runway capacity and sectors capacity for States that have still pending compliance of this task;
- d) Publication of AIC/AIP referred to the ATFM issue as reflected in the ATFM action plan.

**Presentation of the ICAO draft ATFM guidance material**

5.5 The meeting revised the ICAO draft ATFM guidance material and did not have any comments regarding its structure, objectives and applicability of the document.

5.6 The meeting also considered appropriate that States which so wish could issue comments regarding structure, objectives and applicability of the ICAO Draft Guidance Material until the publication of the final edition of such document, foreseen for 31 July 2012.

**Modification of the Contingency Plan for events involving volcanic ashes**

5.7 The meeting took note that the ICAO working group on volcanic ashes (IVATF) prepared an initial contingency plan which includes all aspects related to volcanic ashes to be considered in a regional contingency plan. This model is a draft to be improved as experience is gained in managing procedures related as a consequence of volcanic ashes.

5.8 The group analysed the suggestions contained in WP/22 in order to explore the possibility to incorporate them into the contingency action plan, upon of volcanic ashes events, in order to achieve the necessary maturity and adjust it to the users' needs.

5.9 In view of the above, the meeting deemed pertinent that the Secretariat submit suggestions to ICAO Headquarters, to consider the proposals during the development of the Contingency Plan upon volcanic ashes events.

**APPENDIX A****ACTION PLAN FOR THE IMPLEMENTATION OF ATFM AT SAM AIRPORTS**

<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
<b>1. Airport demand/capacity (runway capacity) analysis</b>	<b>Sep 2008</b>	<b>Apr 2010</b>		
1.1 Prepare ATFM survey	N/A	Aug 2008	Project RLA/06/901 Regional Office	<b>Completed</b>
1.2 Send survey to the States of the Region	Aug 2008	SAM/IG/2	Regional Office	<b>Completed</b>
1.3 Analyse the methodology presented by Brazil for estimating airport capacity (runway capacity)	June 2008	SAM/IG/2	ATFM/IG	<b>Completed</b> and analyzed through WP/08, WP/16.
1.4 Send response to survey	N/A	SAM/IG/2	States	<b>Completed</b> Except for French Guyana, Guyana, and Suriname.
1.5 Assess survey results	N/A	SAM/IG/3	ATFM/IG	<b>Completed</b>
1.6 Course offered by Brazil on Airport Capacity (runway capacity) Estimate	Mar 2009	Mar 2009	Brazil	<b>Completed</b> 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	<b>Completed</b> Presented at SAM/IG/4

<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
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	<p><b>Completed</b></p> <p>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. Conclusion completed since the guidance material is being applied. Therefore there is no need to carry out more exercises.</p>
1.9 Carry out Calculation of Airport and Airspace Capacity of main airports by States.	Sept 2009	SAM/IG/9	States	<p><b>Valid</b></p> <p>Brazil, Paraguay and Peru presented the data.</p> <p>Venezuela presented its runway capacity calculation for the Maiquetía airport.</p> <p>Chile announces completion of estimates in its main airport, results to be provided mid-June.</p> <p>Valid in view of the lack of estimates in some airports.</p> <p>As a conclusion encourage States to accelerate publication of data, date to be determined by Secretariat, even though the tentative date would be SAM/IG/11.</p>



<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
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	<b>Permanent</b> Brazil, Paraguay and Peru presented the data. It is suggested to merge 1.9 with 1.12 and 1.20 with 1.11 in order to assure States that the aim of these tasks is to share information.
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	<b>Valid</b> Brazil, Paraguay and Peru presented the data.
1.12 Present the conclusions on existing airport capacity	<b>N/A</b>	SAM/IG/9	States	<b>Valid</b> Brazil and Peru presented their conclusions on airport capacity (runway capacity)
<b>2. Coordination with the ATM community</b>				
2.1 Present initial AIC model	SAM/IG/2	SAM/IG/2	ATFM/IG	<b>Completed</b>
2.2 Publish initial AIC	SAM/IG/2	Next AIRAC date/2009 after SAM/IG/3	States	<b>Completed</b>

<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
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	<p><b>Completed</b></p> <p>On 29 to 31 March 2010, the First CDM Workshop was carried out in Rio de Janeiro, Brazil, with the participation of 27 experts.</p> <p>The second ATFM/CDM Workshop will be carried out in Rio de Janeiro during 26 and 27 November 2010</p>
2.4 Inform the GREPECAS CNS/ATM Subgroup	SAM/IG/3	Permanent	N/A	<p><b>Completed</b></p> <p>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)</p> <p>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.</p>
<b>3. Infrastructure and database</b>		<b>Aug 2008</b>		
3.1 Send the results of the survey developed by the hired expert to the Automation Group.		Dec 2008		<b>Completed</b>

<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
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		<b>Valid</b> The meeting was informed that the Secretariat will follow-up on this matter.
3.3 Coordinate implementation activities with the Automation Group			ATFM/IG	<b>Permanent</b>
<b>4. Policy, standards, and procedures</b>				
4.1 Hiring of an expert to draft the manuals on ATFM measures for airports and FMU and FMP procedures			N/A	<b>Completed.</b> Task included in 4.2
4.2 Hiring of an expert for the elaboration of the ATFM Manual		February 2009	Regional Office	<b>Completed.</b> Task developed from 6 to 17 July 2009
4.3 Detailed development of ATFM Manual chapters	Dec 2008	SAM/IG/5	Regional Office	<b>Completed</b> 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)	<b>Completed</b> 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.

<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
4.5 Present the model AIC Supplement		SAM/IG/6	ATFM/IG	<b>Completed</b> 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	<b>Completed</b> The AIP/AIC supplement was approved.
4.7 Keep updated AIP/AIC Supplements.		SAM/IG/10	States	<b>Permanent</b>
<b>5. Training</b>				
5.1 Draft ATFM training plans and submit them		TBD	States	<b>Permanent</b>
5.2 Train the team on decision-making at airports		December 2011	States	<b>Completed</b> See 5.1.
5.3 Hiring of an expert to draft Manual on the Introduction to ATFM for the ATM Community		TBD	Regional Office	<b>Completed</b> 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.

<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
5.4 Present and assess the Manual for the Introduction to ATFM for the ATM Community		SAM/IG/6	RLA/06/901	<p><b>Completed</b></p> <p>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.</p> <p>It has been planned to develop a second part of such manual.</p>
5.5 Train the members of the ATM community in the CDM and ATFM concepts		TBD	States	<p><b>Completed</b></p> <p>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.</p> <p>The First CDM Workshop was held from 29 to 31 March 2010, with the participation of 27 experts.</p> <p>The Second ATFM SAM course was held in Rio de Janeiro, Brazil, from 23 to 25 November 2010, with the participation of 29 experts.</p> <p>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.</p> <p>The Second Seminar/Workshop on airport capacity calculation</p>

<b>A: AIRPORT</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or organisation in charge)</b>	<b>Remarks</b>
				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	<b>Permanent</b>
5.7 Monitor the training of the ATM community		SAM/IG/10	States	<b>Valid</b>
<b>6. Final implementation decision</b>				
6.1 Identify and review factors that may affect the implementation decision		SAM/IG/10	States	<b>Permanent</b>
6.2 Declare the pre-operational implementation in the defined area		SAM/IG/10	States	<b>Valid</b>
6.3 Declare the final operational implementation in the defined area		SAM/IG/10	States	<b>Valid</b>
<b>7. Monitor system performance</b>				
7.1 Draft the ATFM post-implementation follow-up programme at airports	SAM/IG/6	SAM/IG/10	ATFM/IG	<b>Valid</b>
7.2 Implement the ATFM post-implementation follow-up programme at airports	SAM/IG/7	SAM/IG/10	States	<b>Valid</b>
<b>Tentative pre-operational implementation date</b>		SAM/IG/10	<b>States</b>	<b>Valid</b>
<b>Tentative definitive implementation date</b>		SAM/IG/10	<b>States</b>	<b>Valid</b>

<b>ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION</b>				
<b>B- AIRSPACE (ATC Sector)</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or office in charge)</b>	<b>Remarks</b>
<b>1. Airspace demand and capacity analysis</b>				
1.1 Analyse the methodology to estimate ATC sector airspace capacity presented by Brazil	Jun 2008	SAM/IG/2		<b>Completed</b>
1.2 Prepare an airspace demand survey	TBD	TBD		
1.3 Attend the course on Airspace Capacity Estimate (ATC Sector).	Mar 2009	States		<b>Completed</b>
1.4 Carry out the States estimate airspace ATC sector capacity at the major airports	<b>Sept. 2009</b>	SAM/IG/10	States	<b>Valid</b> States must submit their studies before the SAM/IG/10 Meeting. Brazil has presented their studies.
1.5. Identify airspace sectors where demand sometimes exceeds capacity, including simulations by the States, if necessary	<b>TBD</b>	SAM/IG/10	States	<b>Permanent</b> States must submit their studies before the SAM/IG/10 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	<b>TBD</b>	SAM/IG/10	States	<b>Permanent</b> States must submit their studies before the SAM/IG/10 Meeting. Brazil has presented their studies.
1.7 Present conclusions on the existing airspace capacity.	<b>TBD</b>	SAM/IG/10	States	<b>Valid</b> States must submit an information paper on the situation before the SAM/IG/10 Meeting. Brazil has presented their studies.

<b>ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION</b>				
<b>B- AIRSPACE (ATC Sector)</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or office in charge)</b>	<b>Remarks</b>
<b>2. Coordination with the ATM community</b>	<b>Sep 2008</b>	<b>Aug 2009</b>		
2.1 Consider by the ATM community the implementation of ATFM in airspace	Sep 2008	SAM/IG/10	States	<b>Valid</b> 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/10 Meeting. Submit for consideration of the Secretariat the new tasks form proposed by Colombia and discussed by all.
<b>3. Infrastructure and database</b>	<b>TBD</b>	<b>Dec 2013</b>		<b>Valid</b>
3.1 Send requirements to the Automation Group, as stipulated in Appendix B of the ATFM CONOPS	<b>TBD</b>	<b>TBD</b>	ATFM/IG	<b>Valid</b>
3.2 Coordinate implementation activities with the Automation Group	N/A	Dec 2013	ATFM/IG	<b>Valid</b>
<b>4. Policy, standards, and procedures</b>	<b>TBD</b>	<b>Jun 2013</b>	States	<b>Valid</b>
4.1 Develop ATFM policies, taking into account the objectives and principles established in the CAR/SAM ATFM CONOPS	<b>TBD</b>	<b>TBD</b>	States	<b>Valid</b>
4.2 Develop a regional strategy and framework for the implementation of Centralized ATFM units	<b>2008</b>	<b>2014</b>	Regional Project RLA/06/901	<b>Valid</b>
4.3 Develop template/contents for operational agreements between Centralized ATFM units for interregional demand/capacity balancing	<b>2008</b>	<b>2014</b>	Regional Project RLA/06/901	<b>Valid</b>



<b>ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION</b>				
<b>B- AIRSPACE (ATC Sector)</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party(designate individual or office in charge)</b>	<b>Remarks</b>
4.4 Define common elements of situational awareness between FMUs; <ul style="list-style-type: none"> <li>• common traffic displays,</li> <li>• common weather displays (Internet),</li> <li>• communications (teleconferences, web), and</li> <li>• daily teleconference/messages methodology advisories</li> </ul>	<b>2008</b>	<b>2012</b>	Regional Project RLA/06/901	<b>Valid</b> States maintain web conferences for exchange of information.
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	<b>2008</b>	<b>2014</b>	Regional Project RLA/06/901	<b>Valid</b>
4.6 Develop a regional strategy to implement the use of a flexible upper airspace (FUA): <ul style="list-style-type: none"> <li>• evaluate the management processes in the use of the airspace;</li> <li>• improve the current domestic airspace management to adjust dynamic changes to the traffic flows in tactical stages;</li> <li>• 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</li> <li>• 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 /</li> </ul>	<b>200/8</b>	<b>2015</b>	Regional Project RLA/06/901	<b>Valid</b>

<b>ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION</b>				
<b>B- AIRSPACE (ATC Sector)</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or office in charge)</b>	<b>Remarks</b>
<b>5. Training</b>	<b>TBD</b>	<b>May 2013</b>		
5.1 Train the team on airspace data collection	Jun 2009	March 2011	States	<p><b>Completed</b></p> <p>A first course was carried out in March 2009.</p> <p>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.</p> <p>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.</p>
5.2 Air Traffic Flow Management Course	Mar 2010	Nov 2010	Brazil	<p><b>Completed</b></p> <p>Hosted by RP RLA/06/901.</p> <p>The Second ATFM Course was held in Rio de Janeiro, Brazil, from 22 to 26 March 2010 with 28 experts, and the holding of tele-conferences was agreed, and they have been held as of 12 April 2011, with excellent results.</p> <p>The Second ATFM SAM Course was held in Rio de Janeiro, Brazil, from 23 to 25 November 2010, with 29 Experts.</p> <p>The Third Seminar-workshop on airport capacity and ATC sectors will be held in Lima,</p>

<b>ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION</b>				
<b>B- AIRSPACE (ATC Sector)</b>				
<b>Task description</b>	<b>Start</b>	<b>End</b>	<b>Responsible party (designate individual or office in charge)</b>	<b>Remarks</b>
				Peru, from 24 to 28 October 2011, addressed to instructors.
5.3 Train personnel in ATFM strategic measures for airspace	<b>TBD</b>	<b>TBD</b>	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	<b>TBD</b>	<b>TBD</b>	States	<b>Permanent</b> In 2010 an ATFM/CDM course was held in Brazil with the participation of several States.
5.5 Conduct training of personnel involved.	<b>TBD</b>	<b>TBD</b>	States	<b>Valid</b>
			States	<b>Valid</b>
<b>6. Final implementation decision</b>	<b>N/A</b>	<b>Sep 2013</b>	States	<b>Valid</b>
6.1 Analyse factors affecting the implementation decision	<b>N/A</b>	<b>SAM/IG/9</b>	States	<b>Valid</b>
6.2 Declare pre-operational implementation in the area defined	<b>N/A</b>	<b>SAM/IG/9</b>	States	<b>Valid</b>
6.3 Declare definitive operational implementation in the area defined	<b>N/A</b>	<b>SAM/IG/9</b>	States	<b>Valid</b>
<b>7. Monitor system performance</b>	<b>TBD</b>	<b>N/A</b>	States	<b>Valid</b>
7.1 Draft ATFM post-implementation follow-up programme	<b>TBD</b>	Aug 2013	Regional Project RLA/06/901	<b>Valid</b>
7.2 Implement ATFM post-implementation follow-up programme	Dec 2013	N/A	States	<b>Valid</b>
<b>Tentative pre-operational implementation date</b>	<b>N/A</b>	<b>Jul 2013</b>	States	<b>Valid</b>
<b>Tentative definitive implementation date</b>	<b>N/A</b>	<b>Dec 2013</b>	States	<b>Valid</b>

**Agenda Item 6:           Assessment of operational requirements in order to determine the implementation of communications, navigation and surveillance (CNS) capabilities improvement for en-route and terminal area operations**

***SAM ATN architecture***

6.1           Under this Agenda Item, the Meeting analyzed WP/07 (Secretariat) and WP/13 (Project Coordinator).

6.2           In this respect, the action plan for the implementation of REDDIG II was updated, taking into account the changes in the dates for the offer evaluation process and later activities linked to this activity. **Appendix A** to this Agenda Item presents the updated action plan.

***Project ATN architecture for the SAM Region***

6.3           The Meeting took note of the progress made in the implementation of the Project *ATN architecture* for the SAM Region. The monitoring for the implementation of REDDIG II was added to the original deliverables assigned to the Project ATN architecture for the CAR/SAM Regions, and that were taken into account for the Project specific to the SAM Region.

6.4           **Appendix B** shows the Project Description document reflecting its deliverables and all the main phases of the Projects, since its establishment up to the closing of all activities. On the other hand, the Project Management document, in **Appendix C**, enables the management of all Project variables, such as scope, time, resources, quality, human resources and others. The Meeting considered that, for the drafting of the *IP routing policy* and *IP security guide*, the Project would require the support of RLA/06/901 Project, for the hiring of a CNS expert for a two-week period.

***ATN ground-ground and air-ground applications for the SAM Region***

6.5           Under this Agenda Item, WP/18 (Secretariat), WP/20 (Project Coordinator) and IP/07 (SITA) were analyzed upon.

***Project ATN Ground-ground and Air-ground Applications in the SAM Region***

6.6           The Meeting took note of the progress made in the implementation of the Project *ATN ground-ground and air-ground applications* activities, and examined the deliverables, their completion dates, as well as the people responsible for their conduct. The changes made are reflected in **Appendix D** to this Agenda Item.

***Folow-up to AMHS interconnection***

6.7           The Meeting took note of the progress made in the interconnection of AMHS, finding to date the following situation:

6.7.1           Operational interconnections (in chronological order):

- a) Colombia – Peru
- b) Guyana – Suriname
- c) Argentina - Paraguay

6.7.2 Operational trials:

Argentina and Brazil: in addition to the AMHS message exchange trials between the Brasilia MTA and the CIPE trial MTA, conducted in June 2011, to date message exchange tests between the operational systems terminals (MTA) of Brasilia and Ezeiza have started, estimating general operation by mid **June 2012**.

6.7.3 Connectivity trials conducted:

- a) Argentina (CIPE) - Peru: conducted between the Lima and CIPE (Ezeiza) MTAs, pending solution to authentication topics for the exchange of messages; and
- b) Brazil - Peru: connectivity aspects are pending solution.

6.7.4 Signed memoranda of understanding (MoU) firmados, without action:

- a) Argentina - Chile: because of updatings to the system in Chile, the trials have been delayed until October this year; and
- b) Ecuador – Peru: recently signed.

6.7.5 MoUs pending signature:

- a) Chile – Peru: Peru has signed it, Chile indicated the document is currently under study, without being able to specify the date for its signature. In this respect, the Secretariat will request Chile the signature of said document, and
- b) Peru – Venezuela: Peru delivered the signed documents to Venezuela, for their signature and submittance to the ICAO SAM Regional Office, for its later deliverance to the aeronautical administration of Peru.

6.7.6 New MoUs:

The installation of new AMHS in Bolivia and Ecuador make necessary the introduction of new MoUs between said States and those currently having AFTN connectivity, expecting same be signed by SAM/IG/10 meeting.

6.8 In addition, the Meeting analyzed the following AMHS trial requests:

- a) Trinidad & Tobago – Venezuela;
- b) Bolivia – Paraguay;
- c) Curacao – Venezuela; and
- d) Bolivia – Chile.

6.9 In this sense, the Meeting deemed it convenient that the SAM States focal points start coordinations with their counterparts, and draft the respective MoUs. The completed and signed MoUs would be presented at SAM/IG/10 meeting.

6.10 **Appendix E** to this Agenda Item presents the updated action plan for the interconnection of AMHS, containing all the afore indicated modifications.

6.11 On the other hand, the Meeting analyzed and approved the material proposed for the Course on ATS Message Handling System (COM AMHS) and suggested that its Programme, Module 3, Part 3, included in Appendix C to WP/18, be presented in further detail.

6.12 As a ground-air data link implementation experience model, the Meeting noted that of Central Europe's data link implementation (IP/07).

***Assessment of operational requirements to determine the implementation of improvements to navigation capabilities***

6.13 Under this Agenda Item, WP/16 (Secretariat) and WP/19 (Brazil) were presented.

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

6.14 The Meeting noted that all SAM States, with the exception of Guyana, had replied to the ICAO consult on their intention to participate in the purchasing of the RAIM availability prediction service through RLA/06/901 Project and, from the replies obtained, only one State, France (French Guiana), informed that the system they currently count with could provide them with the prediction service.

6.15 SAM/IG/8 meeting analyzed the technical specifications document for the implementation of a RAIM availability prediction service and later approved it. In this manner, the bidding process would start through the ICAO Technical Cooperation Bureau, without the participation of Guyana and French Guiana (France). In addition, the Meeting, upon reviewing the technical specifications, deemed it convenient that it be specified that the prediction service be presented in more than one language (Spanish, English and Portuguese). The technical specifications document is shown in **Appendix F** to this Agenda Item.

***GBAS implementation guide***

6.16 During SAM/IG/8 meeting and as action resulting from Activity A2.2 – *Develop practical guideline for the implementation of GBAS system*, of the Project *Air navigation systems in support of PBN* (Programme PBN), Brazil presented WP/18, which included a draft Guideline for GBAS Implementation.

6.17 At said moment, the Meeting considered the guideline as an initial document and deemed it necessary to include in it a series of detailed topics on the analysis of the ionosphere impact over the GPS systems in support of the GBAS service.

6.18 SAM/IG9 meeting considered that the Appendix contained in WP/19 and presented by Brazil (included as **Appendix F** to this Agenda item), presents a proposal to be included in *Guideline for GBAS implementation*, under Item 3.5 - *Considerations for GBAS Implementation*, a posteriori de *Certification and Operational approvals*.

6.19 The Meeting took note of the current activities for the operation of GBAS in Brazil (IP/06).

## 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
<b>1</b> 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	<b>Completed</b> Identified in the study for the implementation of the new digital network, REDDIG II
<b>2</b> 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	<b>Completed</b> Identified in the study for the implementation of the new digital network, REDDIG II
<b>3</b> 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	<b>Completed</b> Identified in the study for the implementation of the new digital network, REDDIG II
<b>4</b> 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	<b>Completed</b> Identified in the study for the implementation of the new digital network, REDDIG II
<b>5</b> 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	<b>Completed</b> 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
<b>6</b> 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	<b>Completed</b> 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
<b>7</b> 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	<b>Completed</b> Identified in the study for the implementation of the new digital network, REDDIG II
<b>8</b> 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	<b>Completed</b> 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)
<b>9</b> 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	<b>Completed</b> Identified in the study for the implementation of the new digital network, REDDIG II
<b>10</b> 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	REDDIG RCC/14 meeting (Lima, Peru, 16-18 Mar 2011)  SAM/IG/7	<b>Completed</b> 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.
<b>11</b> 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	<b>Completed</b> During this seminar/workshop, the communications services providers, integrators and manufacturers will present initial implementation proposals on the new REDDIG II digital network



ACTIVITIES	ACTION TO BE TAKEN BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
<b>12</b> 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	REDDIG RCC/14 meeting (Lima, Peru, 16-18 Mar 2011) SAM/IG/7	<b>Completed</b> 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.
<b>13</b> 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	<b>Completed</b> The technical specifications were drafted with the support of RLA/06/901
<b>14</b> 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	<b>Completed</b> Circulated to all REDDIG members for comments
<b>15</b> Presentation of REDDIG network study and technical specifications to RAAC/12 meeting	Secretariat	Go ahead for the public bidding process through ICAO	Oct 2011	<b>Completed</b> 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
<b>16</b> Review of technical specifications on the basis of comments from States, and submittance to ICAO HQ TCB to start the bidding process	REDDIG Administration	REDDIG technical specifications	Jan 2012	<b>Completed</b> Final technical specifications were sent to TCP (Purchasing Section) to start with bidding process
<b>17</b> Drafting of assessment criteria of REDDIG II offers	REDDIG Administration and ICAO Technical cooperation Directorate	Offers assessment criteria	Jan 2012	<b>Completed</b> The criteria for the offer assessment will be used

ACTIVITIES	ACTION TO BE TAKEN BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
<b>18</b> International bidding process for REDDIG II implementation	ICAO Technical Cooperation Bureau	Bidding process	Apr 2012	<b>Completed</b> Bidding process started on 4 April 2012. The calling for bidding was uploaded in the site <a href="http://www.lima.icao.int/procurement">www.lima.icao.int/procurement</a> , under number 22501200
<b>19</b> Reception of offers	Bidding companies	Offers from bidders	15 Jun 2012	<b>In course</b> Offers target delivery date is 1 June 2012
<b>20</b> Evaluation of offers presented to determine winning company	REDDIG experts members and Administration	Assessment of offers	18-29 Jun 2012	<b>To be conducted</b> The REDDIG experts members will be composed by specialists from Argentina, Bolivia, Brazil, Colombia, French Guiana (France, Peru and Venezuela. In addition, REDDIG Administration will participate (ICAO SAM Secretariat and REDDIG Administrator)
<b>21</b> Bid winner negotiation process	ICAO Technical Cooperation Bureau and REDDIG Administration	Negotiation with bid winner	2-6 Jul 2012	<b>To be conducted</b> Negotiation with bid winner to determine the better value
<b>22</b> Review and approval of offer evaluation analysis and approval of winning company	REDDIG RCC/15 meeting	Considerations to and approval of offers assessment and of selected bid winner	15-17Aug 2012	<b>To be conducted</b> All REDDIG members unable to participate in the assessment process will have the opportunity of considering and approving the assessment and selection of the winning company
<b>23</b> Start of REDDIG II installation	Bid winner	REDDIG II installation	Jun 2013	<b>To be conducted</b> It is expected that by the first quarter of 2012, all REDDIG members have cancelled the quotas corresponding to the implementation of REDDIG II
<b>24</b> REDDIG II Supervision and installation	REDDIG Administration and member States	REDDIG II supervision and installation	Jun-Dec 2013	<b>To be conducted</b> REDDIG member States, together with its Administration, will supervise all REDDIG II installation works
<b>25</b> REDDIG II acceptance trials	REDDIG Administration, member States and winning company	REDDIG II acceptance	Jan-Feb 2014	<b>To be conducted</b> REDDIG member States, together with its Administration, will conduct the REDDIG II acceptance trials
<b>26</b> REDDIG II operation	Winning company	REDDIG II operation	Mar 2014	<b>To be conducted</b> All services in operation through REDDIG II

## APPENDIX B

### PROJECT ATN ARCHITECTURE IN THE SAM REGION

SAM Region	PROJECT DESCRIPTION (PD)	PD N° D1	
Programme	Project Title	Starting Date	Ending Date
Ground-ground and Air-ground Telecommunications Infrastructure (Programme Coordinator: Onofrio Smarrelli)	ATN Architecture in the SAM Region  <i>Project Coordinator: Athayde Licério Vieira Frauche (Brazil)</i> <i>Contributing experts: Omar Gouarnalusse (Argentina), Michel Areno (France), Jose Luis Paredes (Peru), Jesús Bolívar (Venezuela), Christian Amaris de León (Colombia) and Hernando Lara (Bolivia)</i>	March 2010	June 2013
<b>Objective</b>	Study and implementation of optimum architecture for an IP protocol backbone network (REDDIG II) for the SAM Region		
<b>Scope</b>	<p>Study and implementation of an IP backbone network for the SAM Region, including an optimum configuration and considering, among other deliverables, the following:</p> <ul style="list-style-type: none"> <li>• Technical review of the regional telecommunications networks (ground, satellite or mixed) for the implementation of ATN under a cost-benefit analysis</li> <li>• Holding of trials to determine the ATN bandwidth necessary to support ground applications</li> <li>• IP addressing scheme (IPv4 and IPv6) and analysis of the data communications infrastructure in support to ATS operational requirements in the short, medium and long term</li> <li>• Support in the bidding process by TCB (Montreal) and in the implementation of the IP backbone network for the SAM Region</li> </ul>		
<b>Metrics</b>	<ul style="list-style-type: none"> <li>• Percentage concluded of the study for an IP backbone network for the SAM Region</li> <li>• Drafting of technical specifications for REDDIG II</li> <li>• REDDIG II implementation percentage</li> </ul>		
<b>Strategy</b>	<ul style="list-style-type: none"> <li>• All tasks will be conducted by experts nominated by States of the SAM Region members of the project <i>ATN Architecture in the SAM Region</i>, under management of the project coordinator, in coordination with the programme coordinator. Communications among project members, as well as between the project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet. In addition, the programme coordinator, together with the project coordinator and the contributing experts, can convene at SAM/IG implementation meetings</li> <li>• Once studies are completed and REDDIG II is implemented, the results will be submitted to the ICAO programme coordinator as a final consolidated document for its analysis, review, approval and presentation at the GREPECAS PPRC</li> </ul>		

<b>Justification</b>	<ul style="list-style-type: none"><li>• A study on an ATN IP backbone network for the SAM Region will permit defining the optimum communications network architecture for said Region, currently mainly based on REDDIG (satellite digital communications network).</li><li>• To arrive to the conclusion on the better network infrastructure, the determining of the current applications demand in terms of band width is considered very important. In this respect, States are carrying out tests, mainly AMHS, to determine the associated space segment. The action is considered as the beginning of the network's cost-benefit relationship research.</li><li>• In addition, the increasing band width requirements for new services such as automation, surveillance, ATFM and meteorology. Also, a close relationship with the other programmes and their respective projects is necessary, with the aim of collecting the operational requirements demanded by the mentioned applications and their respective tentative implementation dates</li><li>• After developing all tasks necessary for determining the better network infrastructure, technical specifications for the purchasing and implementation of the SAM backbone network (REDDIG II) will be drafted</li><li>• This project ends once the SAM IP backbone network (REDDIG II) is implemented</li><li>• This project contributes to the implementation of SAM PFF CNS 01, CNS04, ATM 05, ATM 06, MET 04 and AIM 02 of the <i>Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)</i></li></ul>
<b>Related Projects</b>	<ul style="list-style-type: none"><li>• Air Navigation Systems in Support of PBN</li><li>• Automation</li><li>• Improve ATM Situational Awareness</li><li>• Implementation of the ICAO New Flight Plan Format</li><li>• ATN Ground-ground and Air-ground Applications</li></ul>

Project Deliverables	Relationship with Performance Based Regional Plan (PFF)	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
Analysis of the current SAM communications network (REDDIG)	PFF SAM CNS01	REDDIG Administration, Project Coordinator and Omar Gouarnalusse (Argentina)		August 2010	Completed
Analysis of the current MEVA II/ REDDIG interconnection	PFF SAM CNS01	REDDIG Administration		June 2011	Completed
Analysis of the AMHS band width impact on the current REDDIG satellite infrastructure	PFF SAM CNS01	Project Coordinator and Omar Gouarnalusse (Argentina)		September 2010	Completed
Long term applications requirements in the SAM Region	PFF SAM CNS01 PFF SAM CNS 04 PFF SAM MET 04 PFFs SAM ATM 05 and 06 PFF SAM AIM 02	ICAO		September 2010	Completed

<sup>1</sup> **Gray:** Activity has not started

**Green:** Activity has or will deliver planned milestone as scheduled

**Yellow:** Activity is behind schedule on milestone, but still within acceptable parameters to deliver milestone on time

**Red:** Activity has failed to deliver milestone on time, mitigation measures need to be identified and implemented

Project Deliverables	Relationship with Performance Based Regional Plan (PFF)	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
Comparative study on satellite, ground and mixed (satellite and ground) IP based network models for the SAM Region	PFF SAM CNS 01	Project Coordinator, Omar Gouarnalusse (Argentina) and REDDIG Administration		October 2010	Completed Approved by REDDIG Member States
Definition of ATN IP network infrastructure model for the SAM Region	PFF SAM CNS 01	Project Coordinator, Omar Gouarnalusse (Argentina) and REDDIG Administration		October 2010	Completed Approved by REDDIG Member States
Completion of IPv4 addressing plan for the SAM Region	PFF SAM CNS 01	Project Coordinator and Omar Gouarnalusse (Argentina)		August 2010	Completed The addressing scheme was approved through GREPECAS Conclusion 16/37
Drafting of technical specifications for REDDIG II	PFF SAM CNS01 PFF SAM CNS 04 PFF SAM MET 04 PFFs SAM ATM 05 and 06 PFF SAM AIM 02	Project Coordinator, Omar Gouarnalusse (Argentina) and REDDIG Administration		August 2011	Completed and approved by REDDIG Member States
Drafting of safety guidelines for REDDIG	PFF SAM CNS 01	REDDIG Administration		March 2013	An initial document has been drafted

Project Deliverables	Relationship with Performance Based Regional Plan (PFF)	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
Drafting of IP Routing Policy	PFF SAM CNS 01	Project Coordinator		October 2013	An initial document has been drafted
Support in the bidding process and in the offer evaluation		Project Coordinator, Omar Gouarnalusse (Argentina), Michel Arenó (France), José Luis Paredes (Peru), Jesus Bolívar (Venezuela), Hernando Lara (Bolivia), Christian Amaris (Colombia) and REDDIG Administration		April 2012	The bidding will be conducted by TCB, under coordination with the ICAO Regional office. The evaluation process will count with the REDDIG Administration and CNS experts selected by the REDDIG Member States
Support in the implementation of REDDIG II		REDDIG Administration, Project Coordinator and Omar Gouarnalusse (Argentina)		November 2012-December 2013	This activity is scheduled to start at the end of 2012
Monitor the ATN architecture project activities in the SAM Region		ICAO		March 2010-December 2013	
Resources necessary	Economic contribution necessary for the implementation of REDDIG II				

**APPENDIX C / APENDICE C**  
**ATN ARCHITECTURE IN THE SAM REGION / ARQUITECTURA DE LA ATN EN LA REGION SAM SAM**

ID	Nombre de la tarea	2009		2010		2011		2012		2013		2014	
		H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
1	<b>ATN ARCHITECTURE IN THE SAM REGION / ARQUITECTURA DE LA ATN EN LA REGION SAM SAM</b>			19/03								30/01	
2	<b>PROJECT MANAGEMENT PROCESS/PROCESOS DE GERENCIAMIENTO DEL PROYECTO</b>			19/03	12/07								
3	<b>FORMALIZATION OF THE PROJECT FORMALIZACIÓN DEL PROYECTO</b>			19/03	12/07								
4	<b>DP (Description of the Project / Descripción del Proyecto)</b>			19/03	12/07								
20	<b>EAP</b>												
25	<b>PROCESS FOR THE STUDY OF A SAM ATN INFRASTRUCTURE / PROCESOS DE ESTUDIOS DE UNA INFRAESTRUCTURA DE LA ATN SAM</b>			02/06	09/07								
26	<b>START OF THE PROJECT / INICIO DEL PROYECTO</b>			19/05									
27	<b>Collect and analyze current networks infrastructure and applications/services / Levantar y Analizar la infraestructura y Aplicaciones/Servicios de las Redes Actuales</b>			19/05	29/07								
28	<b>Analysis of the current SAM communications network (REDDIG) / Análisis de la situación actual de la red de comunicaciones SAM (REDDIG)</b>			O. Gouarnalusse, A. Frauche 19/05	03/08								
29	Analysis of REDDIGs current infrastructure / Análisis de la Infraestructura actual de la REDDIG			O. Gouarnalusse, A. Frauche, Administración REDDIG 19/05	22/06								
30	<b>Analysis of bandwidth used in REDDIG / Análisis del ancho de banda utilizado en la REDDIG</b>			O. Gouarnalusse, A. Frauche 19/05	26/07								
31	<b>Analyze bandwidth for AFTN service / Analizar el ancho de Banda para el Servicio AFTN</b>			O. Gouarnalusse, A. Frauche 19/05	26/07								
32	Identify and analyze traffic generated by the application / Identificar e analizar el tránsito generado por la aplicación			O. Gouarnalusse, A. Frauche, Administración REDDIG 19/05	26/07								
33	Analysis of the bandwidth used by the application / Análisis del ancho de banda utilizado por la aplicación			O. Gouarnalusse, A. Frauche, Administración REDDIG 19/05	26/07								
34	<b>Analyze band for voice over frame relay / Analizar Banda para Voz Over Frame Relay</b>			19/05	26/07								
35	Identify and analyze traffic generated by the application / Identificar y analizar el tránsito generado por la aplicación			O. Gouarnalusse, A. Frauche, Administración REDDIG 19/05	26/07								
36	Analysis of the bandwidth used with DAMA / Análisis del ancho de banda utilizado con la utilización de DAMA			O. Gouarnalusse, A. Frauche, Administración REDDIG 19/05	26/07								
37	Analysis of the bandwidth used with PAMA / Análisis del ancho de banda utilizado con la utilización de PAMA			O. Gouarnalusse, A. Frauche, Administración REDDIG 19/05	26/07								
38	<b>Analyze band for surveillance/automated systems / Analizar banda para sistema de vigilancia/automatizados</b>			19/05	26/07								



**APPENDIX C / APENDICE C**  
**ATN ARCHITECTURE IN THE SAM REGION / ARQUITECTURA DE LA ATN EN LA REGION SAM SAM**

ID	Nombre de la tarea	2009		2010		2011		2012		2013		2014	
		H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
39	Identify and analyze traffic generated by the application / Identificar e analizar el tránsito generado por la aplicación			O. Gouarnalusse, A. Frauche, Administración REDDIG 19/05	26/07								
40	Analysis of the bandwidth used by the application / Análisis del ancho de banda utilizado por la aplicación			O. Gouarnalusse, A. Frauche, Administración REDDIG 19/05	26/07								
41	Identify possible logistical problems in terms of equipment discontinuity / Identificar posibles problemas logísticos en términos de discontinuidad de equipos			O. Gouarnalusse, A. Frauche, Administración de la REDDIG 23/06	14/07								
42	Final report / Informe Final			O. Gouarnalusse, A. Frauche, Administración de la REDDIG 27/07	03/08								
43	<b>Analysis of the current MEVA II/REDDIG interconnection / Análisis de la situación actual de la Interconexión MEVA II/REDDIG</b>				13/09		03/06						
44	Analysis of the current interconnection infrastructure / Análisis de la Infraestructura actual de interconexión				Administración REDDIG 13/09		21/12						
45	MEVA II/REDDIG interconnection performance analysis / Análisis del desempeño de la interconexión MEVA II /				Administración REDDIG 13/09		21/12						
46	<b>Analysis of the bandwidth used in the interconeciton / Análisis del ancho de banda utilizado en la interconexión</b>				13/09		22/04						
47	<b>Analysis of bandwidth for AFTN service / Analizar el ancho de Banda para el Servicio AFTN</b>				13/09		22/04						
48	Identify and analyze traffic generated by the application / Identificar y analizar el tránsito generado por la aplicación				Administración REDDIG 13/09		21/12						
49	Analysis of the bandwidth used by the services / Análisis del ancho de banda utilizado por los servicios				Administración REDDIG 13/09		22/04						
50	<b>Analyze band for voice over frame relay / Analizar Banda para Voz Over Frame Relay</b>				13/09		21/12						
51	Identify and analyze traffic generated by the application / Identificar e analizar el tránsito generado por la aplicación				Administración REDDIG 13/09		21/12						
52	Analysis of the bandwidth used with DAMA / Análisis del ancho de banda utilizado con la utilización de DAMA				Administración REDDIG 13/09		21/12						
53	Analysis of the bandwidth used with PAMA / Análisis del ancho de banda utilizado con la utilización de PAMA				Administración REDDIG 13/09		21/12						
54	<b>Analyze band for surveillance/automated systems / Analizar Banda para Sistema de Vigilancia/automatizados</b>				13/09		21/12						
55	Identify and analyze traffic generated by the application / Identificar y analizar el tránsito generado por la aplicación				Administración REDDIG 13/09		21/12						
56	Analysis of the bandwidth used by the application / Análisis del ancho de banda utilizado por la aplicación				Administración REDDIG 13/09		21/12						





















**APPENDIX C / APENDICE C**  
**ATN ARCHITECTURE IN THE SAM REGION / ARQUITECTURA DE LA ATN EN LA REGION SAM SAM**

ID	Nombre de la tarea	2009		2010		2011		2012		2013		2014	
		H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
57	Identify possible logistical problems in terms of equipment discontinuity / Identificar posibles problemas logísticos en términos de discontinuidad de equipos					Administración REDDIG 22/12	12/01						
58	Final report / Informe Final					Administración de la REDDIG 25/04	30/05						
59	Remittance of information to Programme Coordinator / Envío de las Informaciones al Coordinador de Programa					Administración REDDIG 03/06	03/06						
60	Consolidated report on the survey and analysis of the current network infrastructure and applications/services / Informe Consolidado del levantamiento y análisis de la infraestructura e Aplicaciones/Servicios de la Red Actual					Coordinador Proyecto 06/06	29/07						
61	<b>DESARROLLO DEL PROYECTO</b>												
62	<b>Comunicaciones de datos en apoyo a la ATM</b>					19/05						28/10	
63	<b>Trials to determine the ATN bandwidth to support ATM applications / Pruebas para Determinar el Ancho de Banda de la ATN para Soportar Aplicaciones ATM</b>					19/05	10/01						
64	<b>Trials guideline for AMHS bandwidth / Guía de pruebas de Ancho de Banda AMHS</b>					19/05	16/08						
65	Study the message statistics among States / Estudiar las estadísticas de mensajes entre Estados					Coordinador Proyecto 19/05	26/05						
66	Prepare the simulation script / Preparar el "script" para la simulación					Coordinador Proyecto 19/05	26/05						
67	Trials schedules / cronogramas de pruebas					O. Gouarnalusse, A. Frauche 15/07	16/07						
68	Trials types / Tipos de pruebas					A. Frauche 15/07	27/07						
69	Carry out trials between Argentina (Ezeiza) and Brazil (Manaos) / Realizar las Pruebas entre Argentina (Ezeiza) y Brasil (Manaos)					O. Gouarnalusse, A. Frauche 28/07	04/08						
70	<b>Analysis of the data and AMHS bandwidth determination / Análisis de los Datos y Determinación del Ancho de Banda para AMHS</b>					05/08	16/08						
71	Analysis of the trials AMHS data between Argentina (Ezeiza) and Brazil (Manaos) Análisis de los datos de las pruebas de AMHS entre Argentina (Ezeiza) y Brasil (Manaos)					O. Gouarnalusse, A. Frauche 05/08	16/08						
72	Final report on bandwidth necessary for AMHS / Informe Final de la determinación del ancho de banda necesario para AMHS					Coordinador Proyecto 25/08	01/09						
73	<b>Análisis del impacto del ancho de banda en la infraestructura actual satelital</b>					01/09	10/01						
74	Inform REDDIG Administration of the trial results between Ezeiza and Manaos / Informar a la Administración de la REDDIG los resultados de las pruebas entre Manaos y Ezeiza					Coordinador Proyecto, Coordinador Programa 01/09	02/09						
75	<b>Bandwidth in REDDIG / Ancho de Banda en la REDDIG</b>					02/09	30/09						

**APPENDIX C / APENDICE C**  
**ATN ARCHITECTURE IN THE SAM REGION / ARQUITECTURA DE LA ATN EN LA REGION SAM SAM**

ID	Nombre de la tarea	2009		2010		2011		2012		2013		2014	
		H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
76	Study the bandwidth necessary for AMHS under current configuration / Estudiar el ancho de banda necesario para AMHS con la configuración actual			O. Gouarnalusse, A. Frauche 02/09 23/09									
77	Determine the costs increase for AMHS / Determinar el incremento de costos para AMHS			O. Gouarnalusse, A. Frauche 23/09 30/09									
78	<b>Study and analysis of bandwidth in the MEVAII/REDDIG interconexion / Estudio y analisis de la utilización de ancho de banda em la interconexión de las redes MEVA II/ REDDIG</b>			01/11 10/01									
79	Study the bandwidth necessary for AMHS under current configuration / Estudiar el ancho de banda necesario para AMHS con la configuración actual			Administración REDDIG 01/11 31/12									
80	Determine the costs increase for AMHS in the MEVAII/REDDIG / Determinación de los costos para el incremento de banda en la MEVAII/REDDIG			Administración REDDIG 03/01 10/01									
81	<b>Identify and study the new services and applications in the SAM Region / Identificar y estudiar los nuevos servicios e aplicaciones ATN en la Región SAM</b>			19/05 08/09									
82	<b>Long term applications requirements for the SAM Region / Requerimientos de Aplicaciones a lo largo del tiempo em la Región SAM</b>			19/05 08/09									
83	<b>ATM AUTOMATION AND SITUATIONAL AWARENESS / AUTOMATIZACION ATM Y CONPRENSION SITUACIONAL</b>			19/05 08/09									
84	<b>Automation (systems interconnection) / Automatización (Interconexión de Sistemas)</b>			19/05 30/06									
85	Analysis of bandwidth requirements for AIDC/OLDI application / Analizar los requerimientos de ancho de banda para la aplicación AIDC/OLDI.			Coordinador Proyecto, Coordinador Programa 19/05 30/06									
86	Analizar los requerimientos de ancho de banda para la aplicación de datos radar.			Coordinador Proyecto, Coordinador Programa 19/05 30/06									
87	<b>Improvement to the situational awareness / Mejora a la Comprensión Situacional</b>			28/07 08/09									
88	Analysis of bandwidth requirements for ADS application / Analizar los requerimientos de ancho de banda para las aplicación ADS			Coordinador Proyecto, Coordinador Programa 28/07 08/09									
89	Analysis of bandwidth requirements for Multilateration application / Analizar los requerimientos de ancho de banda para la aplicación Multilateración.			Coordinador Proyecto, Coordinador Programa 28/07 08/09									
90	<b>AIM</b>			19/05 30/06									
91	Analyze the bandwidth requirements for related applications / Analizar los requerimientos de ancho de banda para las aplicaciones relacionadas			Coordinador Proyecto, Coordinador Programa 19/05 30/06									
92	<b>ATFM</b>			19/05 30/06									

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**ATN ARCHITECTURE IN THE SAM REGION / ARQUITECTURA DE LA ATN EN LA REGION SAM SAM**

ID	Nombre de la tarea	2009		2010		2011		2012		2013		2014	
		H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
93	Analysis of bandwidth requirements for applications in support of ATFM implementation / Analizar los requerimientos de ancho de banda para las aplicaciones em apoyo de la Implantación de la ATFM			Coordinador Proyecto, Coordinador Programa 19/05  30/06									
94	<b>MET</b>			19/05  30/06									
95	Analizar los requerimientos de ancho de banda para las aplicaciones MET			Coordinador Proyecto, Coordinador Programa 19/05  30/06									
96	Consolidated report on the study for new services and ATM/ATN applications in the SAM Region / Informe Consolidado del Estudio de Nuevos Servicios y Aplicaciones ATM / ATN em la Región SAM			Coordinador Proyecto, Coordinador Programa 23/08  06/09									
97	<b>Study of the desired scenario / Estudio del escenario deseado</b>			16/08  22/10									
98	<b>SAM Network / Red SAM</b>			16/08  22/10									
99	<b>Infrastructure of a satellite network / Infraestructura de una Red Satélite</b>			16/08  06/09									
100	Study on a SAM satellite IP network structure / Estudiar una estructura de rede IP SAM satelital			O. Gouarnalusse, A. Frauche, Administración de la REDDIG 16/08  30/08									
101	Determination of SAM satellite network costs / Determinación de los costos de Red SAM Satelital			O. Gouarnalusse, A. Frauche, Administración de la REDDIG 23/08  06/09									
102	<b>Infrastructure of a ground network / Infraestructura de una Red Terrestre</b>			16/08  06/09									
103	Study on a SAM ground IP network structure / Estudiar una estructura de rede IP SAM Terrestre			O. Gouarnalusse, A. Frauche, Administración de la REDDIG 16/08  30/08									
104	Determination of SAM ground network costs / Determinación de los costos de Red SAM Terrestre			O. Gouarnalusse, A. Frauche, Administración de la REDDIG 23/08  06/09									
105	<b>Infrastructure of a mixed network (satellite + ground) / Infraestructura de una Red Mixta (Satélite + Terrestre)</b>			16/08  06/09									
106	Study on a SAM mixed IP network structure (satellite + ground) / Estudiar una estructura de rede IP SAM Mixta (terrestre y satélite)			O. Gouarnalusse, A. Frauche, Administración de la REDDIG 16/08  30/08									
107	Determination of SAM mixed network costs / Determinación de los costos de Red SAM Mixta			O. Gouarnalusse, A. Frauche, Administración de la REDDIG 23/08  06/09									
108	Comparative analysis between network infrastructures / Análisis comparativo entre las infraestructuras de red.			O. Gouarnalusse, A. Frauche 08/09  06/10									
109	Analysis of desired platform implementation costs / Análisis de costos de implementación de la plataforma deseada			O. Gouarnalusse, A. Frauche, Administración REDDIG 06/09  04/10									
110	Definition of desired platform / Definición de la Plataforma deseada			Miembros REDDIG, Administración de la REDDIG 06/10  22/10									
111	<b>Drafting of guide on development of information security / Elaborar Guía de Desarrollo de Seguridad de la Información</b>							10/01  29/03					
112	Completion of guide on REDDIG network communications security / Completar el guía de seguridad para la red de comunicación REDDIG							Coordinador Proyecto, Administración de la REDDIG 10/01  29/03					

## ATN ARCHITECTURE IN THE SAM REGION / ARQUITECTURA DE LA ATN EN LA REGION SAM SAM

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## APPENDIX D

### PROJECT ATN GROUND-GROUND AND AIR GROUND APPLICATIONS IN THE SAM REGION

SAM Region	PROJECT DESCRIPTION (PD)	PD N° D2	
Programme	Project Title	Starting Date	Ending Date
Ground-ground and Air-ground Telecommunications Infrastructure (Programme Coordinator: Onofrio Smarrelli)	ATN Ground-ground and Air-ground Applications  <i>Project Coordinator: Omar Gouarnalusse (Argentina)</i> <i>Contributing experts: Javier Vittor (Argentina), Andres Jansen (Brazil)</i>	May 2010	December 2014
<b>Objective</b>	Develop the implementation of ATN ground-ground and air-ground applications in the SAM Region		
<b>Scope</b>	Implementation of SAM ATN ground-ground and air-ground applications, including, at least: <ul style="list-style-type: none"> <li>Operational integration of international AMHS connections in the SAM Region</li> <li>Operational integration of international AIDC connections in the SAM Region</li> <li>Guidelines for the implementation of DCL, DATIS, DVOLMET &amp; CPDLC services through VDL in the SAM Region</li> </ul>		
<b>Metrics</b>	<ul style="list-style-type: none"> <li>Number of AMHS interconnections as per CAR/SAM FASID Table 1Bb</li> <li>Number of AIDC interconnections as per CAR/SAM FASID Table 1Bb</li> <li>Drafting of following guidelines: Guideline for the use of AIDC / Guideline for the establishment of ground-air data links in terminal, approach and aerodrome areas / Guideline for the implementation of DCL, DATIS and DVOLMET systems / Guideline for the implementation of CPDLC through VDL in the SAM Region</li> </ul>		
<b>Strategy</b>	<ul style="list-style-type: none"> <li>All tasks will be conducted by experts nominated by States and organizations of the SAM Region members of the project <i>ATN Ground-ground and Air-ground Applications in the SAM Region</i>, under management of the project coordinator, in coordination with the programme coordinator. Communications among Project members, as well as between the Project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet. In addition, the programme coordinator, together with the project coordinator and the contributing experts, can convene at SAM/IG implementation meetings</li> <li>Once studies are completed, the results will be submitted to the ICAO programme coordinator as a final consolidated document for its analysis, review, approval and presentation at the GREPECAS PPRC</li> </ul>		

<b>Justification</b>	<ul style="list-style-type: none"> <li>The implementation of ground-ground and air-ground data communications infrastructure will contribute to the reduction of air traffic control incidents, increasing the capacity of the transition of information with regard to the currently analogue based applications</li> <li>This project contributes to the implementation of the SAM PFF SAM CNS 01, CNS 02, ATM 05, ATM 06, MET 03, MET04 and AIM 02 of the <i>Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)</i></li> </ul>
<b>Related Projects</b>	<ul style="list-style-type: none"> <li>Automation (systems interconnection)</li> <li>ATFM</li> <li>Improve ATM Situational Awareness</li> <li>Implementation of the ICAO New Flight Plan Format</li> </ul>

<b>Project Deliverables</b>	<b>Relationship with Performance Based Regional Plan (PFF)</b>	<b>Responsible</b>	<b>Status of Implementation<sup>1</sup></b>	<b>Delivery Date</b>	<b>Remarks</b>
Document on regional strategy for the implementation of ground-ground and air-ground applications in the SAM Region	PFF SAM CNS 01 PFF SAM CNS 02	Omar Gouarnalusse (Argentina)		June 2012	An initial review to the strategy was presented at SAM/IG/8 meeting (Lima, Peru, 10-14 October 2011)
Guideline for the use of AIDC with the aim of reducing coordination errors	PFF SAM CNS 01 PFF SAM ATM 06	Javier Vittor (Argentina)		November 2012	The guideline will be based on the Argentinean experience in the IP AIDC implementation between the Cordoba and Ezeiza ACCs. The GREPECAS-approved <i>Interface control document</i> (ICD) for data communications among ATS units in the Caribbean and South American Regions will be reviewed.

<sup>1</sup> **Gray:** Activity has not started

**Green:** Activity has or will deliver planned milestone as scheduled

**Yellow:** Activity is behind schedule on milestone, but still within acceptable parameters to deliver milestone on time

**Red:** Activity has failed to deliver milestone on time, mitigation measures need to be identified and implemented

Project Deliverables	Relationship with Performance Based Regional Plan (PFF)	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
Guideline for the implementation of ground-air data links in the SAM Region	PFF SAM CNS 02 PFF SAM ATM 06	ICAO		May 2013	The guideline will be based on the experience of Brazil in the implementation of ground-air data links, in same DATS, DVOLMET and DCL will be included, among others
Operational integration of AMHS among States	PFF SAM CNS 01 PFF SAM ATM 05 PFF SAM ATM 06 PFF SAM MET 03, PFF SAM MET 04 PFF SAM AIM 02	States / Project Coordinator / Programme Coordinator		June 2014	Of all the AMHS installed in the Region, the following are interconnected in AMHS (P1 Protocol) Peru-Colombia, Guyana-Suriname, Argentina-Paraguay Other States are in the process of implementation, having drafted and signed MoUs to this end Follow-up to the implementation of AMHS integration is carried out at SAM/IG meetings
Operational integration of AIDC service between adjacent ACCs	PFF SAM CNS 01 PFF SAM ATM 06	States / Project Coordinator / Programme Coordinator		November 2014	To date no AIDC interconnection trials have been held between the Ezeiza and Cordoba ACCs. The integration is still not being used operationally Many States of the Region have drafted and signed MoUs to carry out the integration
Monitor the implementation of ATN ground-ground and air-ground applications activities in the SAM Region		ICAO		March 2010- November 2014	
Resources necessary	Designation of experts for the conduct of some of the deliverables				




## APPENDIX E

### 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 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	<p>MoU for the interconnection of AMHS currently implemented in the SAM Region:</p> <ul style="list-style-type: none"> <li>a) Argentina-Brazil</li> <li>b) Argentina-Chile</li> <li>c) Argentina-Peru</li> <li>d) Argentina-Paraguay</li> <li>e) Brazil-Colombia</li> <li>f) Brazil-Paraguay</li> <li>g) Brazil-Peru</li> <li>h) Chile-Peru</li> <li>i) Colombia-Peru</li> <li>j) Colombia-Panama</li> <li>k) Colombia-Venezuela</li> <li>l) Peru-Venezuela</li> <li>m) Brazil-Suriname</li> <li>n) Guyana-Venezuela</li> <li>o) Suriname-Venezuela</li> <li>p) Brazil-Guyana</li> <li>q) Guyana-Suriname</li> <li>r) Brazil-Venezuela</li> <li>s) Bolivia-Peru</li> <li>t) Bolivia-Brazil</li> <li>u) Bolivia-Argentina</li> <li>v) Ecuador-Peru</li> <li>w) Ecuador-Colombia</li> <li>x) Ecuador-Venezuela</li> <li>y) Bolivia-Paraguay</li> </ul> <p>The AMHS interconnection MoU in French Guiana (France) and Uruguay should be drafted once AMHS installation is completed at national level.</p>	SAM States involved	MoU for interconnection of AMHS systems between SAM States having AMHS implemented	Valid a), b) c), d), f), g), i), q) & v) completed	<ul style="list-style-type: none"> <li>h) Oct 2012</li> <li>j) Mar 2013</li> <li>k) Oct 2012 SAMIG10</li> <li>l) Jul 2012</li> <li>m) Oct 2012 SAMIG10</li> <li>n) Oct 2012 SAMIG10</li> <li>o) Oct 2012</li> <li>p) Oct 2012</li> <li>r) Oct 2012</li> <li>s) Oct 2012 SAMIG10</li> <li>t) Dec 2012</li> <li>u) Oct 2012 SAMIG10</li> <li>w) Mar 2013</li> <li>x) Mar 2013</li> <li>y) Oct 2012 SAMIG10</li> </ul>

ITEM	ACTIVITY	RESPONSIBLE	EXPECTED RESULT	STATUS	FINALIZATION DATE
1	2	3	4	5	6
8	<p>Phase I Interconnection trials between MTAs of:</p> <ul style="list-style-type: none"> <li>a) Argentina-Brazil</li> <li>b) Argentina-Paraguay</li> <li>c) Brazil-Paraguay</li> <li>d) Colombia-Peru</li> <li>e) Argentina-Chile</li> <li>f) Argentina-Peru</li> <li>g) Brazil-Peru</li> <li>h) Guyana-Suriname</li> <li>i) Ecuador-Peru</li> <li>j) Brazil-Colombia</li> </ul> <p>Types of tests to carry out: Network transportation; Network connectivity; Message exchange; Preparatory phase.</p> <p><b>Note:</b> Inclusion has been made of only the AMHS interconnected between States having implemented and signed the MoU.</p>	Argentina, Brazil, Chile, Colombia, Paraguay, Peru and REDDIG Administration	Interconnection trials between Argentina, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru and Suriname MTAs	Valid a) message exchange trials were held between Brasilia (Brazil) and CIPE (Argentina) MTAs 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. b), d) and h) Operational interconnection trials completed c), e), i), and j) No tests carried out f) operational trial pending	<ul style="list-style-type: none"> <li>a) Jun 2012</li> <li>b) Mar 2012</li> <li>c) Oct 2012</li> <li>d) Oct 2010</li> <li>e) Oct 2012</li> <li>f) Aug 2012</li> <li>g) Jun 2012</li> <li>h) Jun 2011</li> <li>i) Oct 2012</li> <li>j) Dec 2012</li> </ul>
9	<p>Operational interconnection implementation at the following MTAs:</p> <ul style="list-style-type: none"> <li>a) Argentina-Paraguay</li> <li>b) Argentina-Brazil</li> <li>c) Argentina-Chile</li> <li>d) Argentina-Peru</li> <li>e) Brazil-Paraguay</li> <li>f) Brazil-Peru</li> <li>g) Colombia-Peru</li> <li>h) Guyana-Suriname</li> <li>i) Ecuador-Peru</li> <li>j) Brazil-Colombia</li> </ul> <p><b>Note:</b> Inclusion has been made of only the AMHS interconnected between States having implemented and signed the MoU.</p>	Argentina, Brazil, Chile, Colombia, Paraguay and Peru	Operational implementation of AMHS systems	AMHS interconnection completed between following MTA, using P1 protocol and operational: Colombia-Peru Guyana-Suriname Argentina-Paraguay	<ul style="list-style-type: none"> <li>a) Mar 2012</li> <li>b) Jun 2012</li> <li>c) TBD</li> <li>d) Oct 2012</li> <li>e) Dec 2012</li> <li>f) Oct 2012</li> <li>i) Dec 2012</li> <li>j) Mar 2013</li> </ul>

## APPENDIX F

	<p align="center"><b>INTERNATIONAL CIVIL AVIATION ORGANIZATION</b></p>	<p align="center"><b>THIS COLUMN TO BE COMPLETED BY TENDERER</b></p> <p align="center"><b>COMPLIANCE STATEMENT</b></p> <p>Tenderer <b>must</b> state below, against <b>every</b> item, <b>Compliance</b> or <b>Non Compliance</b>. Failure to complete and return this form may invalidate the bid.</p>
<p>ICAO SPECIFICATION CODE:</p>		
<p><b>TITLE: SAM REGIONAL RAIM PREDICTION AVAILABILITY SERVICE VIA WEB</b></p>		<p><b>SUPPLIER NAME:</b></p>
<p align="center"><i>It is strictly prohibited for tenderers to alter this document. Only the originator of the specification may provide amendments.</i></p> <p><b>SECTION A – INTENT AND STANDARDS</b></p>		
<p><b>1. OBJECTIVE</b></p> <p>1.1 The International Civil Aviation Organization (ICAO), on behalf of the Governments of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana (France), Guyana, Paraguay, Peru, Panama, Suriname, Uruguay and Venezuela <i>intends to procure, on a turnkey basis, the implementation of a SAM Regional RAIM prediction availability service through an own WEB page functioning the 24 hour per seven day a week (24/7) to support the PBN procedures en route, terminal and approach area.</i></p> <p><b>2. OBJECTIVE OF SAM REGIONAL RAIM PREDICTION AVAILABILITY SERVICE (SRRPAS)</b></p> <p>2.1 In order to achieve this objective, the aeronautical authorities of the Region have agreed that the SRRPAS shall <b>ensure</b>:</p> <p>To provide users of an on-line status of the prediction availability of GPS RAIM the 24 hours/7 days a week (24/7) to support the PBN RNAV/RNP operations at Regional level and to each State of the SAM Region.</p> <p>To develop a web site for the SRRPAS</p> <p>To be easily expandable to cover other Performance-Based Navigation (PBN) RNAV and RNP applications. Based on other constellation of navigation satellite system (GALILEO, GLONASS, Beidou).</p> <p>To cover all regional airspace for RNAV/RNP operations for both Fault Detection (FD) and Fault Detection and Exclusion (FDE) capable receivers.</p>		

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## SECTION A – INTENT AND STANDARDS

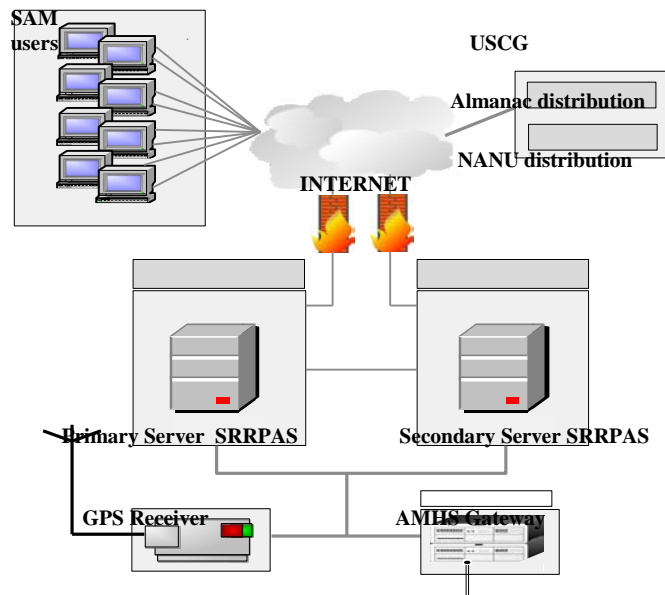
### 3. SCOPE

3.1 The Project contemplates that the Successful Bidder shall **provide**:

- a) SAM Regional RAIM Prediction Availability Service (FD and FDE capable receivers) for the following PBN/RNAV /RNP operations
  - En route**
  - Oceanic :and remote continental area RNP 10, RNP 4
  - Continental area RNAV 5, RNAV 2
  - Terminal** RNAV 1, RNP 1
  - Approach** RNP APCH, RNP AR APCH
- b) Provision of database of waypoints within SAM airspace GRPS website design.
- c) The develop of a WEB page for he SRRPAS
- d) To maintain and manage the WEB page for the SRRPAS
- e) The SRRPAS application shall be hosted on an dual application server with a database back- end providing highly available file storage facilities

### 4. BASIC TECHNICAL CHARACTERISTICS

4.1 The hardware shall consist of two servers, one for the redundant primary and mirror (2 in total) See Figure 1 for SRRPAS architecture



**Figure 1 SRRPAS Architecture**

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<b>SECTION A – INTENT AND STANDARDS</b>	
<p><b>5. GENERAL CONSIDERATIONS</b></p> <p>5.1 The Successful Bidder shall be responsible for the implementation of a SRRPAS, a design of a WEB page, acquisition, transport, installation, hosting and commissioning of the required equipment and services, with all the accessories and facilities and to maintain and manage the SRRPAS.</p> <p>5.2 The system shall be installed , hosted and operated on the place of the bid winner installation and deployed across two geographically dispersed servers, at two different Data Centres, offering 24/7 service with a better than 99.5% availability</p> <p><b>6. RULES AND STANDARDS</b></p> <p>6.1 All designs, materials, manufacturing techniques and workmanship shall be in accordance with the highest accepted international standards.</p> <p>6.2 Where applicable, the equipment shall fully comply with or exceed the requirements of the following documents (latest edition plus any related amendments):</p> <ul style="list-style-type: none"> <li>a) the standards and recommended practices of the International Civil Aviation Organization (ICAO) contained in the Annexes, as well as the provisions of its manuals, documents and circulars concerning aeronautical telecommunications, the ATN, CNS/ATM systems, and air traffic services. The Successful Bidder is responsible for complying also with the new standards, amendments and recommendations issued during the implementation of the project;</li> <li>b) those applied by public carriers in each State; and</li> <li>c) the ISO 9000 certification in terms of its methods and lines of production. Compliance with ISO 14000 standards is desirable in terms of materials, installation process, maintenance and disposal of materials.</li> </ul> <p>6.3 If at the time of the publication of this document the specific rules and standards mentioned in any of the other Sections have been revoked, superseded or updated, the new rules or standards shall be deemed as applicable.</p> <p>6.4 The Bidders shall pay special attention to minimising manual operations and maintenance tasks, and to the expansion capacity of the system, for both electronic and electrical components.</p> <p>6.5 In order to achieve these objectives, the use of standard and COTS (commercial off-the-shelf) materials and equipment from manufacturers engaged in their production shall be maximised.</p> <p><b>7. ALTERNATIVES</b></p> <p>7.1 Bidders are invited to bid for any equipment that, in their opinion, meets, or exceeds the requirements of, this specification. Any such alternative or variation shall be fully and clearly defined and substantiated so as to easily determine such equivalence or superiority.</p>	

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## SECTION A – INTENT AND STANDARDS

### 8. BIDDER'S EXPERIENCE

8.1 The Bidder shall demonstrate broad experience in the RAIM Prediction Availability Service implementation. The Bidder shall include a list of customers to whom it has supplied and installed, during the last five (5) years, similar to those offered in its technical proposal and that are currently in operation. The list shall contain the names, addresses and references of customers that can be contacted.

8.2 The Bidder shall submit at least three (3) letters of reference with the contact names of different customers with similar projects in different locations to enable verification of the level of compliance and quality of the equipment and services previously provided. ICAO or the AAA may visit such customers to check the accuracy of the information submitted.

8.3 The Bidder shall demonstrate that the level of quality of its personnel is commensurate to the installation, commissioning and maintenance of the systems and services to be supplied and installed.

8.4 The system manufacturer shall be a leading company worldwide, with a technology proven and recognised in the international markets. In this sense, Bidders shall also indicate the country of manufacture of the proposed equipment.

### 9. BIDDER'S DOCUMENTATION

9.1 *Statement of compliance: all bids shall be accompanied by a Statement of Compliance, in the form of a copy of the specifications, indicating in the right column whether it Complies (C) or Does not Comply (NC). If the bid states that it complies, any reference, indication, comment or subsequent note to the contrary shall not release the Bidder from the responsibility for the compliance stated.* The Bidder shall make reference to the statement of compliance, indicating what section of its documentation substantiates such statement. Failure to provide such definitive indication with respect to any requirement can invalidate its bid.

9.2 The Bidder shall submit its bid in Spanish and English, in two (2) hard copies and one (1) electronic copy. See Section D, Technical Documentation for further details. The official language of the tender will be English.

9.3 Each Bidder shall submit the appropriate technical documentation containing data sheets, performance data, drawings, illustrations, pictures, etc., of the system being offered to enable full and detailed assessment of the bidder as a whole, in accordance with that stated in Section C. The financial bid shall provide detailed costs of the equipment and services required in this technical specification.

9.4 The proposal shall include documentation on operational *commands, and other information that the Bidder may deem appropriate.*

9.5 The Bidder shall submit, together with its bid, a timetable of major activities to be carried out concerning the design, manufacturing, provision, FAT, installation, , site acceptance and commissioning (see other details in Section E).

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<b>SECTION A – INTENT AND STANDARDS</b>	
9.6 Additionally, the Bidder shall submit the available operational manuals (as described in Section D) as part of the proposal.	

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<b>SECTION B – GENERAL REQUIREMENTS</b>	
<p><b>1. REQUIREMENTS)</b></p> <p><b>1.1 General guidelines</b></p> <p>1.1.1 The Bidder may be required to provide the organizational chart of the company and resumes of its technical staff.</p> <p>1.1.2 The Bidder shall prepare a project and assembly timetable for the implementation of the SRRPA</p> <p>1.1.3 The Successful Bidder shall be fully responsible for the design, selection of components and materials, and installation techniques, to ensure total integration and full compatibility between the main components and all auxiliary units.</p> <p>1.1.4 Within forty-five (45) days following the signing of the contract, the Successful Bidder shall submit for the approval of ICAO a detailed System Design Document (SDD) for the implementation of the SRPP</p> <p>1.1.5 The Successful Bidder shall appoint properly qualified personnel in sufficient number to perform the work within the proposed timeframes.</p> <p>1.1.6 The Successful Bidder shall prepare and submit Factory Acceptance Test (FAT) procedures for approval, and shall conduct the performance tests.</p> <p>1.1.7 The Successful Bidder shall prepare and submit the Final Acceptance Test (FAT) protocols for approval.</p> <p>1.1.8 The Successful Bidder shall be responsible for host maintain and manage the SRRAPS</p> <p>1.1.9 The Successful Bidder shall submit operating and maintenance manuals, as well as the final drawings showing how facilities were constructed.</p> <p><b>1.2 Input power supply</b></p> <p>1.2.1 Nil.</p> <p><b>1.3 Environmental conditions</b></p> <p>1.3.1 Nil.</p> <p><b>1.4 General considerations</b></p> <p>1.4.1 Nil.</p> <p><b>1.5 Protection system</b></p> <p>1.5.1 Nil.</p>	



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<b>SECTION B – GENERAL REQUIREMENTS</b>	
<p>1.6 <b>Electric power system protection requirements</b></p> <p>1.6.1 Nil.</p> <p>1.7 <b>Communication equipment protection requirements</b></p> <p>1.7.1 Nil.</p> <p>1.8 <b>Protection against atmospheric discharges</b></p> <p>1.8.1 Nil.</p> <p>1.9 <b>Mechanical and electrical requirements</b></p> <p>1.9.1 Nil.</p> <p>1.10 <b>Equipment assembly and installation</b></p> <p>1.10.1 Nil.</p> <p>1.11 <b>Bidder's responsibilities</b></p> <p>1.11.1 The Bidder shall assume full responsibility for the following issues:</p> <ul style="list-style-type: none"> <li>a) Project proposal, organisation and distribution of all works.</li> <li>b) Any deviation from the specifications must be corrected at its own expense.</li> </ul>	

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<b>SECTION C – TECHNICAL REQUIREMENTS</b>	
<p><b>1. INTRODUCTION</b></p> <p><b>SRRPS OVERVIEW</b></p> <p>General Features</p> <p>1.1 SRRPAS will be developed such that Operators can access up to date information about the GPS Satellite constellation and calculated RAIM unavailability pertinent to their operations.</p> <p>1.2 SRRPAS shall make information available to Operators over the Internet and shall ensure that the most up to date GPS Satellite constellation data available is used as the basis for RAIM calculations and constellation status reports. The System will use a variety of information sources to collate the best available GPS constellation data. Information shall be made available both graphically and in a textual form.</p> <p>1.3 SRRPAS shall be configured such that it is resilient and will provide 99.5% availability. The System shall be deployed in a mirrored configuration with two independent and geographically distributed server installations. The two server installations shall be synchronised to ensure that continuity is preserved regardless of the server used by the Operator. The SRRPAS software will be designed such that the switch between the primary site and the mirror site in the event of a failure occurs automatically, without operator input.</p> <p>1.4 SRRPAS shall ensure that the Operator is made aware of the provenance and source of the constellation data used by the tools. The System will ensure that the Tools use a consistent constellation data set by means of the Constellation Mediator system function.</p> <p>1.5 The System shall maintain calculation audit logs that capture the following information:</p> <p style="padding-left: 40px;">Calculation parameters and results. Data and time of the calculation.</p> <p>1.6 In addition the System shall ensure that data provided to Operators is logged for audit purposes. At a minimum, the system will record sufficient information to allow the Operator to be identified and for the information provided to the Operator to be recreated.</p> <p>1.7 The System shall be designed to enable it to be easily expanded to provide an integrity prediction capability for Galileo, GLONASS, Beidou and future navigation systems.</p> <p><b>2. GPS RAIM PREDICTION SERVICE TECHNICAL APPROACH</b></p> <p>2.1 SRRPAS shall be a web-based tool with access for SAM regional customers. The information in the web site must be presented in English, Spanish and Portuguese. The main URL and mirror URL shall be defined in conjunction with ICAO in representative of the SAM Member States.</p>	

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## SECTION C – TECHNICAL REQUIREMENTS

2.2 The following sections define the proposed tools and functions within SRRPAS.

### GPS status tool

2.2.1 The GPS Status Tool presents a view of the GPS Satellite constellation based on the latest almanac and NANUs (Notice Advisory to Navigation Users) issued by the US Coast Guard. Information disseminated by the US Coast Guard can be found at the USCG NAVCEN web site.

2.2.2 The GPS Status Tool presents the number of operational satellites in the GPS constellation based on the information current at the time of the request to inform users whether or not there are sufficient satellites to meet the minimum requirements for RNAV 5 and so determine the necessity of RAIM predictions for RNAV 5 operations. The almanac used and NANUs that affect the availability of satellites during the requested time period are also displayed.

2.2.3 The GPS Status Tool is configured to provide the status of the GPS constellation for a 72 hour period calculated from the midnight previous to the time at which the status request was made (times are in UTC).

### Terminal/Approach tool

2.2.4 The Terminal/Approach Tool have to uses algorithms to calculate the predicted RAIM availability for a 72 hour period for specific Aerodromes. The algorithms can be used in Terminal mode addressing the RAIM requirements for GNSS receivers operating in Terminal operations ( $\pm 1\text{NM}$ ) or in Approach mode addressing the RAIM requirements for GNSS receivers operating in Approach operations ( $\pm 0.3\text{NM}$ ). Both the Fault Detection (FD) and Fault Detection and Exclusion (FDE) algorithms are provided, with FD set as the default.

2.2.5 The Terminal/Approach Tool has to provide a graphical output and a tabular output each of which display the predicted RAIM outages over the scenario period for each of the selected aerodromes.

2.2.6 The Terminal/Approach Tool has to be configured to return the status of the GPS constellation for a 72 hour period calculated from the midnight previous to the time at which the status request was made (times are in UTC).

2.2.7 The Terminal/Approach Tool has to be allows up to 10 aerodromes to be specified – aerodromes are selected by entering their ICAO identifier.

2.2.8 The Terminal/Approach Tool has to calculate the predicted RAIM availability at the Aerodrome Reference Point (ARP) for baro (pressure altitude) aided and non-baro aided GNSS user equipment at 1 minute intervals throughout the scenario time. The sample time is taken to be the mid-point of a 1 minute period. Therefore a RAIM outage detected at a single sample time will have a duration of 1 minute starting 30 seconds prior to the sample time and ending 30 seconds after the sample time.

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<b>SECTION C – TECHNICAL REQUIREMENTS</b>	
<p><b>Visibility tool</b></p> <p>2.2.9 The SRRPAS has to calculate the location of the GPS satellites relative to a fixed receiver position for a given time duration.</p> <p>2.2.10 The Visibility Tool has to provide the following output options:</p> <ul style="list-style-type: none"> <li>a) Graphical sky plot representation of the visible satellites.</li> <li>b) Tabular representation of the visible satellites. (A table of azimuth and elevation values and the visibility status for each satellite at each sample time in the scenario is displayed, azimuth and elevation are displayed in decimal degrees, all satellites are included regardless of visibility and health.</li> <li>c) Visibility Tool has to require entries user-configurable parameters as: <ul style="list-style-type: none"> <li>- Receiver Position</li> <li>- Mask angle</li> <li>- Scenario duration</li> <li>- Number of samples required to calculate the satellite visibility</li> <li>- UTC date and time</li> </ul> </li> </ul> <p><b>Route tool</b></p> <p>2.2.11 The Route Tool has to calculate the predicted RAIM availability for points along a defined route using either the RAIM algorithm in En-Route mode or the Terminal mode.</p> <p>2.2.12 A route shall be defined by a series of waypoints selected, or input, by the user. The tool has to maintain a list of current en-route waypoints and nav aids in the South American Region area which can be selected by ICAO identifier. The user can also have the possibility to define custom waypoints by entering an identifier, State, latitude and longitude</p> <p>2.2.13 The system has to contain a database of waypoints inside South American Region airspace and easily configured by the User.</p> <p>2.2.14 The defined route and the results of the RAIM check has to be saved and reviewed for the session but will be discarded when the User leaves the GRPS website.</p> <p>2.2.15 The User has the capability to select other angles.</p> <p>2.2.16 Both the Fault Detection (FD) and Fault Detection and Exclusion (FDE) algorithms have to be provided.</p> <p>2.2.17 The tool has to calculate the anticipated RAIM availability for points spaced at one minute intervals along the route, based upon the Time Offset values entered, and displays any anticipated RAIM outages that equal or exceed 5 minutes (User configurable).</p>	

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## SECTION C – TECHNICAL REQUIREMENTS

2.2.18 The Route Tool has to provide a graphical output and a tabular output each displaying the predicted RAIM outages over the scenario period. Both displays have also to show the anticipated outages if the start time is delayed, or brought forward, by 5, 10 or 15 minutes.

### 3 SRRPAS HOSTING AND OPERATIONAL FACTORS

3.1 SRRPAS shall be managed and operated by the winning bidder and shall be deployed across two geographically dispersed servers, at two different Data Centres, offering 24/7 service with a better than 99.5% availability. (See Figure 1 for SRRPAS architecture).

3.2 SRRPAS application shall be hosted on an application server with a database back- end providing highly available file storage facilities.

3.3 The server shall be fault-tolerant and shall include support for hot-swapping of essential hardware such as disks and power supplies.

3.4 The hardware shall consist of two servers, one for the redundant primary and mirror (2 in total) with the following minimum specification:

- a) Redundant Pair o firewalling Devices w.
- b) Redundant Pair of Hardware Load Balancers balancing traffic at layer 4, 100Mbit access switch ports with 1Gbps trunks between distribution, aggregation and core switching layers.
- c) Multiple upstream internet providers shall be provided.
- d) Servers provided with the following minimum configuration that will be update during the implementation planning phase of the project (Processor (Quad 2.0Ghz) – 4Gb Ram – 2x 72Gb SAS 10k Disks in Raid 1).

#### IP security

3.5 SRRPAS server infrastructure shall be protected by a dual firewall system. The internal network clusters shall be hosted on a private network segment with a private address range – not directly accessible from outside the firewall. Only web traffic, email traffic and management traffic shall be permitted through the firewall.

3.6 SRRPAS shall be patched with software security updates (OS, Database, etc) as they become available.

3.7 Local physical security measures shall be implemented.

#### Constellation data mediator

3.8 SRRPAS shall maintain an up to date record of the GPS satellite constellation as well as scheduled changes to the constellation in order to ensure that the System calculations are based on the best available data.

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## SECTION C – TECHNICAL REQUIREMENTS

3.9 The System shall obtain constellation data and constellation updates from a number of sources, as follows:

- a) United States Coast Guard (USCG).
- b) Almanac.
- c) Unscheduled outages/changes (NANU).
- d) AFTN (as a future option).
- e) Unscheduled outages/changes (NOTAM).

3.10 The Constellation Data Mediator subsystem will mediate the constellation information to provide the system with the best available picture of the constellation for the calculation time periods supported by the Tools.

3.11 The Constellation Data Mediator subsystem will also orchestrate the recalculation of static data in response to a constellation change to ensure that RAIM outage predictions are current and reliable.

3.12 The Constellation Data Mediator subsystem will be written to be resilient to errors in the data feeds from the external data sources. SRRPA will not update reference constellation data until it is verified as good with respect to format validity, range checking.

3.13 By using multiple data sources, GRPS will be able to use the best data available if one or more of the data sources is not functioning correctly. SRRPA will allow customisation of audit logging and notifications to system administrators based on errors detected in the source data (availability or content) to allow timely manual override of default behaviour and investigation of the issue if necessary.

### SRRPAS helpdesk

3.14 The bid winner has to respond to queries related to SRRPAS and its operation via the SRRPAS Helpdesk, contactable via an Email address to be specified.

3.15 The bid winner shall assist in resolving issues at application level, specifically:

- a) To support the quality of the GPS RAIM predictions,
- b) Monitoring and validation of the US Notice Advisory to NAVSTAR Users (NANU) Service and GPS NOTAMs.

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<b>SECTION D – SPARE PARTS, ACCESSORIES, TEST EQUIPMENT &amp; TECHNICAL DOCUMENTATION</b>	
<p>1. <b>SPARE PARTS</b></p> <p>1.1 Nil</p> <p>2. <b>MEASURING EQUIPMENT AND TOOLS</b></p> <p>2.1 Nil.</p> <p>3. <b>TECHNICAL DOCUMENTATION</b></p> <p>3.1 The bid winner will supply an operational manual with the description of all the function of the SRRAP.</p>	

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<b>SECTION E – SERVICES, TESTS AND ACCEPTANCE</b>	
<p><b>1. FACTORY ACCEPTANCE TEST</b></p> <p>1.1 The tenderer undertakes to submit for AAA/ICAO's approval at least forty-five (45) days prior to the scheduled commencement of the factory acceptance tests, a Factory Acceptance Test Plan and Procedures. ICAO shall notify the tenderer of its decision within thirty (30) days thereafter, and after an agreement has been reached, the plan/procedures shall form part of the eventual contract. Any changes in the plan/procedures initiated by the tenderer will be without cost to ICAO and subject to ICAO's approval.</p> <p>1.2 All results of the Factory Acceptance Test shall be duly recorded and shall be signed by the tenderer's QA representative and AAA/ICAO representatives.</p> <p>1.3 All observations agreed on and discrepancies noted during the Factory Acceptance Test are to be corrected by the tenderer prior to shipment of the equipment.</p> <p>1.4 The tenderer shall arrange for one (1) FAT Session, to run consecutively for all equipment and not fragmented sessions.</p> <p>1.5 ICAO's appointed representative(s) together with AAA's representative(s) shall be entitled to enter the works of the tenderer at reasonable times during the normal working hours to witness the test of the equipment and work in progress.</p> <p>1.6 The Factory Acceptance Tests shall be performed at the tenderer's factory in accordance with the approved procedures, the intent of which shall be that those systems tests accepted at factory, as a minimum, shall be functionally duplicated on-site.</p> <p>1.7 The Factory Acceptance Tests shall be conducted in the presence of ICAO's appointed representative and representatives from AAA whose names shall be advised to the tenderer at least three weeks prior to the commencement of tests. Following the satisfactory completion of the tests, ICAO shall sign and issue a Factory Acceptance Certificate.</p> <p>1.8 If ICAO's appointed representative does not issue and sign the Factory Acceptance Certificate, he shall immediately notify the tenderer in writing with proper reference to any tests in the approved Acceptance Test schedule or to any part of the Specifications which the equipment has failed to meet. It is agreed between the parties that minor failures, which do not adversely affect the performance or operation of the equipment for the purpose intended and subsequently subject to modification by the tenderer at no extra cost, shall not be considered as items preventing ICAO Factory Acceptance.</p> <p>1.9 With respect to ICAO's reason for non-acceptance, the tenderer shall give notice to ICAO stating how it intends to rectify the equipment in order that ICAO may repeat the tests with which the equipment did not initially comply and also the tests in respect of those parts of the equipment affected by the rectification. The tenderer shall bear all costs associated with the re-testing (i.e. travel, accommodation and subsistence costs for ICAO's/AAA's representative(s) re-participation).</p>	



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## SECTION E – SERVICES, TESTS AND ACCEPTANCE

1.10 If the equipment, or any part thereof, is not accepted by the anticipated final Factory Acceptance date for the systems, ICAO shall have the right to request that the accepted component equipment be shipped, provided that the use of the equipment, or any part thereof, for any purpose by AAA/ICAO under such conditions shall not imply Final Acceptance in any way and the tenderer shall be afforded the earliest possible opportunity of taking such steps as may be necessary to obtain Final Acceptance.

1.11 In the event of ICAO or AAA representatives failing to be present at the time and place appointed by the tenderer for the Factory Acceptance Tests, the tenderer may proceed with the tests which shall be deemed to have been made in the presence of ICAO and AAA representatives and the tenderer shall sign the Factory Acceptance Certificate for corresponding purposes which shall have the same meaning and value as if it had been signed by ICAO. A copy of the FAT test results must be submitted to ICAO for review prior to shipment.

1.12 The equipment shall be considered factory accepted by ICAO upon satisfactory completion of each acceptance test as certified by the relevant test records signed by the tenderer's appointed representative and counter-signed by ICAO's appointed representative(s). Three copies of the said records shall be sent to ICAO addressed to the Chief, Field Procurement Section.

1.13 The tenderer shall ensure that all the equipment included under the eventual Contract, as well as spare parts, tools, test equipment, accessories and documentation are present at the Factory Acceptance, for ICAO inspection, review and approval.

1.14 The tenderer shall include in his offer, the air travel, accommodation, and DSA costs for the participation at the Factory Acceptance Test by AAA personnel.

## 2. TRAINING

### 2.1 General aspects

2.1.1 The Bidder shall include in its proposal a one day operational training of the SRRPAS

## 3. INSTALLATION

3.1 Nil.

## 4. SITE ACCEPTANCE TESTS AND START-UP

4.1 A PSAT tests shall be conducted for the service operation , covering the following aspects:

- a) Connectivity to the WEB page
- b) Functionality of all the parts of the SARRPS described in Section C part 2
- c) Verify the content and quality of the data base of location and waypoint of the SAM Region
- d) Documentation

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4.1.1 The FSAT tests are intended to ensure that the Successful Bidder has resolved all pending issues, even those that might have been identified after the provisional acceptance certificate has been issued.

4.1.2 Supply tests (PS) shall be carried out by the Successful Bidder. These tests shall be conducted once the Project Office has approved the “Supply Test Protocols” (PPS) documentation.

4.1.3 Supply tests protocols (PPS) and their results may be used by the Project Office as a standard and reference for subsequent tests, and in the operation of the supply.

4.1.4 It is expressly established that supply test protocols (PPS) shall be performed in sufficient depth so as to ensure that the tests to be conducted will guarantee and demonstrate that the supply satisfactorily meets all the requirements of the technical specifications document.

4.1.5 The language used for coordination and supply test protocols (PPS) shall be Spanish. If the language normally used by the Successful Bidder is other than Spanish, a set of documents shall be delivered in English.

4.1.6 The following is established:

- a) The “provisional acceptance certificate” corresponding to the “provisional acceptance tests” does not imply the definitive acceptance of the service.
- b) Once the “provisional acceptance certificate” has been issued, the Project Office shall request the Successful Bidder to start up with the service operations.

### Programmes and protocols

4.1.7 The supply test programmes (PROG-PS) are documents that establish in detail the timetables of supply tests.

4.1.8 The documentation for the supply test programmes shall contain at least the following:

- a) Detailed test timetable, by day
- b) Test sites and schedules
- c) List of participants on behalf of the Successful Bidder

4.1.9 The supply test protocols (PROT-PS) are documents that establish in detail the technical procedures for running the supply tests. The results of these tests must also be recorded in these documents.

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4.1.10 The documentation of each of the tests established in the supply test protocol shall contain at least the following:

- a) Purpose of the test
- b) General description of the SRRAP to be tested.
- c) Description of test procedures and steps
- d) Lists with expected results
- e) Complete operational manuals of the equipment to be tested;

4.1.11 The Successful Bidder shall draft and submit to the Project Office the proposed supply test schedules and protocols for the PSATs, NATs, and FSATs.

4.1.12 The Successful Bidder shall make available to the Project Office, 30 calendar days in advance, the proposed supply test schedules and protocols for the PSATs, NATs, and FSATs. The Successful Bidder shall take into account the following:

- a) After receiving the proposed supply test schedules and protocols, the Project Office shall have up to 7 calendar days for assessing them and issuing its approval or disapproval.
- b) If the Project Office considers that the aforementioned proposals do not meet the technical specifications, the proposals of the Successful Bidder shall not be approved. In such case, the Successful Bidder shall correct them by making the additions and/or modifications required by the Project Office and shall submit such documents for approval.
- c) Any delays in the execution of the contract resulting from the non-approval of the aforementioned proposals shall be attributable to the Successful Bidder and shall not give the right to extensions in the execution timeframes established in the document and in the contract.
- d) "Supply tests" shall not start until the Contract Office has approved the corresponding testing schedule and protocol.

4.1.13 Once the Project Office has approved the supply test schedule and protocols, they shall become official documents.

4.1.14 During test implementation, the Project Office may include additional testing, as necessary, in order to ensure the correct operation of the supply. These tests shall be automatically included as a supplement to the official test programme.

### Start-up

4.1.15 The start up of the service will start once PSAT will be approved. The Successful Bidder will start the provision of the SRRPAS for the 24 hours a day, 7 days a week (24x7). The service will be in a preoperational phase for of 30 day period

4.1.16 After this period a FAT (Final Acceptance Test) will be made. FAT tests are intended to ensure that the Successful Bidder has resolved all pending issues, even those that might have been identified after the provisional acceptance certificate has been issued.

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<b>SECTION E – SERVICES, TESTS AND ACCEPTANCE</b>	
5. <b>GUARANTEES</b>	

## GLOSSARY OF ACRONYMS

[illegible]

## APPENDIX G

### ANALYSIS OF IONOSPHERE IMPACT ON GBAS

Ionosphere is a challenge for GBAS implementation. Under normal conditions, this layer of the atmosphere is already causing delays in the signals from GPS satellites, varying according to the region of the globe.

SAM region, located in the vicinity of the geomagnetic equator, suffers greater impacts because of the ionosphere particularly with the phenomena of scintillation and plasma bubbles, which can cause errors in receivers and even cause loss of information from satellites.

Stanford University has developed a threat model to increase the availability of GBAS stations based on the geometrical arrangement of satellites in space. In addition, they have modeled abnormal shaped ionosphere gradients as linear wavefronts semi-infinite with constant speed propagation. The gradient is assumed as a linear variation in the vertical ionosphere delay between a maximum and a minimum (<http://waas.stanford.edu/~www/papers/gps/PDF/LeeIONGNSS06.pdf>).

Thus, three parameters are essential in this threat model:

- Delay difference between two points;
- Distance between the points;
- Speed of the wavefront.

This threat model, however, applies to date only to the architecture of the station Honeywell SLS-4000 and was conducted only with data collected in the continental U.S. and is valid for mid-latitude regions.

A State that purchases a station from other company must ensure the same equipment certification in accordance with the requirements of accuracy, availability, continuity and integrity required for the phase of flight that is required to support, even during hostile ionosphere conditions. It must be clear that manufactures can use a different threat model in their systems and they must be certificated according to State regulations.

Ensuring that a GBAS system is robust enough to operate at low latitudes may require simulations or even tests facing the actual events of the ionosphere. The problem of using actual events is that they are unpredictable and periods of high solar activity, when events become more frequent, occur every 11 years.

**A State wishing to validate Stanford threat model for a specific region** should set up a structure which allows collecting data from GPS satellites to identify and measure the ionosphere gradients and their speeds. To do this it is necessary to:

#### **1- Install GPS receivers around the area of interest**

The receivers must be in large number to allow identification of delays at various points in the ionosphere.

The receivers must be spaced apart no more than 100 km in order to provide a good definition of the gradients calculated.

The receivers must be able to receive L1 and L2 frequencies, for a better definition of the ionosphere delays.

Data acquisition rate of the receivers must be greater than 1Hz for greater definition of the measures, which will generate a large amount of data.

The mounting location of GPS antennas should preferably be free of obstacles from 5 degrees elevation.

## **2- Collect and store data from receivers**

Data should be collected periodically from the stations and stored.

Data collection can be accomplished by an external storage device or by a network that performs the download to a storage server.

## **3- Identify the occurrence of severe ionosphere events**

A software must be used to identify, within the amount of data collected, the occurrence of significant ionosphere event.

## **4- Calculate the velocities of the wavefronts and gradients**

A software must be used to calculate the velocity of the wavefronts and the gradients referent to the data with significant ionosphere event.

## **5- Comparison with the threat model**

Finally, the calculated points will be entered into the threat model allowing the evaluation of the applicability of the model.

It is important to point out that the validation of Stanford threat model is a huge effort, demanding a high budget to cover expenses with equipment, software and research, and also requires the support of institutions capable of doing this kind of work.

Besides, the completion of this kind of analysis in an area subject to worse ionosphere behavior is very useful to areas with better ionosphere.

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

7.1           Under this Agenda Item, the Meeting analyzed WP/08 and WP/09, examining the following topics:

- a)           Follow-up to ATM automation activities; and
- b)           Follow-up to improve ATM situational awareness activities.

**FOLLOW-UP TO ATM AUTOMATION ACTIVITIES**

7.2           The Meeting took note of the progress made in the interconnection of automated systems between adjacent ACCs, agreed upon through the establishment and signature of Memoranda of Understanding (MoU), as well as implementation of new MoUs.

***Interconnection of automated systems between Argentina and Uruguay***

7.3           The Meeting noted that to date, the radar data from Durazno (Uruguay) are available at Ezeiza (Argentina), and the radar data from Quilmes (Argentina) are available in Montevideo (Uruguay), pending only their operational use at the Montevideo and Ezeiza ACCs. The implementation of the AIDC service between both ACCs would be implemented once Uruguay installed the new automated system (INDRA Aircon 2100) at the end of July 2012.

***Interconnection of automated systems between Argentina and Brazil***

7.4           The Meeting was informed that Argentina is ready to send information to the radars specified in the MoU. Brazil informed that it is in the firewall installing phase and that, once this installation is completed, it would continue with the interconnection of radar data. The Meeting was informed that the radar data interconnection and the flight plan automatic hand-off (AIDC) would be implemented by the last quarter of 2012.

***Interconnection of automated systems between Brazil and Uruguay***

7.5           Note was taken that Brazil, in the same manner as for the interconnection with Argentina, is in the firewall installation phase. Uruguay would send radar data and flight plans once the new INDRA (Aircon 2100) automated system is installed, scheduled for the end of July 2012. The Meeting noted that the installation would be completed by the last quarter of 2012.

***Interconnection of automated systems between Argentina and Chile***

7.6           With regard to this interconnection, the Meeting was informed that Argentina was ready to start with the radar information interconnection at the sites specified in the MoU, and that Chile was acquiring equipment to complete the interconnection. The Meeting noted that the radar data interconnection and flight plan hand-off works would be implemented by the end of 2012.

***Interconnection of automated systems between Brazil and Venezuela***

7.7           La Reunión fue informada que se habían efectuado todas las instalaciones requeridas en Brasil y Venezuela para completar la interconexión de datos radar y *hand-off* de plan de vuelo y que para finales de mayo de 2012 estaría completada y en operación la interconexión.



*New memoranda of understanding*

7.8 The Meeting noted that, with the installation of the new automation system and secondary radars for the Asunción and Lima ACCs, coordination would start with Brazil and Peru, as well as with the administrations of Argentina and Paraguay, to draft an MoU for the interconnection of radar data and flight (AIDC), for these MoUs to be signed at SAM/IG/10 meeting.

**ATM AUTOMATION PROJECT FOR THE SAM REGION**

7.9 The Meeting then examined the Project *ATM automation* for the SAM Region, and considered that the support document for the implementation of advanced automation systems would not be drafted, since same would be of no use to the States of the Region for the short and medium term. **Appendix A** to this Agenda Item presents updated information on the Project.

**Follow-up to improve ATM situational awareness activities**

7.10 The Meeting reviewed the activities of the Project *Improve ATM Situational Awareness*, as well as the tasks which had no one assigned as responsible for its conduct. The Meeting examined the indexes of the *Guide on technical operational considerations for ADS-B implementation* and of the *Guide for presentation of SIGMET products in graphic format*. The review of the Guide for the presentation of SIGMET products in graphic format counted with the participation of the ICAO SAM MET and ATM Regional officers. The indexes of the above described guidelines are found in Appendices C and D to WP/08.

7.11 In addition, the Meeting noted that the *ATM Automation* Project Coordinator would be in charge of conducting the task related with the current surveillance systems coverage, and that Mr. Andre Jansen (Brazil) would draft a guideline on technical operational considerations for MLAT implementation.

7.12 In this respect, the Meeting deemed it convenient that CNS experts would be required for a two-week period each for the drafting of the guideline and the status of the coverage, through the support of RLA/06/901 project. **Appendix B** to this Agenda Item presents the updated Project document.

## APPENDIX A

### PROJECT ATM AUTOMATION IN THE SAM REGION

SAM Region	PROJECT DESCRIPTION (DP)	PD N° C1	
Programme	Project Title	Starting Date	Ending Date
ATM Automation and Situational Awareness (Programme Coordinator: Onofrio Smarrelli)	ATM Automation  <i>Project Coordinator: Alessandro Santoro (Brazil)</i> <i>Contributing experts: Automation Group (Brazil), Omar Gouarnalusse (Argentina) and SAM/IG ATM Automation Group</i>	September 2009	December 2014
<b>Objective</b>	Support States of the SAM Region in the implementation of automated systems, and in their regional interconnection		
<b>Scope</b>	The scope of the project includes the drafting of guidelines, trials for the identification of the automation level required at the Region's ATS units, and the implementation of automation systems and their interconnection through the VSAT based South American digital network (REDDIG)		
<b>Metrics</b>	<ul style="list-style-type: none"> <li>• Drafting of the following documents: <ul style="list-style-type: none"> <li>✓ Guidance document on automated systems requirements at ATS units (SSS)</li> <li>✓ Memorandum of Understanding (MoU) model for the interconnection of automated systems</li> </ul> </li> <li>• Interconnection of automated systems between: <ul style="list-style-type: none"> <li>✓ Argentina-Brazil</li> <li>✓ Argentina-Chile</li> <li>✓ Argentina-Uruguay</li> <li>✓ Brazil-Uruguay</li> <li>✓ Brazil-Venezuela</li> </ul> </li> <li>• Reduction in number of operational errors, including LHD</li> </ul>		
<b>Strategy</b>	<ul style="list-style-type: none"> <li>• All tasks will be conducted by experts nominated by States and organizations of the SAM Region members of the Project Automation, under management of the project coordinator, in coordination with the programme coordinator. Communications among project members, as well as between the project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet. In addition, the programme coordinator, together with the project coordinator and the contributing experts, can convene at SAM/IG implementation meetings</li> <li>• Once studies are completed, the results will be submitted to the ICAO programme coordinator as a final consolidated document for its analysis, review, approval and presentation at the GREPECAS PPRC</li> </ul>		

<b>Justification</b>	<ul style="list-style-type: none"> <li>The CAR/SAM air traffic control centres have had difficulties in duly coordinating air traffic, an important factor contributing in air traffic incidents. The air traffic control automated centres' interconnection will permit a coordinated automated air traffic for the transfer of responsibilities between CAR/SAM adjacent area control centres, thus reducing the risk in aeronautical incidents generated by undue coordination activities and improving, at the same time, the planning phases for an efficient control of flights from/to corresponding Flight Information Regions (FIR).</li> <li>The interconnection of automated systems would be facilitated, in view of REDDIG (SAM VSAT regional network), which has the necessary capability to transport automated systems applications</li> <li>This project contributes towards the implementation of SAM PFF CNS 04, ATM 05 and ATM 06 of the <i>Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)</i></li> </ul>
<b>Related Projects</b>	<ul style="list-style-type: none"> <li>ATFM</li> <li>Implementation of the New ICAO Flight Plan Model</li> <li>Improve ATM Situational Awareness</li> </ul>

<b>Project Deliverables</b>	<b>Relationship with Performance Based Regional Plan (PFF)</b>	<b>Responsible</b>	<b>Status of Implementation<sup>1</sup></b>	<b>Delivery Date</b>	<b>Remarks</b>
Automation level required according to the ATM service provided in airspace and international aerodromes, assessing <ul style="list-style-type: none"> <li>operational architecture design,</li> <li>characteristics and attributes for</li> <li>interoperability,</li> <li>data bases and software, and</li> <li>technical requirements.</li> </ul>	PFF SAM CNS 04  PFF SAM ATM 05  PFF SAM ATM06	Project Coordinator and ATM Automation Group		Completed	The System and Subsystem Specifications (SSS) document has been drafted for the identification of automated requirements necessary at ATS units (ACC)

<sup>1</sup>

**Gray:** Activity has not started

**Green:** Activity has or will deliver planned milestone as scheduled

**Yellow:** Activity is behind schedule on milestone, but still within acceptable parameters to deliver milestone on time

**Red:** Activity has failed to deliver milestone on time, mitigation measures need to be identified and implemented

Project Deliverables	Relationship with Performance Based Regional Plan (PFF)	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
Guidelines for elaboration of Memorandum of Understanding (MoU) for the implementation of the automation system interconnection	PFF SAM CNS 04	Project Coordinator and Omar Gouarnalusse (Argentina)		Completed	A model MoU for the interconnection of automated systems has been developed
Monitor the implementation of flight plan data processing system and electronic transmission tools	PFF SAM CNS 04 PFF SAM ATM 05 PFF SAM ATM06	Project Coordinator		July 2013	A regional action plan to monitor automated systems interconnection between adjacent ACCs has been drafted. With regard to automated systems interconnection, five MoUs have been drafted and signed between SAM States: Argentina-Brazil; Argentina-Chile; Argentina-Uruguay; Brazil-Uruguay; Brazil-Venezuela. Radar data has been interconnected between Argentina-Uruguay using IP protocol through REDDIG. Flight plan and radar data exchange trials have been conducted between Brazil-Venezuela. It is expected that by July 2013, automated systems interconnection is completed between States having drafted and signed the MoUs, as well as new MoU developed as new automated systems are implemented in the Region
Monitor implementation progress of automation activities in the SAM Region		ICAO		September 2009-December 2014	
Resources necessary	Designation of experts in the conduct of the deliverables. Implement facilities required to permit interconnection of automated systems in accordance with the dates established in the MoUs drafted and signed to this end				

**APPENDIX B****PROJECT IMPROVE ATM SITUATIONAL AWARENESS IN THE SAM REGION**

<b>SAM Region</b>	<b>PROJECT DESCRIPTION (PD)</b>	<b>PD N° C2</b>	
<b>Programme</b>	<b>Project Title</b>	<b>Starting Date</b>	<b>Ending Date</b>
ATM Automation and Situational Awareness (Programme Coordinator: Onofrio Smarrelli)	Improve ATM Situational Awareness  <i>Project Coordinator: Paulo Vila (Peru)</i> <i>Contributing experts: José Rubira, Marcos Vidal, Jorge Otiniano and Daniel Gomez (Peru); Javier Vittor (Argentina)</i>	October 2011	November 2013
<b>Objective</b>	Develop guidelines supporting the implementation of improvements in the situational awareness of ATS units in the South American Region		
<b>Scope</b>	<p>Guidelines supporting the implementation of various applications, such as common traffic visualization, common meteorological conditions visualization and communications in general</p> <ul style="list-style-type: none"> <li>• Analysis of the current surveillance infrastructure and identification of necessary improvements to support en route and terminal airspaces, airspace classification, PBN and ATFM</li> <li>• Implementation of ADS-B, ADS-c and/or MLAT surveillance systems at selected airspaces</li> <li>• Minimum common electronic information and data bases required in support of decision-making process and alert systems towards an interoperable situational awareness among centralized ATFM units</li> <li>• Implement flight plan data process systems (new FPL format) and data communications tools among ACC's</li> <li>• Implement advanced automation support tools to contribute towards the sharing of aeronautical information</li> </ul>		
<b>Metrics</b>	<p>Drafting of following documents:</p> <ul style="list-style-type: none"> <li>• Regional surveillance strategy for the implementation of systems in support of improvement of situational awareness – revised</li> <li>• Evaluation of the surveillance systems coverage in the SAM Region - completed</li> <li>• Guideline on technical/operational considerations for ADS-B implementation - completed</li> <li>• Guideline on technical/operational considerations for MLAT implementation - completed</li> <li>• Guideline on technical considerations in support of ATFM implementation - completed</li> <li>• Guideline for the drafting of SIGMET in graphical format - completed</li> </ul>		

<b>Strategy</b>	<ul style="list-style-type: none"> <li>• All tasks will be conducted by experts nominated by States and organizations of the SAM Region members of the Project <i>Improve ATM situational awareness in the SAM Region</i>, under management of the project coordinator, in coordination with the programme coordinator. Communications among project members, as well as between the project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet. In addition, the programme coordinator, together with the project coordinator and the contributing experts, can convene at SAM/IG implementation meetings</li> <li>• Once studies are completed, the results will be submitted to the ICAO programme coordinator as a final consolidated document for its analysis, review, approval and presentation at the GREPECAS PPRC</li> </ul>
<b>Justification</b>	<ul style="list-style-type: none"> <li>• Improve situational awareness has been identified as a great support for ATM, contributing in the increase of safety and in flight efficiency</li> <li>• During the seventh meeting of the SAM Implementation Group (SAM/IG/7), a review was made to the project <i>Improve ATM situational awareness in the SAM Region</i>, considering the nomination of a coordinator for the SAM Region</li> <li>• In addition, a close relationship with the other programmes and their respective projects is necessary, with the aim of collecting the operational requirements demanded by the mentioned applications and their respective tentative implementation dates</li> <li>• This project contributes to the implementation of SAM PFF CNS 04, ATM 05, ATM 06 and MET 03 of the <i>Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)</i></li> </ul>
<b>Related Projects</b>	<ul style="list-style-type: none"> <li>• Air Navigation Systems in Support of PBN</li> <li>• Automation</li> <li>• ATFM</li> <li>• Implementation of the ICAO New Flight Plan Format</li> <li>• ATN Ground-ground and Air-ground Applications</li> </ul>

Project Deliverables	Relationship with Performance Based Regional Plan (PFF)	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
<i>Evaluation of surveillance infrastructure and identification of surveillance systems improvements</i>					
Revision to regional surveillance strategy for the implementation of systems in support to improvement of situational awareness	PFF SAM CNS 04 PFF SAM ATM 06	Paulo Vila (Peru)		June 2012	An initial revision to the strategy was presented at SAM/IG/8 meeting (Lima, Peru, 10-14 October 2011)
Evaluation of current surveillance systems coverage in the SAM Region	PFF SAM CNS 04	Paulo Vila (Perú)		October 2012	Some surveillance coverage diagrammes have been provided by States of the Region Designation of an expert for the conduct of the activity is pending
<i>Drafting of regional plan for ADS-B and MLAT implementation</i>					
Guideline on technical/operational considerations for ADS-B implementation	PFF SAM CNS 04 PFF SAM ATM 06	José Rubira (Peru) Marco Vidal (Peru)		June 2012	The guideline will be based on the Peruvian experience regarding the progress in the implementation of ADS-B in Pisco
Guideline on technical/operational considerations for MLAT implementation	PFF SAM CNS 04 PFF SAM ATM 06	André Jansen (Brazil)		June 2013	Designation of an expert for the conduct of the activity is pending

<sup>1</sup> **Gray:** Activity has not started

**Green:** Activity has or will deliver planned milestone as scheduled

**Yellow:** Activity is behind schedule on milestone, but still within acceptable parameters to deliver milestone on time

**Red:** Activity has failed to deliver milestone on time, mitigation measures need to be identified and implemented

Project Deliverables	Relationship with Performance Based Regional Plan (PFF)	Responsible	Status of Implementation <sup>1</sup>	Delivery Date	Remarks
Guideline on technical considerations in support of ATFM implementation	PFF SAM CNS 01 PFF SAM ATM 05	Javier Vittor (Argentina)		October 2013	The guideline will base itself on the CAR/SAM ATFM Manual approved through GREPECAS Conclusion 16/35
Guideline for the drafting of SIGMET in graphical format	PFF SAM MET 03	Jorge Otiniano (Peru) Daniel Gómez (Perú)		October 2012	The guideline will be based on the Peruvian experience in the use of meteorological information in graphical format, including the SIGMET
Monitor the implementation of improving ATM situational awareness activities in the SAM Region		ICAO		March 2010-October 2013	
Resources necessary	Designation of experts for the conduct of the deliverables				



**Agenda Item 8: Implementation of the new flight plan format****8. Analysis**

8.1 The Meeting, in follow-up to the implementation of the new flight plan format, analyzed the following topics:

- a) Regional action plan;
- b) List of focal points;
- c) Web teleconferences;
- d) Status of implementation of the changes in the FDP and AMHS; and
- e) Scheduling of regional and inter-regional trials

*Regional action plan*

8.2 The Meeting examined the regional action plan for the implementation of Amendment 1 to Doc 4444, 15<sup>th</sup> Edition, taking into account the progress made by the SAM States. **Appendix A** to this Agenda Item presents updated information on the regional action plan.

*List of focal points*

8.3 The Meeting examined the list of focal points for the SAM Region in charge of the coordination of the Amendment implementation activities. The list is shown in **Appendix B** to this Agenda Item. The Meeting recalled the importance that all States of the Region inform the ICAO SAM Regional Office on any changes in same, since the focal point has the important task of supporting regional and interregional coordinations necessary during the transition period (1 July 2012 – 14 November 2012), when the NEW and CURRENT flight formats will operate.

*Web teleconferences*

8.4 The Meeting noted that, in follow-up to the Amendment and since SAM/IG/8 meeting, four teleconferences have been held for Spanish-speaking States (including Brazil), and two for the English-speaking.

8.5 The Meeting was informed that in these teleconferences, all focal points should have participants and in the event of absences, they should have sent information on their activities on the basis of the teleconferences' agendas, but regrettably, very few focal points have participated in the teleconferences. In this regard, it should be recalled that the Twelfth Meeting of Civil Aviation Authorities of the SAM Region formulated Conclusion RAAC/12-2 - *Implementation of Amendment 1 to the 15th Edition of ICAO Doc 4444 (New flight plan format) in the SAM Region*, urging, among other things, States participation in all events scheduled with regard to the implementation of the Amendment.

8.6 The Meeting deemed important to continue holding web teleconferences and presented the following schedule: 25 May, 29 June, 31 August, 28 September and 31 October 2012, inviting all focal points to actively participate. The reports of the teleconferences conducted in 2012 are shown in Appendix C to WP/09.

8.7 In this respect, the Meeting, in view of the importance of the topic, urged for the active participation of all focal points and the web teleconferences, and deemed convenient that in same the main users in the Region be also invited to attend.

*Status of implementation of the changes in the FDP and AMHS*

8.8 The Meeting noted the status of implementation of the changes in the FDP and AMHS equipment (templates with NEW FPL at the users terminals) shown in **Appendix C** to this Agenda Item. Therein, observation can be made that most States of the Region having the mentioned equipment installed have taken action to make the changes, but to date very few States have performed said changes. There are States that would be incapable of completing the changes in the automated systems by 15 November, since they require additional time, but necessary contingency measures are being taken. It is important to remind States of the Region on informing the SAM Regional office of any change made to this equipment.

8.9 Note was also taken on the solution adopted by Brazil (WP/10) over its automated equipment, in order to comply with the Amendment. The solution is presented in **Appendix D** to this Agenda Item. In addition, it took note of the activities conducted by Bolivia and Panama with regard to the implementation of the Amendment (IP/03, IP/08 and IP/09).

*Scheduling of regional and inter-regional trials*

8.10 With the aim of establishing trials among States of the Region and of other Regions, the Meeting established a date scheduling, presented in **Appendix E** to this Agenda Item.

8.11 The Meeting considered convenient that an only AFTN address be used for the tests, agreeing to the trial AFTN address “XXXXNFPL” for each of the SAM States.

8.12 Note was taken that Argentina, Brazil, Guyana, Peru and Suriname are ready to start with the inter-regional trials as of the month of June. For the conduct of the tests, the Meeting considered convenient the following date schedule: 29 June, 20 July and 30 August 2012 for the regional trials. For the inter-regional tests, the following dates will be considered upon: 1 July, 30 August, 15 September, 1 October 2012. The trials would be conducted between adjacent ACCs (intra- and inter-regional), the messages of the NEW FPL should be sent to trial AFTN addresses previously coordinated between the parties involved, also considering important to include the users in the trials (see Appendix D).

8.13 The Meeting was informed that Eurocontrol had drafted a guideline document to conduct tests for the European States, as well as to States of other Regions. The document included as Appendix F to WP/09 describes in Section 4 the procedures to follow for the tests with the air navigation service providers outside the IFPS (Eurocontrol) working Region, indicating the AFTN address for the tests, the dates scheduled for the trials, and the steps to follow for the registration. States of the Region are invited to register and conduct the tests permitting the validation of the messages through the NEW FPL format.

8.14 In this respect, the Meeting, taking into account the afore described topics, formulated the following conclusion:

**Conclusion SAM/IG/9-4      Active participation in all regional activities for the implementation of Amendment 1 to Doc 4444, 15<sup>th</sup> Edition**

That the SAM States, with the aim of complying with the implementation of Amendment 1 to ICAO Doc 4444, 15<sup>th</sup> Edition:

- a) Inform of any changes in the list of focal points shown in Appendix B to this Agenda Item;

- b) Actively participate through their focal points in the web teleconferences scheduled in the following dates: 25 May, 29 June, 31 August, 28 September and 31 October 2012; and
- c) Participate in the scheduling of the regional and inter-regional trials described in Appendix E to this Agenda Item

## APPENDIX A

### ACTION PLAN FOR THE IMPLEMENTATION OF THE NEW FLIGHT PLAN FORMAT – AMENDMENT 1 TO THE 15<sup>th</sup> 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 – <i>(Procedures for air navigation services – air traffic management)</i> (ICAO State letter 13/2.1-08/50 of 25 June 2008)	SAM States	Take note of the Amendment	December 2008	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 15 <sup>th</sup> 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 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	All States have presented their action plans, with the exception of French Guiana (France). Some States of the Region have updated their national action plans, but have not been submitted to the ICAO SAM Regional Office.

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	Updated. See list in Appendix B to this working paper.
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	All SAM States have conducted the analysis on the impact in the implementation of the amendment to automated systems
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	Information on training activities in some SMA States is shown in Appendix C to this working paper

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 airline 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	National, regional and interregional trials would initially be conducted from 1 Jan to 30 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 planned for 14 to 18 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	Updating at SAM/IG/9 meeting
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). Information on SAM States implementation activities is shown in Appendix C to this working paper

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). From 1 Jul to 14 Nov 2012, the systems will be capable to operate with both the new and the current FPL format.
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	States should keep the ICAO SAM Regional office informed on the new FPL implementation activities
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

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**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
<b>Argentina</b>	CNS	Omar Gouarnalusse Departamento CNS de la Dirección Nacional de Servicio de Navegación Aérea y Aeródromo, ANAC	ogouarna@faa.mil.ar	T: + 54 11 4317 6667
<b>Bolivia</b>	ATM	Miguel Castillo Ochoa Jefe Unidad ATM/SAR, DGAC	mcastillo@dgac.gob.bo	T: +591 2 2444450/2114465 C: + 591 72046745 F: +591 2 2114465
<b>Brasil</b>	CNS	Alessander de Andrade Santoro Oficial CNS Departamento de Control del Espacio Aéreo, DECEA	ddte7@decea.gov.br	T: + 5521 2101 6209
<b>Chile</b>	ATM	Marcial Vidal Arriagada Controlador de Tránsito Aéreo, DGAC	mvidal@dgac.cl	T: +56 2 290 4709
<b>Colombia</b>	AIM	Mauricio Diaz Villabona	mauricio.diaz@aerocivil.gov.co	T: + 571 2962571 F: +57 1 2962800
		Oscar Arturo Alfonso Bravo	oscar.alfonso@aerocivil.gov.co	T: 571 2963887
<b>Ecuador</b>	AIM	Carlos Delgado Toledo, DGAC	carlos_delgado@dgac.gob.ec karlyn_1966@yahoo.com	Tel: +5932 223 1008
<b>French Guiana</b>		Jean Jacques Deschamps Head, Technical Department for the ANSP in French Antilles and Guyana, DIRAC	jean- jacques.deschamps@aviation- civile.gouv.fr	TLF 33696 961107
<b>Guyana</b>	ATM	Chaitrani Heeralall Director Air Navigation Services, CAD	dans@gcaa-gy.org	T: +592 261 2217 F: +592 261 2293
	ATM	Rickford Samaroo Manager ATS Operations, CAD	satcori@hotmail.com	T: +592 261 2564 F: +592 261 2279
<b>Panamá</b>	AIM	Hector Gonzalez Chief of Aeronautical Telecommunication	hgonzalez@aeronautica.gob.pa	T: +507 501 9825/501 9826 F: +507 501 9848
<b>Paraguay</b>	ATM	Liz Rocío Portillo Castellanos Sección Normas y Reglamentos, DINAC	nyrlrpc@dinac.gov.py lizroportillo@gmail.com	T: +595 21 205 365
	CNS	David Ricardo Torres Sección Terminales AMHS/GTE, DINAC	dr.torres33@gmail.com	T: +595 21 645707/08 +595 21 205365 F: +595 21 645598



Estado/State Organization	Autoridad / Authority		E-mail	T / F
	Area	Nombre y título / Name and Title		
1	2	3	5	6
<b>Perú</b>	AIM	Victor Martinez Serna Gerente de Operaciones Aeronáuticas, CORPAC	amartinez@corpac.gob.pe	T: +511 630-1150/630-1151 F: +511
<b>Suriname</b>	AIM	Lunette Rinelda Edam AIS/Maps and Charts and Communication, CAD	ais@cadur.sr; edamlunette@hotmail.com	T: +597 498-898 F: +597 498-901
	AIM	Doris Kranenburg AIS/Maps and Charts and Communication, CAD	ais@cadur.sr; do12burg@hotmail.com	Tel.: +597 498-898 Fax: +597 498-901
<b>Uruguay</b>	ATM	Rosanna Barú Banchieri Encargada Departamento de Servicios Aeronáuticos, DINACIA	rbaru@dinacia.gub.uy rocbb17@gmail.com	T: +5982 604 0408 – Ext. 4461
<b>Venezuela</b>	ATM	Henry Iván Rodríguez Manrique	henryr_1970@hotmail.com	Tel: +0414 261 1888 Fax: +0212 355 2216
	CNS	Vicente Fiore Jefe de MMTO Radar Maiquetía, INAC	v.fiore@inac.gob.ve	T: +58 416 6235 643
	AIM	Benjamín Uquillas Jefe Subcentro Comunicaciones Maiquetía, INAC	buquillas@gmail.com	T: +58 412 721 5068

**APPENDIX C / APENDICE C**

**IMPLEMENTATION STATUS OF CHANGES IN THE AMHS AND FDP EQUIPMENTS IN THE ACCs OF SAM REGION TO  
ACCEPT THE NEW FPL / ESTADO DE IMPLANTACION DE LOS CAMBIOS EN LOS EQUIPOS AMHS Y FDP EN LOS ACC DE  
LA REGION SAM PARA ACEPTAR EL NUEVO FPL**

<b>State/Site Estado/Localidad</b>	<b>Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS</b>	<b>Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS</b>	<b>Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)</b>	<b>Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP</b>	<b>Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL</b>	<b>Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL</b>
ARGENTINA/ ACC Ezeiza	RADIOCOM AMHS Extended Service Installation: 2005	The NEWFPL format template will be installed in all national AMHS terminals	INDRA Aircon 2100 system Installation: 2008	Between 1 July and 14 November 2012 all the FDP will be updated to accept NEW FPL	Trials in the AMHS and FDP simulator system installed in Ezeiza (CIPE) was made in March 2012 where was installed the new software to both system	During June will be tested between AMHS terminal Ezeiza FIR and FDP Cordoba simulator and vice versa. Regional and interregional tests will be initiated in July 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	RADIOCOM AMHS Extended Service Instalación: 2005	La plantilla con el NUEVO formato de FPL será instalado en todos los terminales AMHS a nivel nacional	Aircon 2100 de INDRA Instalación: 2008	Entre el 1 de julio y el 14 de noviembre de 2012 todos los FDP estarán listos para aceptar el NUEVO FPL.	Durante Marzo 2012 se realizaron pruebas entre los simuladores AMHS y FDP instalados en Ezeiza (CIPE), donde se instaló el nuevo software en ambos.	Durante Junio se realizarán pruebas entre terminales AMHS de la FIR Ezeiza y el simulador FDP de Córdoba y viceversa. Pruebas regionales e interregionales iniciarán en julio 2012
ARGENTINA/ ACC Comodoro Rivadavia	RADIOCOM AMHS Extended Service Installation: 2005	Between 1 April to 30 June 2012 the NEWFPL format template will be installed in all national AMHS terminals	There's not FDP in this FIR, the operation is manual-		Trials between Comodoro Rivadavia AMHS terminals and FDP simulator of Comodoro Rivadavia will be made on May 2012.	During June will be tested between Comodoro Rivadavia FIR AMHS terminals and FDP Cordoba & Ezeiza simulators. Regional and interregional tests will be initiated in July 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	RADIOCOM AMHS Extended Service Installation: 2005	La plantilla con el NUEVO formato de FPL será instalado en todos los terminales AMHS a nivel nacional	No existe FDP en este FIR, la operación es manual.		Para el mes de mayo se realizarán pruebas entre terminales AMHS de Comodoro Rivadavia y el simulador FDP instalado en Ezeiza,	Durante Junio se realizarán pruebas entre terminales AMHS de la FIR Comodoro Rivadavia y los simuladores FDP de Córdoba & Ezeiza. Pruebas regionales e interregionales iniciarán en julio 2012
ARGENTINA/ ACC Cordoba	RADIOCOM AMHS Extended Service Installation: 2005	Between 1 April to 30 June 2012 the NEWFPL format template will be installed in all national AMHS terminals	INDRA Aircon 2100 system Installation: 2008	Between 1 July and 14 November 2012 all the FDP installed in the ACC will be updated to accept NEW FPL	Trials in the AMHS and FDP simulator system installed in Córdoba will be made in May 2012. The software with the NEW FPL will be installed in the FDP and AMHS simulator of Cordoba.	During the month of June will be tested between AMHS terminal Ezeiza FIR and FDP Cordoba simulator and vice versa. Regional and interregional tests will be initiated in July 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	RADIOCOM AMHS Extended Service Instalación: 2005	La plantilla con el NUEVO formato de FPL será instalado en todos los terminales AMHS a nivel nacional	Sistema Aircon 2100 INDRA Instalación: 2008	Entre el 1 de julio y el 14 de noviembre de 2012 todos los FDP estarán listos para aceptar el NUEVO FPL.	Durante el mes de mayo se realizarán pruebas entre terminales AMHS y el simulador FDP instalado en Córdoba, donde se instalará el nuevo software en ambos	Durante el mes de Junio se realizarán pruebas entre terminales AMHS de la FIR Ezeiza y el simulador FDP de Córdoba y viceversa. Pruebas regionales e interregionales iniciarán en julio 2012
ARGENTINA/ ACC Resistencia	RADIOCOM AMHS Extended Service Installation: 2005	Between 1 April to 30 June 2012 the NEW FPL format template will be installed in all national AMHS terminals	INDRA Aircon 2100 system Installation: 2011	Between 1 July and octubre 2012 all the FDP installed in the ACC will be updated to accept NEW FPL	Trials in Resistencia AMHS terminals and FDP simulator system installed in Ezeiza will be made in May 2012. The software with the NEW FPL will be installed in the FDP simulator of Ezeiza for trials	During June will be tested between Resistencia FIR AMHS terminals and FDP Cordoba & Ezeiza simulators. Regional and interregional tests will be initiated in July 2012
	RADIOCOM AMHS Extended Service Instalación: 2005	La plantilla con el NUEVO formato de FPL será instalado en todos los terminales AMHS a nivel nacional	Aircon 2100 INDRA de Ezeiza Instalación: 2011	The software with the NEW FPL will be installed in the FDP and AMHS simulator of Cordoba	The software with the NEW FPL will be installed in the FDP and AMHS simulator of Cordoba	The software with the NEW FPL will be installed in the FDP and AMHS simulator of Cordoba

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
ARGENTINA/ ACC Mendoza	RADIOCOM AMHS Extended Service Installation: 2005	Between 1 April to 30 June 2012 the NEWFPL format template will be installed in all national AMHS terminals	There's not FDP in this FIR, the operation is manual-		Trials in Mendoza AMHS terminals simulator system installed in Córdoba will be made in May 2012. The software with the NEW FPL will be installed in the FDP simulator of Córdoba for trials	During June will be tested between Mendoza FIR AMHS terminals and FDP Córdoba & Ezeiza simulators. Regional and interregional tests will be initiated in July 2012
	RADIOCOM AMHS Extended Service Instalación: 2005	La plantilla con el NUEVO formato de FPL será instalado en todos los terminales AMHS a nivel nacional	No existe FDP en este FIR, la operación es manual.	.	Durante el mes de mayo se realizarán pruebas entre terminales AMHS de Mendoza y el simulador FDP instalado en Córdoba, donde se instalará el nuevo software en ambos	Durante Junio se realizarán pruebas entre terminales AMHS de la FIR Mendoza y los simuladores FDP de Córdoba & Ezeiza. Pruebas regionales e interregionales iniciarán en julio 2012
BOLIVIA/ACC La Paz	Thales AERMAC AMHS System Installed December 2011	NEWFPL template included in the AMHS terminals The implementation at national level will be completed by the end of first semester 2012	FDP system not implemented	Manual Processing for the NEW FPL		Regional and interregional tests will be initiated in July 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	Sistema AMHSAERMAC de Thales Instalado Diciembre 2011	La plantilla con el NUEVO formato FPL incluido en los terminales AMHS La implantación a nivel nacional se completara a finales del primer semestre de 2012	Sistema FDP no implementado	El procesamiento del NUEVO FPL será en forma manual		Pruebas regionales e interregionales iniciarán en julio 2012
BRAZIL/ACC Brasilia	ATECH AMHS Extended Service Installation: 2009	Ongoing – to be concluded on 16 June	ATECH-Sagitario Installation: 2012	Ongoing – to be concluded on 16 June	Ongoing – to be concluded on 16 June	Regional and interregional tests will be initiated in June 2012
	ATECH AMHS Extended Service Instalación: 2009	Continua – A ser concluida el 16 de junio	ATECH Sagitario Instalación: 2012	Continua – A ser concluida el 16 de junio	Continua – A ser concluida el 16 de junio	Pruebas regionales e interregionales iniciarán en junio 2012
Brazil/ACC Manaus	ATECH AMHS Extended Service Installation: 2009	Ongoing – to be concluded on 22 June	ATECH X4000 Installation: 2008	Ongoing – to be concluded on 22 June	Ongoing – to be concluded on 22 June	Regional and interregional tests will be initiated in June 2012
	ATECH AMHS Extended Service Instalación: 2009	Continua – A ser concluida el 22 de junio	ATECH X4000 Instalación: 2008	Continua – A ser concluida el 22 de junio	Continua – A ser concluida el 22 de junio	Pruebas regionales e interregionales iniciarán en junio 2012
Brazil/ACC Curitiba	ATECH AMHS Extended Service Installation: 2009	Ongoing – to be concluded on 24 May	ATECH-Sagitario Installation: 2010	Ongoing – to be concluded on 24 May	Ongoing – to be concluded on 24 May	Only internal tests

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	ATECH AMHS Extended Service Instalación: 2009	Continua – A ser concluida el 24 de mayo	ATECH Sagitario Instalación: 2010	Continua – A ser concluida el 24 de mayo	Continua – A ser concluida el 24 de mayo	Unicamente pruebas internas
Brazil/ACC Recife	ATECH AMHS Extended Service Installation: 2009	Ongoing – to be concluded on 10 May	ATECH-Sagitario Installation: 2011	Ongoing – to be concluded on 10 May	Ongoing – to be concluded on 10 May	Only internal tests
	ATECH AMHS Extended Service Instalación: 2009	Continua – A ser concluida el 10 de mayo	ATECH Sagitario Instalación: 2011	Continua – A ser concluida el 10 de mayo	Continua – A ser concluida el 10 de mayo	Unicamente pruebas internas
Brazil / ACC Atlántico	ATECH AMHS Extended Service Installation: 2009	Ongoing – to be concluded on 10 May	ATECH X4000 Installation: 2008	Ongoing – to be concluded on 10 May	Ongoing – to be concluded on 10 May	Only internal tests
	ATECH AMHS Extended Service Instalación: 2009	Continua – A ser concluida el 10 de mayo	ATECH X4000 Instalación: 2008	Continua – A ser concluida el 10 de mayo	Continua – A ser concluida el 10 de mayo	Unicamente pruebas internas
CHILE/ACC Santiago	Thales AERMAC AMHS system Instalación: 2009	By the end of first semester of 2012 they initiated the implementation of the NEW FPL template in the AMHS terminals at national level	Thales EUROCAT C system Installation: 2009	By the end of first semester of 2012 it is foreseen to initiate the installation of FDP update software to accept the NEW FPL		Regional and interregional tests will be initiated in August 2012



State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	Sistema AMHS AERMAC Thales Instalación: 2009	Para finales del primer semestre de 2012 se iniciara la instalación en los terminales AMHS a nivel nacional de la plantilla con el NUEVO formato de plan de vuelo	EUROCAT C Thales Instalación: 2009	Para finales del primer semestre de 2012 esta previsto la instalación del software actualizado del FDP para aceptar el NUEVO FPL.		Pruebas regionales e interregionales iniciarán en agosto 2012
CHILE/ACC Antofagasta	Thales AERMAC AMHS system Instalación: 2009	By the end of first semester of 2012 they initiated the implementation of the NEW FPL template in the AMHS terminals at national level	EUROCAT 1000 Thales	By the end of first semester of 2012 it is foreseen to initiate the installation of FDP update software to accept the NEW FPL		Regional tests will be initiated in August 2012
	Sistema AMHS AERMAC Thales Instalación: 2009	Para finales del primer semestre de 2012 se iniciara la instalación en los terminales AMHS a nivel nacional de la plantilla con el NUEVO formato de plan de vuelo	EUROCAT 1000 Thales	Para finales del primer semestre de 2012 esta previsto la instalación del software actualizado del FDP para aceptar el NUEVO FPL		Pruebas regionales iniciarán en agosto 2012
CHILE/ACC Puerto Montt	Thales AERMAC AMHS system Instalación: 2009	By the end of first semester of 2012 they initiated the implementation of the NEW FPL template in the AMHS terminals at national level	EUROCAT 1000 Thales	By the end of first semester of 2012 it is foreseen to initiate the installation of FDP update software to accept the NEW FPL		Regional tests will be initiated in August 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implementación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implementación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implementación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implementación de las pruebas regionales e interregionales con el NUEVO FPL
	Sistema AMHS AERMAC Thales Instalación: 2009	Para finales del primer semestre de 2012 se iniciara la instalación en los terminales AMHS a nivel nacional de la plantilla con el NUEVO formato de plan de vuelo	EUROCAT 1000 Thales	Para finales del primer semestre de 2012 esta previsto la instalación del software actualizado del FDP para aceptar el NUEVO FPL		Pruebas regionales iniciarán en agosto 2012
CHILE/ACC Punta Arena	Thales AERMAC AMHS system Instalación: 2009	By the end of first semester of 2012 they initiated the implementation of the NEW FPL template in the AMHS terminals at national level	EUROCAT 1000 Thales	By the end of first semester of 2012 it is foreseen to initiate the installation of FDP update software to accept the NEW FPL		Regional tests will be initiated in August 2012
	Sistema AMHS AERMAC Thales Instalación: 2009	Para finales del primer semestre de 2012 se iniciara la instalación en los terminales AMHS a nivel nacional de la plantilla con el NUEVO formato de plan de vuelo	EUROCAT 1000 Thales	Para finales del primer semestre de 2012 esta previsto la instalación del software actualizado del FDP para aceptar el NUEVO FPL		Pruebas regionales iniciarán en agosto 2012
COLOMBIA/ACC Bogotá	COMSOFT CADAS AMHS system Installation: 2009	NEW FPL template not included Initially it is foreseen to work manually with the NEW FPL	INDRA Aircon 2000 system Installation: 2009	The changes in the FDP will be initially not ready by 15 November 2012 It is expected to work manually		Regional tests will be initiated in August 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	Sistema AMHS CADAS COMSOFT Instalación: 2009	Plantilla del NUEVO formato no incluido Inicialmente está previsto trabajar en forma manual	Aircon 2000 INDRA Instalación: 2009	Inicialmente los cambios en el FDP no estarán listo para el 15 de noviembre de 2012 .Se espera trabajar en forma manual		Pruebas regionales iniciarán en agosto 2012
COLOMBIA/ACC Barranquilla	COMSOFT CADAS AMHS system Installation: 2009	NEW FPL template not included Initially it is foreseen to work manually with the NEW FPL	INDRA Aircon 2000 system Installation: 2009	The changes in the FDP will be initially not ready by 15 November 2012 It is expected to work manually		Regional tests will be initiated in August 2012
	Sistema AMHS CADAS COMSOFT Instalación: 2009	Plantilla del NUEVO formato no incluido Inicialmente está previsto trabajar en forma manual	Aircon 2000 INDRA Instalación: 2009	Inicialmente los cambios en el FDP no estarán listo para el 15 de noviembre de 2012 .Se espera trabajar en forma manual		Pruebas regionales iniciarán en agosto 2012
ECUADOR/ACC Guayaquil	Thales AERMAC AMHS system Instalación: 2011	NEW FPL template included in the AMHS terminals The implementation at national level will be completed by the end of first semester 2012	AMS Alenia Marconi SAT CAT system Installation: 2004	The changes in the FDP will be initially not ready by 15 November 2012 It is expected to work manually		Regional tests will be initiated in August 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	Sistema AMHS AERMAC Thales Instalación: 2011	La plantilla con el NUEVO formato FPL incluido en los terminales AMHS La implantación a nivel nacional se completará a finales del primer semestre de 2012	AMS Alenia Marconi SAT CAT Instalación: 2004	Inicialmente los cambios en el FDP no estarán listo para el 15 de noviembre de 2012 .Se espera trabajar en forma manual		Pruebas regionales iniciarán en agosto 2012
GUYANA/ACC Guyana	SKYCOM by INTELCAN	<b>Implemented</b> NEW and ACTUAL FPL template included in the AMHS terminals June 2011	INTELCAN June 2011	<b>Implemented</b> December 2011		Regional tests will be initiated in June 2012
	SKYCOM de INTELCAN	<b>Implementado</b> Los terminales del sistema AMHS incluyen la plantilla con el NUEVO y ACTUAL formato FPL Junio 2011	INTELCAN junio 2011	<b>Implementado</b> Diciembre 2011		Pruebas regionales iniciarán en junio 2012
FRENCH GUIANA (France) / GUYANA FRANCESA (Francia)	SIGMA system	V17 being tested in Bordeaux France. Overseas standard version realized by French DGAC (DTI, Toulouse) should be delivered in Guadeloupe for trials and validation at the end of May2012, in Cayenne June 2012	SIGMA system  AURORA for oceanic FIR	V17 being tested in Bordeaux France. Overseas standard version realized by French DGAC (DTI, Toulouse) should be delivered in Guadeloupe for trials and validation at the end of May2012, in Cayenne June 2012		Regional tests will be initiated in August 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	Sistema SIGMA	V 17 esta siendo probada en Bordeaux Francia. Versión estándar fuera territorio esta siendo realizada por la DGAC de Francia estaría en Guadalupe para pruebas y validación mayo 2012	Sistema SIGMA  Sistema AURORA para FIR Oceanica	V 17 esta siendo probada en Bordeaux Francia. Versión estándar fuera territorio esta siendo realizada por la DGAC de Francia estaría en Guadalupe para pruebas y validación mayo 2012		Pruebas regionales iniciarán en agosto 2012
PANAMÁ/ACC Panamá	COCESNA AMHS system Installation: 2008  New AMHS AERMAC from Thales will be in operation by the end of first quarter of 2013. The new system will count with the NEW FPL template	NEW FPL format will be entry in a manual form	INDRA Aircon 2000 system Installation: 2009	The INDRA Aircom 2000 system will not be update in order to accept NEW FPL considering that a new FDP from Thales that accept the NEW FPL will be in operation in the third quarter of 2013. Before that date the NEW FPL will be manually processed	National trials were made in March 2012 in order to know the necessary workload considering they have to work in a manual form to accept the new FPL until the end of third quarter 2013	Trials between Peru and Panamá were made in March 2012. Regional tests continue in July 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
	Sistema AMHSCOCESNA Instalación: 2008  Nuevo sistema AMHS AERMAC de Thales estará en operación a finales del primer trimestre de 2013 . El nuevo sistema contará con la plantilla del NUEVO FPL.	NUEVO formato de Plan de Vuelo será introducido en forma manual	Parte del sistema Aircon 2000 INDRA Instalación: 2009	El sistema Aircom 2000 de INDRA no será actualizado para aceptar el NUEVO FPL, considerando que para finales del tercer trimestre de 2013 se instalará el nuevo sistema FDP de Thales que acepta el NUEVO FPL. Antes de esta fecha el NUEVO FPL será procesado manualmente	Pruebas nacionales se realizaron en marzo de 2012 para verificar la carga de trabajo requerida en vista que tienen que trabajar en forma manual para aceptar el NUEVO FPL hasta finales del tercer trimestre de 2013.	Pruebas entre Peru y Panamá a se realizaron en marzo 2012. Pruebas regionales continúan en julio 2012
PARAGUAY /ACC Asunción	RADIOCOM AMHS Extended Service Installation: 2007	AMHS terminals in Asuncion count with the NEW FPL template since the end of March 2012. At national level will be completed by the end of June 2012	Part of INDRA Aircon 2100system Installation: October 2011	The FDP system will be updated in June 2012		Regional tests will be initiated in August 2012
	RADIOCOM AMHS Extended Service Installation: 2007	Los terminales de AMHS en Asunción cuentan con la plantilla del NUEVO FPL. A nivel nacional se completará para fines de junio de 2012	Parte del sistema Aircon 2100 INDRA Instalación: octubre 2011	El sistema FDP se actualizará en junio de 2012		Pruebas regionales iniciarán en agosto 2012

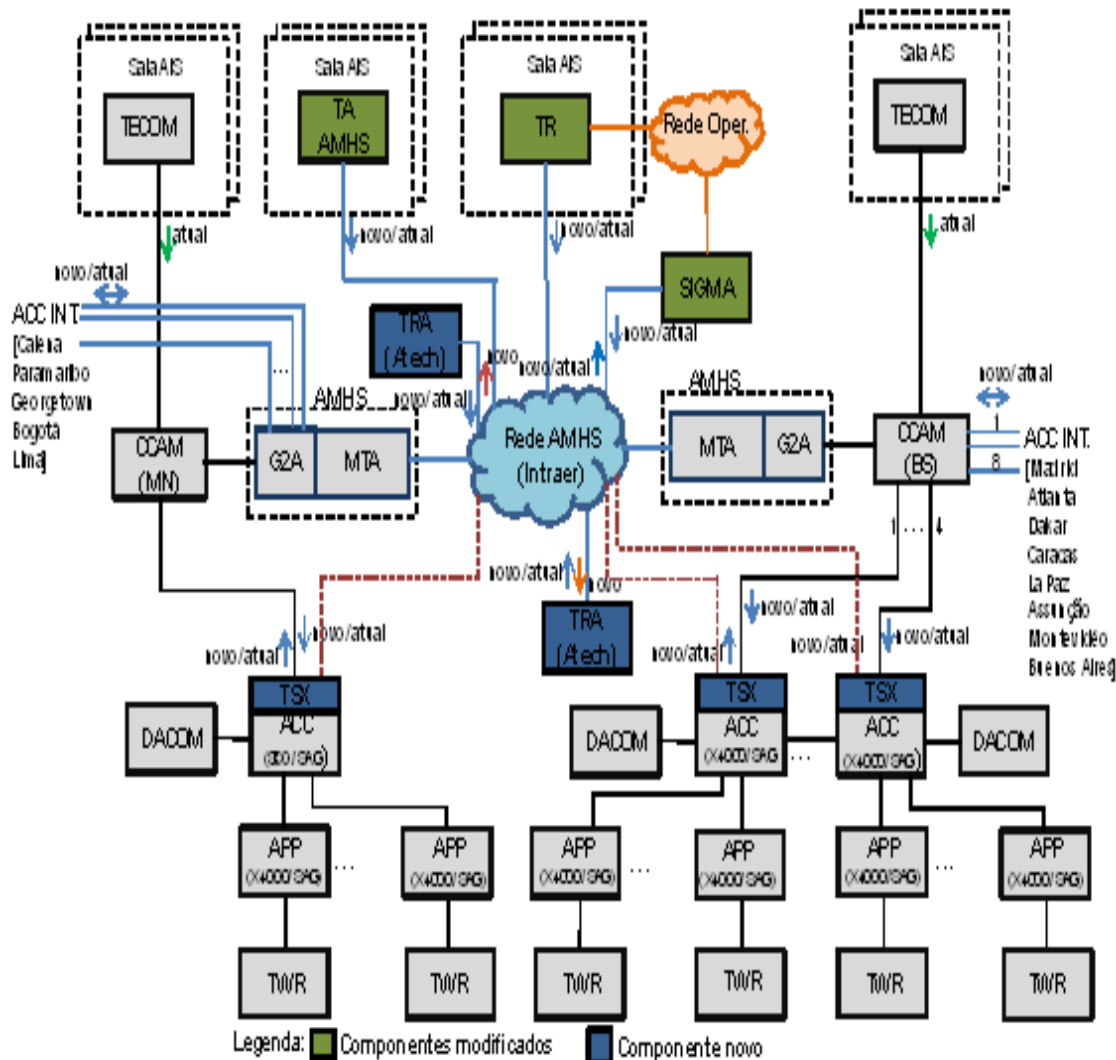
State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
PERU /ACC Lima	COMSOFT CADAS AMHS system Instalación: 2009	AMHS terminals in Lima count with the NEW FPL template since beginning of 2012. At national level will be completed by the end of June 2012	INDRA Aircon 2100system Installation: April 2012	<b>Implemented</b> The FDP is ready to accept the NEW FPL April 2012	<b>Implemented</b> National trials were made to the AMHS and the FDP with positive results March 2012	Trials between Peru and Panamá were made in March 2012. Regional test will continue June 2012
	Sistema AMHS CADAS COMSOFT Instalación: 2009	Los terminales de AMHS en Lima cuentan con la plantilla del NUEVO FPL desde inicio del 2012. A nivel nacional se completara para fines de junio de 2012	Aircon 2100 INDRA Instalación: abril 2012	<b>Implementado</b> El FDP esta listo a aceptar el NUEVO FPL Abril 2012	<b>Implementado</b> Pruebas Nacionales fueron realizadas en el sistema AMHS y el FDP con resultados positivos Marzo 2012	Pruebas entre Perú y Panamá se realizaron en marzo de 2012. Continúan pruebas regionales junio 2012
SURINAME /ACC Paramaribo	SKYCOM by INTELCAN	<b>Implemented</b> NEW and ACTUAL FPL template included in the AMHS terminals June 2011	INTELCAN March 2011	<b>Implemented</b> December 2011		Regional tests will be initiated in June 2012
	SKYCOM de INTELCAN	<b>Implementado</b> Los terminales del sistema AMHS incluyen la plantilla con el NUEVO y ACTUAL formato FPL Junio 2011	INTELCAN Marzo 2011	<b>Implementado</b> Diciembre 2011		Pruebas regionales iniciarán en junio 2012

State/Site Estado/Localidad	Manufacture of the AFTN/AMHS System / Fabricante del Sistema AFTN/AMHS	Implementation status of NEW FPL in the AFTN/AMHS system/ Estado de implantación del NUEVO FPL en el sistema AFTN/AMHS	Manufacture of the Flight Plan Processing System (FDP)/ Fabricante del sistema de procesamiento de plan de vuelo(FDP)	Implementation status of the NEW FPL in the FDP / Estado de implantación del NUEVO FPL en el sistema FDP	Implementation status of national trials with NEW FPL/ Estado de implantación de las pruebas nacionales con el NUEVO FPL	Implementation status of regional and interregional trials with the NEW FPL / Estado de implantación de las pruebas regionales e interregionales con el NUEVO FPL
URUGUAY /ACC Montevideo	Global Weather	NEW FPL format will be entry in a manual form	INDRA Aircon 2100system Installation: 2005	Update of INDRA FDP will be made in June 2012		Regional tests will be initiated in August 2012
	Global Weather	NUEVO formato de Plan de Vuelo será introducido en forma manual	Aircon2100 INDRA Instalación: 2005	Actualización del FDP de INDRA se realizará en junio de 2012		Pruebas regionales iniciarán en Agosto 2012
VENEZUELA /ACC de Maiquetía	RADIOCOM AMHS Extended Service Installation: 2010	AMHS terminals in Maiquetia count with the NEW FPL template since the end of December of 2011. At national level will be completed by the end of June 2012	ATECH X4000 system Installation: 2008	Update of ATECH system will be made by the end of June 2012		Regional tests will be initiated in August 2012
	RADIOCOM AMHS Extended Service Instalación: 2010	Los terminales de AMHS en Maiquetía cuentan con la plantilla del NUEVO FPL desde finales del 2011. A nivel nacional se completará para fines de junio de 2012	ATECH X4000 Instalación: 2008	Actualización del sistema ATECH X4000 se realizará para finales de junio de 2012		Pruebas regionales iniciarán en Agosto 2012



## APPENDIX D / APÉNDICE D

### IMPLEMENTATION OF AMENDMENT 1 AT THE AUTOMATED SYSTEMS IN BRAZIL / IMPLANTACIÓN DE LA ENMIENDA 1 EN LOS SISTEMAS AUTOMATIZADOS DE BRASIL



## APPENDIX E / APENDICE E

**SAM REGION TESTING SCHEDULE FOR THE IMPLEMENTATION OF THE NEW FLIGHT PLAN FORMAT /  
PROGRAMACION DE ENSAYOS PARA LA IMPLANTACION DEL NUEVO FORMATO DE PLAN DE VUELO EN LA REGION SAM**

Estado / State	National Testing Before 31 Mar 2012 / Pruebas Nacionales antes del 31mar 2012	Regional Testing 1 Apr to 30 Jun 2012/ Pruebas Regionales 1 abr al 30 jun 2012		Inter-Regional Testing 1 Apr to 30 Jun 2012/ Pruebas Interegionales 1 abr al 30 jun 2012		User Testing 1 Jul to 14 Nov 2012/ Pruebas usuarios 1 Jul a 14 Nov 2012		Type of Solution Converter or Upgrade/  Tipo de Solución o Mejora	Date of Acceptance of Both Present and New Format 1 Jul 2012/  Fecha de Aceptación de Actual y Nuevo Formato 1 Jul 2012	Remarks
		State/ Estado	Date/ Fecha	User/ Usuario	Date/ Fecha	User/ Usuario	Date/ Fecha			
Argentina	Comodoro Rivadavia	Chile Puerto Montt Punta Arenas	30Aug/ Ago	South Africa Johannesburg	15Sep			FDP Manual  AMHS Upgrade/ Mejoras	July/Julio 2012	
	Cordoba	Bolivia La Paz	20Jul					Upgrade/ Mejoras FDP and AMHS	July/Julio 2012	
		Chile Antofagasta	30Aug/ Ago							
	Ezeiza	Uruguay Montevideo	30Aug/ Ago	South Africa Johannesburg	15Sep			Upgrade/ Mejoras FDP and/y AMHS	July/Julio 2012	
		Chile Puerto Mont	30Aug/ Ago							
	Mendoza	Chile Santiago	30Aug/ Ago					FDP Manual  AMHS Upgrade/ Mejoras	July/Julio 2012	

Estado / State	National Testing Before 31 Mar 2012 / Pruebas Nacionales antes del 31mar 2012	Regional Testing 1 Apr to 30 Jun 2012/  Pruebas Regionales 1 abr al 30 jun 2012		Inter-Regional Testing 1 Apr to 30 Jun 2012/  Pruebas Interegionales 1 abr al 30 jun 2012		User Testing 1 Jul to 14 Nov 2012/  Pruebas usuarios 1 Jul a 14 Nov 2012		Type of Solution Converter or Upgrade/  Tipo de Solución o Mejora	Date of Acceptance of Both Present and New Format 1 Jul 2012/  Fecha de Aceptación de Actual y Nuevo Formato 1 Jul 2012	Remarks
		State/ Estado	Date/ Fecha	User/ Usuario	Date/ Fecha	User/ Usuario	Date/ Fecha			
	Resistencia	Paraguay Asuncion	30Aug/ Ago					FDP Manual	July/Julio 2012	
		Uruguay Montevideo	30Aug/ Ago					AMHS Upgrade/ Mejoras		
		Brasil Curitiba	20Jul							
Bolivia		Argentina Cordoba	20Jul					FDP Manual	TBD	
		Brasil Amazónico Curitiba	20Jul					AMHS Upgrade/ Mejoras		
		Chile Antofagasta	30Aug/ Ago							
		Paraguay Asunción	30Aug/ Ago							
		Perú Lima	20 Jul							
Brasil	Amazonico	Bolivia La Paz	20 Jul					Converter/ Conversor	July/Julio	
		Colombia Bogota	30Aug/ Ago					AMHS Upgrade/ Mejoras		
		Guyana Francesa Rochambeau	30Aug/ Ago							
		Guyana Georgetown	29Jun							
		Peru	20Jul							

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Estado / State	National Testing Before 31 Mar 2012 / Pruebas Nacionales antes del 31mar 2012	Regional Testing 1 Apr to 30 Jun 2012/  Pruebas Regionales 1 abr al 30 jun 2012		Inter-Regional Testing 1 Apr to 30 Jun 2012/  Pruebas Interegionales 1 abr al 30 jun 2012		User Testing 1 Jul to 14 Nov 2012/  Pruebas usuarios 1 Jul a 14 Nov 2012		Type of Solution Converter or Upgrade/  Tipo de Solución o Mejora	Date of Acceptance of Both Present and New Format 1 Jul 2012/  Fecha de Aceptación de Actual y Nuevo Formato 1 Jul 2012	Remarks
		State/ Estado	Date/ Fecha	User/ Usuario	Date/ Fecha	User/ Usuario	Date/ Fecha			
Chile	Antofogasta	Argentina Cordoba	30Aug/ Ago					Upgrade/ Mejoras FDP and/y AMHS		
		Bolivia LaPaz	30Aug/ Ago							
		Peru Lima	30Aug/ Ago							
	Santiago	Argentina Mendoza	30Aug/ Ago	Australia Brisbane	15Sep			Upgrade/ Mejoras FDP and/y AMHS		
				Nueva Zelandia Auckland	15Sep					
	Puerto Montt	Argentina Ezeiza ComodoroRiv adavia	30Aug/ Ago					Upgrade/ Mejoras FDP and AMHS		
Punta Arenas	Argentina ComodoroRiv adavia	30Aug/ Ago					Upgrade/ Mejoras FDP and/y AMHS			

Estado / State	National Testing Before 31 Mar 2012 / Pruebas Nacionales antes del 31mar 2012	Regional Testing 1 Apr to 30 Jun 2012/ Pruebas Regionales 1 abr al 30 jun 2012		Inter-Regional Testing 1 Apr to 30 Jun 2012/ Pruebas Interegionales 1 abr al 30 jun 2012		User Testing 1 Jul to 14 Nov 2012/ Pruebas usuarios 1 Jul a 14 Nov 2012		Type of Solution Converter or Upgrade/  Tipo de Solución o Mejora	Date of Acceptance of Both Present and New Format 1 Jul 2012/  Fecha de Aceptación de Actual y Nuevo Formato 1 Jul 2012	Remarks
		State/ Estado	Date/ Fecha	User/ Usuario	Date/ Fecha	User/ Usuario	Date/ Fecha			
Colombia	Barranquilla	Panama	30Aug/ Ago	Curazao	15Sep			AMHS Upgrade/ Mejoras		
		Venezuela Maiquetia	30Aug/ Ago	Jamaica Kingston	15Sep					
	Bogota	Brasil Amazonico	30Aug/ Ago	COCESNA	1Jul			AMHS Upgrade/ Mejoras		
		Ecuador Guayaquil	30Aug/ Ago							
		Panama	20Jul							
		Peru Lima	20Jul							
Ecuador	Guayaquil	Venezuela Maiquetia	30Aug/ Ago							
		Colombia Bogota	30Aug/ Ago							
Guyana	Georgetown	Peru Lima	30Aug/ Ago	COCESNA	1Jul			FDP Manual  AMHS Upgrade/ Mejoras		
		Brasil Amazonico	29Jun							
		Surinam Paramaribo	29Jun							
		Venezuela Maiquetia	30Aug/ Ago	Trinidad Tabago Piarco	1 Oct			Upgrade/ Mejoras FDP and/y AMHS		

Estado / State	National Testing Before 31 Mar 2012 / Pruebas Nacionales antes del 31mar 2012	Regional Testing 1 Apr to 30 Jun 2012/  Pruebas Regionales 1 abr al 30 jun 2012		Inter-Regional Testing 1 Apr to 30 Jun 2012/  Pruebas Intereregionales 1 abr al 30 jun 2012		User Testing 1 Jul to 14 Nov 2012/  Pruebas usuarios 1 Jul a 14 Nov 2012		Type of Solution Converter or Upgrade/  Tipo de Solución o Mejora	Date of Acceptance of Both Present and New Format 1 Jul 2012/  Fecha de Aceptación de Actual y Nuevo Formato 1 Jul 2012	Remarks
		State/ Estado	Date/ Fecha	User/ Usuario	Date/ Fecha	User/ Usuario	Date/ Fecha			
French Guiana (France)	Rochambeau	Brasil Amazonico Atlantico	30Aug/ Ago	Trinidad Tabago Piarco	1 Oct			Upgrade/ Mejoras FDP and/y AFTN		
		Suriname Paramaribo	30Aug/ Ago							
Paraguay	Asuncion	Argentina Resistencia Cordoba	30Aug/ Ago					Upgrade/ Mejoras FDP and/y AMHS		
		Bolivia La Paz	20Jul							
		Brasil Curitiba	20Jul							
Panama	Panama	Colombia Barranquilla Bogota	20Jul	COCESNA	1Jul			Manual FDP and AMHS		
				Jamaica Kingston	1Jul					
Perú	Lima	Bolivia La Paz	20Jul					Upgrade/ Mejoras FDP and/y AMHS		
		Brasil Curitiba	20Jul							
		Chile Antofogasta	30Aug/ Ago							
		Ecuador Guayaquil	30Aug/ Ago							

Estado / State	National Testing Before 31 Mar 2012 / Pruebas Nacionales antes del 31mar 2012	Regional Testing 1 Apr to 30 Jun 2012/  Pruebas Regionales 1 abr al 30 jun 2012		Inter-Regional Testing 1 Apr to 30 Jun 2012/  Pruebas Interegionales 1 abr al 30 jun 2012		User Testing 1 Jul to 14 Nov 2012/  Pruebas usuarios 1 Jul a 14 Nov 2012		Type of Solution Converter or Upgrade/  Tipo de Solución o Mejora	Date of Acceptance of Both Present and New Format 1 Jul 2012/  Fecha de Aceptación de Actual y Nuevo Formato 1 Jul 2012	Remarks
		State/ Estado	Date/ Fecha	User/ Usuario	Date/ Fecha	User/ Usuario	Date/ Fecha			
Suriname	Paramaribo	Brasil Amazonico	29Jun	Trinidad Tabago Piarco	1 Oct			Upgrade/ Mejoras FDP and/y AMHS		
		Guyana Georgetown	29Jun							
		French Guyana Rochambeau	30Aug/ Ago							
Uruguay	Montevideo	Argentina Ezeiza Resistencia Curitiba	30Aug/ Ago					Manual AFTN Upgrade/ Mejoras FDP		
		Brasil Amazonico Atlantico Curitiba	30Aug/ Ago							
Venezuela	Maiquetia	Brasil Amazonico	30Aug/ Ago	Curazao	30Aug/ Ago			Upgrade/ Mejoras FDP and/y AMHS		
		Colombia Barranquilla Bogota	30Aug/ Ago	San Juan	30Aug/ Ago					
				Aruba	15Sep					
		Guyana Rochambeau	30Aug/ Ago	Trinidad Tabago Piarco	1 Oct					



**Agenda Item 9:           Aviation System Block Upgrade (ASBU)**

9.1           The meeting took note of the new ASBU methodology (Aviation System Block Upgrades), originated in order to achieve interoperability of global systems and data, as required by the ICAO Thirty-seventh Assembly (A37). To this respect, during the session of a full day presentations, it had the opportunity to understand the methodology through presentations, by ICAO, IATA, CANSO and a representative from the industry.

9.2           ASBU methodology shall be presented for approval and inclusion in the new global air navigation plan, in the forthcoming Air Navigation Conference (AN-Conf/12) to be held in Montreal, Canada, from 19 to 30 November 2012. In this regard, the Meeting invited the States of the Region to actively participate in this event.

9.3           The meeting deemed pertinent that once the methodology is approved and included in the global air navigation plan, the SAM Region performance-based navigation system implementation plan and performance-based national plans should be revised.

**Agenda Item 10: Other business**

10.1 The meeting took note that the Caribbean and South American Monitoring Agency (CARSAMMA) is responsible for the creation and maintenance of the PBN approved and cancelled aircraft data base, through the reception of Forms F5 and F6 sent to this agency by the States Civil Aviation Authorities of the SAM Region.

10.2 Also, the Group recognised the difficulty of the Agency after the first submission of forms F5 by the States' CAAs during the creation of the data base, where the duplication of the information in the same aircraft registration was observed, but with PBN certificates issued by the Certification Authorities and different codes.

10.3 The Group recognised that there are aircraft operating with the same license for two operators of different States. Also, one aircraft may have obtained different PBN approvals upon the authority of the operator, which should not be considered as a discrepancy.

10.4 In view of the above, it is recommended that CARSAMMA evaluates the need to insert a column in the database, indicating the name of the operators, in such a way that the search by users of the data base is simplified.

10.5 Also, in case a State requires updating Form F5 to include or delete the information on specifications or other aircraft data, States should use Form F5 as a replacement, so as to fill-in the complete valid information for the referred aircraft.

10.6 Thus, CARSAMMA will maintain the history of each aircraft more easily. To this end, it is recommended to include an explanatory note in Form F5 before the instructions to complete this form.

10.7 Finally, it should be recommended to CARSAMMA to delete in Table A of code B6 regarding RNAV with LORAN C, which was deactivated on 2010. This will avoid inclusion of inconsistent information by States. In addition, ICAO SAM Office should consult ICAO about an amendment to ICAO Doc 4444/501, where code B6 still appears.