SAM/IG/14

INTERNATIONAL CIVIL AVIATION ORGANIZATION
South American Office

Regional Project RLA/06/901

FOURTEENTH WORKSHOP/MEETING OF THE SAM IMPLEMENTATION GROUP

(SAM/IG/14)

FINAL REPORT

Lima, Peru, 10 to 14 November 2014

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HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Fourteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/14) was held at the premises of the ICAO South American Regional Office in Lima, Peru, from 10 to 14 November 2014, under the auspices of Regional Project RLA/06/901.

ii-2 OPENING CEREMONY AND OTHER MATTERS

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

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

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

Mr. Luiz Ricardo de Souza Nascimento, delegate from Brazil, was unanimously elected as Chairman of the Meeting. Also, Mr. Paulo Vila Millones, delegate from Peru, was elected as Vice-Chairman.

Mr. Onofrio Smarrelli, RO/CNS SAM Office, Lima, acted as Secretary assisted by Messrs. Julio Pereira, RO/ATM/SAR, Roberto Arca, RO/ATM/SAR/AIM, Marcelo Ureña, RO/FLS and Lia Ricalde, RO/AGA.

In addition, the Secretariat counted with the support of Messrs. Mauricio Corredor, Rapporteur of the ATFM Group; Omar Gouarnalusse, Rapporteur of the CNS Group; and Murilo Albuquerque Loureiro and Alessander de Andrade Santoro, Rapporteurs of the Automation Group.

ii-4 WORKING LANGUAGES

The working language of the Meeting was Spanish with simultaneous interpretation in English, and its relevant documentation was presented in Spanish and English.

ii-5 AGENDA

The following agenda was adopted:

Agenda Item 1: Follow up to conclusions and decisions adopted by SAM/IG meetings, results of the Seventeenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/17) and progress in the development of the new electronic Air Navigation Plan (e-ANP);

Agenda Item 2: State industry collaborative process for the transition of the current systems in those specified in the ASBU.

Agenda Item 3: Optimization of the SAM air space

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

Agenda Item 4: Criteria and procedures for the approval of performance-based navigation operations

Agenda Item 5: Implementation of the Air Traffic Flow Management (ATFM)

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

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

Agenda Item 8: Other business

ii-6 **ATTENDANCE**

The Meeting was attended by 72 participants from 9 States of the SAM Region (Argentina, Bolivia, Brazil, Chile, Ecuador, Panamá, Paraguay, Peru and Uruguay), 1 CAR State (United States), 2 International Organizations (IATA and SITA) and 7 Observers (APADA, ATECH, IACIT, INDRA, Rockwell Collins ARINC, RTCA and THALES Air Systems). The list of participants is shown in pages iii-1 to iii-2.

ii.7 **LIST OF CONCLUSIONS**

No.	**Title**	**Page**
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LIST OF PARTICIPANTS

ARGENTINA
1. Angel Rojo
2. Carlos Omar Torres
3. Fernando Calvo
4. Guillermo Ricardo Cocchi
5. Gustavo Adolfo Chiri
6. Gustavo Joaquín Rodríguez
7. Mario Cristian Correa
8. Matías Eduardo Valdata
9. Moira Lidia Callegare
10. Norma Rota
11. Obdulio Omar Gouarnalusse
12. Víctor Marcelo De Virgilio

BOLIVIA
13. Fernando Azuga Hurtado
14. Hernando Lara Valda
15. Jaime Yuri Alvarez Miranda
16. Luis Benjamín Rojas Santa Cruz

BRAZIL
17. Alessander de Andrade Santoro
18. Alexandre Luiz Dutra Bastos
19. Francisco Almeida da Silva
20. José Airton Patricio
21. Luis Henrique Pinto M. Alves
22. Luiz Antonio Dos Santos
23. Luiz Ricardo de Souza Nascimento
24. Marcelo Marques Lobo
25. Murilo Albuquerque Loureiro
26. Ricardo da Silva Miranda

CHILE
27. Alfonso De La Vega

ECUADOR
28. Darwin Francisco Suarez León
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PANAMA
31. Iván de León
32. Mario Facey

PARAGUAY
33. Jorge Szwako Montero
34. Liz Rocío Portillo Castellanos
35. Roque Diaz Estigarribia
36. Sindulfo Ibarrola

PERU
37. Fernando Hermoza Hübner
38. Karla Albañil Albán
39. Martha Soto Ansaldi
40. Norma Nava Hernández
41. Paulo Vila Millones
42. Raúl Anastacio Granda
43. Renzo Gallegos Begazo
44. Rodrigo Aguirre Herrera
45. Sady Beaumont Valdez
46. Tatiana Mendoza Tinco
47. Víctor Prado Bernaola
48. Jorge Garcia
49. Johnny Avila

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50. Fernando de Medina

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51. Claudio Norberto Espósito
52. Ricardo Luis González

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53. Delfim Ossamu Miyamaru
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IACIT
55. João Paulo Maia Ishida
56. Luiz Antonio Freitas de Castro

IATA
57. Carlos Cirilo
58. Marco Vidal
59. Diego Figueroa (Aerolinesa Argentinas)
60. Fabio Lessa (TAM)
61. Mariela Valdez (LATAM)

INDRA
62. Rodrigo San Martin Muñoz

ROCKWELL COLLINS ARINC
63. Manuel Gongora

RTCA
64. Jennifer Iversen
65. Kalyan Balasubramaniam
66. Margaret Jenny

SITA
67. Adriana Mattos

THALES AIR SYSTEMS
68. Ludmilla Gonzáles

OACI / ICAO
69. Onofrio Smarrelli
70. Marcelo Ureña
71. Julio Pereira
72. Roberto Arca

Agenda Item 1: Follow-up to conclusions and decisions adopted by SAM/IG meetings, results of the Seventeenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/17) and progress in the development of the new electronic Air Navigation Plan (e-ANP)

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

a) WP/02 – *Review of the status of compliance of conclusions formulated by SAM/IG meetings (*presented by the Secretariat);
b) WP/03 – *Results of the Seventeenth Meeting of the Regional Planning and Implementation Group (GREPECAS/17)* (presented by the Secretariat);
c) WP/04 – *Progress made in the develoment of the new electronic Air Navigation Plan (e-ANP)* (presented by the Secretariat).

Follow-up to conclusions and decisions adopted by SAM/IG meetings

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

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

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

Results of the Seventeenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/17)

1.4 On this matter, the Meeting took note of the results of the Seventeenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/17), held in Cochabamba, Bolivia, on 21-25 July 2014, at the facilities of the National Civil Aviation Institute (*Instituto Nacional de Aviación Civil* - INAC), and analysed the impact of the following items of the GREPECAS meeting:

a) global, intra-regional and inter-regional air navigation activities;

b) regional air navigation planning and implementation performance framework: review of programmes and projects;

c) air navigation deficiencies in the CAR/SAM Regions.

1.5 Aspects contemplated in the agenda of the GREPECAS meeting and their impact on the SAM/IG, were reviewed under agenda items 2 to 7 of this Meeting, respectively.

Status of development of the new Electronic Air Navigation Plan (e-ANP)

1.6 The Secretariat recalled that the SAM/IG/13 meeting was presented with the format of the volumes proposed for the development of the new electronic Regional Air Navigation Plan. The Meeting was also informed that this new format and content had been presented at the GREPECAS/17 meeting, which had taken note of the new template and procedure for amendment of the electronic Regional Air Navigation Plan (eANP).

1.7 The Secretariat informed that the objectives and purpose of the regional ANPs were as follows:

a) ANPs allowed for planning and implementation of air navigation systems within a given region, in accordance with the agreed global and regional planning framework. Their purpose was to meet needs in specific areas that were not contemplated in global provisions. ICAO PIRGs were in charge of developing and maintaining the ANPs, with the assistance of the ICAO Secretariat;

b) ANPs were used as repositories of the responsibilities assigned to States with respect to the provision of air navigation facilities and services within a given area, in accordance with Article 28 of the Convention on International Civil Aviation (Doc 7300);

c) ANPs contained requirements concerning the facilities and services to be implemented by States, in accordance with regional air navigation agreements. Those parts of the ANP concerning procedures are published in the ICAO Regional Supplementary Procedures (SUPPS) (Doc 7030);

d) ANPs contained provisions that the States could follow when planning the provision of their navigation facilities and services, with the certainty that facilities and services provided in accordance with the Plan would be compatible with those of other States, creating an integrated system suitable for the foreseeable future;

e) ANPs could serve as a basis for fees charged for services provided or made available to users, in accordance with ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082) and the ICAO Manual on Air Navigation Services Economics (Doc 9161); and

f) ANPs supported the performance-based approach adopted by ICAO for measuring the efforts made by States for the implementation of the agreed requirements.

1.8 The Meeting took note of the new revised procedure of amendment of the eANP, using a web-based platform.

1.9 Furthermore, the Meeting was informed that focal points designated by States and international organisations would have access to the ANP web-based platform for the drafting and submission of proposals for amendment (PfA) to the ANP of each region concerned, in accordance with the corresponding amendment procedures, and the public would have read-only access to ANPs.

1.10 The participating States that had not yet sent the information on focal points for amending the eANP could complete the data in **Appendix C** to this part of the Report.

1.11 Finally, the Meeting took note of the e-ANP implementation action plan, shown in **Appendix D** to this part of the Report.

APPENDIX A

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

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
1. ATS Routes Implementation							
1-1	Realignment of Route UM548	Coordinate realignment	AIRAC	Nov 2014	Bolivia, Peru, Paraguay	RO/ATM/ AIM	**COMPLETED**
2. Optimisation of ATS routes in the SAM Region							
2-4	Handling of air transport environmental problems	Obtaining of objective data over benefits that will be reached in terms of reduction of harmful gas emissions into the atmosphere.	• Known data. • Availability of information required for monitoring of environmental protection.	Permanent	States	N/A	**VALID** States must use IFSET tool. Reports should be submitted by States during the PBN implementation process. Permanent task.
2-5	Prepare a measurable plan of performance, including gas emissions safety, efficiency, etc.	• Check available tools to carry out this task. • Prepare a measurable plan.	A measurable plan will be available which will permit a clear vision of the current and future status of performance regarding gas emissions, safety and efficiency.	SAM/IG/9	RLA/06/901	RO/ATM	**VALID** This task was included in the review of the action plan for the optimization of the SAM airspace, developed at SAM/IG/11 meeting. The Secretariat will evaluate the feasibility of developing the plan under the auspices of RLA/06/901 Project, taking into account the PBIP.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3. Implementation of Performance Based Navigation (PBN) in the SAM Region							
3-17	**Conclusion SAM/IG/5-4 Implementation of Continuous Descent Operations** That, recognizing the efficiency and environmental benefits of Continuous Descent operations, and the need to harmonize these operations in the interest of safety, States are encouraged to include the implementation of Continuous Descent operations (CDO) as part of their PBN implementation plans and to implement CDO in accordance with the ICAO CDO Manual.	States should include in their PBN programmes the CDO concept.	CDO implemented as per national requirements.	SAM/IG/15	States	RO/ATM	**VALID** After the Second Workshop on PBN use in the design of airspaces in terminal areas, States may present their preliminary works, applying CDO and CCO techniques. PBN implementation national plans should indicate procedures in which CDO and CCO techniques are or will be applied.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-18	**Conclusion SAM/IG/11-1 – Support to the SAM States in the redesign of their TMAs** That, Project RLA/06/901 consider the viability of: a) Replicate the Course/ Workshop on Airspace Design at the Lima Regional Office for one week, with an intensive schedule, with experts of the Region, Project and IATA instructors, that have already offered their support to this initiative; and b) Create a support team to assist a group of States that are aligned in their traffic flows, in the development of a basic design aimed at main international airports.	Conduct courses on PBN design in terminal areas for the SAM Region, in the Lima Regional Office.	Base design of selected terminal areas, in order to allow States to deepen and implement new TMAs based on PBN design.	PBN/4 Workshop	RLA/06/901 Project	ATM/ROs and Miami Course instructors	**VALID** The First Workshop on design of airspace using PBN was conducted in Bogota, Colombia from 12 to 23 May 2014 and the Second Workshop for the presentation of State's preliminary designs was held in Lima, Peru, from 8 to 12 September 2014. Following activities will be submitted for the approval of RCC: a) Third PBN Workshop, from 09 to 13 March 2015; b) Fourth PBN Workshop, from 17 to 21 August 2015. Support teams were replaced by the 4 PBN Workshops, which have the objective to guiding the 4 PBN implementation phases (planning, design, validation and implementation).. Panama and Bolivia did not attend the First Workshop on design of airspace using PBN.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-19	**Conclusion SAM/IG/11-2 – Implementation of the concept of the Flexible Use of the Airspace in the SAM Region** That, the States of the SAM Region use the Guidance for the implementation of the Concept of the Flexible Use of the Airspace in the SAM Region, shown in Appendix E to the item 2 of the SAM/IG/10 Meeting, for the design and management of the airspace of the Flight Information Regions under its jurisdiction.	Implement Civil-Military Coordination and Cooperation Committees. Coordinate flexible use of prohibited, restricted and dangerous areas affecting the airspace optimization.	Redesign and coordination for optimized use of prohibited, restricted and dangerous areas.	SAM/IG/16	States	RO/ATM	**VALID**
3-23	**Conclusion SAM/IG/6-3 – Forms CMA F5 and CMA F6** That SAM States take pertinent action in order to apply forms CMA F5 and CMA F6, attached as Appendices A and B to this part of the report, and send them to CARSAMMA as soon as the PBN approval of aircraft and operators is established.	• Use Forms CMA F5 and CMA F6. • Taking into consideration that some listings contain all data foreseen in such form, and in such cases, the meeting concluded that the submission of the corresponding F5 forms is not necessary. In cases in which the lists do not contain information foreseen in Form F5, States should send them to CARSAMMA.	Safe RNAV5 implementation.	First Phase October 2011 SAM/IG/14	States	RO/ATM	**COMPLETED** Replaced by the new aircraft and operators PBN database, developed by RLA/06/901 Project.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-25	**Conclusion SAM/IG/6-5 - Lateral navigation deviation reporting form** That SAM States take the corresponding action in order to use the monitoring programme and particularly lateral navigation deviation reporting form attached as Appendix F to this part of the report, and send it to CARSAMMA on the tenth day of each month.	Collect information of lateral deviations and send it to CARSAMMA	Safe RNAV5 implementation.	SAM/IG/14	States	RO/ATM	**COMPLETED** Lateral deviations were already used in the development of separation criteria foreseen in Document 4444, under the auspices of the Separation Airspace Safety Panel (SASP). Operational risks should be mitigated under the frame of SMS.

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

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
4. Standards and procedures for performance based navigation operations approval							
4-11	**Para 4.9 SAM/IG/6 report-** Establish standard criteria for the Regional System on ground and flight Validation of flight procedures through satellite-based PBN instruments.	Prepare standardised criteria.	Uniform application of Validation criteria on ground and flight procedures through satellite-based PBN instruments.	SAM/IG/9	RLA/99/901	RO/FLS	**VALID** The draft CA 91-012 – Flight validation (FV) of satellite-supported instrument flight procedures (IFP) of performance based navigation (PBN) was presented during the SAM/IG/6. To this respect, the Meeting requested the Secretariat to send a survey of flight inspection experts for comments and further approval. The Secretariat will consult with SAM RO/FLS on the status of this Conclusion.
5- ATFM implementation							
5-11	**Conclusion SAM/IG/5-7 ATFM Teleconferences in the SAM Region** That SAM States continue to hold weekly ATFM teleconferences between flow management units or flow management positions (FMU / FMP) to improve the exchange of information among participating States.	Implement ATFM teleconferences	Coordination between FMU/FMP carried out.	Permanent	States	RO/ATM	**VALID** REDDIG II includes a speech communications sub-network to support this application. Weekly teleconferences are not being held, but various States transmit the teleconference format by e-mail.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-16	**Conclusion SAM/IG/6-8 ATFM AIP SUPP/AIC Model** That the States of the ICAO South American Region, when preparing their national AIC, use as a reference the ATFM AIP SUPP/AIC model shown in Appendix E to this part of the report.	Prepare AIC	Harmonised publications in the SAM Region	October 2016	States	RO/ATM	**VALID**
5-20	**Conclusion SAM/IG/13-4 – Action to support flow management during the FIFA 2014 World Cup in Brazil** That the following action be taken to support flow management during the FIFA 2014 World Cup: *Items a) to i) of the Conclusion*	States' Action Plan Designate point of contact Participate in teleconferences	Send information on demand forecast. Dissemination of AIC. Teleconferences. Updated ATFM points of contact.	July 2014	States	ROATM	**COMPLETED** Information on activities carried out is available at WP/08.
5-22	**Conclusion SAM/IG/13-5 – Draft proposal on Second Part of ICAO Doc 9971** That SAM States send by 30 September 2014, comments on draft proposal on Second Part of ICAO Doc 9971 aiming to provide required information for the optimization of the Manual, as deemed appropriate	Analyse document and send comments.	Comments of States	Oct 2014	States	RO/ATM	**COMPLETED** Only Colombia and Brazil submitted comments. Comments of Brazil and Colombia were considered during SAM/IG/14 meeting.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-23	**Conclusion SAM/IG/13-8 – Actions on air traffic flow control measures** That in view of air traffic flow operational restrictions, SAM States adopt following measures: a) consider the text on flow control measures used in the ATS 06/14 Multilateral Meeting, or similar, for inclusion in the Letters of Operational Agreement between ATS dependencies; b) consider of utmost priority to take necessary and urgent actions to avoid the adoption of unilateral flow restrictions that could severely affect air traffic flow; c) implement air traffic flow control measures, if necessary, based on well-founded studies of ATS sector capacities, and coordinate same previously with ATC dependencies responsible for ATS supply in adjacent FIRs. d) consider the application of gradual control measures using as far as possible separations based on distance, by taking advantage of existing ATS surveillance tools; e) use in messages established for communicating flow control measures, terminology and format as detailed in Manual on Air Traffic Flow Management for CAR/SAM Regions, Version 1.1, October 2010, Chapters 12 and 13.	Review Letters of Agreement to reflect Conclusion. Establish urgent actions to avoid unilateral measures with direct impact in adjacent FIRs.	Letters of Agreement reflecting recommended actions	Nov 2014	States	RO/ATM	**VALID**

<table>
<tr><th>No.</th><th>Task to be developed</th><th>Specific tasks</th><th>Deliverables</th><th>Finalization date</th><th>Responsible</th><th>Supporting members to the task</th><th>Status of implementation</th></tr>
<tr><td colspan="8">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</td></tr>
<tr><td>6-7</td><td>Conclusion SAM/IG/6-9 - Actions required for AMHS interconnection
That SAM States, in view of the delays in the interconnection of the AMHS, proceed with the following actions:
a) Require from their AMHS providers the necessary support to successfully end the necessary interconnections;
b) Make necessary arrangements to train personnel in the interconnection tasks, with the aim of minimizing the dependency with their providers;
c) Maximize pertinent coordination; and
d) States that have not yet done so, complete the drafting and signature of the MoU.</td><td>Coordination with AMHS equipment providers

Training of personnel in charge of the interconnection implementation.

Complete MoU.</td><td>Interconnection of AMHS</td><td>End of 2013</td><td>SAM States</td><td>SAM States
AMHS providers
RO/CNS</td><td>COMPLETED
a) Completed. Coordination has been carried out with providers to complete the interconnection.
b) Completed. In July 2012 an AMHS course was carried out by EUROCONTROL’s INSTILUX center; from 24 to 28 July 2013 a second course was carried out by the same Institute.
c) Completed. Coordination has been increased.
d) Even though AMHS interconnection MoUs are pending, States involved have approved goals to complete AMHS interconnection, indicated inSAM/IG/13, Agenda Item 4, Appendix C.</td></tr>
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No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-12	**SAM/IG/10 Report paragraph 5.1** – To complete safety guidelines for the implementation of IP networks and IP router policy.	Complete safety guidelines for the implementation of IP networks and IP router policy.	Safety guidelines of IP networks document. IP router policy document.	SAM/IG/11	Project D1	RO/CNS	**COMPLETED** SAM/IG/11 meeting examined same, and were later submitted to States for their review. Comments were only received from Bolivia, which were incorporated into the guides. SAM/IG/12 approved the indicated guides.
6-13	**Conclusion SAM/IG/11-4 - International AMHS interconnection** That, with regard to international operational AMHS interconnections, if bilateral arrangements conducted by States do not permit another solution, same should make adjustments in their systems in order that they are compatible with mode TP0 as a whole and in accordance with Regulation RFC 1006.	Compatibility with mode TP0 at AMHS installed	AMHS compatible with mode TP0	2016	States	RO/CNS	**SUPERSEDED** By Conclusion SAM/IG/12-3

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-14	**Conclusion SAM/IG/11-5 - Use of the radio frequency spectrum** That, the States of the SAM Region: a) Ensure the VSAT networks operating in the band between 3.4 to 4.2 Ghz with regard to the IMT services, informing of any interference to both the pertinent national entity and the ICAO SAM Regional Office; b) Examine lists COM 1 to 3 and confirm the use of the frequencies assigned, notifying of any changes therein; and c) Count with a mechanism agreed upon with the national authority enabling detection and solving the use of unauthorized transmissions causing inconveniences to the aeronautical services.	a) Inform on the interference in 3.4 to 4.2 Ghz band b) Examine lists COM 1, 2 and 3 c) Mechanism to enable detection and solution to interferences presented	a) 3.4 to 4.2 Ghz band interference free b) Lists COM 1, 2 and 3 updated c) Establishment of mechanisms to detect and solve interference problems	Continuous activity	States	RO/CNS	**COMPLETED** As it is a continuous activity, the Secretariat will make follow-up, inviting States to keep the ICAO SAM RO informed on the topics taken under consideration in parts a) b) and c) of this Conclusion

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-15	**Conclusion SAM/IG/12-3 – International AMHS interconnection** That, with regard to international operational AMHS interconnections and with the aim of solving apparent incompatibility problems between the systems installed in Argentina, Brazil and Venezuela with the AMHS in Peru, these States carry out corresponding efforts so: a) their providers determine and inform the precise causes preventing the interconnections, and appropriately indicate the procedures to solve them; and b) they inform the results of the evaluation at SAM/IG/13 meeting.	a) Determine the precise causes preventing the AMHS interconnection between Argentina, Brazil and Venezuela with Peru. b) Present the results to SAM/IG/13.	Procedures to complete the AMHS interconnection between Argentina, Brazil and Venezuela with Peru.	December 2014	Argentina, Brazil, Peru and Venezuela	RO/CNS	**VALID** Although positive trials have been made between Brazil and Peru, Brazil asked Peru to undertake new trials using AMHS equipment in operation and not AMHS equipment on trial and development, by applying the trial protocol used by Brazil in Spain. Updated information on this regard is included under SAM/IG/14 Agenda Item 6.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-16	**Conclusion SAM/IG/12-4 – Approval of Web RAIM availability prediction service bidding process** That, the Meeting, as result of the technical and commercial evaluations made to the proposals presented at the RAIM availability prediction service bidding process, proceeded to analyse same and endorse the results obtained.	Approval of the results of the evaluation to the proposals presented at the Web RAIM availability prediction service bidding process.	Web RAIM availability prediction service approved.	October 2013	Project RLA/06/901 member States	RO/CNS RO/ATM	**COMPLETED** SAM/IG/12 Meeting analyzed and approved the evaluation to the proposals presented at the Web RAIM availability prediction service bidding process. ICAO has assigned a contract number for the implementation of this service (22501411). To date, contract between ICAO and the winning company has not yet been signed. It is expected that the contract is signed by the end of May 2014.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-17	**Conclusion SAM/IG/13-7 – Implementation of the RAIM availability prediction service in the SAM Region** That, with the aim of achieving a successful implementation of the RAIM availability prediction service and its effective use by States: a) SAM States, the Secretariat and the RAIM service provider carry out necessary coordinations through web teleconferences to define, among other aspects, the website format, the mode of access to the service with the assignment of a password, as well as verification of the veracity of the information; b) The Secretariat make the amendments required to the SAM advisory circulars on PBN procedures to mention the existence of the RAIM availability prediction service; c) States of the Region that have not adhered to the prediction service inform of their intent to join same; and d) RLA/06/901 member States, once the service is operational, make use of it and motivate its use by all interested parties.	a) Website format, the mode of access to the service; b) Amendment to advisory circulars; c) Inclusion of new States; d) Use of the service.	RAIM availability prediction service in operation	Dic 2014	States, Regional Office	RO/CNS RO/FLS	**VALID** a) Completed b) Pending c) Pending d) Pending

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
7. Operational implementation of new ATM automated systems and integration of the existing systems							
7-1	**SAM/IG/3-8 - Preparation of specific implementation plans for the interconnection of automated systems** That States of the SAM Region start the development of specific plans for the implementation of automated systems interconnection, considering the implementation dates indicated in Regional Interconnection Plan for Automated Systems in adjacent ACCs, specified in Appendix B of this part of the Report, and information contained in the following documentation: a) Memorandum of Understanding for the implementation of automated systems interconnection between two States having adjacent ACCs, Interface Control Document (ICD) for data communication between ATS dependencies in Caribbean and South American Regions (CAR/SAM ICD); b) Interface control document (ICD) for data communications between ATS units in the Caribbean and South	Operational implementation of ATM automated systems and interconnection of automated systems installed between adjacent ACCs.	Memorandum of Understanding (MoU) between SAM pairs of States for the interconnection of automated systems.	2012	SAM States	RO/CNS RLA/06/901 Project automation experts	**COMPLETED** Most States of the Region with automated systems installed at their ACCs have issued plans taking into account the guide material prepared by SAM/IG with the support of RLA/06/901 Project. States pending implementation of their plans, have taken note of the guideline material drafted by SAM/IG. Follow-up by the Secretariat to SICD Document.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	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).						
8. Follow up to conclusions and decisions adopted by SAM/IG meetings, results of the thirty-eighth session of the ICAO Assembly (A38) and thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13) and progress made in the development of the new electronic Air Navigation Plan (e-ANP)							
8-1	**Conclusion SAM/IG/13-1 – Alignment of the national air navigation plans with the ICAO Global Air Navigation Plan (GANP) and SAM Performance-Based Air Navigation Implementation Plan (PBIP)** That SAM States amend their national air navigation plans, with the aim of aligning them with the new ICAO Global Air Navigation Plan (GANP, 4th Edition) and SAM Performance-Based Air Navigation Implementation Plan (PBIP) approved at the thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13), and present any progress made in October 2014, at SAM/IG/14		National air navigation plans aligned with ASBU	SAM/IG/14	States	ICAO SAM Office	**VALID** States will inform progress at SAM/IG/14

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	meeting						
8-2	**Conclusion SAM/IG/13-2 – Designation of national focal points to coordinate activities in support of the ICAO position at the ITU WRC-15** That SAM States, if they have not done so yet, designate a national focal point to coordinate, as necessary, between ICAO and the national bodies responsible for managing the radio frequency spectrum, with a view to supporting the ICAO position at the ITU WRC-15 shown in Appendix C to this part of the Report, notifying the Regional Office no later than 31 May 2014.	Designate focal points	Focal point	31 May 2014	States	RO/CNS	**VALID** Not all States have designated focal points. Colombia, French Guiana, Guyana, Suriname and Uruguay are still pending.
8-3	**Conclusion SAM/IG/13-3 – Designation of a national focal point for the drafting of the new regional e-ANP** That, with the aim that SAM States can coordinate with the ICAO SAM Regional Office the provision of the data necessary for the drafting of the new regional electronic air navigation plan (e-ANP): a) The ICAQ SAM Regional Office will send a State letter in early June 2014, requesting the nomination of	Designate focal points	Focal point	01 Aug 2014	States	RO/ATM	**VALID** Not all States have informed their focal point. Secretariat sent letter SA-280 on 12 June 2014. Information of Argentina, Bolivia, Ecuador, French Guiana, Guyana, Panama, Paraguay, Suriname and Venezuela is still missing

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	a national focal point; and b) SAM States will officially inform by 1 August 2014 the name of the designated focal point, and provide a brief resumé, telephone number and electronic mail of the incumbent.						
9. Matters related to safety							
9-1	**Conclusion SAM/IG/13-9 – IATA safety events indicators for SAM States** Encourage States to develop, jointly with operators, Secretariat and other ATM community stakeholders deemed relevant, the methodology allowing the use of the data on safety events and indicators registered by airlines through IATA, in order to identify and mitigate any potential risk to operations, setting goals, priority areas and action plan	Activities of States with operators for the analysis of safety events	SMS analysis and mitigating measures	Inform at each SAM/IG meeting	States	RO/ATM	**VALID**

APPENDIX B

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

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

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

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

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
4-5 **Initial ATFM AIC Model**	**YES**	**YES**	**N/A**	**YES**	**YES**	**YES**	**--**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**BRA:** information published in the AIP. **GUY**: 22 Oct 2009.
Conclusion SAM/IG/3-1 **ATS Route Network Optimising in the South American Region** That the ICAO SAM States take relevant action to follow the guidelines and meet the target dates established in the ATS Route Network Optimising Programme in the South American Region that appears in Appendix B to this part of the report.	**YES**	**YES**	**YES**	**YES**	**O/G**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**VEN:** pertinent actions taken.
Conclusion SAM/IG/3-4 **Advisory Circulars CA 91-008, CA 91-009 and CA 91-010** That States of the SAM Region: a) use as acceptable means of compliance in aircraft approval and exploiters for RNP APCH, RNP AR APCH and APV/Baro-VNAV operations, Advisory Circulars CA 91-008, CA 91-009 and CA 91-010, shown in Appendices B, C and D, respectively to this part of the report; and b) publish the corresponding national regulations until 5 October 2009.	**O/G**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**BOL**: published in RAB 91 **COL:** published the following information circular: CI-5102-082-008 CI-5102-082-009 CI-5102-082-010 **PAR:** in final process of publication. **VEN:** published in September 2010 CA RNAV5, RNP-1, RNP AR APCH and APV-BARO/VNAV.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
3-5 **Conclusion SAM/IG/3-5** **Runway capacity of an international airport and ATC associated sector** SAM States are encouraged to carry out at least an exercise to determine the runway capacity of an international airport and ATC sector, associated or another one selected for each State, to present the results to the SAM/IG/4 Meeting, providing the following information: a) Amount of personnel trained for the exercise 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.															**SUPERSEDED** This activity has been superseded by Conclusion in SAM/IG/14.
Conclusion SAM/IG/4-1 **SAM routes network point of contact** That SAM States designate a point of contact to support the development of task 2.2.5 of the Action Plan for optimisation of the SAM Routes Network, and send the corresponding data (email and telephone) until 31 January 2010.	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**BOL:** César Varela **URU:** Gustavo Turcatti Tel.5982 604 0408 Int. 5111 blantur@gmail.com **VEN:** Carlos Gonzalez and Pablo Rattia

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

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

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAMIG/5-3 **Data Collection** That: a) SAM States collect data on flights conducted on domestic and international routes in the upper airspace (FL 245 or above) of the SAM Region during the period 1 to 15 July 2010, and send them to the SAM Regional Office before 13 August 2010; and b) That the sample be consistent with the form and the guidelines for completing the form described in Appendix B to this part of the Report, using the Excel format.	**YES**	**YES**	**YES**	**YES**	**NO**	**--**	**--**	**O/G**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**VEN**: sent to the regional office and delivered during SAM/IG/6 Meeting.
Conclusion SAM/IG/5-4 **Implementation of Continuous Descent Operations** That, recognizing the efficiency and environmental benefits of Continuous Descent operations, and the need to harmonize these operations in the interest of safety, States are encouraged to include the implementation of Continuous Descent operations (CDO) as part of their PBN implementation plans and to implement CDO in accordance with the ICAO CDO Manual.	**O/G**	**O/G**	**YES**	**YES**	**O/G**	**--**	**--**	**O/G**	**--**	**YES**	**NO**	**--**	**NO**	**NO**	**URU:** will request support of Regional Office to restructure airspace and procedures construction. During 2014 two theoretical/practical training workshops were held for the SAM Region, with the support of RLA/01/901 Project
Conclusion SAMIG/5-7 **ATFM Teleconferences in the SAM Region** That SAM States continue to hold weekly ATFM teleconferences between flow management units or flow management positions (FMU / FMP) to improve the exchange of information among participating States.	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**NO**	**NO**	**YES**	Web REDDIG II includes a speech communications sub-network to meet initial ATFM requirements. REDDIG II includes an IP sub-network for teleconferences.

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

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/6-5 **Lateral navigation deviation reporting form** That SAM States take the corresponding action in order to use the monitoring programme and particularly lateral navigation deviation reporting form attached as Appendix F to this part of the report, and send it to CARSAMMA on the tenth day of each month.	**NO**	**--**	**YES**	**YES**	**YES**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	
Conclusion SAM/IG/6-9- **Actions required for AMHS interconnection** That SAM States, in view of the delays in the interconnection of the AMHS, proceed with the following actions:	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Actions corresponding to parts a), b) and c) of this Conclusion have been completed, pending only part d). French Guiana (France) has no AMHS. Uruguay installed its AMHS in March 2014.
a) Require from their AMHS providers the necessary support to successfully end the necessary interconnections;	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**NO**	**YES**	**YES**	**YES**	**YES**	**YES**	
b) Make necessary arrangements to train personnel in the interconnection tasks, with the aim of minimizing the dependency with their providers;	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**NO**	**YES**	**YES**	**YES**	**N/A**	**YES**	
c) Maximize pertinent coordination; and	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	
d) States that have not yet done so, complete the drafting and signature of the MoU.	**O/G**	**N/A**	**O/G**	**O/G**	**O/G**	**O/G**	**N/A**	**O/G**	**O/G**	**YES**	**O/G**	**O/G**	**N/A**	**O/G**	
Conclusion SAM/IG/7-1 **ATS routes network optimisation programme of the South American Region, Phase 3, Version 02** That ICAO SAM States take pertinent actions to follow the guidelines and comply with established deadlines to continue with Phase 3, Version 02 of the ATS routes network optimisation programme of the South American Region, shown in Appendix A to this part of the report.	**--**	**YES**	**--**	**YES**	**O/G**	**--**	**--**	**--**	**--**	**O/G**	**--**	**--**	**NO**	**--**	
Conclusion SAM/IG/7-2 **Implementation of RNAV-5** That SAM States implement RNAV-5 in continental airspace routes, on 20 October 2011, at 09:01 UTC.	**YES**	**YES**	**--**	**YES**	**YES**	**--**	**--**	**--**	**--**	**YES**	**--**	**--**	**YES**	**YES**	

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

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

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

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/13-1 – Alignment of the national air navigation plans with the ICAO Global Air Navigation Plan (GANP) and SAM Performance-Based Air Navigation Implementation Plan (PBIP) That SAM States amend their national air navigation plans, with the aim of aligning them with the new ICAO Global Air Navigation Plan (GANP, 4th Edition) and SAM Performance-Based Air Navigation Implementation Plan (PBIP) approved at the thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13), and present any progress made in October 2014, at SAM/IG/14 meeting.	**O/G**	**O/G**	**YES**	**O/G**	**YES**	**O/G**	**N/A**	**N/A**	**N/A**	**O/G**	**O/G**	**N/A**	**N/A**	**N/A**	
Conclusion SAM/IG/13-2 – Designation of national focal points to coordinate activities in support of the ICAO position at the ITU WRC-15 That SAM States, if they have not done so yet, designate a national focal point to coordinate, as necessary, between ICAO and the national bodies responsible for managing the radio frequency spectrum, with a view to supporting the ICAO position at the ITU WRC-15 shown in Appendix C to this part of the Report, notifying the Regional Office no later than 31 May 2014.	**YES**	**YES**	**YES**	**YES**	**NO**	**YES**	**NO**	**NO**	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/13-3 – Designation of a national focal point for the drafting of the new regional e-ANP That, with the aim that SAM States can coordinate with the ICAO SAM Regional Office the provision of the data necessary for the drafting of the new regional electronic air navigation plan (e-ANP): a) The ICAO SAM Regional Office will send a State letter in early June 2014, requesting the nomination of a national focal point; and b) SAM States will officially inform by 1 August 2014 the name of the designated focal point, and provide a brief resumé, telephone number and electronic mail of the incumbent.															
Conclusion SAM/IG/13-5 – Draft proposal on Second Part of ICAO Doc 9971 That SAM States send by 30 September 2014, comments on draft proposal on Second Part of ICAO Doc 9971 aiming to provide required information for the optimization of the Manual, as deemed appropriate.	**NO**	**NO**	**YES**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**COMPLETED** Only Brazil and Colombia submitted comments. The meeting adopted comments made by Brazil and Colombia in order to inform Headquarters and that same are considered at the Panel.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/13-6 – Review of the advanced RNP (A-RNP) and RNP 0.3 advisory circulars That, with the aim of approving Advisory Circulars AC 91-007 and AC 91-012 for Advanced RNP (A-RNP) and RNP 0.3 operations: a) the ICAO South American Regional Office will send the States of the SAM Region and by 15 May 2014, the AC 91-007 and AC 91-012, for their review and comments; b) SAM States will submit their comments by 15 August 2014; and c) The SAM/IG Secretariat will include the comments received in the advisory circulars and present them at SAM/IG/14 meeting, for their approval.															

Conclusión/Tarea Conclusion/Task	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES REMARKS**
Conclusion SAM/IG/13-7 – Implementation of the RAIM availability prediction service in the SAM Region That, with the aim of achieving a successful implementation of the RAIM availability prediction service and its effective use by States: a) SAM States, the Secretariat and the RAIM service provider carry out necessary coordinations through web teleconferences to define, among other aspects, the website format, the mode of access to the service with the assignment of a password, as well as verification of the veracity of the information; b) The Secretariat make the amendments required to the SAM advisory circular son PBN procedures to mention the existence of the RAIM availability prediction service; c) States of the Region that have not adhered to the prediction service inform of their intent to join same; and d) RLA/06/901 member States, once the service is operational, make us of it and motivate its use by all interested parties.	**YES** **O/G**	**YES** **O/G**	**YES** **O/G**	**YES** **O/G**	**YES** **O/G**	**YES** **O/G**	**NO**	**NO**	**YES** **O/G**	**YES** **O/G**	**YES** **O/G**	**NO**	**YES** **O/G**	**YES** **O/G**	

Conclusión/Tarea **Conclusion/Task**	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES** **REMARKS**
Conclusión SAM/IG/13-8 – Actions on air traffic flow control measures That in view of air traffic flow operational restrictions, SAM States adopt following measures: a) consider the text on flow control measures used in the ATS 06/14 Multilateral Meeting, or similar, for inclusion in the Letters of Operational Agreement between ATS dependencies; b) consider of utmost priority to take necessary and urgent actions to avoid the adoption of unilateral flow restrictions that could severely affect air traffic flow; c) implement air traffic flow control measures, if necessary, based on well-founded studies of ATS sector capacities, and coordinate same previously with ATC dependencies responsible for ATS supply in adjacent FIRs. d) consider the application of gradual control measures using as far as possible separations based on distance, by taking advantage of existing ATS surveillance tools; e) use in messages established for communicating flow control measures, terminology and format as detailed in Manual on Air Traffic Flow Management for CAR/SAM Regions, Version 1.1, October 2010, Chapters 12 and 13.	1	2				3				4					1) **Argentina:** Used text shown under paragraph a) in their national Letters of Agreement, as well as with Bolivia, Chile and Paraguay. 2) **Bolivia**: Used text shown under paragraph a) in their LOAs with Argentina and Paraguay. 3) **Ecuador:** Used the text shown under paragraph a) in their LOA between Guayaquil and Bogota. 4) **Paraguay**: Used the text shown under paragraph a) in their LOAs with Bolivia and Argentina.

Conclusión/Tarea Conclusion/Task	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES REMARKS**
Conclusion SAM/IG/13-9 **IATA safety events indicators for SAM States** Encourage States to develop, jointly with operators, Secretariat and other ATM community stakeholders deemed relevant, the methodology allowing the use of the data on safety events and indicators registered by airlines through IATA, in order to identify and mitigate any potential risk to operations, setting goals, priority areas and action plan.															

e-ANP NATIONAL FOCAL POINTS

STATE	ADMINISTRATION	NAME	POSITION	TELEPHONE	E-MAIL
ARGENTINA					
BOLIVIA					
BRAZIL	Departamento de Control del Espacio Aéreo - DECEA	Cristiano de Uzêda Pinto	Chief AIS Planning Section, Operations Sub-department	+55 21 2101 6936 +55 21 98269 8300	dpln4@decea.gov.br
COLOMBIA	Unidad Administrativa Especial de Aeronáutica Civil - UAEAC	Nibia Lucia Morales Galindo	Aeronautical specialist, General Sub-direction	+57 1 296 2080 +57 313 333 0021	nmorales@aerocivil.gov.co
CHILE	Dirección General de Aeronáutica Civil - DGAC	Alfonso de la Vega Sepúlveda	In charge of Air Navigation Section, Planning Department	+56 2 439 2952	adelavega@dgac.gob.cl
ECUADOR					
GUYANA					
FR. GUIANA					
PANAMA					
PARAGUAY					
PERU	Dirección General de Aeronáutica Civil - DGAC	Fernando Hermoza	Air navigation technical coordinator	+51 1 615 7880	fhermoza@mtc.gob.pe
SURINAME					

STATE	ADMINISTRATION	NAME	POSITION	TELEPHONE	E-MAIL
URUGUAY	Dirección Nacional de Aviación Civil e Infraestructura Aeronáutica - DINACIA	Rosanna Barú	Chief of the Aeronautical Services Department	+598 2 604 0409 Int. 4461	rbaru@dinacia.gub.uy navegacionaerea@dinacia.gub.uy
		Adriana San Germán	Chief of the ATC Technical Department	+598 2 604 0408 Int. 5109	asangerman@gmail.com
VENEZUELA					

Update: 14 November 2014

ACTION PLAN FOR THE DEVELOPMENT/APPROVAL OF e-ANP

ANP Volume	**eANP activity/task**	**Responsible**	**Completion date**
Vol I, II & III	Population of eANP with existing data completed	Regional Offices	September 2014
Vol I, II & III	Agreement on the content of the eANP	PIRG/States	Mid 2015
Vol I	Approval of Volume I of eANPs by the Council	Regional Offices/ANB	End 2015
Vol II	Approval of Volume II of eANPs by regional agreement involving the relevant PIRG	Regional Offices/ PIRG/ANB	End 2015
Vol III	Development and approval of Part II of Volume III by PIRG. Inclusion of Volume III on web-based platform	Regional Offices/ PIRG/ANB	Mid 2015
Consequential amendments	Amendments to existing ICAO documentation related to ANPs to ensure harmonization, including the Regional Office Manual, and review of the applicability of the Uniform methodology for the identification, assessment and reporting of air navigation deficiencies to the new ANP	ANB	Mid 2015

Agenda Item 2: State-industry collaborative process for the transition of the current systems in those specified in the ASBU

2.1 Under this agenda item, the Meeting reviewed the following paper:

a) WP/05 - *State-industry collaborative process for the transition of the current systems in those specified in the ASBU* (presented by IATA/RTCA).

2.2 The Meeting took note of the presentation made by IATA/RTCA, which stated that the problems inherent to the transition from existing systems to those specified in the ASBU framework were one of the main obstacles to achieve the objectives of the Global Air Navigation Plan.

2.3 The presentation revealed that the US NextGen programme had faced these same obstacles when the 2025 NextGen vision was first published. With the assistance of RTCA, the FAA had established a working group made up by the government and the industry, to define the steps required for the implementation of short- and medium-term NextGen operational capabilities. The working group highlighted the importance of implementing **operational** rather than technological **capabilities** and deriving benefits from the **existing equipment**.

2.4 The working group for NextGen implementation in the medium term had more than 300 members from more than 140 organisations from the aeronautical community, and developed the following strategic framework:

- **“Who”**: Identify the capabilities that would prompt at least one operator to invest.
- **“Where”**: Identify the locations where these capabilities would have to be implemented in order to attract the participation of at least one operator.
- **Equipment availability**: Define what avionics is currently available.
    - Identify the level of performance of equipment on board the existing fleet.
- **Procedures:** Identify new processes or changes to existing processes and procedures that could help improve the capacity and expedite the transition to NextGen.
    - Define the deterrents or barriers to such operational use and work to mitigate them.
- **Aircraft:** Identify any airborne equipment that does not require supplementary ground infrastructure.
- **Use of existing equipment**: Determine how existing equipment can be used to derive new benefits, mainly focusing on the next 3-5 years.
    - Is there any need for ground decision-making support?
    - Do controllers, pilots or dispatchers need any additional training?
    - Is there any additional procedure required?

2.5 Although the operational environment in the SAM Region differs in terms of operational requirements, the framework established and the processes used by the NextGen Mid-Term Implementation Task Force could be adapted to expedite the implementation of ASBU elements in support of the existing regional plan.

2.6 One of the main lessons learned by the aforementioned task force is that the involvement of the government and the industry throughout the whole process is advantageous.

2.7 The Meeting took note that this issue had been submitted to the Seventeenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/17), which agreed that SAM/IG and ANI/WG meetings could analyse the best options for the proposed framework, approve a coordinated Pan-American approach, and submit it to the PPRC.

2.8 Based on the presentation and on working paper SAM/IG/14-WP/05, IATA and RTCA proposed the creation of a States-Industry Working Group to focus on the following objectives:

a) profit from the lessons learned by the "NextGen Mid-Term Implementation Task Force" and apply a similar framework to support the functions of the working group;

b) serve as a mechanism for defining the steps required to implement the short- and medium-term operational capabilities set forth in the SAM Performance-Based Air Navigation Implementation Plan (PBIP); and

c) report on the results of the GREPECAS Programmes and Projects Review Committee (PPRC).

2.9 The Meeting acknowledged the support and interesting contributions provided by Mr. Carlos Cirilo, IATA Regional Director for Safety and Flight Operations, and by the delegation of the United States RTCA (Radio Technical Commission for Aeronautics), composed by its president, Mrs. Margaret Jenny, Mr. Kalyan Balasubramaniam, and Mrs. Jennifer Iversen.

2.10 In view of its complexity, the Meeting decided to establish an *ad hoc* group to assess the proposal and to seek mechanisms for its implementation, if appropriate.

2.11 The *ad hoc* group included representatives of Argentina, Bolivia, Brazil, Chile, Ecuador, Panama, Paraguay, Peru, APADA, IATA, INDRA and the ICAO Secretariat.

2.12 The discussions of the *ad hoc* group showed that the proposal would benefit SAM States, since regional planning would be able to use of a methodology of demonstrated efficiency, based on objective data, supplementing the mechanism currently used, based on the operational judgment of State and ICAO SAM Office experts. Likewise, the inclusion of cost-benefit analysis mechanisms and a greater participation of industry could provide essential information for prioritising the implementation of the operational capabilities best suited to the operational environment of each SAM State.

2.13 The *ad hoc* group deemed it advisable to implement the IATA/RTCA proposal using already established GREPECAS mechanisms, in accordance with a project-based methodology.

2.14 Likewise, the members of the *ad hoc* group identified that the activities of the new project might not be feasible because the existing budget for activities being implemented -especially to meet the goals of the Bogota Declaration- would not permit the incorporation of additional costs. In this regard, IATA informed that a fund would be created, with the participation of the industry, which could provide resources to Project RLA/06/901 to finance the activities of the project.

2.15 One of the main concerns expressed during the discussions of the *ad hoc* group referred to the scope of the project, taking into account that it would not be possible to make any modifications to the Bogota Declaration, and that it should cover a time horizon that went beyond ASBU-0, also encompassing ASBU-1.

2.16 The Meeting approved the report submitted by the *ad hoc* group, based on which it formulated the following conclusion:

Conclusion SAM/IG/14-1 State-industry collaborative process for the transition from current systems to those specified in the ASBU

That the following action be taken to make possible the State-industry collaborative process for the transition from current systems to those specified in the ASBU:

a) IATA, with the support of the ICAO SAM Regional Office, develop a draft project related to the State-industry collaborative process for the transition from current systems to those specified in the ASBU;

b) IATA, with the support of the ICAO SAM Regional Office, send the aforementioned draft to SAM States before 26 November 2014;

c) the ICAO SAM Regional Office coordinate a teleconference on 28 November 2014, with the participation of SAM States and IATA, with a view to analysing and approving the draft project;

d) the ICAO SAM Regional Office coordinate the approval of the draft project through the *fast-track* mechanism of the GREPECAS Programmes and Projects Review Committee;

e) the ICAO SAM Regional Office submit the project to the coordination meeting of Project RLA/06/901, with a view to including it in the management mechanisms of the aforementioned regional project.

Agenda Item 3: Optimisation of the SAM airspace
a) PBN en-route
b) PBN in terminal areas
c) PBN procedures

3.1 Under this agenda item, the Meeting analysed the following papers:

a) WP/06 – *Status of implementation of the Airspace Optimisation Action Plan* (presented by the Secretariat);
b) WP/15 – *PBN National Implementation Plans* (presented by the Secretariat);
c) WP/16 - *Project A1 - PBN implementation* (presented by the Secretariat);
d) WP/23 – *ATS/RO/6 meeting report* (presented by the Secretariat);
e) WP/27 – *Phraseology and professional culture in air traffic controllers and flight crews during the implementation of PROESA airspace* (presented by Peru);
f) IP/05 – *Fuel consumption assessment using the IFSET tool following the implementation of the PROESA airspace in the Lima FIR* (presented by Peru);
g) IP/07 – *Safety assessment prior to the implementation of the PROESA airspace in the Lima FIR* (presented by Peru);
h) IP/17 – *Planning PBN implementation in the Southern Region of Brazil – PBN SUR* (presented by Brazil)

3.2 The Meeting took note that, out of the 15 goals established in the Bogota Declaration, 5 were directly related and 3 were indirectly related to PBN implementation. These goals are listed in **Appendix A** to this part of the Report.

3.3 Accordingly, the Meeting noted that PBN implementation had high priority within the ATM work programme of the South American Regional Office, and agreed that it should also be assigned the appropriate priority within SAM States.

3.4 Taking into account the need to further PBN implementation in the SAM Region, the Meeting concluded that Regional Project RLA/06/901 should be requested to increase the number/duration of activities related to the aforementioned implementation for 2015 and 2016, in order to ensure compliance with the goals established in the Bogota Declaration. In this regard, the Meeting reviewed the South American airspace optimisation action plan, and approved the proposals for the addition of new activities. The aforementioned updated plan is contained in **Appendix B** to this part of the report.

3.5 Based on the requirement for meetings and resources defined in the updated South American airspace optimisation action plan, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-2 Meetings and resources required for the conduction of activities under the South American Airspace Optimisation Action Plan

That the ICAO Regional Office submit to the coordination meeting of Project RLA/06/901, the following requirements for meetings and resources for the conduction of activities under the South American airspace optimisation action plan:

Activity	Tentative date	Scholarships	Objective	Remarks
Third PBN workshop	9-13 Mar 2015	2 per State	Validate the airspace concepts for the TMAs and/or airspaces selected by States	
Fourth PBN workshop	17-21 Aug 2015	2 per State	Verify the tasks for the implementation of airspace concepts at the TMAs and/or airspaces selected by the States	
Version 03 of the SAM route network	16 Mar / 01 Apr 2015	-----	Give continuity to detailed study of the SAM ATS route network, with a view to developing Version 3 of the route network	Hiring of 3 experts for a period of 3 weeks
Version 03 of the SAM route network (final version)	24 Aug / 11 Sep 2015	-----	Give continuity to detailed study of the SAM ATS route network, with a view to developing Version 3 of the route network (final version)	Hiring of 3 experts for a period of 3 weeks
ATS/RO/7	13-17 Apr 2015	2 per State	Review draft Version 3 of the SAM route network	
ATS/RO/8	14-18 Sep 2015	2 per State	Review draft Version 3 of the SAM route network (final version)	
SAM PBN instrument procedures design workshop	6-17 Sep 2015	1 per State	Train PANS-OPS experts in the development and harmonisation of PBN instrument procedures	

3.6 **PBN en-route**

3.6.1 The Meeting noted that ATS/RO meetings dealt with the implementation of PBN en-route, based on the route network version concept. The use of route network versions reflected the need for periodic integrated reviews to make sure that the best possible airspace structure is always in place, within an integrated development concept.

3.6.2 In this regard, the Meeting recalled that the implementation of Version 03 of the route network depended on consistent and harmonised implementation in SAM TMAs, and that the delay in one or more States could have an impact on the other States and on the Regional Project as a whole. The studies concerning Version 03 of the SAM route network had been reviewed by the ATS/RO/6 meeting, and would be presented later under this part of the report.

3.7 **PBN in terminal areas**

3.7.1 The Meeting took note that 43 experts from 10 States and 8 experts from the industry (Airbus and IATA) attended the First PBN Workshop of the South American Region. The participants were representatives of aeronautical authorities, air navigation service providers, and civilian and military aircraft operators of the South American Region. In general terms, the participants were experts in areas such as air traffic control, airspace planning, instrument approach procedure design, airline technical pilots/operation engineers, aircraft dispatch, AIS, air navigation inspectors, and aeronautical mapping.

3.7.2 The first PBN workshop included 31 modules of theory, where 20 modules involved presentations by the instructors, and 11 included presentations by the States and IATA. Furthermore, 43 exercise modules were conducted to put into practice the theory. The workshop provided 61 effective hours of training, excluding coffee and lunch breaks. The summary of the first PBN workshop is contained in **Appendix C** to this part of the report.

3.7.3 The Meeting took note that the second PBN workshop of the South American Region was attended by 34 experts from 11 States and 9 experts from the industry (IATA and Jeppesen). The participants were representatives of aeronautical authorities, air navigation service providers, and civilian and military aircraft operators of the South American Region. The summary of the second PBN workshop appears in **Appendix D** to this part of the report.

3.7.4 During the second workshop, presentations were made of the preliminary design and action plan for the TMAs selected by each SAM State. Based on these presentations, workshop participants made specific recommendations for optimising and harmonising each design, for assessment by each Administration.

3.7.5 The Meeting highlighted that, to that date, within the context of PBN workshops, only two TMAs were considered to be sufficiently mature to start the validation process: Asuncion and Santiago. The other States were at different stages of the planning and design process, at different levels of development, requiring a greater or lesser effort by each Administration in order to arrive at the third PBN workshop (tentatively to be held in Lima, Peru, on 9-13 March 2015) in conditions to verify the suitability of the proposed design, mainly from the safety and efficiency point of view.

3.7.6 The Meeting also noted that the Lima and Rio TMAs, whose PBN redesign had already been completed by Peru and Brazil, respectively, were the only ones ready to undertake Stage 2 of Version 03 of the SAM route network. The Santiago and Sao Paulo TMAs, which were also subject to PBN redesign by Chile and Brazil, respectively, will be affected by the projects underway in the two States.

3.7.7 In order to give continuity to the PBN implementation process in the selected TMAs, and as agreed at the second PBN workshop, the Meeting considered that each State should carry out the planning, design, and validation. Accordingly, it formulated the following conclusion:

Conclusion SAM/IG/14-3 PBN implementation at the South American TMAs

That, in order to give continuity to the PBN implementation process at the main SAM TMAs, States meet the following requirements:

a) develop the Action Plan for the implementation of the PBN airspace concept in the selected TMA/airspace, in order to make up the SAM PBN Project;

b) complete data collection and processing, with a view to give consistency to the PBN design of the TMA and/or airspace selected by the State;

c) develop, as necessary, a new PBN airspace concept based on data collection and processing and on the recommendations of the second PBN workshop;

d) conduct the validation of the preliminary design, taking into account the minimum requirements listed in Appendix D to this part of the report;

e) review, as necessary, the airspace concept based on validation results, until a satisfactory PBN design is attained for the implementation phase, which shall be submitted to the third PBN workshop;

f) submit the PBN design of the selected TMA and/or airspace to the SAM Regional Office (icaosam@icao.int) before 20 February 2015;

g) participate in the teleconferences in preparation for the third PBN workshop to be held on the following tentative dates:

- 19 November 2014
- 18 December 2014
- 05 February 2015
- 25 February 2015

3.7.8 The Meeting also recalled that the Bogota Declaration urged States to implement PBN SIDs and STARs at international aerodromes, with a view to attaining the established goals based on CDO and CCO techniques. Information collected to date on the status of implementation of PBN SIDs and STARs at international airports is shown in **Appendix E** to this part of the Report.

3.8 **PBN approach procedures**

3.8.1 Another commitment of the States in relation to PBN implementation involved attaining the goals established in ICAO Assembly Resolution A37-11. In addition to approaches included in the redesign of the TMAs selected by States, the Meeting acknowledged the need to make an effort to meet the goals of the Bogota Declaration as well. Accordingly, the goals to be achieved by States would be: 70% of thresholds with APV approaches by 2014, and 100% by 2016. Information collected to date on the status of implementation of approach procedures at international airports is shown in Appendix E to this part of the report.

3.9 **Fuel and CO_2 savings**

3.9.1 The Meeting felt that, in addition to figures related to the implementation of routes, SIDs, STARs, and approach procedures, it is essential for States to report on their fuel and CO_2 savings estimates obtained through the use of the IFSET tool.

3.9.2 It would also be important that, during the post-implementation phase, States that consider it feasible calculate actual fuel and CO_2 savings using tools that retrieve data from "Flight Operations Quality Assurance" and/or other means that may provide actual fuel consumption information.

3.10 Taking into account the various requirements concerning follow-up of the PBN goals established in the Bogota Declaration, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-4 Follow-up of the PBN goals established in the Bogota Declaration

That, in order to follow-up on the PBN goals established in the Bogota Declaration, SAM States:

a) complete the template contained in Appendix E to this part of the report**;**

b) do the calculations and/or collect data on (estimated and actual) fuel and CO_2 savings, using the IFSET tool for the estimates;

c) send the data cited in a) and b) to the SAM Regional Office before 30 June and 31 December each year.

3.11 **NAM/CAR SAM PBN instrument procedure design workshop**

3.11.1 The Meeting took note that the PBN instrument procedure design workshop would be held at the ICAO NACC Regional Office in Mexico City, Mexico, on 17-28 November 2014.

3.11.2 It is expected that this workshop will be attended by pilots, air traffic controllers and experts with basic knowledge of PBN airspace design and/or instrument approach procedure (IAP) design from ICAO NAM/CAR and SAM States and Territories, as well as by representatives of guest international organisations. The working languages of the event will be English and Spanish, and simultaneous interpretation would be provided if sufficient participants of the two languages register in time.

3.11.3 The Meeting noted that various comments and suggestions on PANS-OPS training requirements for SAM experts were made during the second PBN workshop held in Lima, Peru, on 8-12 September 2014.

3.11.4 The Meeting concluded that, given the need for SAM States to have PANS-OPS experts knowledgeable of PBN instrument procedures, and the comments made during the second PBN workshop, there was a need to replicate the course to be conducted at the Mexico NACC Office, whose agenda is shown in **Appendix F**.

3.12 **Terms of reference and work programme of the SAM/PBN/IG**

3.12.1 The Meeting reviewed the terms of reference and work programme, the revised version of which is shown in **Appendix G** to this part of the Report.

3.13 **PBN points of contact**

3.13.1 **Appendix H** to this part of the report contains the updated list of focal points for PBN matters. The Meeting considered that this list of focal points should be kept updated to ensure an effective participation in PBN teleconferences and to update the SAM PBN Project.

National PBN implementation plans

3.14 The Meeting took note that 5 years had elapsed since the drafting of the national PBN implementation plans and agreed on the need for those plans to be updated, based on the strategy applied in the SAM Region.

3.15 National PBN implementation plans must be drafted based on the plans developed in each State to meet the PBN goals of the Bogota Declaration, which are shown in Appendix A to this part of the report. The aforementioned plans must consider the following, *inter alia*:

a) TMAs whose airspace will be completely redesigned, based on the methodology established at PBN workshops. In this regard, TMAs that contain the main international airports of each State should be included;

b) implementation of PBN SIDs and STARs, using the CDO and CCO technique;

c) implementation of APV approach procedures;

d) fuel and CO_2 savings.

3.16 The Meeting took note that, in order to harmonise the drafting of national PBN implementation plans, the Secretariat had developed a model that is shown in **Appendix I** to this part of the Report.

3.17 Taking into account the importance of planning national PBN implementation in harmony with the South American airspace optimisation action plan and with the Bogota Declaration, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-5 National PBN implementation plans

That SAM States submit their updated national PBN implementation plans to the SAM/IG/15 meeting, using the model National PBN implementation plan shown in Appendix I to this part of the Report.

Project A1 (PBN implementation)

3.18 The Meeting took note that activities related to PBN implementation in the SAM Region were becoming more complex, taking into account the need to integrate tasks related to the en-route, TMA and approach phases, with a view to attaining the PBN goals of the Bogota Declaration.

3.19 Thus, the Meeting considered that it was essential to establish a SAM PBN implementation project that included all the activities in a comprehensive manner, with a view to achieving a safe, efficient, and harmonised airspace.

3.20 In view of the complexity of this implementation process, the Meeting deemed it important to apply project management techniques to clearly identify the deliverables of the en-route, TMA and approach phases and their interconnection, and thus enable the follow up of the various implementation activities and give consistency to their execution, establishing their interdependencies.

3.21 In this regard, the Meeting noted and assessed the proposed SAM PBN project developed by the Secretariat, and approved its basic structure and the part related to en-route PBN implementation. The Meeting considered that States should send their projects and/or national action plans for PBN implementation in TMAs, in order to complete the SAM PBN Project. It is important to highlight that once completed and approved by the PBN Implementation Group, the cited project shall replace the South American airspace optimisation action plan. Accordingly, the Meeting approved the following conclusion:

Conclusion SAM/IG/14-6 Projects and/or action plans for PBN redesign of the main South American TMAs

That SAM States:

a) send the **Project and/or Action Plans for PBN redesign of the main TMA(s)** selected by their Administration, in order to complete the SAM PBN Project that is contained in **Appendix J** to this part of the Report, to the SAM Regional Office by 31 December 2014;

b) send the corresponding updates to the aforementioned Project and/or Plans to the SAM Regional Office as soon as possible, so as to ensure harmonisation of activities under the SAM PBN Project.

ATS/RO/6 meeting report

3.22 The Meeting took note that, in order to support the implementation of Version 03 of the ATS/RO Programme, the SAM/IG/11 meeting had agreed to hire 4 experts for a period of 3 weeks to conduct a detailed study and prepare the optimisation of the SAM ATS route network.

3.23 Accordingly, the Meeting was informed that consultants José Tristão Mariano, Alexandre Luiz Dutra Bastos, Fernando Hermoza Hübner and Héctor Ibarra Martínez, under the sponsorship of Regional Project RLA/06/901, had prepared a preliminary report for the optimisation of the SAM ATS route network, covering Stage 1 of Version 03, which included proposals for route realignment and elimination, as well as for implementation of new RNAV routes, based on the existing design of the main South American TMAs. The final version (Stage 2) of Version 03 of the route network depends on the PBN redesign of the main TMAs, the validation of which shall be presented at the third PBN workshop.

3.24 The Meeting agreed with the following general and planning principles for SAM airspace restructuring applied by the consultants:

a) ensure the connectivity of the ATS route network to/from the known TMA points of entry/exit submitted to ICAO;

b) turn conventional regional routes into RNAV regional routes, taking into account a future exclusionary RNAV 5 upper airspace (RNAV routes may have the same path as that of an existing conventional route);

c) the more direct routes must consider the IAF for arrivals instead of aligning them with the ARP;

d) parallel RNAV routes must be implemented where operational benefits can be derived (for example, significant air traffic movement, separation of flows to airports in the same TMA, etc.);

e) enable integration with the domestic route network of the States;

f) eliminate or reduce points of congestion wherever possible;

g) keep the number of ATS routes to a minimum, always taking into account traffic demand with respect to ATC capacity and the possibility of applying direct routes;

h) minimise the number of crossings inasmuch as possible, and where such crossings are required, they should be planned avoiding the more congested sectors;

i) avoid redundant ATS routes;

j) consider those routes planned in previous Version 02 implementation stages which, for various reasons, had not been implemented;

k) for this Stage 1, due to lack of data from the States, restricted airspaces were not considered as flexible-use airspaces.

3.25 The Meeting noted that the AVIANCA-TACA and LATAM groups had felt that the work done by the experts had been thorough, comprehensive and very easy to analyse, and had acknowledged the Regional Office for giving the possibility of presenting the study for comments. The ATS/RO/6 meeting had agreed to analyse other additional routes submitted by LATAM in order to consider additional airport pairs, which were incorporated in the proposed ATS/RO Version 03.

3.26 The Meeting took note that there could be an opportunity for seeking better integration of State plans and the SAM route optimisation plan, or to conduct separate analyses of the main traffic flows in the main regional homogeneous areas.

3.27 After discussing the ATS/RO/6 meeting report, the Meeting requested that each SAM State assess the routes in their airspace and indicate the possible AIRAC date for their implementation. These dates were inserted in Stage 1 of Version 03 of the selected ATS/RO programme, which appears in **Appendix K** to this part of the report.

3.28 The Meeting considered that the implementation of Stage 1 of Version 03 of the SAM route network should be discussed among the States, the users, and the ICAO SAM Office via teleconferencing. These teleconferences would be divided into two types:

a) implementation teleconferences, to discuss the details of the implementation of the paths already agreed among SAM States;

b) coordination teleconferences, to present the proposals developed by the ATS/RO/6 meeting and that involved States that had not participated in that meeting (Colombia, Guyana, French Guiana, and Suriname) and/or the Mexico Office, in the case of paths involving the CAR Region.

3.29 In this regard, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-7 Implementation of Stage 1 of Version 03 of the SAM route network

That the ICAO SAM Office:

a) coordinate the conduction of implementation teleconferences, taking into account the activities mentioned in **Appendix L** to this part of the report. The first teleconference will be conducted on 26 November at 15:00 UTC;

b) coordinate the conduction of coordination teleconferences. The first teleconference will be held on 10 December at 15:00 UTC.

Use of the Table of Cruising Levels

3.30 Upon reviewing the ATS/RO/6 report, the Meeting took note of the problem involving the use of the table of cruising levels on route UL 793, in the segment between UDIDI and GLINT, as well as on route UL 404, in the segment between BOLET and VIR. In both cases, there is a difference in the levels to be used, between the Table of Cruising Levels of Annex 2 and those actually applied by the ATC.

3.31 In this regard, the Meeting recalled that this issue could significantly affect safety, especially in case of communication failure in bilateral routes.

3.32 Likewise, the Meeting considered that it was good practice to avoid changing levels in routes due to heading variations in short route segments. However, action should be taken as necessary to make sure that this good practice does not become a safety issue.

3.33 Accordingly, the most appropriate (even or odd) levels should be selected and indicated in the relevant aeronautical charts and publications (AIPs and aeronautical charts), and inserted in operational letters of agreement so that the ATC and the users may apply them in a harmonised manner. Operational letters of agreement and aeronautical publications (AIPs and aeronautical charts) must have the same effective date.

3.34 Following the ATS/RO/6 meeting, the delegation of Argentina stated that it had already published a NOTAM to correct the problem in UL 404 and had requested the representative of Bolivia to do likewise. The delegation of Brazil reported that it would publish a NOTAM to adapt the table of cruising levels of UL 793 to the operational model adopted by air traffic controllers of the Amazonico ACC.

Phraseology and professional culture of air traffic controllers and flight crews during the implementation of the PROESA airspace

3.35 The Meeting took note that Peru was conducting the post-implementation assessment of the first stage of PROESA, which contemplated feedback from flight crews on the execution of flight procedures, and from air traffic controllers on management of the new airspace. This feedback has reflected into the introduction of some adjustments to the designed procedures.

3.36 During the activities of dissemination and training of air traffic controllers in the new SID/STAR procedures and the new airspace configuration of the Lima TMA, the Meeting noted the need to develop and strengthen several aspects, such as the use of phraseology concerning compliance with vertical profiles published for SIDs and STARs.

3.37 The controllers expressed their concern regarding many flight crews that, after establishing first radiotelephony contact and being instructed to climb to a given flight level, proceeded to climb unrestrictedly to the level cleared by the ATC, disregarding the restrictions published in the SID vertical profile. This was observed in real time on radar screens, and also in photographic records.

3.38 The operation of high-performance aircraft executing unrestricted, unauthorised climbs and achieving higher levels in the proximity of the airport, gave rise to undesired conditions that required additional tactical intervention to avoid infringing regulatory separation minima.

3.39 Likewise, controllers stated that, despite using the phraseology established in Doc 4444 for climb instructions, many aircraft continued to execute unrestricted climbs, requiring the use of additional phraseology to insist that flight crews comply with the published vertical profiles.

3.40 Although these situations resulted in increased workload because of the need to increase surveillance in crossing points for which such level windows had been established, the most noteworthy consequence was mistrust amongst air traffic controllers on the efficacy of PBN procedures for managing airspace and the way in which flight crews flew such procedures.

3.41 Regarding climb clearances, the Meeting highlighted that Doc 4444 part 6.3.2.4 specified the following:

> *"CLEARANCE TO CLIMB ABOVE LEVELS SPECIFIED IN A SID: When a departing aircraft is cleared in a SID to climb to a level higher than initially cleared or higher than the level(s) specified in a SID, the aircraft will follow the published vertical profile of a SID, unless the ATC explicitly cancels such restrictions"*

3.42 Likewise, to cancel one or all level restrictions of a SID when convenient for the ATC, Doc 4444 Chapter 12.3.1.2 specifies the following phraseology:

> *"LEVEL CHANGES, REPORTS AND RATES*
>
> ***a) ASCIENDA** seguido, si es necesario, de **PARA** (nivel)*
> ***b) CLIMB** followed as necessary by: **TO** (level)*
>
> *…clearance to cancel vertical profile restriction(s) of a SID during climb:*
>
> ***z) ASCIENDA A** (nivel) [**RESTRICCIÓN** O RESTRICCIONES **DE NIVEL** (designador SID) **CANCELADA** (o) RESTRICCIÓN O RESTRICCIONES DE NIVEL (designador SID) EN (PUNTO) CANCELADA];*
> ***z) CLIMB TO** (level) [**LEVEL RESTRICTION**(S) (SID designator) **CANCELLED** (or) LEVEL RESTRICTION(S) (SID designator) AT (point) CANCELLED];"*

3.43 It was noted that many crews conducting flights abroad, especially to the United States, used FAA phraseology as a reference, which differs in the meaning of climb instructions.

3.44 Document FAA InFO 12014 Subject: "Climb Via" Phraseology for Standard Instrument Departure (SID), Modification to "Descend Via" Phraseology for Standard Terminal Arrival (STAR), and Phraseology associated with Speed Instructions", specifies the following phraseology:

a) ***"CLIMB VIA**: An abbreviated ATC clearance that requires compliance with the procedural lateral path, associated speed restrictions and altitude restrictions along the cleared route or procedure. Subsequent issuance of a **"maintain"** clearance deletes published altitude restrictions"*
b) ***"CLIMB/DESCEND AND MAINTAIN** (altitude): Pilot is expected to vacate current altitude and commence an unrestricted climb/descent to comply with the clearance. For aircraft already climbing via a SID, or descending via a STAR, published altitude restrictions are deleted unless reissued by ATC"*
c) ***"COMPLY WITH RESTRICTIONS**: requires aircraft joining or resuming a procedure to comply with published restrictions. May be used in lieu of reissuing individual restrictions"*

3.45 In view of the above, the DGAC of Peru deemed it advisable to issue a NOTAM to reinforce compliance of the published vertical profiles of SIDs by flight crews, with the following content:

> *"PILOTS CLIMBING IN A STANDARD INSTRUMENT DEPARTURE (SID) MUST FOLLOW PUBLISHED VERTICAL PROFILE AND LEVEL RESTRICTIONS, UNLESS SUCH RESTRICTIONS ARE EXPLICITY CANCELLED BY ATC"*

3.46 Likewise, CORPAC S.A (ANSP) has incorporated the word ***"VIA"*** into the phraseology used for climb clearances, considering that such word is consistent with the phraseology established by the FAA, does not lead to confusion in flight crews familiar with ICAO phraseology, and its meaning entails compliance by flight crews of the lateral flight path, altitudes and speeds published in a SID.

3.47 When it is necessary or advisable to cancel any altitude restriction published in the SID, the ATC will use the ICAO phraseology contained in Doc 4444, Chapter 12.3.1.2.

3.48 Examples of English phraseology:

a) Phraseology so that the flight crew may comply with the vertical profile published in the SID:

ICAO: ***"(Callsign) CLIMB TO FLIGHT LEVEL 340"***

FAA: ***"(Callsign) CLIMB VIA ISREN1F DEPARTURE TO FLIGHT LEVEL 340"***

PERU: ***"(Callsign) CLIMB TO FLIGHT LEVEL 340 VIA ISREN 1F"***

b) Phraseology for flight crew to cancel level restrictions published in the SID and maintain an unrestricted climb:

ICAO: ***"(Callsign) CLIMB TO FLIGHT LEVEL 340, LEVEL RESTRICTIONS ISREN1F CANCELLED"***

FAA: ***"(Callsign) CLIMB AND MAINTAIN FLIGHT LEVEL 340"***

3.49 Following the presentation of working paper SAM/IG/14-WP/27 by the delegation of Peru, the Meeting expressed its concern about differences in ICAO phraseology identified in Doc 4444, Doc 9432 and Doc 9931, as well as with respect to FAA phraseology used by some flight crews.

3.50 The delegation of Brazil noted that ICAO phraseology would not be appropriate for a more complex environment, where multiple crossing windows had to be implemented, as observed for example in PBN implementation in the Rio de Janeiro and Sao Paulo TMAs. In order to avoid problems that might result from deficiencies in ICAO phraseology, Brazil has adopted the FAA phraseology and, accordingly, has published AIC A21/13, dated 12 December 2013 (Standard Phraseology for STAR/SID RNAV/RNP or Procedural Execution), shown in **Appendix M** (English only) to this part of the report.

3.51 Following an extensive discussion, the Meeting felt that the SAM ICAO Office should inform ICAO Headquarters about the phraseology issue identified in the PBN implementation process in South America, with a view to attaining global harmonisation of the phraseology used by pilots and controllers.

3.52 The Meeting also identified a tendency in SAM States to apply FAA phraseology, which seemed more appropriate for a PBN environment. Accordingly, the Meeting also felt that the ICAO SAM Office should study the feasibility of pursuing harmonised use of this phraseology, introducing an amendment to Doc 7030.

3.53 The Meeting congratulated the delegation of Peru for presenting the issue concerning the use of ICAO and FAA phraseology, and formulated the following conclusion:

Conclusion SAM/IG/14-8 ICAO phraseology

That the ICAO SAM Office:

a) submit the issues concerning the use of phraseology to ICAO Headquarters, with a view to attaining global harmonisation;

b) study the feasibility of harmonising the use of phraseology in the SAM Region, based on an amendment to Doc 7030.

Misinterpretation of VM path terminators (heading to manual termination) in open STARs

3.54 The delegation of Peru, in its post-monitoring process of the PROESA project, identified a problem of misinterpretation of VM path terminators in open STARs.

3.55 Said STARs must be flown up to a point whose path terminator is coded ***VM****: heading to manual termination*. This means that, from that point on, flight crews must receive vector guidance to intercept an aid interpreted by the pilot for the execution of an instrument approach procedure, disconnecting the automatic database navigation in the flight management system.

3.56 Air traffic controllers stated that several flight crews, especially foreign, despite being instructed to maintain the heading being flown and being informed about waiting for vector guidance to intercept the instrument approach procedure, started to fly direct to the final approach, encountering aircraft that were established in the approach path, and requiring tactical intervention to avoid contravening regulatory separation minima and/or initiating resolution advisories (RAs) that would lead to the execution of missed approaches.

3.57 Once again, it should be noted that, although these situations resulted in increased workload, the most significant consequence was mistrust amongst air traffic controllers of the way in which flight crews interpreted the information contained in their FMS, and in their training and experience in managing the aircraft during the execution of open STAR procedures.

3.58 The delegation of Brazil informed that it had also applied the open STAR concept to PBN implementation in the Rio de Janeiro and Sao Paulo TMAs. Also, in some STARs, it had applied the open and closed STAR concept in the same chart, clearly stating this in the remarks inserted in the STARs. Brazil stated that it had also published AIC A 23/13, dated 12 December 2013 (Restructuring of Rio de Janeiro and São Paulo Terminal Area (TMA) Airspace with the Performance-Based Navigation (PBN) Concept Application), shown in **Appendix N** (English only) to this part of the report, with a view to informing the aeronautical community about the way in which the open and closed STAR concept was applied in Brazilian airspace.

3.59 After discussing this issue, the Meeting recommended States to clearly insert the necessary information in the charts, so that the pilot might identify the procedures for applying open and/or closed STARs, including procedures in case of loss of communication.

Assessment of fuel consumption using the IFSET tool after the implementation of the PROESA airspace in the Lima FIR

3.60 The Meeting recalled that the Bogota Declaration approved at the RAAC/13 meeting established regional goals for 2016 regarding estimated fuel savings/reduction of $C0_2$ emissions, based on the ICAO fuel savings estimation tool (IFSET), whereby the Region undertook to reduce CO_2 emissions by 40,000 tonnes per year with the implementation of PBN en-route.

3.61 In this sense, the Meeting took note that the airspace reorganisation and performance-based navigation implementation programme (PROESA/PBN) of the Peruvian State, amongst its activities, sought to measure the reduction of distances flown in the new route scheme and, thus, estimate fuel savings through the ICAO IFSET tool. This would enable the identification, in a simple and harmonised manner, of the benefits derived from the operational improvements introduced.

3.62 Although, according to the Global Air Navigation Plan, the IFSET is an instrument for calculating the difference in consumed fuel mass, comparing a case prior to implementation with a case after implementation (that is, after introducing operational improvements). In the specific case of Peru, the Meeting agreed to assess the scenario before and after the implementation of PROESA.

3.63 For the purpose of this study, a number of operations in June 2014 were compared with the same flows of operations in August 2014. It was estimated that this sample represented 97% of total international operations and 88% of total domestic operations.

3.64 Recognising that more operations were conducted in August 2014 as compared to June because of the high season, the assessment was made using samples of fuel savings in the main flows.

3.65 A total of 23 main flows for international operations and 8 main flows for domestic operations were analysed. Overflights were not taken into account, since the improvements made to PROESA airspace structure were not intended for such flights. **Appendix O** to this part of the report contains tables detailing the main flows included in the study.

3.66 These calculations have been made on the basis of a **conservative scenario** for descent segments to the point FAP (DALNA) of the ILS on runway 15, since radar vector guidance is frequently provided to aircraft at the time of the international HUBs at the AIJCH. Savings during the climb phases in the Lima TMA have not been measured, since it was felt that continuous climb operations had not reached a significant implementation level yet, and would be subject to supplementary actions under PROESA in 2015.

3.67 The study revealed **a total monthly savings of 361,400 kg of fuel**, which correspond to 184,300 kg of savings in international flows and 177,100 kg of savings in domestic flows. **Appendix P** to this part of the report contains tables with the reports on general/detailed, international/domestic fuel savings.

3.68 Based on the above, a conservative estimate, without taking into account traffic growth, gives **<u>4’336,800 Kg of fuel saved per year</u>** in the airspace under consideration as a result of its optimisation through the use of PBN**.**

3.69 If we calculate the reduction of CO_2 emissions into the atmosphere by multiplying the kilogrammes of fuel annually saved by a conversion factor of 3.16, we obtain **an annual reduction in emissions of 13'704,288 kg of CO_2 as a result of this optimisation.**

3.70 Upon assessing the results of the work presented by the delegation of Peru, the Meeting considered that the study should serve as an example for the other SAM States to validate the TMAs to be presented at the third PBN workshop.

3.71 The Meeting discussed the use of Flight Operations Quality Assurance (FOQA) data for post-monitoring of PBN airspace redesign, and concluded that it was a tool that offered actual and conclusive data on the efficacy of a PBN implementation project. In order to use the aforementioned tool, the States must include it in their implementation plans and coordinate in advance with users that could provide the necessary data, taking into account the importance of obtaining pre- and post-implementation data.

3.72 LATAM informed that the use of FOQA had already been foreseen for the assessment of the PAMPA Project in November 2014, taking into account that this assessment must be done after the period of adaptation of controllers and users to the new airspace concept.

3.73 The delegation of Brazil noted that FOQA data should be used not only for assessing fuel savings, but also for determining if the planned airspace concept has been actually implemented in terms of applying the procedures in the operational routine of ATC units.

3.74 The Meeting reiterated the need for proper flow management in order for the PBN airspace redesign to operate effectively, taking into account that the PBN concept enables the insertion of a larger number of paths in the airspace, based on a reduced separation between paths. In this regard, the Meeting felt that sectorisation and the corresponding capacity of each ATC sector should be recalculated in order to properly support the new operational scenario. Furthermore, tactical ATFM measures should be optimised for proper sequencing of aircraft by ATC during arrivals and departures at the main airports, thus enabling CDO and CCO operations.

3.75 The delegation of Ecuador informed that the implementation of the new surveillance system has also led to significant fuel and CO_2 savings, taking into account that it was possible to optimise aircraft operations not only in terms of distance flown, but also of vertical profiles. Preliminary estimates indicate that savings could amount to 10,000 tonnes of CO_2 per year.

Safety assessment prior to the implementation of the PROESA airspace in the Lima FIR

3.76 The Meeting took note that, according to the Plan for PBN implementation in Peruvian airspace shown in information paper SAM/IG/13-IP/08, the safety assessment was conducted prior to PBN implementation in Peruvian airspace through the PROESA Programme.

3.77 The purpose of the safety assessment was to conduct an operational risk analysis and assess the feasibility of the airspace reorganisation programme and the implementation of performance-based navigation, taking into account that absolute safety is unattainable. It was also aimed at establishing whether the analysed system was acceptably safe within the context in which it operates.

3.78 The PROESA/PBN programme contemplated the participation and commitment of CORPAC S.A. and of all the ATM community and the national industry, while calling upon the support of international organisations, professional associations and users in general. The PBN design phase was carried out with the support of domestic operators LAN and TACA, which provided the flight simulation for analysing, and getting feedback on, aircraft performance and safety aspects. The programme also received valuable technical support from the IATA Office in Lima.

3.79 The safety assessment process, which followed the guidelines of the ICAO SMS Manual (Doc 9859) and the DGAC NTC-004-2013, enabled a logical and sequential identification of possible hazards, and served as a basis for determining the technical feasibility of the PROESA/PBN programme.

3.80 In summary, the Task Force on identification of PROESA hazards was able to identify all hazards associated to the implementation of performance-based navigation and airspace modifications, and concluded that they could all be mitigated to an acceptable level in the short term. Accordingly, it recommended to continue with the implementation programme, provided mitigation measures were adopted as established in the safety requirements. The results were posted on the DGAC website:

http://www.mtc.gob.pe/portal/transportes/aereo/ssp_sms/files/Eval_sop_PBN.pdf

3.81 Following the presentation of the study conducted by Peru, the Meeting agreed that the study could serve as an example for SAM States when validating the PBN design of their airspace, especially of the TMAs selected for presentation at the third PBN workshop.

PBN implementation planning in the Southern Region of Brazil – PBN SUR

3.82 The Meeting took note that, in order to meet national requirements and ensure an evolution consistent and integrated with ICAO guidelines, DECEA had drafted DCA 351-2 (National ATM operational concept) and PCA 351-3 (National ATM implementation plan). This is the challenge facing the SIRIUS Programme, which, within the scope of SISCEAB, encompasses the projects and activities required for the implementation of the ATM operational concept in Brazil, with a view to meeting the expectations of the ATM community and justifying the investments required by its members. Based on the progress made in PBN implementation in the SAM Region and in order to ensure a homogeneous route network among the States, Brazil has planned the implementation of PBN in the Curitiba, Florianopolis and Porto Alegre terminals.

3.83 Taking into account post-implementation activities of the Rio de Janeiro/Sao Paulo TMA PBN Project, the absorption of the Navegantes terminal by the Curitiba and Florianopolis terminals, and other activities conducted by the project team, it was decided that the implementation would be carried out in two phases. First, adjustments would be made to the route network of the southern region of the country, taking into account the modifications requested by the Region, followed by PBN operational implementation in the Curitiba, Florianopolis and Porto Alegre terminals.

3.84 The planning of macro-activities is described below:

Route Optimisation in the Southern Region of Brazil

Route implementation in the Curitiba FIR - 13/10/15	
Airspace concept	09/01/15
Performance measurement	30/01/15
Safety assessment	15/02/15

Collaborative decision-making (CDM)	31/07/15
ATC automated systems	09/09/15
Standards and procedures	31/08/15
Publication of air navigation procedures	08/09/15
Training	04/09/15
Approval of aircraft and operators	05/10/15
Post-implementation monitoring	09/10/16

PBN Implementation in Terminals

PBN operational implementation in terminal control areas - Curitiba, Florianopolis and Porto Alegre - 08/10/16	
Airspace concept	03/05/16
Performance measurement	23/05/15
Safety assessment	14/06/15
Collaborative decision-making (CDM)	29/01/16
ATC automated systems	06/06/16
Standards and procedures	31/08/16
Publication of air navigation procedures	12/09/16
Training	04/08/16
Approval of aircraft and operators	29/05/16
Post-implementation monitoring	08/10/17

3.85 Following a discussion of the planning submitted by Brazil, the Meeting noted that the route network of the Curitiba FIR, scheduled for implementation in October 2015, could have an impact on Stage 1 of Version 03 of the SAM route network. Accordingly, the Meeting requested the delegation of Brazil to identify those routes that could be affected and withdrawn from the Version 03 Stage 1 package.

3.86 The Meeting also concluded that planning of PBN Sur in Brazil advanced Stage 2 of Version 03 of the SAM route network, since it was based on the PBN redesign of the TMAs involved (Sao Paulo, Curitiba, Florianopolis and Porto Alegre). In this sense, the Meeting noted that this could have a significant impact on the PBN planning process of the Asuncion, Buenos Aires and Carrasco TMAs. Thus, the Meeting considered that a multilateral meeting should be held by Argentina, Brazil, Paraguay and Uruguay, to discuss the plans for the implementation of the Curitiba FIR route network in October 2015, and to offer subsidies for the planning of the Asuncion, Buenos Aires and Carrasco TMAs. Accordingly, the Meeting requested the Secretariat to coordinate the holding of the aforementioned meeting with the States involved, if possible, in 2014.

GOALS OF THE BOGOTA DECLARATION RELATED TO PBN IMPLEMENTATION

Indirect relation

2. Accidents

Reduce the SAM regional accident rate gap in 50% with regard to the global accident rate.

3. Runway excursions

Reduce runway excursions in 20% with regard to the average rate of the Region (2007 – 2012).

11. ATFM

100% of the area control centre (ACCs) providing air traffic flow management (ATFM).

Direct relation

6. PBN terminal

Full compliance with goals established in ICAO Assembly Resolution A37-11 regarding approach procedure with vertical guidance (APV).

7. PBN enroute

- 60% of the international aerodromes with standard instrument departure (SID) / standard instrument arrival (STAR) PBN.
- 60% of the routes/airspaces with performance based navigation (PBN).

8. CDO

40% of the international aerodromes / terminal control areas (TMA) with continuous descent operation (CDO).

9. CCO

40% of the international aerodromes / TMAs with continuous climb operations (CCO).

10. Estimated fuel savings / $C0_2$ emissions reduction based on the ICAO fuel savings estimation tool (IFSET)

Reach 40,000 tons of regional CO_2 emissions reduction per year in en-route PBN implementation.

ACTION PLAN FOR THE OPTIMIZATION OF THE SOUTH AMERICAN AIRSPACE
(B0-5, B0-10, B0-20, B0-65)

Activity	Start	End	Responsible party	Observations
1. **Implementation of Version 2 of the SAM ATS Route Network / PBN implementation of main South American TMA**				
Activity	**Start**	**End**	**Responsible party**	**Observations**
1.1 Airspace concept				
1.1.1 Collect traffic data to understand traffic flows.	SAM/IG/11	TBD	SAM/PBN/IG (Project RLA/06/901) States	The Secretariat sent a State letter: Response date: September 2011 Chile, Colombia, Paraguay and Uruguay sent traffic data on time. Another traffic data collection was conducted in August 2012. Argentina, Bolivia, Chile, Colombia, Paraguay, Peru, Uruguay and Venezuela sent data. Data collected for CARSAMMA will be used for future works related to the action plan. Next collection will be done in December 2014, including from FL 250 to 410. To be sent to Regional Office before February 2015.
1.1.2 **TMA**				

1.1.2.1 Conduct a Seminar/Workshop/Work Meeting on airspace planning.	ATS/RO/3	April 2013	Project RLA/06/901	Request the support of Project RLA/06/901. The purpose is to train airspace planners of the States of the Region. This task was fulfilled with the conduction of a Course/Workshop on PBN design of CAR/SAM airspace and terminal areas on 11-22 March 2013, where IATA provided the instructors, CANSO the translation, and Project RLA/06/901 contributed with LAN Chile and LAN Peru designers to support the experts during the workshops. Argentina, Brazil, Colombia, Paraguay, and Peru participated from the SAM Region, together with two experts from Project RLA/06/901. A total of 8 experts from the SAM Region were trained. A practical exercise related to the Lima TMA was conducted. **COMPLETED**

1.1.2.2 Conduct the First Workshop on PBN airspace design in the SAM Region.	May 2014	May 2014	Project RLA/06/901 States	Objective: complete the training of experts of the SAM Region, taking into consideration that not all States participating in the Project could attend the Course/Workshop held in Miami. 2 weeks/2 fellowships by State. A practical exercise in Bogota and Asuncion TMAs will be carried out. This task has been completed. A SAM course/ workshop on PBN airspace design and terminal areas was carried out from 12 to 23 May 2014, with the support of the Colombian Civil Aviation Authority and RLA/06/901 Project. 43 experts from 10 States and 8 experts of the Industry (Airbus and IATA) participated. A practical exercise on Asuncion and Bogota TMAs was carried out. **COMPLETED**

1.1.2.3 Conduct the Second Workshop on PBN airspace design.	July 2014	July 2014	Project RLA/06/901	1 week. During this Workshop, States will present a preliminary PBN design on one of their State's TMAs, in order to be evaluated by the Workshop. Two fellowships per State will be requested for this Workshop. This task has been completed. A SAM course/workshop on PBN airspace design and Terminal Areas was carried out from 08 to 12 September 2014, with the support of RLA/06/901 Project. 34 experts from 11 States and 9 experts of the Industry (IATA and Jeppesen) participated. 10 PBN designs were evaluated on TMAs selected by SAM States. **COMPLETED**
1.1.2.4 Conduct the Third Workshop on PBN airspace design	SAM/IG/14	March 2015	RLA/06/901 Project	Objective: Validate airspace concepts of TMAs and/or airspaces selected by States. States should: a) Develop an Action Plan for the implementation of the PBN airspace concept in the selected airspace, as an input for the SAM PBN project.

				b) Complete data collection and processing in order to achieve a consistent PBN design of the TMA and/or airspace selected by the State. c) Develop, as necessary, a new PBN airspace concept, based on the collected and processed data and on the recommendations of the PBN/2 workshop. d) Perform the validation of the preliminary design, taking into account the minimum requirements specified in PBN/2 workshop. e) Review the airspace concept as needed, based on validation results, until a satisfactory PBN design is obtained for implementation, which shall be submitted at the PBN/3 workshop. f) Send the PBN design of the selected TMA and/or airspace to the SAM Regional Office before 20 February 2015. g) Participate in the preparatory teleconferences of the PBN/3 workshop to be carried out on the following tentative dates:

				- 02 October 2014 - 23 October 2014 - 19 November 2014 - 18 December 2014 - 05 February 2015 - 25 February 2015 Tentative date: 9 to 13 March 2015
1.1.2.5 Conduct the Fourth Workshop on PBN airspace design	SAM/IG/14	August 2015	RLA/06/901 Project	Objective: Verify the tasks for the implementation of the airspace concepts of TMAs and/or airspaces selected by States. Tentative date: 17 to 21 August 2015
1.1.2.6 Detail the planning of the optimization of the main SAM Region TMA, taking into account the base design developed by States, defining among other relevant aspects, the gateways of the main TMAs of the SAM Region.	SAM/IG/12	SAM/IG/14	States	During PBN/2 workshop it was not possible to obtain consistent entry and exit points. It is expected to obtain same during PBN/3 workshop, aiming to progress on Version 03 of the route network.
1.1.3 **SAM routes network**				
1.1.3.1 Conduct a detailed study of the SAM ATS route network, with a view to preparing Version 03 of the route network, including: • Identification of the tools required for conducting the study mentioned (aeronautical charts, specific software). • Identification of ATS routes that should be eliminated based on their utilization. • Description of the interface between the SAM route network and the CAR route network.	SAM/IG/12	SAM/IG/14	SAM/PBN/IG (Project RLA/06/901)	Two experts will be hired for a period of 3 weeks on August 2014. Project RLA/06/901 will be requested to hire 2 experts for 3 weeks, to initiate works for the development of Version 03 of the SAM route

• Presentation of an initial proposal of amendment to the CAR/SAM ANP. • Development of planning criteria to be used by States and airspace users in this implementation process (see paragraph 2.13 of the ATS/RO/03 report).				network, based on the preliminary PBN design of TMAs which were developed during the two workshops on PBN airspace design. 4 experts were hired during varied periods between 15 September and 03 October. Study presented during ATSRO/6. **COMPLETED**
1.1.3.2 Give continuity to the detailed study on SAM ATS route network, aiming to develop Version 03 of the route network, including: • Identification of tools required for conducting the study mentioned (aeronautical charts, specific software). • Analyse traffic data to understand traffic flows. • Develop Version 03 of the SAM route network including ATS routes, control sectors, interface with TMA, etc., considering following aspects: • Entry and exit points of main TMA in the SAM Region. • ATS routes which should be eliminated according to its use. • Volume of excluding airspace for application of RNAV-5. • “Conventional” ATS routes which should be eliminated or substituted by RNAV routes according to excluding RNAV-5 airspace volume. • RNAV routes which should be realigned,	SAM/IG/14	April 2015	SAM/PBN/IG (RLA/06/901 Project)	3 experts for a period of 3 weeks will be hired. Tentative date: 16 March to 01 April 2015.

according to entry and exit points of main SAM TMA. • Interface between SAM and CAR route network. • Use of orientation material for the application of Flexible Use of Airspace concept, including the use of Conditional routes (CDR-Eurocontrol). • Evaluate the feasibility/necessity to evaluate preliminar design in "airspace modelling" tools and ATC simulation in accelerated time. • Propose first draft for proposal of amendment to CAR/SAM ANP. • Perform an optimization plan for restricted, prohibited, dangerous and reserved use areas in the SAM Region. • Develop calculation methodology for fuel/CO_2 saving using IFSET for the validation of preliminary design of SAM airspace structure, encompassing SID/STAR routes. • Prepare working paper for the ATS/RO/7 meeting.				

1.1.3.3 Continue with the detailed study of SAM ATS routes network, aiming to develop Version 03 of the routes network, including: • Identification of tools required for conducting the study mentioned (aeronautical charts, specific software). • Analyse traffic data to understand traffic flows. • Analyse fleet navigation capacity. • Develop Version 03 of the SAM route network including ATS routes, control sectors, interface with TMA, etc., considering following aspects: • Entry and exit points of main TMA in the SAM Region. • ATS routes which should be eliminated according to its use. • Volume of excluding airspace for application of RNAV-5. • "Conventional" ATS routes which should be eliminated or substituted by RNAV routes according to excluding RNAV-5 airspace volume. • RNAV routes which should be realigned, according to entry and exit points of main SAM TMA. • Interface between SAM and CAR route network. • Use of orientation material for the application of Flexible Use of Airspace concept, including the use of Conditional routes (CDR-Eurocontrol). • Evaluate the feasibility/necessity to evaluate preliminar design in "airspace modelling" tools and ATC simulation in accelerated time. • Propose first draft for proposal of amendment	SAM/IG/14	September 2015	SAM/PBN/IG (RLA/06/901 Project)	3 experts will be hired for a period of 3 weeks. Tentative date: 24 August to 11 September 2015

to CAR/SAM ANP. • Perform an optimization plan for restricted, prohibited, dangerous and reserved use areas in the SAM Region. • Develop calculation methodology for fuel/CO_2 saving using IFSET for the validation of preliminary design of SAM airspace structure, encompassing SID/STAR routes. • Develop FINAL document "Version 03 of the SAM routes network". • Prepare working paper for the ATS/RO/8 meeting.				
1.1.3.4 Conduct the Sixth Workshop/Meeting for the Optimization of the SAM ATS Route Network (SAM ATS/RO/6), for the purpose of reviewing Version 03 of routes.	SAM/IG/10	October 2014	Project RLA/06/901 States	Objective: Review draft of Version 03 of SAM routes network
1.1.3.5 Conduct the Seventh Workshop/Meeting for the Optimization of the SAM ATS Routes Network (SAM/ATS/RO/7), for the purpose of reviewing Version 03 of routes.	SAM/IG/14	September 2015	Project RLA/06/901 States	Objective: Review draft of Version 03 of SAM routes network. Tentative date: 13 to 17 April 2015
1.1.3.6 Conduct the Eighth Workshop/Meeting for the Optimization of the SAM ATS Routes Network (SAM/ATSRO/8), for the purpose of reviewing Version 03 of routes.	SAM/IG/14	Sept. 2015	Project RLA/06/901 States	Objective: Review draft of Version 03 of SAM routes network. Tentative date: 14 to 18 September 2015

1.1.4 **Training**				
1.1.4.1 Basic PANS/OPS Procedure Design Course for Ecuador.	May 2013	June 2014	RLA/06/901 Project Ecuador	Request of Ecuador to conduct a basic PANS-OPS procedure design course in Quito was met. Regional Office coordinated the selection of instructors. Ecuador has assumed the total cost of the course. The course will be developed in a period of 8 weeks, in two phases: Phase 1: 22 Sept. to 17 Oct. Phase 2: 10 Nov. to 05 Dec.
1.1.5 **Safety assessment**				
1.1.5.1 Prepare the required safety assessment, applying a qualitative methodology using the SMS.	31/07/12	SAM/IG/11	Project RLA/06/901 States	**COMPLETED** An expert needs to be hired for 2 weeks to carry out this task. (This task has been completed.) **COMPLETED**
1.1.5.2 Prepare the safety assessment required in their airspaces (route and TMA).		SAM/IG/12	States	States shall conduct a safety analysis of changes in their terminal areas (TMAs).
1.1.5.3 Conduct the third Workshop/Seminar/ Meeting on risk analysis of Version 02 of the SAM ATS route network.	September 2012	SAM/IG/11	RLA/06/901 Project States	**COMPLETED**
1.1.5.4 Conduct the Third Workshop/Seminar/Meeting for the risk analysis of Version 02 of the SAM ATS route network.	SAM/IG/14	March 2016	RLA/06/901 Project States	Hiring of one expert for 2 weeks is required to perform this task

FIRST WORKSHOP ON PBN AIRSPACE DESIGN IN THE SAM REGION

Summary

The First Workshop on PBN Airspace Design in the SAM Region was held in Bogota, Colombia, from 12 to 23 May 2014, under the sponsorship of the Unidad Administrativa Especial de Aeronautica Civil of Colombia and the support of RLA/06/901 Regional Project – *"Assistance in the implementation of an ATM regional system according to the ATM operational concept and the corresponding technological CNS support"*, in response to ICAO Assembly Resolution A37-11, adopting the global implementation of Performance Based Navigation (PBN).

Taking into consideration Conclusion SAM/IG/11-1 (*Support to SAM States in the redesign of their TMA*), it was deemed advisable to plan activities of RLA/06/901 Project for 2014, in order to identify needs and extend training to ATM experts in the SAM Region, to support and facilitate PBN regional implementation plan, by increasing participants knowledge regarding application of PBN.

During the SAM/IG/12 Meeting (Lima, Peru 14 to 18 October 2013), it was concluded that the most beneficial would be to conduct the required training in three consecutive phases:

The **first phase** consists of on-line training obtaining basic PBN concepts through the ICAO website (*http://www.icao.int/safety/pbn/SitePages/PBN%20ikit.aspx*) and the study by each one of the participants of the following PBN-related manuals: PBN Manual (Doc 9613), Manual on the use of PBN in airspace design (Doc 9992), Continuous Descent Operations Manual (Doc 9931) and Continuous Climb Operations Manual (Doc 9993).

The **second phase** consists of participation in the Workshop I on PBN Airspace Design, during two weeks, which objective is to provide theoretical/practical training on PBN Terminal Area design, selecting for the practical exercise one high complexity TMA and one medium/simple TMA. Terminal Areas selected to conduct such exercise were Bogota and Asuncion, respectively.

The **third phase** includes the participation in Workshop II on PBN Airspace Design, during one week, where the participants of the First Workshop present the basic preliminary design for one TMA selected for each State, so that it may be harmonized and optimized during the workshop using the techniques of the First Workshop, pursuing as well an integration of entry and exit points of these TMAs with a view to elaborate Version 3 of SAM ATS Route network.

The First Workshop on PBN Airspace Design in the SAM Region was attended by 43 experts of 10 States and 8 experts of the industry (Airbus and IATA). Participants were representatives of aviation authorities, air navigation services providers as well as civil and military air operators of the South American Region. Overall, participants were experts in specialties such as air traffic control, airspace planning, instrumental approach procedures, pilots, airline operations technicians/engineers, aircraft dispatch, AIS experts, air navigation inspectors and aeronautical cartography.

During the opening of the PBN Workshop, the Director of the Unidad Administrativa Especial de Aeronáutica Civil (UAEAC), Dr. Gustavo Lenis Steffens, welcomed the participants. Mr. Julio Pereira, ATM/SAR Regional Officer of the ICAO South American Regional Office briefly explained the objectives of the workshop, thanking the aviation authorities of Colombia for their efforts made to carry out this important event, which is part of the regional strategy for achieving the goals of the Declaration of Bogota.

The instructors of the Workshop were the following:

Mr. Julio de Souza Pereira, ICAO ATM/SAR Regional Officer;
Mr. Roberto Arca Jaurena, ICAO ATM/SAR/AIM Regional Officer;
Mr. Jorge Fernández Demarco, former ICAO ATM/SAR Regional Officer, ATM Advisor;
Mr. Fernando Hermoza Hübner, Technical Coordinator of Air Navigation, DGAC Peru;
Mrs. Mariela Valdés Piña, Chief Airspace Project, LAN Airlines, LAN base of maintenance.

The first activity of the Workshop was to identify the level of knowledge of participants, with an initial test which roughly assessed several of the topics which would be delivered during the workshop. In this regard, the Group achieved an average of 75%, 87% of them ranging between the concept of good and regular.

The Workshop was developed on **31 Modules**, which contemplated the theoretical part, including 20 modules with presentations made by instructors and 11 intended for submissions from States and IATA. Moreover, **43 Modules** of exercises were given, where each one of the theoretical classes were practiced. For the development of the Workshop, 61 effective hours of training were given, excluding coffee breaks and lunch time.

In **Module 1 – General overview of the Workshop**, the prospects of the workshop were explained, deeply analyzing the scope and objectives of same, especially emphasizing those related to the use of PBN in airspace design, review of the main points in ICAO relevant documentation (Doc. 9613, Doc. 9931, Doc. 9992 y Doc. 9993), share lessons learned, train experts to develop and apply PBN action plans in their States, as well as participate appropriately in the regional PBN implementation processes, train participant experts for them to replicate the knowledge in their States as well as develop preliminary PBN designs of Asuncion and Bogota TMAs.

Module 2 – SAM implementation strategy, reviewed SAM implementation strategy for the PBN implementation, explained the vision and mission of ICAO, especially emphasizing the optimization of operations in all phases of flight, in order to take advantage of these features to improve efficiency and safety. ASBU concerning PBN implementation was briefly analyzed.

Module 3 – Overview of PBN and airspace concept, was focused in the relationship between PBN and airspace concept, explaining the application of navigation specifications and air navigation infrastructure and how a specification should be selected according to its use, either in ATS, SID/STAR routes and/or approach procedures. The meaning of an airspace concept as well as the reasons for its development was also recalled. Through such concept a structured and systematic way is provided to determine what should be achieved in an airspace and how should it be achieved to help ensuring that the objectives and expected benefits for the new structure of airspace are clearly established, the objectives in the change in airspace are achieved as well as the means to achieve the objectives are appropriate and feasible with the available resources.

Module 4 - Manual on the use of performance-based navigation (PBN) in the airspace design (Doc. 9992), referred to the use of performance-based navigation (PBN) in the airspace design, Doc. 9992, explaining in detail the four phases of the implementation process: Planning, Design, Validation and Implementation, as well as the 17 macro activities to achieve the established objectives. The importance of initiating a project of airspace structuring for the application and use of PBN, maintaining a strong coordination with the whole ATM community and particularly, with the users of airspace was stressed, as such coordination would allow an early explanation of what would be the scope and objectives of PBN implementation project. Afterwards, all activities described in Doc 9992 were explained one by one.

In **Module 5 - CDO Manual (Doc. 9931)** and **Module 6 - CCO Manual (Doc. 9993)**, implementation processes of continuous descent operations (CDO) and continuous climb operations (CCO) encompassed in Documents 9931 and 9993 respectively, were explained. Both manuals and therein contained designs were reviewed, assessing the techniques for their application as well as the specific requirements for this kind of operations. Particularly, a review was made on the main benefits to be obtained from its application, identifying in the case of continuous descent operations, the increase in flight predictability, airspace efficiency and safety, while reducing fuel consumption, CO_2 emissions, pilot/ATC workload and CFIT. On the other hand, the implementation of CCO techniques offer advantages such as operations with improved fuel performance, reduced pilot/ATCO workload, reduced communications, cost savings and environmental benefits (lower consumption, noise mitigation) and, if applicable, authorizations for operations which otherwise, may be restricted by noise.

Module 7 – Designing routes-Route spacing, encompassed aspects related to the design and route spacing. Regarding the design, an evaluation was made on the type of specification that should be used, depending of the phase of flight, which would be the requirements of airspace concept and under which circumstances it would be necessary or not, to carry out an on board performance monitoring and alert, particularly taking into account that navigation specifications not include all airspace requirements needed for the operation in an airspace, route or procedure in particular. Applicable procedures must be inserted in AIP and/or Regional Supplementary Procedures or other documents of the State and States must conduct a safety assessment in accordance with the provisions of Annex 19 and PANS-ATM. It was also clarified that the PBN Manual is not a document of certification/approval. Its purpose is to harmonize, so each State must publish its own document, reminding at this point that the SAM Region counts with the Advisory Circulars of the Regional Safety Oversight Cooperation System, for aircraft approval in the different navigation specifications to be applied. Regarding route spacing, the generic model to determine separation and spacing between routes was analyzed, and different types used worldwide were provided for information. Finally, in this module information and explanation was given on the different separations included in Amendment to Doc 4444, which application begins on November 2014.

Module 8 – **Good design practices** had as main objective to explain general PBN good design practices. Regarding the considerations for the design, it was indicated that design should be based on reality, i.e. the location of the airport, terrain and optimal altitudes of aircraft. It was also stressed that the reality is the originator of LOAs and not the other way round, as well as the requirement to determine optimal crossing points concerning routes. On the other hand, always related with the considerations for the design, there was also indicated the need to start with the shortest routes, or with those that occupy less the sector, try to balance the ATC intervention with the required distances and consider links with the structure of conventional routes. It was especially remembered that RNAV/RNP aircraft will require less ATC intervention, that RNAV/RNP routes contribute to safety and that no RNAV/RNP aircraft probably will have to be vectored to assure harmonization and safety within a given airspace. In this same module, different arrival and departure paths that could be applied in the optimization of airspace were largely explained.

Module 9 – **Data required for airspace planning,** covered general aspects related with the data required for airspace planning. In such sense, the need to know the reference scenario, i.e. the present scenario, initially based on TMA dimensions, geographical coordinates, prohibited, restricted and dangerous areas in a radius of 100 NM from the center of main airport, geographical limitations, total number of airports served by the terminal, etc. was thoroughly explained. It was also encouraged to identify main traffic flows, entries, exits, pairs of cities served and ATS routes, assess aircraft fleet, their characteristics and navigation capacities, see or identify delays and its reasons, etc. Finally, some examples on data processing for terminal areas were delivered.

Module 10 – **Designing airspace volumes and sectors,** aimed at providing an understanding of airspace volumes and sectors, to be considered in the design process. It was indicated that the airspace of one TMA area should be only enough to cover departure and arrival operations. Some rules were presented to define sectors that should be taken into account during planning. Among others, it was stressed on the need that the number of sectors should be the minimum required for different situations and the number of conflicts per sector and time unit should be minimized. Also, the number of sectors crossed by each aircraft and the time of permanence of aircraft in one sector should be the minimum possible. Different ways to establish or define sectors using geographical or functional areas, as well as their advantages and disadvantages, were also presented.

Module 11 - Introduction to exercise and **Module 12 - Generic airspace exercise,** contemplated presentation of basic material to be used on the first exercises. This generic airspace design exercise focused on the Centerville TMA. In order to perform this exercise, fictitious information on TMA, as well as sufficient information to understand the operation of such TMA was provided. The exercise requested to establish concepts and to design a new Centerville TMA, by applying the good design practices for departures, arrivals and holds which were explained on previous module. A description of the case was delivered referring to ATM concepts, airspace, meteorology, aircraft types, major flow paths, existing infrastructure on communications, navigation and surveillance, environmental and social aspects, special use areas, etc. Participants were requested to design a new TMA, define airspace volume as well as sectors related to such TMA. Finally, the Group was invited to show the work carried out in a PPT presentation, applying all the base material provided to this point of the workshop.

From this module, presentations and exercises made by the Group were developed intending that each lecture was followed by a practical exercise, in order to enlarge on what was learned.

Module 13 – **Safety criteria and assumptions**, focused on safety criteria, providing an overview on safety criteria, performance and related policy. In general terms, explanation was given on why to establish safety criteria as well as on the difference between safety qualitative and quantitative assessments. Subsequently, explanation was also given on the 7 steps of a risk analysis and the probability, severity and tolerability matrix proposed by ICAO for the risk analysis, as well as the criteria to be used in each case. The importance in an implementation programme to conduct an analysis before implementation, preferably during the planning phase as proposed by Doc 9992, and after implementation, in order to assure that the system maintains or improves levels of safety, was highlighted.

Module 14 – **Validation and implementation**, focused attention in aspects related to validation of airspace concept and routes (routes themselves / departures / arrivals / approaches) and resulting instrument flight procedures. The objective of this module was to show the importance of validation, which in general terms allow assess whether the ATM objectives will be achieved, check the flyability of instrument flight procedures, identify potential problems and develop mitigations, provide evidences that the design is safe and above all, explain that validation is an ongoing process throughout the project life. Information on the different methods of validation for both, airspace and instrumental procedures, while showing the advantages and disadvantages of each one of these methods, was also delivered.

Module 15 – **Introduction to Asuncion and Bogota case study**, was initiated with the presentation made by the representatives of Paraguay and Colombia, giving details of their terminal areas Asuncion and Bogota respectively, these being the two case studies to be analyzed by the workshop. Both presentations focused in providing as much information as possible regarding size of the TMA, with geographical coordinates and vertical TMA dimension, prohibited, restricted and dangerous areas in a radius of 100 NM from ARP of main airport, geographical limitations, runways, type of control service provided, radar coverage, main traffic flows based on data collection form, standardized entries and exits, main city pairs served by ATS routes, main airports in TMA (indicating identification, extension, aircraft category allowed, runway capacity), aircraft type operating the airport, navigation capacity of the aircraft fleet operating in the airport. If there are delays, identify reasons (due to ATC, MET conditions, airlines, etc.), indicate potential traffic conflicts within TMA (bottlenecks / points of conflict), maps of ATS routes, number of TMA overflights and any other information which was useful for the analysis of airspace in each case.

Continuing with Module 15, a brief summary was made on the topics seen so far, based mainly on the 4 phases of Doc 9992 implementation process. Based on the presentations made by Paraguay and Colombia, clear information was submitted, explaining the Group what was expected and informing that tasks would be divided into 7 different working groups. Task 1 expected to establish operational requirements and its scope. Task 2 asked to undertake a review of the reference data. Task 3 requested for the identification of interferences, enablers and project constraints. On the other hand, task 4 asked for the identification of routes and departure/arrival points to terminal areas. Task 5 focused on the identification of at least two main flows for departure and arrival, as well as a preliminary draft of IFR procedures. Task 6 was related to airspace volumes and sectors. Finally, task 7 requested the groups to perform a final presentation of the result achieved. Before the final presentation, the groups presented the progress made after each task performed.

Module 16 – **Practical effects of path terminations application in procedures and use of FOQA data,** covered the use and meaning of each one of the path terminations usable in RNAV/RNP procedures. It addition, it showed how FOQA data can help monitor post implementation of a procedure. Examples were shown on the use of path terminations that did not achieve the desirable or optimal path and why such paths were not optimal. Likewise the navigation accuracy achieved by aircraft by using this data was observed.

Module 17 – Publications and database - Best practices, presented publications requirements to achieve a good coding in navigation databases. Reference was made to aeronautical data chain and the time required for encoding, the data required in coding tables, RF sections publication, 5LNC and alphanumeric way-points naming, magnetic variation applied to RNAV sections as well as RNP, APCH and RNP AR APCH.

In **Module 18 - RNP AR access and efficiency,** it was discussed about the general characteristics of these approaches and the transition concepts for the application of such approaches, as currently benefits can be obtained on its implementation without being specifically implemented in response to geographical obstacles. Moreover, different examples were shown on implementation and difficulties for its application in congested terminals.

In **Module 19 - IFSET tool,** the ICAO tool for the calculation of fuel saving was presented. Practical examples were submitted. Explanation on access to the tool and its corresponding user guide was also given for its use by experts.

Module 20 – Project management action plan, covered aspects related to the meaning of a project, explaining that it is a temporary effort made to create a unique product or service, or to concrete a certain goal. It was also explained that the project should clearly define the objectives, deadlines and resources, its intention to produce a specific result at a given time, within an established budget, and that same could cross organizational lines. On the other hand, an overall explanation was given on how to manage a project and the importance of identifying all stakeholders, determine needs, define their requirements, lead and influence them, as well as to balance the scope, time, cost and quality of the project, emphasizing that it is a set of processes that requires expertise in several areas of knowledge. Some critical aspects or factors that could affect a project were identified and the importance of time management in order to achieve expected results was also underlined. Finally, participants were given an example of generic action plan, with possible dates for the development on a PBN airspace implementation project, in order to facilitate the development of national action plans for the design of their airspaces with PBN application

In addition to theoretical/practical workshop activities, participants had the opportunity to receive another 5 presentations, with a view to obtain information on the experiences and lessons learned from other States and IATA during the planning, design, validation and implementation of their respective airspaces. In such sense, Brazil, Chile and Peru made their presentations and delivered the Group valuable information on their experiences, highlighting such aspects to be taken into account that might have affected the implementation in their respective States. On the other hand, IATA presented an analysis of the reports received from international operators regarding incompatibility of ATC gradients in SIDs with aircraft performance. IATA informed that in current FMS, it is necessary to count with accurate models for calculating acceleration segments and configuration changes from take-off. In such sense, IATA recommends operators to carry out a preliminary study considering tools like “climbout” for the path calculation, delivered by the aircraft manufacturers. Moreover, Mr. Mauricio Corredor, member of the delegation of Colombia, offered the participants a detailed presentation on the Fast Time Simulator (FTS) recently acquired by the civil aviation, as well as the on the potential of this tool for airspace optimization in the terminal area of Bogota.

Regarding the exercises developed during the workshop, from the second day on the practical phase began in both, generic aspects of design as in the phase design of Asuncion and Bogota TMA. Participants were divided into two working groups that were maintained throughout the workshop. In such sense, following exercises were developed by each one of the groups:

1. TMA – Generic airspace exercise.
2. Group work – Operational requirements and scope.
3. Group work – Review of reference data.
4. Group work – Interferences, enablers and constraints.
5. Group work – Routes, arrival/departure points and holds.
6. CDO/CCO exercises.
7. Group work – IFR preliminary procedures.
8. Group work – Airspace volumes and sectors.
9. Preliminary design of airspace (Asuncion). Group final presentation.
10. Preliminary design of airspace (Bogota). Group final presentation.

The result was a preliminary design of terminal areas Asuncion and Bogota, which will serve as reference material for the planning, design and implementation of PBN in their respective States, to be presented during the development of the Second Phase of this workshop, to be held in September 2014.

The last day of the workshop, a final test was taken in order to identify the progress of participants in the knowledge obtained during the event. The details of the evaluation are attached as **Appendix A**.

In summary, the results were:

a) Average group qualification: 89.
b) At the end of the workshop, all participants were rated as good (between 70 and 84) or very good (more than 84).
c) No participant obtained a final qualification under 72.

d) The group average increased by 13.5 points (from 75.5 to 89), comparing the initial and final assessments.

Moreover, a survey was conducted to measure the degree of satisfaction of participants with reference to the workshop and the instructors. Details of the survey are attached as **Appendix B**. The summary of the results was as follows:

a) 87% of participants rated the workshop as excellent, while 13% rated it as good.
b) 91% of participants rated the instructors as excellent, while 9% rated them as good.

APPENDIX A

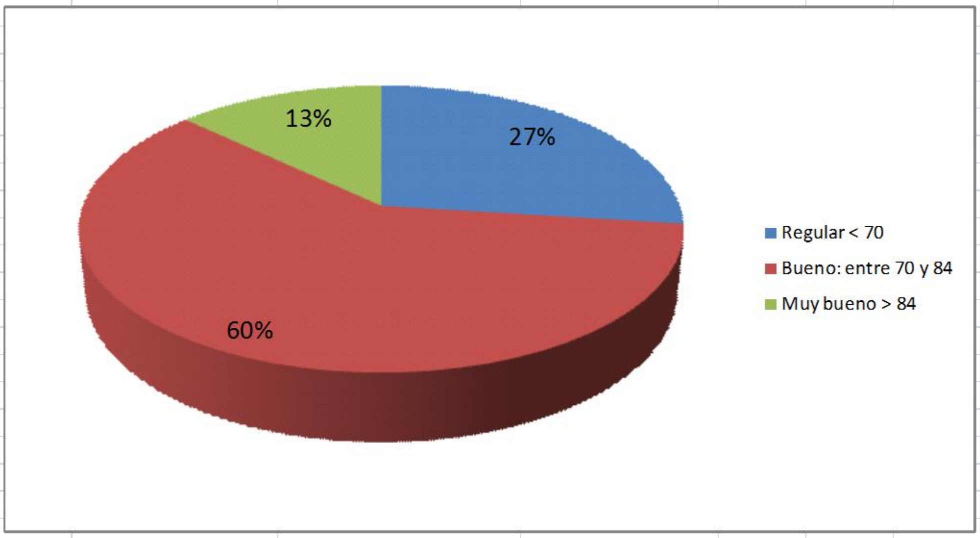
FIRST WORKSHOP ON
PBN AIRSPACE DESIGN
IN THE SAM REGION

COMPARATIVE RESULT OF INITIAL AND FINAL EVALUATION

INITIAL EVALUATION OF WORKSHOP

Note 1: 47 participants took the initial evaluation.

Regular < 70	Bueno: entre 70 y 84	Muy bueno > 84
27%	60%	13%

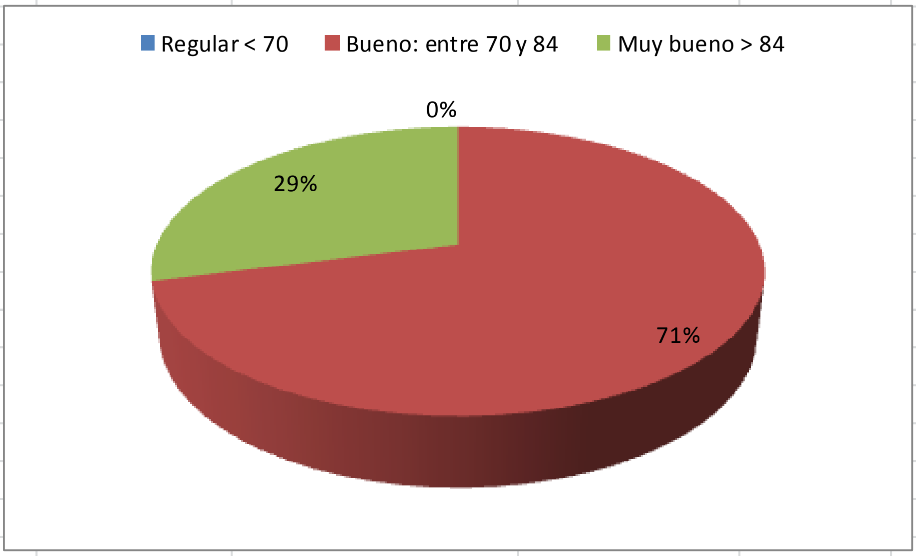


GROUP AVERAGE QUALIFICATION: 75.5

FINAL EVALUATION OF THE WORKSHOP

Note 2: 42 participants took the final evaluation.

Regular < 70	Bueno: entre 70 y 84	Muy bueno > 84
0%	71%	29%



GROUP AVERAGE QUALIFICATION: 89

- AT THE END OF THE WORKSHOP, ALL PARTICIPANTS WERE RATED AS GOOD OR VERY GOOD.
- NO PARTICIPANT OBTAINED A FINAL QUALIFICATION UNDER 72.
- THE GROUP AVERAGE INCREASED BY 13.5 POINTS (FROM 75.5 TO 89).

APPENDIX B

FIRST WORKSHOP ON
PBN AIRSPACE DESIGN
IN THE SAM REGION

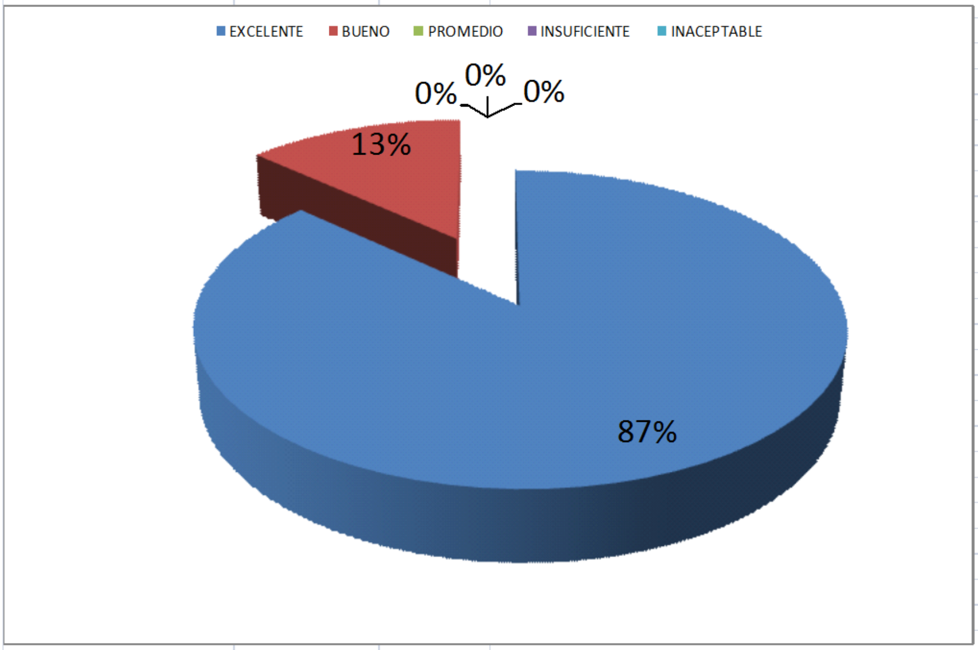
RESULT OF THE SURVEY

EVALUATION OF THE COURSE CONTENT

Clasificación: **5** = *Excelente* / **4** = *Bueno* / **3** = *Promedio* / **2** = *Insuficiente* / **1** = *Inaceptable*)

Evaluación del contenido del curso	
Los temas tratados son actuales.	5.00
¿Como califica el programa de capacitación del Taller PBN?	4.82
¿Cómo califica el material de capacitación?	4.84
Se refuerza la teoría impartida con ejercicios y prácticas.	4.84
Se vincula los temas con la realidad y/o su aplicación en casos reales.	4.87
¿Cómo califica el nivel de información?	4.87
¿El taller ha atendido sus expectativas?	4.84
¿La información suministrada es suficiente para llevar a cabo el plan de implantación PBN en su Estado o Empresa?	4.66
¿El material y la información suministrada en el taller permitirian que se dicte un curso/taller similar en su Estado o Empresa?	4.66
	4.82

EXCELENTE	33	87%
BUENO	5	13%
PROMEDIO	0	0%
INSUFICIENTE	0	0%
INACEPTABLE	0	0%
	38	**100%**

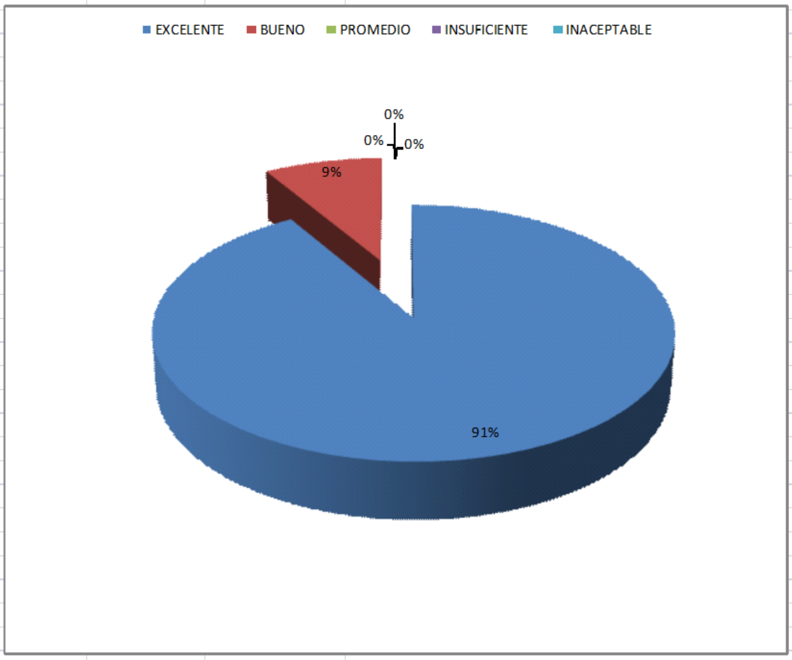


EVALUACION OF THE INSTRUCTORS

lasificación: **5** = *Excelente* / **4** = *Bueno* / **3** = *Promedio* / **2** = *Insuficiente* / **1** = *Inaceptable*)

Evaluación de los instructores	
Facilitan la comprensión de los diferentes temas presentados	4.53
Estimulan la participación y el trabajo en equipo.	4.47
Motivan los participantes en los diferentes tópicos del curso.	4.55
Mantienen el orden y el control del horario establecido.	4.47
Hacen uso adecuado de las ayudas didácticas y de las instalaciones.	4.45
promedio	4.49

EXCELENTE	32	91%
BUENO	3	9%
PROMEDIO	0	0%
INSUFICIENTE	0	0%
INACEPTABLE	0	0%
	35	100%



What suggestions can be offered to improve the workshop?

- Always maintain performance in radar; the participation of Mariela Valdes is invaluable.
- Highlight and discuss certain very important. Sometimes people's interpretation may vary.
- The workshop was conducted flawlessly, exceeding my expectations. I have no suggestions.
- Overall, very good contents and organization on the part of the instructors. Just to improve, presentations could be optimized in some cases.
- Working groups should not be involved by many people, as participation could be distorted.
- I would like to have more working hours with Mariela Valdes, regarding design and calculation of gradients and climbs.
- I believe that all was very well.
- Fewer participants or divided into more groups. Practice focused in training of participants and not in the implementation of a State, in order to homogenize more the knowledge. Increased participation of instructors in practice.
- Divide the groups into more than two, in order to allow more people to participate.
- Try to work in smaller groups to facilitate the performance.
- In view of the quality of the event, if there has been something to improve, it would be very minimal.
- In order to improve work, I suggest that exercises are developed in Leticia TMA, with the data submitted by instructors. For larger groups do not become a subdivision.
- Two suggestions. During the practice, a fictional TMA is considered, so that everyone can get the same level of knowledge and all concepts are applied. To divide the groups into smaller parts. In our case, 4 groups would be good.
- As lived experience in C.A., would suggest ATC involvement from the beginning of the design until activity 14 – implementation.
- To consider training courses, as the level of participants is not the same. To consider other scenarios (airports), of other States, to receive support from specialists of the Region.
- To improve training in IFSET.
- Would suggest that groups were smaller. Two or three groups working on a same topic and then cross information.
- Through the experience gained on workshops and based on the observations made after each presentation, plus the contributions of each State, it could be considered to provide a more comprehensive guide on the process to follow as well as on the provision of deliverables. That is, a kind of list of activities.
- Due to noise, the auditorium was used only by one group to carry out the work. The rooms assigned to the other group did not allow proper display of projections and only a limited number of outlets were available.
- Maintain the same group of instructors. It is difficult to improve them.

Comments

- Control the logistics, so that all groups have equal physical conditions (facilities). Control internet services.
- Very good lecturers. Congratulations.
- I consider the level at which topic was discussed was excellent. Requires more disclosure and support from all involved areas in order to achieve implementation in shorter periods.
- The professional level of instructors is excellent. All expectations were met.
- Keep it up! Excellent job!
- In order to carry out the implementation plan, it would be convenient to receive training in Project management in each State.
- Excellent and very practical workshop, with high level lecturers, according to company's needs.
- To thank the dedication to us.
- The workshop exceeded my expectations.
- Excellent hosting State. Excellent instructors' academic level.
- Congratulations to all the team for their dedication and commitment.
- Excellent workshop and congratulations to the instructors for their dedication.
- High quality and experience in the instructors' team. Scenarios treated (Bogota and Asuncion), were ideal for its complexity and traffic density. Hopefully such seminars are repeated more often. Congratulations.
- Some design problems require internet. Connection should be improved.
- The workshop was a success. Updated in the global context. Enables to observe details that will be used in the PBN design in my State.
- All was excellent. Hope to continue taking into account the Central American Region.
- That SAM Office supports States which require training in procedure design.
- As far as possible, supply more information regarding RNAV and conventional flight treatment in a same scenario, specially referring to separation criteria that should be applied by air traffic controllers.

SECOND PBN WORKSHOP

Summary

The Second workshop on PBN airspace design was held in Lima, Peru, on 8-12 September 2014, under the auspices of the ICAO South American Office and with the support of Regional Project RLA/06/901 – "*Assistance for the implementation of a regional ATM system based on the ATM operational concept and the corresponding CNS technological support",* pursuant to ICAO Assembly Resolution A37-11 whereby the global implementation of performance-based navigation (PBN) was approved.

Pursuant to Conclusion SAM/IG/11-1 (*Support to SAM States for the redesign of their TMAs*), it was deemed advisable to plan Project RLA/06/901 activities for 2014 in order to define the needs and broaden the training of ATM experts in the SAM Region with a view to supporting and expediting the regional PBN implementation plan, thus increasing the knowledge of participants concerning the use of PBN.

The SAM/IG/12 meeting (Lima, Peru, 14-18 October 2013) agreed on the convenience of conducting the required training in three consecutive phases:

- The first phase consisted on distance training, in which participants had to learn about PBN basics through the ICAO website (http://www.icao.int/safety/pbn/SitePages/PBN%20ikit.aspx) and study the following PBN-related manuals: the PBN Manual (Doc 9613), Manual on the Use of Performance-Based Navigation (PBN) in Airspace Design (Doc 9992), Continuous Descent Operations Manual (Doc 9931), and Continuous Climb Operations Manual (Doc 9993).

- The second phase consisted in participation in the First workshop on PBN airspace design, for a period of two weeks, the purpose of which was to provide theoretical/practical training on PBN design of terminal areas, using 1 highly complex TMA and 1 less complex TMA for the practical exercise, for which the terminal areas of Bogota and Asuncion were selected, respectively.

- The third phase involved participation in the Second workshop on PBN airspace design, for a period of 1 week, where all the participants from the first workshop had to submit the preliminary basic design for 1 TMA selected for each State, and the proposed designs were to be harmonised and optimised during the workshop, applying the techniques learned at the first workshop, integrating the points of entry and exit of these TMAs with a view to developing version 3 of the SAM route network.

The second PBN workshop for the South American Region was attended by 34 experts from 11 States and 9 experts from the industry (IATA and Jeppesen), representing aeronautical authorities, air navigation service providers, and civil and military aircraft operators of the South American Region. In general, they were experts in areas such as air traffic control, airspace planning, instrument approach procedure design, airline pilots and operations technicians/engineers, aircraft dispatch, air navigation inspectors, and aeronautical mapping.

During the opening of the PBN workshop, Mr. Julio Pereira, ATM Officer of the ICAO South American Regional Office briefly explained the objectives of the workshop and acknowledged the effort made by aeronautical authorities of the SAM Region to send their experts to this important event, which falls within the framework of the regional strategy for attaining the goals of the Bogota Declaration.

The following aspects were noted during the presentation of the preliminary design and action plan by each SAM State.

Argentina

One of the main objectives of PBN implementation at the Baires TMA is to minimise interference between arrivals and departures at the main airports of the TMA: Aeroparque, Ezeiza, and San Fernando.

Taking into account the interface among the route networks of Argentina, Brazil, and Uruguay, the need was identified for closer coordination among these States during the PBN planning, design, validation, and implementation phases, including the conduction of specific trilateral meetings.

A more comprehensive data collection and analysis is required in order to develop a PBN airspace design that can move into the validation phase.

The PBN design of the Baires TMA that was presented at the workshop was constrained by the structure of the TMA and the existing routes, and had 9 points of entry and exit. Consequently, it was recommended to study the feasibility of dividing the Baires TMA project into two phases:

- Phase 1 - Current route structure, analysis of a new TMA and new entry and exit points;

- Phase 2 - Version 3 of the SAM route network.

Given the significant flow between SAEZ and SUMU, it was suggested that this segment be subject to a specific analysis, including the possibility of eliminating the ATS routes and replacing them with RNAV1/RNP 1 departure and arrival procedures that would permit a 7 NM lateral separation.

Bolivia

The main challenge of the Bolivian administration will be the implementation of a PBN airspace concept in a TMA lacking ATS surveillance.

A more comprehensive data collection and analysis is required in order to develop a PBN airspace design that can move into the validation phase.

The development of a PBN airspace design based on “four corners” has been recommended, seeking a conventional aircraft flow that is consistent with the PBN design.

It was suggested that the “user case” technique be used, which consists in developing several scenarios to verify the feasibility of adopting PBN and non-PBN air traffic routing and separation procedures, based on the existing conventional separation techniques, taking into account the usual air traffic flow of the Santa Cruz TMA.

Taking into account the goal of implementing APV procedures in all thresholds operating under IFR, it was recommended that this type of procedure be implemented as soon as possible in threshold 16 of the Santa Cruz Airport.

The Workshop suggested that the implementation of the PBN concept at the Santa Cruz TMA be done in 2 phases:

- Phase 1 - Without ATC surveillance;
- Phase 2 - With ATS surveillance, taking into account the existence of an ATS surveillance implementation project in Bolivia.

Brazil

The Brazilian delegation did not submit the preliminary design of the Southern PBN (PBN SUR) as scheduled, since efforts were focused on:

- Issues identified during monitoring following PBN implementation in Sao Paulo;
- The need for adjustments in the BH and BR TMAs.

The Southern PBN implementation dates (second semester of 2016 or first semester of 2017) will have a significant impact on PBN implementation in the Montevideo and Buenos Aires TMAs. Accordingly, the meeting recommended that PBN implementation in these TMAs be divided into 2 phases, before and after the implementation of Version 03 of the route network, taking into account that it may be affected by the deadlines set by Brazil. It is important to highlight that the dates established by the Brazilian administration might affect the attainment of the Bogota Declaration goals, due by the end of 2016.

Taking into account the interface amongst the route networks of Argentina, Brazil, and Uruguay, the need was identified for close coordination among these three States during the PBN planning, design, validation, and implementation phases, including the conduction of specific trilateral meetings.

The Brazilian delegation has submitted an airspace planning data collection and processing model (city pair flow - “temperature”), which should be used by the other States.

Chile

The PBN design of the Santiago TMA was considered to be consistent and ready for the validation process. The design was enabled by the implementation of the PAMPA Project, due on 18 September 2014. The validation process may be considered as started, since tests of the new proposed sectors have already been conducted.

The tentative implementation date of the PBN project at the Santiago TMA is September 2015.

The PBN design for RWY 17 was assigned priority in view of the absolute prevalence of operations in this threshold (98% of operations).

According to data collected on the navigation capacity of the fleet, a significant difference was found between the operators approved for using GNSS en-route and those approved for using GNSS in the TMA. Accordingly, it was recommended that an in-depth analysis be conducted on the subject, bearing in mind the importance of this sensor for PBN operations in the TMA.

An initiative of the Chilean administration has been to use FOQA data for the design and monitoring of PBN operations. It is recommended that, if proven feasible, this technique be used by the other States.

The following has been suggested for a second PBN implementation phase at the Santiago TMA:

- Assess the feasibility of conducting independent and/or segregated operations in SCEL, if necessary using RNP and ILS;

- Use of Version 03 of the SAM Route Network.

Colombia

The Workshop noted that no progress had been made in the preliminary PBN design of the Bogota TMA, based on the one developed during the first PBN workshop. The Colombian administration has decided to set the institutional foundation for the Bogota TMA PBN project, with the following documents: project guide, project letter, and AIC announcing PBN implementation. Other States could use these documents for their implementation projects.

It was felt that the project might have been oversized, since it included some activities directly related to PBN implementation, such as: Bogota Airport Master Plan, and Plan for the construction of other airports. This oversizing could have a negative impact on, and unnecessarily delay, PBN implementation in the Bogota TMA.

The representative of Colombia informed about the need for coordination between the Bogota TMA PBN implementation project and the project for the new ATC control and systems centre, taking into account that the two changes must be sufficiently spaced in time so as to avoid operational problems resulting from the proximity of the dates. In this sense, it was suggested that the Colombian administration continue with the various phases of the Bogota TMA PBN project, taking into account that only upon completion of all the foreseen stages will it be possible to define an actual implementation date and use it as a basis for coordinating dates with other projects.

The representative of Colombia also noted that a desirable requirement of the project should be the acquisition of software for the development of instrument procedures and the implementation of the new ATC simulator, both already contemplated by the Colombian administration.

During the presentation of the Bogota TMA PBN project, it was noted that a survey had been used to collect data on controller and aircraft operator requirements. Although this was considered to be a good initiative, it should be used with caution, given its natural limitations given the fact that such requirements are based on the current airspace structure and its corresponding operational flaws. The best strategy to meet the requirements of air traffic controllers and aircraft operators is to ensure their participation from the onset of the PBN implementation process, starting in the planning phase.

A more comprehensive data collection and analysis is required in order to develop a PBN airspace design that can move into the validation phase.

Ecuador

The Workshop took note that the Ecuadorian authority had made a significant investment in air navigation, including the following: ATC simulator, fight inspection aircraft, procedure design course, new navigation and surveillance equipment, etc.

A more comprehensive data collection and analysis is required in order to develop a PBN airspace design that can move into the validation phase.

The Workshop recommended that consideration be given to the feasibility of simplifying the PBN design of the new TMA, reducing the number of crossings between departure and arrival paths. It was also suggested that departures and arrivals in Sector E of the Guayaquil airport be assessed, taking into account the prohibited area of the Ecuadorian Air Force (SEP1).

The need was identified to expand the flexible use of airspace at the Guayaquil TMA and its surroundings, in view of the existence of a significant number of restricted and prohibited areas, their significant size and their interference with civil air traffic, making it extremely difficult to optimise aeronautical operations in the region.

It was also recommended that Class E be adapted to the current and the new Guayaquil TMA, taking into account that a VFR aircraft may fly in this airspace without ATC clearance and without establishing bilateral communication.

The tentative implementation date of the Guayaquil TMA PBN project is 26 May 2016.

Panama

The Workshop noted that operations in the Panama TMA were already based on RNAV. Accordingly, the implementation process -especially the validation phase- should be carried out in greater depth, taking into account the need for the proposed design to be safer and more efficient than the existing one.

A more comprehensive data collection and analysis is required in order to develop a PBN airspace design that can move into the validation phase.

The configuration of the Tocumen Airport (location of passenger terminals and movement between frequently used thresholds – RWY 03) favours segregated and independent operations. In a first phase, the recommendation is to assess segregated operations under IMC and independent approaches under VMC, applying RNP approaches.

It was also recommended that instrument procedure alternatives be sought in order to reduce the impact of obstacles and terrain on the take-off sector of RWY 03, possibly enabling segregated operations and/or independent approaches.

Taking into account the existence of a new DME in the Panama TMA, it has been recommended that a technical (coverage and geometry) and operational (fleet capacity and need for a backup RNAV system) assessment be made for DME/DME operations.

The tentative date of implementation of the Panama TMA PBN project is 17 Sep 2015.

Paraguay

Regarding the PBN design of the Asuncion TMA, it was noted that the “four corners” technique had been fully applied and that the arrival and departure paths of the Asuncion Airport had been improved, giving priority to the main flows. The meeting recommended that the airspace volume of the new proposed TMA be assessed based on departure and arrival paths. The PBN design of the Asuncion TMA was considered to be consistent and ready for validation. However, the need for more comprehensive data collection and analysis was considered with a view to confirming and consolidating the PBN design of the Asuncion TMA.

Taking into account that radar vectors would be used to guide non-PBN approved aircraft on paths similar to those used by PBN-approved aircraft, radar rating of air traffic controllers of the Asuncion ACCs and APPs was considered a critical requirement of the project and a determining factor for defining the tentative date of implementation: 23 June 2016.

It was recommended that the feasibility of implementing an RNP AR approach procedure be analysed in order to shorten arrivals, based on the characteristics of the Asuncion TMA (low air traffic volume and absence of obstacles and significant terrain). However, procedure designers of the Paraguayan administration need to be trained in RNP AR.

Likewise, based on the aforementioned characteristics of the Asuncion TMA, it was recommended that the implementation of a direct omnidirectional departure be considered for times when traffic volume is low.

Peru

The Workshop took note of the broad scope of phase 2 of the PROESA project, which covers 4 TMAs: Arequipa, Cuzco, Juliaca, and Puerto Maldonado.

A more comprehensive data collection and analysis is required in order to develop a PBN airspace design that can move into the validation phase.

Initially, it was thought that the project was oversized, since it included ATFM implementation and the Chinchero Airport. However, during the debate, it was explained that the cited projects were only mentioned as a reference.

It was noted that phase 2 of the PROESA project would use parallel routes between most of the TMAs involved. Accordingly, a more in-depth assessment was recommended, taking into account that unidirectional routes could result in a loss of operational efficiency under low air traffic volume conditions. Nevertheless, unidirectional routes can be efficient in such environments in cases of significant concentration of air traffic during certain hours of the day. In order to mitigate a possible loss of efficiency due to the use of unidirectional routes, the Peruvian representative stated that the shorter segments between TMAs would be subject to a specific analysis in order to assess the possible elimination of ATS routes and their replacement with RNAV1/RNP 1 departure and arrival procedures to enable a 7NM lateral separation.

The Workshop was informed on RNP AR operations being carried out at an angle of 2.8º in Cuzco, because of the high altitude and high temperatures during certain times of the year, whereas Doc 9905 standards and criteria not necessarily apply in very high aerodromes, resulting in an approach slope steeper than desired. In this regard, it was recommended that SAM States study the Peruvian experience with the use of approach angles other than those foreseen in Doc 9905, especially at aerodromes located at very high altitudes and/or with high temperatures.

RNP AR will be used for take-off operations in the PROESA 2 project. Although the effective date for the use of this type of procedure has been set to November 2016 in Doc 8168 (PANSOPS), the workshop saw no problem in it being used, provided safety was ensured and the civil aviation authority approved the criteria for the approval of aircraft and operators and the criteria for the development of instrument procedures.

It was recommended that the holding points proposed in the project by assessed, taking into account that they might be too close to the Cuzco Airport.

The tentative date of implementation of the PROESA PBN project is February 2015.

Uruguay

The preliminary design of the Montevideo TMA submitted during the workshop sought to cover, during the first phase, 60% of the air traffic that makes use of the TMA.

As in the case of Argentina and Brazil, and taking into account the interface amongst the route networks of Argentina, Brazil, and Uruguay, the need was identified for close coordination amongst these States during the PBN planning, design, validation, and implementation phases, including the conduction of specific trilateral meetings.

A more comprehensive data collection and analysis is required in order to develop a PBN airspace design that can move into the validation phase.

It was recommended that, in a second phase, the Uruguayan administration take into account the following aspects:

- The remaining 40% of air traffic;
- Version 03 of the route network;
- Use of RNP AR in order to shorten arrivals.

As in the case of the Baires TMA, and taking into account the significant flow between SAEZ and SUMU, which, in the case of the Montevideo TMA accounts for 50% of air traffic volume, it was suggested that a specific analysis be made of this segment, including the possibility of eliminating ATS routes and replacing them with RNAV1/RNP 1 departure and arrival procedures to enable the use of a 7 NM lateral separation.

Venezuela

The Workshop recommended that an assessment be made of reducing the number of entry and exit points at the Maiquetia TMA, taking into account that the proposed design contained 9 entry and exit points.

Another important aspect is the low percentage of PBN-approved aircraft and operators, which could affect the project. In this regard, the recommendation was to conduct a more in-depth assessment of the PBN approval potential of the fleet, with a view to urging operators to move forward in the PBN approval process.

It was also recommended that an assessment be made of the allocation of class B to the TMA, taking into account that aircraft separation of VFR flights was a complex activity for air traffic controllers and was normally applied only in airspaces with high air traffic density.

The workshop recommended that, in a second implementation phase, an assessment be made of the need and feasibility of conducting segregated operations for approach in RWY 10 and for take-off in RWY 09.

Data collection and processing model (add city pairs)

The presentation by the Venezuelan delegation showed the existence of DME arc-based arrival and approach procedures that were significantly inefficient. The Workshop took note that, in practice, the procedures were not being applied, precisely because of their inefficiency. Accordingly, it recommended that an assessment be made of the modification or cancellation of the procedures not being used.

The preliminary PBN design of the Maiquetia TMA was based on a comprehensive process of data collection and processing, in which only flows between city pairs and air traffic volume graphs were missing, much the same as the one presented by the delegation of Brazil.

Next activities of the SAM TMA PBN project

The next activity of the SAM TMA PBN project will be the third PBN workshop, the main purpose of which is to validate the PBN designs for the TMAs and/or airspaces selected by SAM States.

It is important to highlight that, to date, only two TMAs have been considered sufficiently mature to start the validation process: Asunción and Santiago. The other States are in different stages of the planning and design process, at different levels of maturity, and each administration will have to make a greater or lesser effort in order to be ready to demonstrate, at the third PBN workshop, that the proposed design is suitable, especially from the safety and efficiency point of view.

It is also important to highlight that the implementation of Version 3 of the route network depends on consistent and harmonised implementation in SAM TMAs and that any delay in one or more States could affect the other States and the Regional Project as a whole.

Accordingly, SAM States shall carry out the following activities in preparation for the third PBN workshop:

a) Develop an action plan for the implementation of the PBN airspace concept in the selected airspace, as an input for the SAM PBN project.

b) Complete data collection and processing, with a view to giving consistency to the PBN design of the TMA and/or airspace selected by the State.

c) Develop, as necessary, a new PBN airspace concept, based on the collected and processed data, and on the recommendations of the second PBN workshop.

d) Complete the validation stage of the preliminary design, taking into account the following minimum requirements:

   - work on the white board;
   - IFSET;
   - ground validation of IFR procedures and VFR corridors;
   - independent review of IFR procedures, charts, and coding tables;
   - SMS.

e) Review the airspace concept as needed, based on validation results, until a satisfactory PBN design is obtained for implementation, which shall be submitted at the third PBN workshop.

f) Send the PBN design of the selected TMA and/or airspace to the SAM Regional Office before 20 February 2015.

g) Participate in teleconferences in preparation for the third PBN workshop, to be carried out on the following tentative dates:

   - 02 October
   - 23 October
   - 19 November

- 18 December
- 05 February
- 25 February

Assessment of the Workshop

A survey was conducted to measure participant satisfaction with the workshop. Survey details are contained in **Appendix A**. In summary, the results showed that 89% of participants rated the workshop as excellent, while 11% rated it as good.

APPENDIX A

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

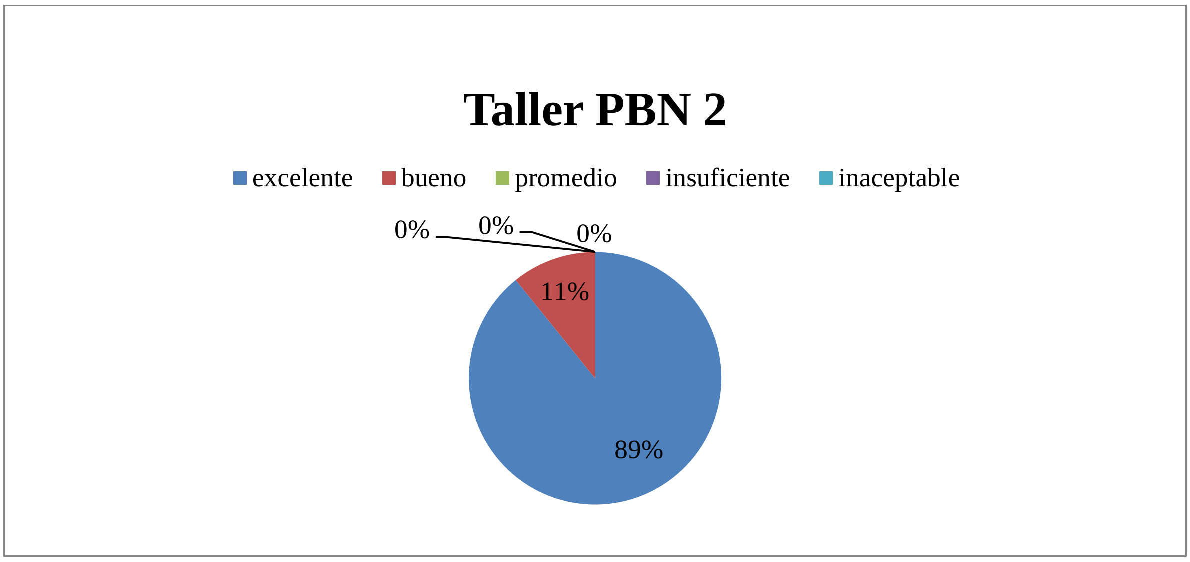
(Lima, Peru, 08 to 12 September 2014)

SURVEY RESULTS

ASSESSMENT OF COURSE CONTENTS

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

	Average
Were the topics relevant?	4.89
How do you rate the PBN workshop training programme?	4.76
How do you rate the training material?	4.43
Is theory reinforced with practical exercises?	4.70
Are topics correlated with reality and/or with their application in real cases?	4.95
How do you rate the level of information?	4.89
Did the workshop meet your expectations?	4.76
Was the information provided sufficient to develop the PBN implementation plan in your State or company?	4.65
Would the material and information provided in the workshop permit the conduction of a similar course/workshop in your State or company?	4.54
Overall average	4,73



Can you offer any suggestions to improve the workshop?

- ICAO should urge States to send the group of designers to all events related to this great PBN project, since many times they only send one or two and exclude other procedure designers who are doing the work.
- These workshops should continue, since each country has a different reality and this allows participants to gain much experience and to avoid possible incidents or accidents.
- Take maximum advantage of the website to disseminate these topics.
- Do it more often.
- Conduct frequent meetings of procedure design personnel to exchange design criteria in view of altitude differences amongst the various States.
- Better preparation; delivery of preliminary papers prior to the next workshop; and convene the next workshop sufficiently in advance to ensure participation.
- More active participation of operators. Commitment to remove obstacles. Try to guide actions towards RNP-AR procedures.
- ICAO to coordinate the tripartite Brazil-Argentina-Uruguay meeting.
- Coordinate trilateral meetings amongst Uruguay, Brazil, and Argentina. The ICAO Regional Office could convene these meetings.
- It is difficult to improve upon the workshop; it is already very good. Send ICAO Circular 324 to the participants.
- Less discussions on unrelated topics.
- Periodic refresher and update courses on Doc 8168.
- Include a post-monitoring plan in the PBN project.
- I would like more practice in design. In addition to presenting the work done, the workshop would benefit from some supplementary activity.
- I suggest that interpretation be provided for presentations made in a language other than Spanish. I thought the Brazilian presentation was very interesting but, unfortunately, I could not fully understand it.
- Sometimes, discussions extend beyond schedule and some issues are left pending, especially with the rest of the participants. The topics of the agenda are fully and properly covered during the course, but it would also be useful to discuss the experiences of other members and have more time for such discussions.
- Through the Regional Office, as an activity under Project RLA/06/901, a meeting of procedure designers working in the TMA project of each country should be scheduled before or after the workshop to harmonise concepts, especially between adjacent States.

Comments

- The PBN work team should be consolidated with the support of State authorities.
- Excellent seminar aimed at improving the route network in the States, not only to benefit passengers, who arrive faster to their destination, but also the environment, since CO_2 emissions will be reduced. Airlines will also save on fuel.
- Just my acknowledgment for the workshop.
- The States should designate the same delegates to participate in the meetings, since constant changes are detrimental to the attainment of goals.
- It helped me clarify many doubts and my colleagues helped me understand many of the concepts to be applied.
- Excellent group convened by ICAO. Great organisation and coordination of the subject matter. Congratulations: it is not easy to make progress on a topic as complex as TMA-PBN.
- Congratulations to all the States that are making the sacrifice of improving their airspace, and to ICAO and IATA.
- Excellent workshop.
- Congratulations.
- Promote meetings of procedure design experts once or twice a year.
- Very grateful for allowing me to participate as an observer; it allowed me to expand my horizons and analyse the possibility of specialising in other fields.
- A meeting of procedure designers (PANSOPS) should be organised once or twice a year to exchange experiences within the context of the SAM Region.

12 September 2014

STATUS OF IMPLEMENTATION OF SIDs AND STARs

AT INTERNATIONAL AERODROMES

	DATA COLLECTION DATE: 10 OCTOBER 2014								
STATE	**INTERNATIONAL AIRPORTS ANP CAR/SAM**	**Threshold IFR**	**Threshold VFR**	**IAP APV**	**IAP LNAV**	**IAP RNPAR**	**SID PBN**	**STAR PBN**	**OBS**
ARGENTINA	**ARGENTINA (16 AEROPUERTOS)**			0	0	0	0	0	
	SABE BUENOS AIRES/Aeroparque Jorge Newbery								
	SAEZ BUENOS AIRES/Ezeiza Ministro Pistarini								
	SADF BUENOS AIRES/San Fernando								
	SARI CATARATAS DEL IGUAZÚ/My. D. Carlos Eduardo Krause								
	SAVC COMODORO RIVADAVIA/General Mosconi								
	SACO CORDOBA/Ing. Aer. A.L. Taravella								
	SASJ JUJUY/Gobernador Guzmán								
	SAZM MAR DEL PLATA/Bgdier. Gral. B. de la Colina								
	SAME MENDOZA/El Plumerillo								
	SAZN NEUQUEN/Presidente Perón								
	SARE RESISTENCIA/Resistencia								
	SAWG RIO GALLEGOS/Piloto Civil N. Fernández								
	SAAR ROSARIO/Rosario								
	SASA SALTA/Salta								
	SAZS SAN CARLOS DE BARILOCHE/San Carlos de Bariloche								
	SAWH USHUAIA/Malvinas Argentinas								
BOLIVIA	**BOLIVIA (4 AEROPUERTOS)**			0	0	0	0	0	
	SLCB COCHABAMBA/Jorge Wilsterman								
	SLLP LA PAZ/El Alto								
	SLVR SANTA CRUZ/Viru Viru								
	SLTJ TARIJA/Oriel Lea Plaza								
	BRAZIL (27 AEROPUERTOS)			0	0	0	0	0	
	SBBE BELÉM/Val-de-Cáes Intl	6		SI	SI	NO	NO	NO	Possui SID RNAV
		24		SI	SI	NO	NO	NO	Possui SID RNAV
		2		NO	SI	NO	NO	NO	Possui SID RNAV
		20		SI	SI	NO	NO	NO	Possui SID RNAV
	SBCF BELO HORIZONTE/Tancredo Neves Intl	16		SI	SI	NO	SI	NO	Possui SID RNAV
		34		SI	SI	NO	SI	NO	Possui SID RNAV
	SBBV BOA VISTA//Boa Vista Intl	8		SI	SI	NO	NO	NO	Possui SID RNAV
		26		SI	SI	NO	NO	NO	Possui SID RNAV
	SBBR BRASÍLIA/Brasília Intl	11L		SI	SI	NO	SI	SI	
		29R		SI	SI	NO	SI	SI	
		11R		SI	SI	NO	SI	SI	
		29L		SI	SI	NO	SI	SI	
	SBKP CAMPINAS/Viracopos Intl	15		SI	SI	SI	SI	SI	
		33		SI	SI	NO	SI	SI	
	SBCG CAMPO GRANDE/Campo Grande Intl	6		SI	SI	NO	SI	SI	
		24		SI	SI	NO	SI	SI	
	SBCR CORUMBÁ/Corumbá Intl	9		NO	NO	NO	NO	NO	Não possui procedimento aproximação devido fronteira.
		27		SI	SI	NO	NO	NO	Possui SID RNAV
	SBCZ CRUZEIRO DO SUL/Cruzeiro do Sul Intl	10		SI	SI	NO	NO	NO	Possui SID RNAV
		28		SI	SI	NO	NO	NO	Possui SID RNAV
	SBCY CUIABÁ/Marechal Rondon Intl	17		SI	SI	NO	NO	NO	Possui SID RNAV
		35		SI	SI	NO	NO	NO	Possui SID RNAV
	SBCT CURITIBA/Afonso Pena Intl	11		SI	SI	NO	SI	NO	
		29		SI	SI	NO	SI	NO	
		15		SI	SI	NO	SI	SI	
		33		SI	SI	NO	SI	SI	
	SBFL FLORIANÓPOLIS/Hercílio Luz Intl		3						
			21						
		14		SI	SI	NO	SI	SI	
		32		SI	SI	NO	SI	SI	
	SBFZ FORTALEZA/Pinto Martins Intl	13		SI	SI	NO	NO	NO	Possui SID RNAV
		31		SI	SI	NO	NO	NO	Possui SID RNAV
	SBFI FOZ DO IGUACU/Cataratas Intl	14		SI	SI	NO	SI	NO	Possui STAR RNAV

BRAZIL	SBFI FOZ DO IGUAÇU/Cataratas Intl	32		NO	SI	NO	SI	NO	Possui STAR RNAV
	SBMO MACEIO/Zumbi dos Palmares	12		NO	SI	NO	NO	NO	Possui SID RNAV
		30		NO	SI	NO	NO	NO	Possui SID RNAV
	SBMQ MACAPÁ/Macapá Intl	8		SI	SI	NO	NO	NO	Possui SID RNAV
		26		SI	SI	NO	NO	NO	Possui SID RNAV
	SBEG MANAUS/Eduardo Gomes Intl	10		NO	SI	NO	NO	NO	
		28		SI	SI	NO	NO	NO	
	SBNT NATAL/Augusto Severo Intl	12		SI	SI	NO	NO	NO	
		30		SI	SI	NO	NO	NO	
		16L		SI	SI	NO	NO	NO	Possui SID RNAV
		34R		SI	SI	NO	NO	NO	Possui SID RNAV
		16R		SI	SI	NO	NO	NO	
		34L		SI	SI	NO	NO	NO	
	SBPP PONTA PORÃ/Ponta Porã Intl	4		NO	NO	NO	NO	NO	
		22		NO	NO	NO	NO	NO	
	SBPA PORTO ALEGRE/Salgado Filho Intl	11		SI	SI	NO	NO	SI	Possui SID RNAV
		29		SI	SI	NO	NO	SI	Possui SID RNAV
	SBRF RECIFE/Guararapes Intl	18		SI	SI	NO	SI	SI	
		36		SI	SI	NO	SI	SI	
	SBGL RIO DE JANEIRO/Galeão, Antonio Carlos Jobim Intl	10		SI	SI	NO	SI	SI	
		28		SI	SI	NO	SI	SI	
		15		SI	SI	SI	SI	SI	
		33		SI	SI	NO	SI	SI	
	SBSV SALVADOR/Deputado Luis Eduardo Magalhães Intl	10		SI	SI	NO	NO	NO	Possui SID/STAR RNAV
		28		SI	SI	NO	NO	NO	Possui SID/STAR RNAV
			17						
			35						
	SBSN SANTARÉM/Santarém Intl	10		SI	SI	NO	NO	NO	Possui SID RNAV
		28		SI	SI	NO	NO	NO	Possui SID RNAV
	SBSL SÃO LUIS/Marechal Cunha Machado Intl		9						
			27						
		6		SI	SI	NO	NO	NO	Possui SID RNAV
		24		SI	SI	NO	NO	NO	Possui SID RNAV
	SBGR SÃO PAULO/Guarulhos Intl	09L		SI	SI	NO	SI	SI	
		27R		SI	SI	NO	SI	SI	
		09R		SI	SI	SI	SI	SI	
		27L		SI	SI	NO	SI	SI	
	SBTT TABATINGA/Tabatinga Intl	12		NO	NO	NO	NO	NO	
		30		NO	NO	NO	NO	NO	
	SBUG URUGUAIANA/Rubem Berta Intl	9		NO	NO	NO	NO	NO	Não possui procedimento aproximação devido fronteira.
		27		NO	NO	NO	NO	NO	
CHILE	**CHILE (8 AEROPUERTOS)**			**0**	**0**	**0**	0	0	
	SCFA ANTOFAGASTA/Cerro Moreno	01			SI	SI	SI	SI	
		19			SI	SI	SI	SI	
	SCAR ARICA/Chacalluta	02			SI	NO	NO	SI	NO por Limite Politico Internacional
		20			NO	NO	SI	NO	
	SCIE CONCEPCIÓN/Carriel Sur	02		SI	SI	SI	SI	SI	
		20		SI	SI	NO	SI	SI	
	SCIP ISLA DE PASCUA/AP Mataveri	10		NO	SI	NO	NO	NO	
		28		NO	NO	NO	NO	NO	
	SCDA IQUIQUE/Gral. Diego Aracena	01			NO	NO	NO	NO	Por Topografía
		19			SI	SI	SI	SI	
	SCTE PUERTO MONTT/El Tepual	17		SI	SI		SI	SI	
		35		SI	SI		SI	SI	
	SCCI PUNTA ARENAS/Pdte. C. Ibañez del Campo	01							
		07		SI	SI			SI	
		12		SI	SI			SI	
		19							
		25		SI	SI		NO*	SI	
		30		SI	SI		NO*	SI	
	SCEL SANTIAGO/Arturo Merino Benítez	17R		SI	SI	SI	SI	SI	
		35L		SI	SI		SI	SI	
		17L		SI	SI	SI	SI	SI	
		35R		SI	SI		SI	SI	
COLOMBIA	**COLOMBIA (11 AEROPUERTOS)**			0	0	0	0	0	
	SKBQ BARRANQUILLA/Ernesto Cortissoz								
	SKBO BOGOTÁ/Eldorado/Distrito Capital								
	SKBG BUCARAMANGA/Palonegro								
	SKCL CALI/Alfonso Bonilla Aragón								
	SKCG CARTAGENA/Rafael Nuñez								
	SKCC CUCUTA/Camilo Daza								
	SKLT LETICIA/Alfredo Vásquez Cobo								

	SKPE PEREIRA/Matecaña								
	SKRG RIONEGRO/José María Córdoba								
	SKSP SAN ANDRES I./Sesquicentenario								
	SKSM SANTA MARTA/Simon Bolivar								
	ECUADOR (4 AEROPUERTOS)			0	0	0	0	0	
ECUADOR	SEGU GUAYAQUIL/Jose Joaquin de Olmedo	21	21	NO	NO	NO	NO		
		3	3	NO	NO	NO	NO		
	SELT LATACUNGA/Cotopaxi	19	19	NO	NO	NO	NO		
		1	1	NO	NO	NO	NO		
	SEMT MANTA/Eloy Alfaro	24	24	NO	NO	NO	NO		
		6	6	NO	NO	NO	NO		
	SEQU QUITO/Mariscal Sucre	36	36	NO	SI	SI	SI	SI	
		18	18	NO	SI	SI	SI	SI	
FRENCH GUIANA	**FRENCH GUIANA (1 AEROPUERTOS)** (France)			0	0	0	0	0	
	SOCA CAYENNE/Rochambeau								
GUYANA	**GUYANA (2 AEROPUERTOS)**								
	SYGO GEORGETOWN/Ogle International Airport								
	SYCJ GEORGETOWN/Cheddi Jagan Int´l Airport								
PANAMA	**PANAMA (6 AEROPUERTOS)**			0	0	0	0	0	
	MPBO BOCAS DEL TORO/Bocas Del Toro	08		NO	NO	NO	NO	NO	
		26		NO	NO	NO	NO	NO	
	MPCH CHANGUINOLA/Cap. Manuel Niño	04		NO	SI	NO	NO	NO	
		22		NO	NO	NO	NO	NO	
	MPDA DAVID/Enrique Malek		18	NO	NO	NO	NO	NO	
			36	NO	SI	NO	NO	NO	
	MPMG PANAMÁ/Marcos A. Gelabert	03R		NO	SI	SI	SI	SI	
		03L		SI	SI	SI	SI	SI	
	MPPA PANAMÁ/Pacífico	18		NO	NO	SI	NO	NO	
		36		SI	SI	SI	NO	NO	
	MPTO PANAMÁ/Tocumén Intl	21R		NO	SI	SI	NO	SI	
		21L		NO	NO	SI*	NO	NO	*TAILORED PROCEDURE
PARAGUAY	**PARAGUAY (2 AEROPUERTOS)**			0	0	0	0	0	
	SGAS LUQUE/Silvio Pettirossi	2		SI	SI	NO	SI	NO	
		20		SI	SI	NO	SI	NO	
	SGES MINGA GUAZÚ/Guaraní	5		SI	SI	NO	NO	NO	
		23		SI	SI	NO	NO	NO	
PERU	**PERU (8 AEROPUERTOS)**			0	0	0	0	0	
	SPQU AREQUIPA/Rodríguez Ballón Intl	10		NO	NO	NO	NO	SI	RWY 10 SOLO PARA ATERRIZAJES.
			28	NO	NO	NO	NO	NO	ATERRIZAJES SOLO VFR
		28		NO	NO	NO	SI*	NO	* TAILORED LAN PERÚ
	SPHI CHICLAYO/Cap. José Quinoñes Gonzalez	01		NO	SI	NO	NO	SI	
		19		NO	SI	SI	NO	SI	
	SPZO CUZCO/Velazco Astete		10	NO	NO	NO	NO	NO	RWY 10 SOLO PARA DESPEGUES. AERONAVES DESPEGAN EN VFR HASTA KIMOR. POSTERIOR IFR.
		10		NO	NO	NO	SI*	NO	* TAILORED LAN PERÚ
			28	NO	NO	NO	NO	SI	RWY 28 SOLO PARA ATERRIZAJES . AERONAVES LLEGAN EN IFR VIA STAR. AP LOS CONDUCE A TRAMO FAVOR VIENTO Y ATERRIZAN VFR.
		28			NO	SI*	NO	SI*	* TAILORED LAN PERÚ
	SPQT IQUITOS/Crnel. FAP Francisco Secada Vignetta	06		NO	NO	SI*	NO	SI*	* TAILORED LAN PERÚ
		24		NO	NO	NO	NO	NO	
	SPIM LIMA-CALLAO/Jorge Chávez Intl	15		NO	NO	NO	SI	SI	
		33		NO	NO	NO	SI	NO	
	SPSO PISCO/Pisco		04	NO	NO	NO	NO	NO	
		22		NO	NO	NO	NO	NO	
	SPTN TACNA/Crnel. FAP Carlos Ciriani Santa Rosa	02		NO	NO	SI*	NO	SI*	RWY 02 SOLO PARA ATERIZAJES TAILORED LAN PERÚ
			20	NO	NO	NO	NO	NO	
	SPRU TRUJILLO/Capitan Carlos Martínez de Pinillos	02		NO	NO	NO	NO	SI	RWY 02 SOLO PARA ATERRIZAJES
		20		NO	NO	SI	NO	NO	
SURINAME	**SURINAME (2 AEROPUERTOS)**			0	0	0	0	0	
	SMZO PARAMARIBO/Zorg en Hoop								
	SMJP ZANDERY/Johan Adolf Pengel Intl								
URUGUAY	**URUGUAY (2 AEROPUERTOS)**			0	0	0	0	0	
	SULS MALDONADO/Int. C/C, Carlos A. Curbelo Laguna del Sauce								
	SUMU MONTEVIDEO/Carrasco Intl Gral. Cesáreo L. Berisso								
	VENEZUELA (7 AEROPUERTOS)			0	0	0	0	0	
	SVBC BARCELONA/Gral. José Antonio Anzóategui Intl	15		SI	SI	NO	SI	NO	
		33		NO	NO	NO	SI	NO	
	SVMI CARACAS/Simón Bolívar Intl, Maiquetía	10		SI	SI	NO	SI	NO	
		28		SI	SI	NO	SI	NO	
	SVMC MARACAIBO/La Chinita Intl	3L		SI	SI	NO	SI	NO	
		21R		SI	SI	NO	SI	NO	

VENEZUELA	SVMG MARGARITA/Intl Del Caribe Gral. Santiago Marino	9		SI	SI	NO	SI	NO	
		27		SI	SI	NO	SI	NO	
	SVJC PARAGUANA/Josefa Camejo Intl	9		SI	SI	NO	SI	NO	
		27		SI	SI	NO	SI	NO	
	SVSA SAN ANTONIO DEL TÁCHIRA/San Antonio del Táchira Intl	17		SI	SI	NO	NO	NO	
		35		NO	NO	NO	SI	NO	
	SVVA VALENCIA/Zim Valencia Intl	10		SI	SI	NO	SI	NO	
		28		SI	SI	NO	SI	NO	
Totales	Totales			0	0	0	0	0	

ICAO NAM/CAR SAM PERFORMANCE-BASED NAVIGATION

(PBN) APPROACH PROCEDURE DESIGN WORKSHOP

(Mexico City, Mexico, 17 to 28 November 2014)

TITLE

ICAO NAM/CAR SAM PERFORMANCE-BASED NAVIGATION (PBN) APPROACH PROCEDURE DESIGN WORKSHOP FOR RNAV 1/ RNP 1, RNP APCH AND BARO-VNAV SPECIFICATIONS

WORKSHOP DURATION

10 class days (two weeks)

NUMBER OF PARTICIPANTS:

A maximum of 20 trainees

WHEN AND WHERE

ICAO NACC Regional Office, Mexico City, Mexico, 17-28 November 2014. English - Spanish interpretation will be provided. Access to required ICAO Documents (9613, 8168, 4444, 9906, 9905) in electronic format on the ICAO website through controlled access by State/Territory designated Focal Points.

INSTRUCTORS

Armando Hernandez Napoles and Ruddy Abdel Romo Seguí are PANS OPS instructors from Instituto de Aeronáutica Civil de Cuba (IACC) and are both involved in the PBN Instrument Approach Procedure implementation project in Cuba.

OBJECTIVES

The purpose of the workshop is to apply procedure design criteria to development of approach procedures for a select set of the navigation specifications as established in ICAO Doc 9613, *Performance-based Navigation (PBN) Manual*, and related Standards and Recommended Practices (SARPs). The general concept will include procedure design criteria associated with specific navigation subjects such as Area Navigation (RNAV 1), Required Navigation Performance (RNP 1), Required Navigation Performance Approach (RNP APCH) and Barometric Vertical Navigation (Baro-VNAV) applications.

Main Objective 1:

Performance conditions	Maps and other documents containing validated data will be provided
Expected result	The trainee will design a RNP 1 or RNAV 1 SID procedure based on Global Navigation Satellite System (GNSS) sensor use
Criteria	In accordance with Doc 8168, *PANS OPS/611*

Main Objective 2:

Performance conditions	Maps and other documents containing validated data will be provided
Expected result	The trainee will design a STAR RNP 1 or RNAV 1 procedure based on GNSS sensor use
Criteria	In accordance with Doc 8168, *PANS OPS/611*

Main Objective 3:

Performance conditions	Maps and other documents containing validated data will be provided
Expected result	The trainee will design a Non-precision Approach (NPA) procedure (Lateral Navigation (LNAV)), based on RNP APCH operations
Criteria	In accordance with Doc 8168, *PANS OPS/611*

Main Objective 4:

Performance conditions	Maps, data and all related documentation with a complete design procedure will be provided
Expected result	The trainee will design and document a RNAV-1 SID and STAR RNP 1, an NPA RNP(LNAV), and an RNP APV Baro VNAV (LNAV/VNAV) approach procedure for validation, publication and traceability
Criteria	Accurately, in a reasonable time, and in accordance with Doc 8168, PANS OPS/611, Annex 4, Annex 15, *Quality Assurance Manual for Flight Procedure Design* (Doc 9906) and *Performance-based Navigation (PBN) Manual* (Doc 9613)

PARTICIPANTS

Prerequisites:
Students should have fundamental knowledge of PBN airspace design or approach procedure design such as:

- Non-RNAV SID, STAR and NPA procedures as well as Instrument Landing System (ILS) procedures (Reference Doc 8168 *PANS-OPS* /611, Volume II, Part I and Part II):
  - Performance Based Navigation (PBN) as in:
    - completion of the ICAO Web-based PBN training (http://icao.int/pbn); or
    - attendance at an ICAO PBN Airspace Design Seminar.
  - Air Traffic Management (ATM) as in ICAO Doc 4444 (PANS-ATM).
  - Navigation systems, aircraft performance and geography
    e.g., knowledge at a level obtained with any Instrument Rated (IR) pilot's license or 5 years of experience in air traffic control services.
  - Annex 15 (Aeronautical Information Services/AIS).
  - Aerodrome - Students must be familiar with Annex 14, obstacle limitation surfaces and aerodrome reference codes requirements.
  - Geodesy (WGS-84).
  - Charting.
  - Annex 4 with regard to SID, STAR and approach charts.

This training workshop does not use a specific procedure design software and therefore trainees will design procedures manually. For that reason, students should bring a ruler, protractor, compass, and calculator with scientific functions, as well as their own updated regulatory documents, e.g., Doc 8168, PANS-OPS/611.

ASSESSMENT

Sample of prerequisite exercises will be performed in advance

An initial assessment will be conducted before the workshop through a sample of elementary exercises that will be checked by the instructors prior to the workshop. Those exercises will be sent to the attendees a month and a half before the workshop, to be returned 10 days prior to the workshop for evaluation.
Progress tests will be conducted during the workshop.
Eventually, the presentation of the project will enable assessment of the capacity of the trainee to meet the main objectives through application of the criteria to procedure designs and, as a secondary objective, demonstration of trainee capacity to summarize, write a technical report and present a procedure design study.

TOPICS COVERED

Performance-Based Navigation (PBN) Manual (Doc 9613) Airspace Concept:
- General overview.
- Description of navigation specifications.
- Avionics, aircraft equipment and airworthiness regulations.
- Which application for which airspace?
- Performance – notions of accuracy, precision, continuity, availability.

GNSS:
- Aircraft-Based Augmentation System (ABAS).
- Satellite-Based Augmentation System (SBAS) in a PBN context.
- Ground-Based Augmentation System (GBAS) in a PBN context.

Quality Assurance Manual for Flight Procedure Design (Doc 9906):
- Document and store procedure for traceability.
- Data origin.
- Procedure design process.

Procedure design criteria (PANS-OPS, Volume II, Part III, Sections 1, 2):
- Underlying criteria.
- General criteria such as:
  - Minimum length of segments.
  - Turn protection.
  - T or Y concept.
  - Terminal Arrival Altitude (TAA).

Procedure construction (PANS-OPS, Volume II, Part III, Section 3 and Doc 9905):
- Departure criteria applicable for Basic-RNP 1 and RNAV 1/2.
- Standard arrival for RNP 1 and RNAV 1/2.
- Approach procedures for RNP AR and RNP APCH operations.
- APV baro VNAV procedures.

Document management for validation and publication (PANS-OPS, Volume II, Part III, Section 5)
- Charting and coding.

MEANS

- Theoretical lectures: Presentation and explanation of the rules and principles described in ICAO SARPs
- Laboratory exercises.

Lectures are followed by practical exercises, scheduled on a daily basis, that illustrate the elementary application of criteria in a simplified environment in order to reinforce theoretical input.

- Comprehensive On-the-Job Training (OJT) Project:

Part of the second week will be focused on OJT final project in teams up to four to design an RNAV 1 SID and STAR, an NPA RNP APCH and an RNP APV Baro-VNAV approach procedure based on simulated conditions of an actual airport environment. The design is conducted step by step under assistance and tutorials from instructors. The project also includes the design of draft SID and STAR charts and instrument approach charts, a technical report and coding instructions.

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ICAO NAM/CAR SAM PERFORMANCE-BASED NAVIGATION (PBN) APPROACH PROCEDURE DESIGN WORKSHOP

TIME SCHEDULE

First Week: 17-21 November 2014

ICAO NACC Regional Office, Mexico City, Mexico

	8:30 – 9:30		*9:45 – 12:00*		13:00 – 14:30		14:45 – 15:30	15:30 – 16:15
MONDAY 17	Registration Opening RNAV Principles GNSS Concept	***Coffee Break***	PBN Concept Navigation Specification PBN Applications	***LUNCH***	Design Principle Waypoints Path Terminator	***Coffee Break***	Minimum Stabilization Distance Descent Gradient	Exercises
	8:00 – 9:30		*9:45 – 12:00*		13:00 – 14:30		14:45 – 15:30	15:30 – 16:15
TUESDAY 18	Transversal Longitudinal Tolerance System Errors		Tolerance and Semi-Width Areas Calculation		Areas Protection Merging Methodology Exercise		Turn Construction Flyby Waypoints	Turn Protection (FB) Exercises
	8:00 – 9:30		*9:45 – 12:00*		13:00 – 14:30		14:45 – 15:30	15:30 – 16:15
WEDNESDAY 19	Turn Construction FlyOver Waypoints		Turn Protection (FO) Exercises		RNP APCH NPA Alignment VSS (VSS Exercises)		Final Approach OCH Computation Intermediate Approach	Initial Approach T / Y Bar concept (Exercises T/Y)
	8:00 – 12:00				13:00 – 14:30		14:45 – 15:30	15:30 – 16:15
THURSDAY 20	RNP APCH NPA Exercises				Missed Approach Obstacles Clearance		Arrival Procedures Underlying Principles Protection Areas	Obstacles Clearance Terminal Arrival Altitude (TAA)
	8:00 – 9:30		9:45 – 12:00		13:00 – 14:30		14:45 – 16:15	
FRIDAY 21	General Progress Test # 1	***Coffee Break***	Departure Procedures Nominal Trajectory Areas		Straight and Turning Departures		Departure Exercise RNP 1 Specification Application	

ICAO NAM/CAR SAM PERFORMANCE-BASED NAVIGATION (PBN) APPROACH PROCEDURE DESIGN WORKSHOP

TIME SCHEDULE

Second Week: 24-28 November 2014

ICAO NACC Regional Office, Mexico City, Mexico

	8:00 – 9:30		9:45 – 12:00		13:00 – 14:30		14:45 – 15:30	15:30 – 16:15
MONDAY 24	RNP APV Baro-Vnav Obstacle Assessment Surface (OAS)	Coffee Break	Final Approach Surface (FAS) / Temperature Correction	LUNCH	RNP APB Baro VNAV Obstacles Clearance OCH Computation	Coffee Break	RNP APCH APV Baro-VNAV Exercises	
	8:00 – 9:30		9:45 – 12:00		13:00 – 16:15			
TUESDAY 25	General Progress Test #2	Coffee Break	Holding Criteria Coding Issues	LUNCH	On-The-Job Application SID/STAR (RNAV1 o RNP 1) NPA / APV RNP APCH			
	8:00 – 12:00				13:00 – 16:15			
WEDNESDAY 26	On-The-Job Application SID/STAR (RNAV1 o RNP 1) NPA / APV RNP APCH			LUNCH	On-The-Job Application SID/STAR (RNAV1 o RNP 1) NPA / APV RNP APCH			
	8:00 – 12:00				13:00 – 16:15			
THURSDAY 27	On-The-Job Application SID/STAR (RNAV1 o RNP 1) NPA / APV RNP APCH			LUNCH	On-The-Job Application SID/STAR (RNAV1 o RNP 1) NPA / APV RNP APCH			
	8:00 – 12:00				13:00 – 15:30		15:30 – 16:00	16:00 – 16:15
FRIDAY 28	Presentation / Assessment of Project			LUNCH	Presentation / Assessment of Project		Jury Deliberation	Assessment Result Debriefing

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

1. TERMS OF REFERENCE

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

2. WORK PROGRAMME

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

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

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

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

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

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

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

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

3. COMPOSITION

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

4. RAPPORTEUR

Alexandre Luiz Dutra Bastos, Brazil

LIST OF CONTACTS FOR OPERATIONAL PBN FOCAL POINTS

LISTA DE CONTACTOS PARA PUNTOS FOCALES PBN

State/ Estado	PBN FOCAL POINTS PUNTOS FOCALES PBN
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PARAGUAY*	José Luis Chávez Gerente de Tráfico Aéreo Dirección Nacional de Aeronáutica Civil Aeropuerto Internacional Silvio Pettirossi Tel: +59521 6882346 E-mail: atm_gnna@dinac.gov.py
PERÚ*	Sady Orlando Beaumont Valdez Inspector Navegación Aérea Dirección General de Aeronáutica Civil (DGAC) Ministerio de Transportes y Comunicaciones Jirón Zorritos 1203 Lima, Perú Tel: +51 1 615-7880 E-mail: sbeaumont@mtc.gob.pe Tomás Ben-Hur Macedo Cisneros Experto PANS-OPS en el Área de Normas y Procedimientos Controlador de Tránsito Aéreo CORPAC S.A. Callao, Perú Tel: +511 414-1442 E-mail: tmacedo@corpac.gob.pe

State/ Estado	**PBN FOCAL POINTS PUNTOS FOCALES PBN**
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State/ Estado	PBN FOCAL POINTS PUNTOS FOCALES PBN
VENEZUELA (Bolivarian Republic of) / **VENEZUELA (República Bolivariana de)***	Omar Enrique Linares Planificador de Espacios Aéreos INAC Aeropuerto Internacional Simón Bolívar Edificio ATC, piso 1, Oficina AIS Maiquetía, Vargas República Bolivariana de Venezuela Tel: +58 212 355-2898 E-mail: o.linares@inac.gob.ve ollinaresomar2@gmail.com Pablo Rattia Rodríguez Planificador de Espacios Aéreos INAC Aeropuerto Internacional Simón Bolívar Edificio ATC, piso 1, Oficina AIS Maiquetía, Vargas República Bolivariana de Venezuela Tel: +58 426 531-0616 E-mail: p.rattia@inac.gob.ve

** Updated SAM/IG/14 / Actualizados en la SAM/IG/14*

PBN IMPLEMENTATION PLAN

MODEL

PBN Implementation Plan
State XX

Table of Contents

1. Objective

This PBN Implementation Plan has the following objectives:

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

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

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

2. Background

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

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

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

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

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

<u>Indirectly related</u>

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

<u>Directly related</u>

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

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

3. Introduction

(AT THE DISCRETION OF THE STATE)

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

4. <u>Strategic Objectives</u>

4.1 En-route operations

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

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

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

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

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

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

4.2 Terminal control areas (SIDs and STARs) and approach

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

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

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

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

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

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

5. <u>Implementation</u>

5.1 En-route operations

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

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

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

5.2 Complete redesign of terminal areas

5.2.1 TMA XX

5.2.1.1 Preliminary operational requirements

5.2.1.2 Tentative date of implementation

5.2.2 TMA YY

5.2.2.1 Preliminary operational requirements

5.2.2.2 Tentative date of implementation

5.2.3 TMA ZZ

5.2.3.1 Preliminary operational requirements

5.2.3.2 Tentative date of implementation

5.3 Implementation of arrivals and departures, using CDO and CCO

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

Plans for, and the status of, implementation of PBN arrivals and departures, with or without the use of CDO and CCO techniques, are shown in **Appendix A** (example: BOLIVIA), and will be updated and delivered to the SAM Regional Office every six months, on 30 June and 31 December each year.

5.4 PBN approach

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

Plans for, and the status of, implementation of PBN approach procedures are shown in **Appendix A** (example: BOLIVIA), which will be updated and delivered to the SAM Regional Office every six months, on 30 June and 31 December each year.

5.5 Fuel savings and reduction of CO_2 emissions

Fuel savings and the reduction of CO_2 emissions to be achieved through PBN implementation will be calculated using the IFSET tool, with a view to determining the efficiency of such implementation. The aforementioned calculation will be part of the complete redesign of the main TMAs and of the implementation of SIDs, STARs, and APV approach procedures. These calculations of fuel savings and CO_2 emission reduction will be delivered to the SAM Regional Office every six months, on 30 June and 31 December each year.

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

Appendix A

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

DATA COLLECTION DATE: 10 OCTOBER 2014											
STATE	**CAR/SAM ANP INTERNATIONAL AIRPORTS**	**IFR thresholds**	**VFR thresholds**	**APV IAP**	**LNAV IAP**	**RNPAR IAP**	**PBN SID**	**PBN STAR**	**CCO SIC**	**CDO STAR**	**OBS**
BOLIVIA	**BOLIVIA (5 AIRPORTS)**										
	SLCB COCHABAMBA	(1)	(2)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(4)
	SLLP LA PAZ										
	SLVR SANTA CRUZ										
	SLTJ TARIJA										
	SLTR TRINIDAD										

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

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

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
1			**Planes Nacionales de Implementación PBN**	**60 days**	**Mon 25/08/14**	**Fri 14/11/14**	
2			**Definir modelo de Plan de Implantación PBN de los Estados SAM**	**60 days**	**Mon 25/08/14**	**Fri 14/11/14**	
3	✓		Elaborar proposta a la SAM IG 14	5 days	Mon 25/08/14	Fri 29/08/14	
4			Discutir e aprobar modelo de plan de implantación PBN	5 days	Mon 10/11/14	Fri 14/11/14	
5			Envio dos planos de implantación PBN	1 day	Fri 15/05/15	Fri 15/05/15	
6			**Optimización Red de Rutas SAM**	**531 days**	**Thu 12/06/14**	**Thu 23/06/16**	
7			**Version 3**	**531 days**	**Thu 12/06/14**	**Thu 23/06/16**	
8			**Concepto Espacio Aéreo**	**327 days**	**Thu 12/06/14**	**Fri 11/09/15**	
9	✓		Objetivos Estrategicos	1 day	Mon 15/09/14	Mon 15/09/14	
10			**Datos de Transito Aéreo**	**1 day**	**Thu 12/06/14**	**Thu 12/06/14**	
11	✓		Obter Datos CARSAMMA 1	5 days	Mon 25/08/14	Fri 29/08/14	
12			Determinar flujos principales 1	15 days	Mon 15/09/14	Fri 03/10/14	11
13			Obter Datos CARSAMMA 2	5 days	Mon 23/02/15	Fri 27/02/15	
14			Determinar los flujos principales 2	15 days	Mon 16/03/15	Fri 03/04/15	12,13
15			Obter datos CARSAMMA 3	5 days	Mon 03/08/15	Fri 07/08/15	
16			Determinar los flujos principales 3	15 days	Mon 24/08/15	Fri 11/09/15	14,15
17			**Capacidad Flota**	**265 days**	**Mon 25/08/14**	**Fri 28/08/15**	
18	✓		Investigar Base de Dados de Capacidade de Navegación	5 days	Mon 25/08/14	Fri 29/08/14	
19			relatorio 1	15 days	Mon 15/09/14	Fri 03/10/14	11
20			relatorio 2	15 days	Mon 02/03/15	Fri 20/03/15	13
21			Relatorio final	15 days	Mon 10/08/15	Fri 28/08/15	15
22			**Medios CNS**	**275 days**	**Mon 25/08/14**	**Fri 11/09/15**	
23			Identificar material necesario para analisis CNS	5 days	Mon 25/08/14	Fri 29/08/14	
24			relatorio 1	15 days	Mon 15/09/14	Fri 03/10/14	23
25			relatorio 2	15 days	Mon 16/03/15	Fri 03/04/15	24
26			relatorio final	15 days	Mon 24/08/15	Fri 11/09/15	25

Project: Proyecto PBN
Date: Wed 29/10/14

Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
27			**Diseño versión 3**	**275 days**	**Mon 25/08/14**	**Fri 11/09/15**	
28			Determinar herramientas necesarias	5 days	Mon 25/08/14	Fri 29/08/14	
29			Determinar herramientas necesarias adicionais	5 days	Mon 15/12/14	Fri 19/12/14	
30			identificar puntos de entrada y salidas TMA1	15 days	Mon 15/09/14	Fri 03/10/14	
31			identificar puntos de entrada y salidas TMA2	15 days	Mon 16/03/15	Fri 03/04/15	
32			identificar puntos de entrada y salidas TMA final	15 days	Mon 24/08/15	Fri 11/09/15	
33			Interface CAR/SAM 1	15 days	Mon 15/09/14	Fri 03/10/14	
34			Interface CAR/SAM 2	15 days	Mon 16/03/15	Fri 03/04/15	
35			Interface CAR/SAM final	15 days	Mon 24/08/15	Fri 11/09/15	
36			Volumen de Espacio Aéreo Excluyente RNAV-5 preliminar 1	15 days	Mon 15/09/14	Fri 03/10/14	
37			Volumen de Espacio Aéreo Excluyente RNAV-5 preliminar 2	15 days	Mon 16/03/15	Fri 03/04/15	
38			Volumen de Espacio Aéreo Excluyente RNAV-5 Final	15 days	Mon 24/08/15	Fri 11/09/15	
39			Diseño Preliminar 1	15 days	Mon 15/09/14	Fri 03/10/14	
40			Diseño Preliminar 2	15 days	Mon 16/03/15	Fri 03/04/15	
41			Diseño Final	15 days	Mon 24/08/15	Fri 11/09/15	
42			**Validación**	**1 day**	**Thu 12/06/14**	**Thu 12/06/14**	
43			Necesidad/viabilidad FTS 1	15 days	Mon 15/09/14	Fri 03/10/14	
44			Necesidad/viabilidad FTS2	15 days	Mon 16/03/15	Fri 03/04/15	
45			Estrategia de uso de la Herramienta IFSET	15 days	Mon 15/09/14	Fri 03/10/14	
46			**Evaluación de la Seguridad Operacional**	**130 days**	**Mon 06/04/15**	**Fri 02/10/15**	
47			Elaboración documento preliminar	10 days	Mon 06/04/15	Fri 17/04/15	40
48			Taller Análise de Riesgo	5 days	Mon 14/09/15	Fri 18/09/15	47,41
49			Elaboración Documento Final	10 days	Mon 21/09/15	Fri 02/10/15	48
50			**Aprobación de Aeronaves y Operadores**	**20 days**	**Mon 01/09/14**	**Fri 26/09/14**	
51			Verificar estatus aprobación RNAV-5	15 days	Mon 01/09/14	Fri 19/09/14	18
52			Estudiar viabilidad de aprobacion RNP2	5 days	Mon 22/09/14	Fri 26/09/14	51

Project: Proyecto PBN
Date: Wed 29/10/14

Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
53			**Normas y Procedimientos**	**130 days**	**Mon 16/03/15**	**Fri 11/09/15**	
54			AIC Divulgación Inicial	15 days	Mon 16/03/15	Fri 03/04/15	
55			Sistematica de Coordinación Provedores Base de Datos	10 days	Mon 16/03/15	Fri 27/03/15	
56			Enmienda AIP	15 days	Mon 24/08/15	Fri 11/09/15	
57			Modelo de Cartas de Acuerdo Operacional	15 days	Mon 24/08/15	Fri 11/09/15	
58			Enmienda ANP	15 days	Mon 24/08/15	Fri 11/09/15	
59			**Decisión de Implantación**	**5 days**	**Mon 19/10/15**	**Fri 23/10/15**	
60			Verificar documentación ATS	5 days	Mon 19/10/15	Fri 23/10/15	
61			Verificar Validación	5 days	Mon 19/10/15	Fri 23/10/15	
62			Verificar estado de aprobación de las operaciones	5 days	Mon 19/10/15	Fri 23/10/15	
63			Verificar avaliación de seguridad	5 days	Mon 19/10/15	Fri 23/10/15	
64			**Monitoreo pos-implantación**	**130 days**	**Mon 16/03/15**	**Fri 11/09/15**	
65			Definir herramientas	15 days	Mon 16/03/15	Fri 03/04/15	
66			Establecer metodologia	15 days	Mon 24/08/15	Fri 11/09/15	
67			**Reuniones ATSRO**	**240 days**	**Mon 20/10/14**	**Fri 18/09/15**	
68			ATSRO 6	5 days	Mon 20/10/14	Fri 24/10/14	12,19,24,30,
69			**ATSRO7**	**5 days**	**Mon 06/04/15**	**Fri 10/04/15**	**14,20,25,31**
70			Proponer actividad a la SAMIG14	5 days	Mon 03/11/14	Fri 07/11/14	
71			Presentar proposta a la reunión RCC	3 days	Wed 11/02/15	Fri 13/02/15	
72			**ATSRO8**	**5 days**	**Mon 14/09/15**	**Fri 18/09/15**	**16,21,26,32**
73			Proponer actividad a la SAMIG14	5 days	Mon 03/11/14	Fri 07/11/14	
74			Presentar proposta a la reunión RCC	3 days	Wed 11/02/15	Fri 13/02/15	73
75			**Contratación Consultores**	**320 days**	**Mon 23/06/14**	**Fri 11/09/15**	
76			Iniciar proceso contratación 1	5 days	Mon 23/06/14	Fri 27/06/14	
77			Contratación consultores 1	15 days	Mon 15/09/14	Fri 03/10/14	
78			Proponer actividad a la SAMIG14	5 days	Mon 10/11/14	Fri 14/11/14	

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
79			Presentar proposta a la reunión RCC	3 days	Wed 11/02/15	Fri 13/02/15	
80			Iniciar Proceso Contratación 2	5 days	Mon 10/11/14	Fri 14/11/14	
81			Contratación consultores 2	13 days	Mon 16/03/15	Wed 01/04/15	
82			Iniciar proceso contratación 3	5 days	Mon 04/05/15	Fri 08/05/15	
83			Contratación consultores 3	15 days	Mon 24/08/15	Fri 11/09/15	
84			**Documentación**	**260 days**	**Mon 15/09/14**	**Fri 11/09/15**	
85			Determinar contenido Documento Versión 3	5 days	Mon 23/02/15	Fri 27/02/15	
86			Documento Versión 3 preliminar 1	15 days	Mon 15/09/14	Fri 03/10/14	
87			Documento Versión 3 preliminar 2	13 days	Mon 16/03/15	Wed 01/04/15	
88			Documento Versión 3 final	15 days	Mon 24/08/15	Fri 11/09/15	
89			Capacitación	60 days	Mon 22/02/16	Fri 13/05/16	
90			**Publicación**	**61 days**	**Thu 31/03/16**	**Thu 23/06/16**	**59**
91			Publicación Enmienda AIP	1 day	Thu 31/03/16	Thu 31/03/16	
92			Publicación Trigger NOTAM	1 day	Thu 09/06/16	Thu 09/06/16	
93			Entrada en Vigencia	1 day	Thu 23/06/16	Thu 23/06/16	
94			**TMA**	**1 day**	**Thu 12/06/14**	**Thu 12/06/14**	
95			**Definir un proceso de report semestral de implantación de nuevos procedimientos**	**60 days**	**Mon 25/08/14**	**Fri 14/11/14**	
98			**Argentina**	**710 days?**	**Fri 21/02/14**	**Thu 10/11/16**	
99			Implantación TMA Baires				
100			**PLANIFICACION**	**216 days**	**Fri 21/02/14**	**Fri 19/12/14**	
101			Acuerdo sobre los requisitos operacionales, Creación del equipo de diseño del espacio aéreo, Acuerdo sobre los objetivos, el alcance y los plazos	216 days	Fri 21/02/14	Fri 19/12/14	
102			Análisis del escenario de referencia	216 days	Fri 21/02/14	Fri 19/12/14	

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
103			Selección de los criterios y politicas de seguridad operacional y los criterios de performance requerida	12 days	Wed 19/03/14	Thu 03/04/14	
104			Acordar los supuestos CNS/ATM sobre los que se va a trabajar: elementos habilitantes y restricciones CNS/ATM que serán consideradas	5 days	Fri 04/04/14	Thu 10/04/14	
105			**DISENO**	**261 days**	**Fri 21/02/14**	**Fri 20/02/15**	
106			Diseño del Espacio Aéreo, Rutas y Circuitos de Espera (primera iteración)	114 days	Tue 15/07/14	Fri 19/12/14	
107			Diseño inicial de procedimientos (primera iteración)	114 days	Tue 15/07/14	Fri 19/12/14	
108			Diseño del Espacio Aéreo, Rutas y Circuitos de Espera (segunda iteración)	114 days	Tue 15/07/14	Fri 19/12/14	
109			Diseño inicial de procedimientos (segunda iteración)	159 days	Tue 15/07/14	Fri 20/02/15	
110			Diseño de los volúmenes y sectores ATC.	159 days	Tue 15/07/14	Fri 20/02/15	
111			Finalizar el diseño del espacio aéreo.	261 days	Fri 21/02/14	Fri 20/02/15	
112			Confirmación de las especificación para la navegación OACI necesarias.	261 days	Fri 21/02/14	Fri 20/02/15	
113			**VALIDACIÓN**	**476 days?**	**Fri 21/02/14**	**Fri 18/12/15**	
114			* Validación del concepto de espacio aéreo a través de la Simulación en tiempo acelerado (si se dispone de la herramienta), validación del modelo de ruido, pruebas de simulación ATC en vivo con una muestra de tráfico etc		Fri 21/02/14		
115			* Validación del concepto de espacio aéreo a través de la Simulación en tiempo real (preparación y ejercicio)	85 days	Mon 02/03/15	Fri 26/06/15	

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID	ℹ	Task Mode	Task Name	Duration	Start	Finish	Predecessors
116			Finalización del diseño de procedimientos y proceso de validación (considerar que se debe publicar dos ciclos AIRAC antes de la implantación) - Elaboración del material de instrucción - Entrenamiento ATC** - Elaboración de Publicaciones	210 days	Mon 02/03/15	Fri 18/12/15	
117			**IMPLANTACIÓN**	**334 days?**	**Mon 03/08/15**	**Thu 10/11/16**	
118			Planificación de implantación - Publicación de nuevos procedimientos (cartas de rutas, de procedimientos y tablas de codificación) - Desarrollo de las Cartas de Acuerdo Operacionales (LoA) - Introducción de cambios al sistema ATC	150 days	Mon 03/08/15	Fri 26/02/16	
119			Implantación de los cambios en el espacio aéreo (fecha AIRAC)	150 days	Mon 03/08/15	Fri 26/02/16	
120			Fecha definitiva de implementación (fecha AIRAC)		fecha AIRAC	Thu 10/11/16	
121			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
122			Estado en 2014				
123			Estado en 2015				
124			Estado en 2016				
125			**Bolivia**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
126			Implantación TMA Santa Cruz				
127			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
128			Estado en 2014				
129			Estado en 2015				
130			Estado en 2016				
131			**Brasil**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
132			Implantación TMA Curitiba, Florianopolis y Porto Alegre (PBN SUR)				
133			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
134			Estado en 2014				

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
135			Estado en 2015				
136			Estado en 2016				
137			**Chile**	**529 days?**	**Fri 21/02/14**	**Wed 02/03/16**	
138			Implantación TMA Santiago				
139			**PLANIFICACION**	**48 days**	**Thu 12/06/14**	**Mon 18/08/14**	
140			Acuerdo sobre los requisitos operacionales, Creación del equipo de diseño del espacio aéreo, Acuerdo sobre los objetivos, el alcance y los plazos	12 days	Thu 12/06/14	Fri 27/06/14	
141			Análisis del escenario de referencia	21 days	Mon 30/06/14	Mon 28/07/14	140
142			Selección de los criterios y politicas de seguridad operacional y los criterios de performance requerida	10 days	Tue 29/07/14	Mon 11/08/14	141
143			Acordar los supuestos CNS/ATM sobre los que se va a trabajar: elementos habilitantes y restricciones CNS/ATM que serán consideradas	5 days	Tue 12/08/14	Mon 18/08/14	142
144			**DISENO**	**42 days**	**Tue 19/08/14**	**Wed 15/10/14**	
145			Diseño del Espacio Aéreo, Rutas y Circuitos de Espera (primera iteración)	10 days	Tue 19/08/14	Mon 01/09/14	143
146			Diseño inicial de procedimientos (primera iteración)	5 days	Tue 02/09/14	Mon 08/09/14	145
147			Diseño del Espacio Aéreo, Rutas y Circuitos de Espera (segunda iteración)	5 days	Tue 09/09/14	Mon 15/09/14	146
148			Diseño inicial de procedimientos (segunda iteración)	5 days	Tue 16/09/14	Mon 22/09/14	147
149			Diseño de los volúmenes y sectores ATC.	5 days	Tue 23/09/14	Mon 29/09/14	148
150			Finalizar el diseño del espacio aéreo.	10 days	Tue 30/09/14	Mon 13/10/14	149
151			Confirmación de las especificación para la navegación OACI necesarias.	2 days	Tue 14/10/14	Wed 15/10/14	150
152			**VALIDACIÓN**	**150 days**	**Thu 16/10/14**	**Wed 13/05/15**	

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
153			* Validación del concepto de espacio aéreo a través de la Simulación en tiempo acelerado (si se dispone de la herramienta), validación del modelo de ruido, pruebas de simulación ATC en vivo con una muestra de tráfico etc	60 days	Thu 16/10/14	Wed 07/01/15	151
154			* Validación del concepto de espacio aéreo a través de la Simulación en tiempo real (preparación y ejercicio)	30 days	Thu 08/01/15	Wed 18/02/15	153
155			Finalización del diseño de procedimientos y proceso de validación (considerar que se debe publicar dos ciclos AIRAC antes de la implantación) - Elaboración del material de instrucción - Entrenamiento ATC** - Elaboración de Publicaciones	60 days	Thu 19/02/15	Wed 13/05/15	154
156			**IMPLANTACIÓN**	**210 days**	**Thu 14/05/15**	**Wed 02/03/1**	
157			Días de trabajo adicionales para absorver potenciales demoras no previstas y trabajo AIS	30 days	Thu 14/05/15	Wed 24/06/15	155
158			Planificación de implantación - Publicación de nuevos procedimientos (cartas de rutas, de procedimientos y tablas de codificación) - Desarrollo de las Cartas de Acuerdo Operacionales (LoA) - Introducción de cambios al sistema ATC	120 days	Thu 25/06/15	Wed 09/12/15	157
159			Implantación de los cambios en el espacio aéreo (fecha AIRAC)	60 days	Thu 10/12/15	Wed 02/03/1	158
160			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
161			Estado en 2014				
162			Estado en 2015				
163			Estado en 2016				
164			**Colombia**	**402 days?**	**Mon 02/06/14**	**Tue 15/12/15**	
165			Implantación TMA Bogotá				
166			**PLANIFICACION**	**1 day?**	**Mon 02/06/14**	**Mon 02/06/1**	
167			Acuerdo sobre los requisitos operacionales	20 days	Mon 02/06/14	Fri 27/06/14	

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
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Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
168			Creación del equipo de diseño del espacio aéreo	8 days	Mon 30/06/14	Wed 09/07/14	167
169			Acuerdo sobre los objetivos, el alcance y los plazos	3 days	Thu 10/07/14	Mon 14/07/14	168
170			Análisis del escenario de referencia	20 days	Tue 15/07/14	Mon 11/08/14	169
171			Selección de los criterios de seguridad operacional, la política conexa y los criterios de actuación	15 days	Tue 12/08/14	Mon 01/09/14	170
172			Acuerdo sobre las hipótesis, elementos habilitantes y restricciones CNS/ATM	20 days	Tue 02/09/14	Mon 29/09/14	171
173			**DISEÑO**	**105 days**	**Tue 30/09/14**	**Mon 23/02/15**	
174			Diseño conceptual de SID/STAR, rutas y esperas del espacio aéreo	30 days	Tue 30/09/14	Mon 10/11/14	172
175			Diseño inicial de los procedimientos	30 days	Tue 11/11/14	Mon 22/12/14	174
176			Diseño de los volúmenes y sectores del espacio aéreo	30 days	Tue 23/12/14	Mon 02/02/15	175
177			Confirmación de la especificación OACI para la navegación	15 days	Tue 03/02/15	Mon 23/02/15	176
178			**VALIDACIÓN**	**80 days**	**Tue 24/02/15**	**Mon 15/06/15**	
179			Validación del concepto de espacio aéreo	30 days	Tue 24/02/15	Mon 06/04/15	177
180			Finalización del diseño de procedimientos	30 days	Tue 07/04/15	Mon 18/05/15	179
181			Validación de procedimientos	20 days	Tue 19/05/15	Mon 15/06/15	180
182			**IMPLEMENTACIÓN**	**131 days**	**Tue 16/06/15**	**Tue 15/12/15**	
183			Integración del sistema ATC	30 days	Tue 16/06/15	Mon 27/07/15	181
184			Elaboración de notificaciones y de material de instrucción	20 days	Tue 28/07/15	Mon 24/08/15	183
185			Ejecución del programa de instrucción y entrenamiento	50 days	Tue 25/08/15	Mon 02/11/15	184
186			Implantación	1 day	Tue 03/11/15	Tue 03/11/15	185
187			Realización de un examen pos implantación	30 days	Wed 04/11/15	Tue 15/12/15	186
188			<New Task>				
189			<New Task>				
190			<New Task>				

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
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Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
191			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
192			Estado en 2014				
193			Estado en 2015				
194			Estado en 2016				
195			**Ecuador**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
196			Implantación TMA Guayaquil				
197			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
198			Estado en 2014				
199			Estado en 2015				
200			Estado en 2016				
201			**Guyana**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
202			Implantación TMA X				
203			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
204			Estado en 2014				
205			Estado en 2015				
206			Estado en 2016				
207			**Guyana Francesa**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
208			Implantación TMA X				
209			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
210			Estado en 2014				
211			Estado en 2015				
212			Estado en 2016				
213			**Panama**	**276 days?**	**Thu 12/06/14**	**Thu 02/07/15**	
214			**Implantación TMA Panama**	**276 days**	**Thu 12/06/14**	**Thu 02/07/15**	
215			**PLANIFICACION**	**63 days**	**Thu 12/06/14**	**Mon 08/09/14**	

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
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Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
216			Acuerdo sobre los requisitos operacionales, Creación del equipo de diseño del espacio aéreo, Acuerdo sobre los objetivos, el alcance y los plazos	**10 days**	Thu 12/06/14	Wed 25/06/14	
217			Análisis del escenario de referencia	**25 days**	Thu 26/06/14	Wed 30/07/14	216
218			Selección de los criterios y politicas de seguridad operacional y los criterios de performance requerida	**13 days**	Thu 31/07/14	Mon 18/08/14	217
219			Acordar los supuestos CNS/ATM sobre los que se va a trabajar elementos habilitantes y restricciones CNS/ATM que serán consideradas	**15 days**	Tue 19/08/14	Mon 08/09/14	218
220			**DISENO**	**69 days**	**Tue 09/09/14**	**Fri 12/12/14**	
221			Diseño del Espacio Aéreo, Rutas y Circuitos de Espera (primera iteración)	**14 days**	Tue 09/09/14	Fri 26/09/14	219
222			Diseño inicial de procedimientos (primera iteración)	**20 days**	Mon 29/09/14	Fri 24/10/14	221
223			Diseño del Espacio Aéreo, Rutas y Circuitos de Espera (segunda iteración)	**10 days**	Mon 27/10/14	Fri 07/11/14	222
224			Diseño inicial de procedimientos (segunda iteración)	**5 days**	Mon 10/11/14	Fri 14/11/14	223
225			Diseño de los volúmenes y sectores ATC.	**10 days**	Mon 17/11/14	Fri 28/11/14	224
226			Finalizar el diseño del espacio aéreo.	**5 days**	Mon 01/12/14	Fri 05/12/14	225
227			Confirmación de las especificación para la navegación OACI necesarias.	**5 days**	Mon 08/12/14	Fri 12/12/14	226
228			**VALIDACIÓN**	**68 days**	**Mon 15/12/14**	**Wed 18/03/1**	
229			* Validación del concepto de espacio aéreo a través de la Simulación en tiempo acelerado (si se dispone de la herramienta), validación del modelo de ruido, pruebas de simulación ATC en vivo con una muestra de tráfico etc	**0 days**	Mon 15/12/14	Mon 15/12/14	227
230			* Validación del concepto de espacio aéreo a través de la Simulación en tiempo real (preparación y ejercicio)	**23 days**	Mon 15/12/14	Wed 14/01/15	229

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
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Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
231			Finalización del diseño de procedimientos y proceso de validación (considerar que se debe publicar dos ciclos AIRAC antes de la implantación) - Elaboración del material de instrucción - Entrenamiento ATC** - Elaboración de Publicaciones	**45 days**	Thu 15/01/15	Wed 18/03/15	230
232			**IMPLANTACIÓN**	**76 days**	**Thu 19/03/15**	**Thu 02/07/15**	
233			Días de trabajo adicionales para absorver potenciales demoras no previstas y trabajo AIS	**15 days**	Thu 19/03/15	Wed 08/04/15	231
234			Planificación de implantación - Publicación de nuevos procedimientos (cartas de rutas, de procedimientos y tablas de codificación) - Desarrollo de las Cartas de Acuerdo Operacionales (LoA) - Introducción de cambios al sistema ATC	**60 days**	Thu 09/04/15	Wed 01/07/15	233
235			Implantación de los cambios en el espacio aéreo (fecha AIRAC)	**1 day**	Thu 02/07/15	Thu 02/07/15	234
236			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
237			Estado en 2014				
238			Estado en 2015				
239			Estado en 2016				
240			**Paraguay**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
241			Implantación TMA Asunción				
242			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
243			Estado en 2014				
244			Estado en 2015				
245			Estado en 2016				
246			**Peru**	**152 days?**	**Thu 12/06/14**	**Fri 09/01/15**	
247			**Implantación TMA Cuzco**	**127 days?**	**Thu 17/07/14**	**Fri 09/01/15**	

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Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
248			FASE DE PLANIFICACIÓN ACTIVIDAD 1: Acuerdo sobre los requisitos operacionales OK ACTIVIDAD 2: Creación del equipo de diseño del espacio aéreo OK ACTIVIDAD 3: Acuerdo sobre los objetivos, el alcance y el plazo ACTIVIDAD 4: Análisis del escenario de refe	**2 days**	***Thu 17/07/14***	Fri 18/07/14	
249			ACTIVIDAD 4: Análisis del escenario de referencia - DATA SURVEY CUSCO	**7 days**	Sun 20/07/14	Sat 26/07/14	
250			ACTIVIDADES DE DISEÑO - ENTREGA DE DOCUMENTACIÓN			Wed 13/08/14	
251			ACTIVIDADES DE DISEÑO - 1 era REUNIÓN DE SEGUIMIENTO			Tue 26/08/14	
252			ACTIVIDADES DE DISEÑO - ACTUALIZACIÓN DE LA DOCUMENTACIÓN			Mon 01/09/14	
253			ACTIVIDADES DE DISEÑO - 2 da REUNIÓN DE SEGUIMIENTO			Tue 02/09/14	
254			ACTIVIDADES DE DISEÑO - ENTREGA FINAL DE LA DOCUMENTACIÓN			Mon 03/11/14	
255			ACTIVIDADES DE DISEÑO - 3° REUNIÓN DE SEGUIMIENTO	**2 days**	Thu 20/11/14	Fri 21/11/14	
256			ACTIVIDADES DE DISEÑO - ENTREGA FINAL DEL PAQUETE DE DISEÑOS			Fri 05/12/14	
257			FASE DE VALIDACIÓN ACTIVIDAD 11: Validación del concepto de espacio aéreo - SIMULACIÓN			Wed 31/12/14	
258			ACTIVIDAD 12 + 13: Finalizacion + Validacion del diseño - ENTRENAMIENTO	**3 days**	Wed 07/01/15	Fri 09/01/15	
259			ACTIVIDAD 12 + 13: Finalizacion + Validacion del diseño - VUELO DE DEMOSTRACIÓN	TBC			

Project: Proyecto PBN
Date: Wed 29/10/14

Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
260			FASE IMPLANTACION ACTIVIDAD 14 + 15 : Planificacion de la implantacion ACTIVIDAD 16: Implantacion - COORDINACIONES CON AREAS ATC Y AIS DE CORPAC	TBC			
261			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
262			Estado en 2014				
263			Estado en 2015				
264			Estado en 2016				
265			**Surinam**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
266			Implantación TMA X				
267			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
268			Estado en 2014				
269			Estado en 2015				
270			Estado en 2016				
271			**Uruguay**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
272			Implantación TMA Carrasco				
273			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
274			Estado en 2014				
275			Estado en 2015				
276			Estado en 2016				
277			**Venezuela**	**252 days?**	**Wed 11/06/14**	**Thu 28/05/15**	
278			**Implantación TMA Maiquetía**	**252 days**	**Wed 11/06/14**	**Thu 28/05/15**	
279			Tareas 1-3	8 days	Wed 11/06/14	Fri 20/06/14	
280			Tarea 4	18 days	Mon 23/06/14	Wed 16/07/14	279
281			Tarea 5	8 days	Thu 17/07/14	Mon 28/07/14	280
282			Tarea 6	5 days	Tue 29/07/14	Mon 04/08/14	281
283			Tarea 7	8 days	Tue 05/08/14	Thu 14/08/14	282

Project: Proyecto PBN
Date: Wed 29/10/14

Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
284			Tarea 8	5 days	Fri 15/08/14	Thu 21/08/14	283
285			Tarea 7B	3 days	Fri 22/08/14	Tue 26/08/14	284
286			Tarea 8B	5 days	Wed 27/08/14	Tue 02/09/14	285
287			Tarea 9	3 days	Wed 03/09/14	Fri 05/09/14	286
288			Tarea 7-9	3 days	Mon 08/09/14	Wed 10/09/14	287
289			Tarea 10	2 days	Thu 11/09/14	Fri 12/09/14	288
290			Tarea 11	20 days	Mon 15/09/14	Fri 10/10/14	289
291			Tarea 11B	22 days	Mon 13/10/14	Tue 11/11/14	290
292			Tarea 12-13	20 days	Wed 12/11/14	Tue 09/12/14	291
293			Demoras	8 days	Wed 10/12/14	Fri 19/12/14	292
294			Demoras2	8 days	Mon 05/01/15	Wed 14/01/15	293
295			Tareas 14-15	40 days	Thu 15/01/15	Wed 11/03/15	294
296			Tarea 16	56 days	Thu 12/03/15	Thu 28/05/15	295
297			**Estado Implantación SID/STAR**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
298			Estado en 2014				
299			Estado en 2015				
300			Estado en 2016				
301			**Aproximación**	**112 days?**	**Thu 12/06/14**	**Fri 14/11/14**	
302			**Definir un proceso de report semestral de implantación de nuevos procedimientos**	**60 days**	**Mon 25/08/14**	**Fri 14/11/14**	
303			Elaborar proposta a la SAM IG 14	5 days	Mon 25/08/14	Fri 29/08/14	
304			Discutir e aprobar proceso de report mensual de nuevos procedimientos	5 days	Mon 10/11/14	Fri 14/11/14	
305			**Argentina**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
306			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
307			Estado en 2014				

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Date: Wed 29/10/14

Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
308			Estado en 2015				
309			Estado en 2016				
310			**Bolivia**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
311			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
312			Estado en 2014				
313			Estado en 2015				
314			Estado en 2016				
315			**Brasil**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
316			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
317			Estado en 2014				
318			Estado en 2015				
319			Estado en 2016				
320			**Colombia**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
321			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
322			Estado en 2014				
323			Estado en 2015				
324			Estado en 2016				
325			**Ecuador**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
326			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
327			Estado en 2014				
328			Estado en 2015				
329			Estado en 2016				
330			**Guyana**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
331			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
332			Estado en 2014				
333			Estado en 2015				

Project: Proyecto PBN
Date: Wed 29/10/14

Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
334			Estado en 2016				
335			**Guyana Francesa**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
336			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
337			Estado en 2014				
338			Estado en 2015				
339			Estado en 2016				
340			**Panama**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
341			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
342			Estado en 2014				
343			Estado en 2015				
344			Estado en 2016				
345			**Paraguay**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
346			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
347			Estado en 2014				
348			Estado en 2015				
349			Estado en 2016				
350			**Peru**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
351			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
352			Estado en 2014				
353			Estado en 2015				
354			Estado en 2016				
355			**Surinam**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
356			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
357			Estado en 2014				
358			Estado en 2015				
359			Estado en 2016				

Project: Proyecto PBN
Date: Wed 29/10/14

Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
Milestone	Inactive Milestone	Start-only
Summary	Inactive Summary	Finish-only
Project Summary	Manual Task	Deadline
External Tasks	Duration-only	Progress

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors
360			**Uruguay**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
361			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
362			Estado en 2014				
363			Estado en 2015				
364			Estado en 2016				
365			**Venezuela**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
366			**Estado Implantación Aprox**	**1 day?**	**Thu 12/06/14**	**Thu 12/06/14**	
367			Estado en 2014				
368			Estado en 2015				
369			Estado en 2016				
370			**Talleres PBN**	**205 days**	**Mon 10/11/14**	**Fri 21/08/15**	
371			**Taller PBN 3**	**5 days**	**Mon 09/03/15**	**Fri 13/03/15**	
372			Proponer actividad a la SAMIG14	5 days	Mon 10/11/14	Fri 14/11/14	
373			Presentar proposta a la reunión RCC	3 days	Wed 11/02/15	Fri 13/02/15	
374			**Taller PBN 4**	**5 days**	**Mon 17/08/15**	**Fri 21/08/15**	
375			Proponer actividad a la SAMIG14	5 days	Mon 10/11/14	Fri 14/11/14	
376			Presentar proposta a la reunión RCC	3 days	Wed 11/02/15	Fri 13/02/15	
377				1 day?	Mon 02/06/14	Mon 02/06/14	

Project: Proyecto PBN
Date: Wed 29/10/14

Task	External Milestone	Manual Summary Rollup
Split	Inactive Task	Manual Summary
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SAM ATS ROUTE NETWORK OPTIMIZATION PLAN

VERSION 03 – STAGE 1

(Spanish only)

**ACTIVITIES TO BE CONSIDERED FOR INCLUSION
IN GREPECAS PROJECT A1 - PBN**

- Provision of information on number of flights and types of aircraft flying the route, in order to calculate fuel savings;

- Inform the Secretariat of special areas or airspaces that have been optimised within the framework of the FUA concept (calculation of miles or square kilometres, and number of optimised levels);

- Updating of the database and maps of automated systems;

- Updating of the database of AMHS systems;

- Definition of the coordinates of crossings with other routes, assignment of 5-letter designators, and validation in the ICARD system by the Regional Office;

- Coordination via teleconferencing with the Secretariat and the States, of the coordinates of points in adjacent FIRs that contain each route, and ICARD processing validated by the Regional Office;

- Development by the Secretariat of the amendment process, for approval by Headquarters;

- Approval of the amendment consultation cycle by States;

- Definition of the date of issuance and effective date of the corresponding AIRAC two periods following the approval of the Amendment;

- Updating of the letters of agreement and contingency plans, as needed.

AIC

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21/13

STANDARD PHRASEOLOGY FOR STAR/SID RNAV/RNP OR PROCEDURAL EXECUTION

(DECEA - Brazil)

BRASIL

DEPARTAMENTO DE CONTROLE DO ESPAÇO AÉREO

SUBDEPARTAMENTO DE OPERAÇÕES

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21/13

12 DEC 2013

STANDARD PHRASEOLOGY FOR STAR/SID RNAV/RNP OR PROCEDURAL EXECUTION

1 PRELIMINARY GUIDELINES

1.1 PURPOSE

This Aeronautical Information Circular (AIC) aims to provide the necessary information to support the RNAV/RNP navigation in a SID/STAR as well as procedural procedures which have ATC restrictions.

1.2 SCOPE

The information contained in this AIC applies to ATS facilities and all those who, while on duty, intend to operate in the Brazilian airspace.

2 INTRODUCTION

2.1 The instrument flight rules procedures, developed according to ICAO document 8168-vol.2,named “Visual and instrument flight procedure building” aim to protect the aircraft using the description of essential areas and obstacle-clearance margin parameters, so as to provide, in a safe way, the accomplishment of instrument operations. The referred ICAO document is used as a basic guide for States and International Organizations that produce air navigation procedure charts, which results in equal practices in all airdromes where these procedures are accomplished.

2.2 The practices related to instrument flight procedures are defined on ICAO’s DOC 4444-PANS ATM (Air Traffic Management related Procedures for Air Navigation Services) including the ones associated to the authorization of their execution.

2.3 This way, based on both mentioned documents and according to one of the Performance-Based Navigation (PBN) principles, it is fundamental to use a phraseology that provides a clear mutual communication between airmen and ATCO so as to provide the operation safety during all phases of flight

3 CONCEPTS

The terms and expressions related below, mentioned in this instruction, have the following meaning:

CANCELLED RESTRICTIONS

Expression used by ATC that means the total or partial clearance restrictions on a SID/STAR, during a procedure accomplishment.

CLIMB VIA

Term used by ATC that determines that the pilot shall accomplish all ATC vertical restrictions as published on a SID.

DESCEND VIA

Term used by ATC that determines that the pilot shall accomplish all ATC vertical restrictions as published on a STAR.

ATC GRADIENT

An angle, percent rated, in which the aircraft shall maintain so as to the safety ATC altitude will be achieved during the departure procedure. It is established in a specific airspace, with the aim of providing safety and efficiency in the air operations flow.

REMARK: The ATC gradient will always be published on chart.

MINIMA CLIMB GRADIENT

An angle, percent rated, in which the aircraft shall maintain so as the minimal obstacle clearance altitude during a departure procedure will be achieved. In case it is not published on chart, the standard minima climb rate is (3,3%),shall be performed.

REMARK: The minima climb gradient will always be published on chart when it is higher than 3,3%

SIGNIFICANT POINT

General expression which stands for a waypoint, fix or navaid.

STAR

Instrument arrival route which connects to a point, normally located on an ATS route, starting at another point from which an instrument approach procedure may be started. It can represent the OPEN STAR/CLOSED STAR concept.

- OPEN STAR - Instrument arrival procedure in which the last waypoint/fix represents a defined track, normally parallel to the runway and opposite to the landing direction, from what the aircraft will expect vectors by ATC to intercept the final approach
- CLOSED STAR - Instrument arrival procedure in which the last waypoint/ fix is the same as the approach procedure Initial Approach Fix or Inner Fix (IAF or IF).This way, the aircraft, after the arrival procedure starts the approach procedure without ATC issued vectors.

4 GENERAL CONSIDERATIONS

4.1 The pilot in command is responsible to accomplish all restrictions (vertical, lateral and speed) as published on procedural or RNAV/RNP STAR/SID, and shall inform the ATC immediately in case of being unable to accomplish.

4.2 In case of any ATC intervention (speed adjustments, vectoring, climb or descent instructions), or deviation required during a procedure execution, the pilot in command, when return to procedure profile, shall report to the ATC facility, as soon as possible, the possibility of being unable to perform further published restrictions (speed, vertical and lateral) associated to a significant point.

REMARK: Pilots shall use all the resources available on board to inform the ATC facility as soon as possible the instructions informed above.

4.3 The altitude/level restrictions cancelling by ATC during a SID execution shall not mean that the pilot in command should not accomplish the minima climb gradient for obstacle clearance as published in every SID phase. It also refers to accomplishment of the lateral profile on a SID, unless it is cleared in a different way by ATC facility.

4.4 In case of communications failure, the pilot shall accomplish what is prescribed on the current law as well as the instructions described on the charts published by DECEA.

4.5 If in a SID/RNAV SID, an aircraft is cleared by the ATC to climb disregarding part or all restrictions published on chart (level/altitude and/or speed), the expression "CANCELLED THE RESTRICTION/ALL RESTRICTIONS" will be used as an explicit instruction, detailing the restriction type and the significant point that it refers to.

4.6 If in a STAR/RNAV STAR, an aircraft is cleared by the ATC to descend disregarding part or all restrictions published on chart (level/altitude and/or speed), the expression "CANCELLED THE RESTRICTION/ALL RESTRICTIONS" will be used as an explicit instruction, detailing the restriction type and the significant point that it refers to.

REMARK: The ATCO shall consider the minima altitude in each sector before issuing an ATC clearance.

4.7 If there is any restrictions published on chart (level/altitude and/or speed), after the TERMINAL AREA, the pilot shall inform to ACC the name of current SID/RNAV SID and the expression " CLIMB VIA"

4.8 The pilot in command **shall readback all instructions** issued by ATC unit published in this AIC.

5 SPECIFIC FRASEOLOGY

5.1 AERODROME CONTROL SERVICE

5.1.1 ATC CLEARANCE

ATCO	PT CTA CLEARED TO RECIFE, FLIGHT LEVEL 370, VIA UW50, RASA1A DEPARTURE, XXX TRANSITION, SQUAWK 4147.
PILOT	GALEÃO CLEARANCE, PT CTA CLEARED TO RECIFE, FLIGHT LEVEL 370, VIA UW50, RASA1A DEPARTURE, XXX TRANSITION, SQUAWK 4147.
	GALEÃO CLEARANCE, PT CTA, UNABLE TO COMPLY ATC GRADIENT RASA 1A DEPARTURE, AS PUBLISHED.
ATCO (After APP facility coordination)	PT CTA CLEARED TO RECIFE, FLIGHT LEVEL 370, VIA UW50, RASA1A DEPARTURE, XXX TRANSITION, DISCONSIDER ATC GRADIENT, SQUAWK 4147.

5.2 APPROACH CONTROL SERVICE

5.2.1 Phraseology to comply a SID/RNAV SID accomplishing **all restrictions as published** on chart.

ATCO	PT CTA, RADAR CONTACT ON DEPARTURE, **CLIMB VIA** RASA 1A DEPARTURE, TO FLIGHT LEVEL 370

5.2.2 Phraseology to comply a SID/RNAV SID accomplishing **part of the restrictions published on chart.**

a) Level restrictions (above or below as published on chart)	
ATCO	PT BCT, **CLIMB AND MAINTAIN** FL100 RASA 1A DEPARTURE (XXXX) TRANSITION, **CANCELLED LEVEL RESTRICTIONS** UNTIL (significant point), THEN **CLIMB VIA** TO FLIGHT LEVEL 370.
	PT BCT **CLIMB VIA** RASA 1A DEPARTURE (XXXX) TRANSITION TO FLIGHT LEVEL 130. (time elapses...) PT BCT, REACH AND MAINTAIN FLIGHT LEVEL 130. AFTER (significant point), **CANCELLED ALL LEVEL RESTRICTIONS** (further instructions).

b) Lateral Profile Deviation	
ATCO	PT BCT, VECTORING (reason), TURN LEFT, HEADING 060, **CLIMB AND MAINTAIN** FL080. (further instructions). PT BCT, RESUME OWN NAVIGATION, FLY DIRECT (significant point) **CLIMB VIA** RASA 1A DEPATURE TO FLIGHT LEVEL 290.

5.2.3 Phraseology to comply a SID/RNAV SID **disregarding all published restrictions.**

ATCO	PT BCT, RADAR CONTACT ON DEPARTURE, **CLIMB AND MAINTAIN** FLIGHT LEVEL 240, RASA 1A, XXX TRANSITION, **CANCELLED ALL LEVEL RESTRICTIONS.**

5.2.4 Phraseology to comply a STAR/RNAV STAR accomplishing **all restrictions** published on the chart

PILOT	XX CONTROL, PT CTA, **DESCENDING VIA** ARENA 1A ARRIVAL, XXX TRANSITION, TO FL200 (further instructions).
ATCO	PT CTA, **DESCEND VIA** ARENA 1A ARRIVAL, XXX TRANSITION

5.2.5 Phraseology to comply a STAR/RNAV STAR accomplishing part of the restrictions published on chart a) level restrictions (above or below restrictions published on chart.

a) Restrições de nível (acima ou abaixo das restrições publicadas)	
PILOT	XX CONTROL, PT CTA, **DESCENDING VIA** ARENA 1A ARRIVAL, XXX TRANSITION, TO FL200 (further instructions).
ATCO	PT BCT, **DESCEND** AND MAINTAIN FL100 ARENA 1A ARRIVAL (XXX) TRANSITION, **CANCELLED LEVEL RESTRICTIONS** UNTIL (significant point), THEN **DESCEND VIA**.
	PT BCT DESCEND VIA ARENA 1A ARRIVAL, (XXX) TRANSITION TO FLIGHT LEVEL 130**.** **………………..** **...CANCELLED ALL LEVEL RESTRICTIONS (** further instructions).

b) Lateral Profile Deviation	
PILOT	-XX CONTROL, PT CTA, **DESCENDING VIA** ARENA 1A ARRIVAL, XXX TRANSITION, TO FL200 (further instructions).
ATCO	-PT BCT, VECTORING (reason), TURN LEFT, HEADING 060, DESCEND AND MAINTAIN FL080. (further instructions) …………………… PT BCT, RESUME OWN NAVIGATION, FLY DIRECT(significant point) **DESCEND VIA** ARENA 1A ARRIVAL.

5.2.6 Phraseology to comply a STAR/RNAV STAR disregarding **all published** restrictions

PILOT	XX CONTROL, PT CTA, **DESCENDING VIA** ARENA 1A ARRIVAL, XXX TRANSITION, TO FL200 (further instructions)
ATCO	PT BCT, DESCEND AND MAINTAIN FLIGHT LEVEL 100, ARENA 1A, XXX TRANSITION, **CANCELLED ALL LEVEL RESTRICTIONS.**

5.2.7 Phraseology to accomplish an OPEN STAR/RNAV OPEN STAR

a) Condition which an aircraft accomplishes a STAR and perform a cleared procedure (IAC).	
PILOT	XX APPROACH CONTROL, PT CTA, **DESCENDING VIA** ARENA 1A ARRIVAL, XXX TRANSITION, TO FL200 (further instructions)
ATCO	PT BCT **DESCEND VIA** ARENA 1A ARRIVAL, XXX TRANSITION, CLEARED FINAL XXX PROCEDURE, RUNWAY XX… OR

b) Condition which an aircraft perform s vectoring as published on chart and expect further instructions to intercept final approach.	
PILOT	XX APPROACH CONTROL, PT CTA, **DESCENDING VIA** ARENA 1A ARRIVAL, XXX TRANSITION, TO FL200 (further instructions).
ATCO	PT BCT **DESCEND VIA** ARENA 1A ARRIVAL, XXX TRANSITION, AT XXX POSITION (significant point as published on chart) HEADING XXX (as published on chart). EXPECT VECTORING TO FINAL APPROACH.

5.2.8 Phraseology to intercept the final course/track in a RNAV (IAC) approach procedure.

ATCO	PT CTA, VECTORS TO FINAL APPROACH COURSE. TURN LEFT HEADING XXX, CLEARED FOR THE RUNWAY XX RNAV APPROACH... PT CTA, RESUME OWN NAVIGATION AND FLY DIRECT TO (significant point) AND REPORT STABLISHED ON FINAL APPROACH TRACK/COURSE.

5.3 AREA CONTROL SERVICE

5.3.1 Phraseology to execute a SID/RNAV SID, accomplishing **all restrictions** published on chart.

PILOT	XX CENTER, PT CTA, **CLIMBING VIA** RASA 1A, TO FL 370.
ATCO	PT CTA, **CLIMB VIA**, TO FLIGHT LEVEL 370.

5.3.2 Phraseology to execute a SID/RNAV SID, accomplishing **part of restrictions** as published on chart.

PILOT	XX CENTER, PT CTA, **CLIMBING VIA** RASA 1A, TO FL 370.
ATCO	PT BCT, CLIMB AND MAINTAIN FL370, **CANCELLED ALL LEVEL RESTRICTIONS**, (further instructions).

5.3.3 Phraseology to execute a SID/RNAV SID accomplishing **all restrictions** published on chart.

ATCO	PT CTA, **DESCEND VIA** ARENA 1A ARRIVAL, XXX TRANSITION, TO FL 120.

5.3.4 Phraseology to execute a STAR/RNAV STAR, accomplishing **part of restrictions** published on chart.

a) Restrições de nível (acima ou abaixo das restrições publicadas)	
ATCO	PT BCT, **DESCEND** AND MAINTAIN FL100 ARENA 1A ARRIVAL (XXX) TRANSITION, **CANCELLED LEVEL RESTRICTIONS** UNTIL (significant point), THEN **DESCEND VIA**

b)Lateral Profile Deviation	
ATCO	PT BCT, VECTORING (reason), TURN LEFT, HEADING 060, DESCEND AND MAINTAIN FL200. (further instructions) …………………… PT BCT, RESUME OWN NAVIGATION, FLY DIRECT(significant point) DESCEND VIA ARENA 1A ARRIVAL, TO FL120.

5.3.5 Phraseology used to inform if unable to perform GNSS/RNP procedures

5.3.5.1 Loss of GNSS capacity

PILOT	XX CENTER, PT CTA, BASIC GNSS UNAVAILABLE DUE TO (reason, e.g. loss of RAIM or RAIM alert)
PILOT	XX APPROACH CONTROL, PT CTA, GBAS (or SBAS) UNAVAILABLE
ATCO	PT CTA, XX APPROACH CONTROL ROGER, ... …VECTOR TO… …EXECUTE XXX PROCEDURE…

5.3.5.2 Loss of RNP capacity

PILOT	XX APPROACH CONTROL, PT CTA, UNABLE RNP/RNAV (specify type) DUE TO (reason)
ATCO	PT CTA, XX APPROACH CONTROL ROGER, ... …VECTOR TO… …EXECUTE XXX PROCEDURE…

6 FINAL ARRANGEMENTS

6.1 DECEA provides a communication channel for you to send questions, suggestions, comments, criticisms, praise and error notifications through the Citizen Service Center at the following address: http://servicos.decea.gov.br/sac/index.cfm, by selecting the CONTATO ("Contact") option in the Área ("Area") menu.

6.2 The criteria and procedures set forth in this AIC does exempt pilots and ATS units from fulfilling the provisions contained in the legislation in force.

6.3 The approval of this AIC was published in DECEA Internal Bulletin nº 204 of 18 of October, 2013 **and cancels AIC A 22/09 of September 24, 2009.**

6.4 Cases not provided for in this Circular shall be solved by the Head of DECEA Operations Subdepartment.

AIC

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23/13

RESTRUCTURING OF RIO DE JANEIRO AND SÃO PAULO TERMINAL AREA (TMA) AIRSPACE WITH THE PERFORMANCE-BASED NAVIGATION (PBN) CONCEPT APPLICATION

(DECEA - Brazil)

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RESTRUCTURING OF RIO DE JANEIRO AND SÃO PAULO TERMINAL AREA(TMA) AIRSPACE WITH THE PERFORMANCE-BASED NAVIGATION (PBN) CONCEPT APPLICATION

1 PRELIMINARY ARRANGEMENTS

1.1 PURPOSE

This Aeronautical Information Circular (AIC) aims to disseminate the redesign of air flow in Rio de Janeiro and São Paulo TMA through the implementation of new conventional procedures and also new procedures based on the concept of Performance-Based Navigation in addition to the provisions of AIC A 20/13.

1.2 SCOPE

This Aeronautical Information Circular (AIC) applies to all those who, in the performance of their duties, may use the conventional or RNAV Standard Instrument Arrival (STAR), Standard Instrument Departure (SID) and Instrument Approach (IAC) procedures in the Rio de Janeiro and São Paulo TMA as well as routes that leave and/or arrive in these TMA.

1.3 ABBREVIATIONS

ANAC	National Civil Aviation Agency
ATS	Air Traffic Service
ATC	Air Traffic Control
CCO	Continuous Climb Operation
CDO	Continuous Descent Operation
CFIT	Controlled Flight into Terrain
CO_2	Carbon Dioxide
DECEA	Department of Airspace Control
DME	Distance Measuring Equipment
FIR	Flight Information Region
FPL	Filed Flight Plan
GNSS	Global Navigation Satellite Systems
ILS	Instrument Landing System
LNAV	Lateral Navigation
NDB	Non-Directional Beacon
OACI	International Civil Aviation Organization
PBN	Performance-Based Navigation
RNAV	Area Navigation

RNP	Required Navigation Performance
RPL	Repetitive Flight Plan
SID	Standard Instrument Departures
SISCEAB	Brazilian Airspace Control System
STAR	Standard Instrument Arrival
TMA	Terminal Control Area
VNAV	Vertical Navigation
VOR	VHF Omni-Directional Beacon

2 PBN OPERATIONAL IMPLEMENTATION IN RJ AND SP TMA

2.1 In order to meet national needs and to ensure that this development is harmonious and integrated into ICAO planning, DECEA conceived the SIRIUS Program, which, in the scope of SISCEAB, represents projects and activities required to implement the ATM Concept of Operation in Brazil, in order to meet the expectations of all the ATM Community and justify the investments required by its members.

2.2 The various developments contemplated by the SIRIUS Program relate to different areas of the ATM System. The project "PBN Operational Implementation" aims to meet a number of operational benefits, such as increasing the safety of air navigation and the efficient use of airspace as well as ensure the regularity of air operations.

2.3 The continuous growth in the aviation demands an increase in the capacity and a better use of the airspace. Increased operating efficiency, derived from the implementation of the Area Navigation (RNAV), means development of the air navigation implementation in all flight phases.

2.4 The redesign of the air traffic flow in TMA aims to meet a series of operational benefits such as: reduced aircraft flight time and distance, increased airspace capacity and efficiency, reduced fuel consumption, optimized descent/climb profiles, increased safety and regularity of air operations, reduced CFTI and airspace complexity.

3 SCOPE OF AIRSPACE

3.1 During the redesign process of Rio de Janeiro and São Paulo TMA air flow it became necessary to change the route network in the polygon formed by Vitória, Belo Horizonte, Brasília, São Paulo and Rio de Janeiro TMA in order to ensure an ideal air traffic flow between the main TMA of the country.

3.2 Based on the statistical data of current and future demand, entry and exit flows have been defined for each TMA to allow more direct routes and increase ATC capacity. Such routes have the purpose of connecting such TMA to the access to other regions of the country, especially North and Northeast.

3.3 Due to the large volume of information to be changed, such as: routes, fixes/*waypoints*, air navigation procedures (STAR, SID, IAC), ATC sectors, FIR limits, frequencies of air-ground communications etc and in order to ensure the safety and regularity of air operations, the redesign was divided into two phases: route structure (1st phase) and TMA structure (2nd phase).

3.4 The first phase was implemented in 2012. However, for the effective date of the second phase, some airways had to be adjusted to the TMA structure and thus had some changes such as flight direction, realignment and vertical limits.

3.5 The routes destined to/coming from São Paulo TMA (Figure 1) were redesigned in order to meet: more direct Departures/Arrivals to Brasília – 4 parallel routes were created, two departing from SP and two arriving. Accordingly, the SBGR flow was separated from the SBKP and SBSP flow in distinct airways, both for arrivals and departures.

a) a) More direct Departures/Arrivings to Brasília–four parallel routes were created, being two departures from SBSP and two arrivals to SBSP. In this sense, the flow from SBGR was separated from the flow from SBKP and SBSP in distinct airways, so much for arrivals as for departures;

b) The airways in the East of the TMA, destined to RJ TMA, were realigned with 5 parallel routes. The connection between RJ and SP TMA was conceived in order to attend an independent flow between the pairs of aerodromes SP/RJ and GR/GL. So, the connections SBRJ/SBSP and SBGR/SBGL are in distinct airways. The SBKP connection with RJ TMA is done on the same SBGR/SBGL connection. One route, more at South, was destined to traffic when crossing between TMA.

c) Four parallel airways were created leaving NE sector of SP TMA destined to BH TMA and NE Region of the country and to Europe. In this flow, there is also a separation of the flows between the aerodrome pairs of SP and BH TMA.

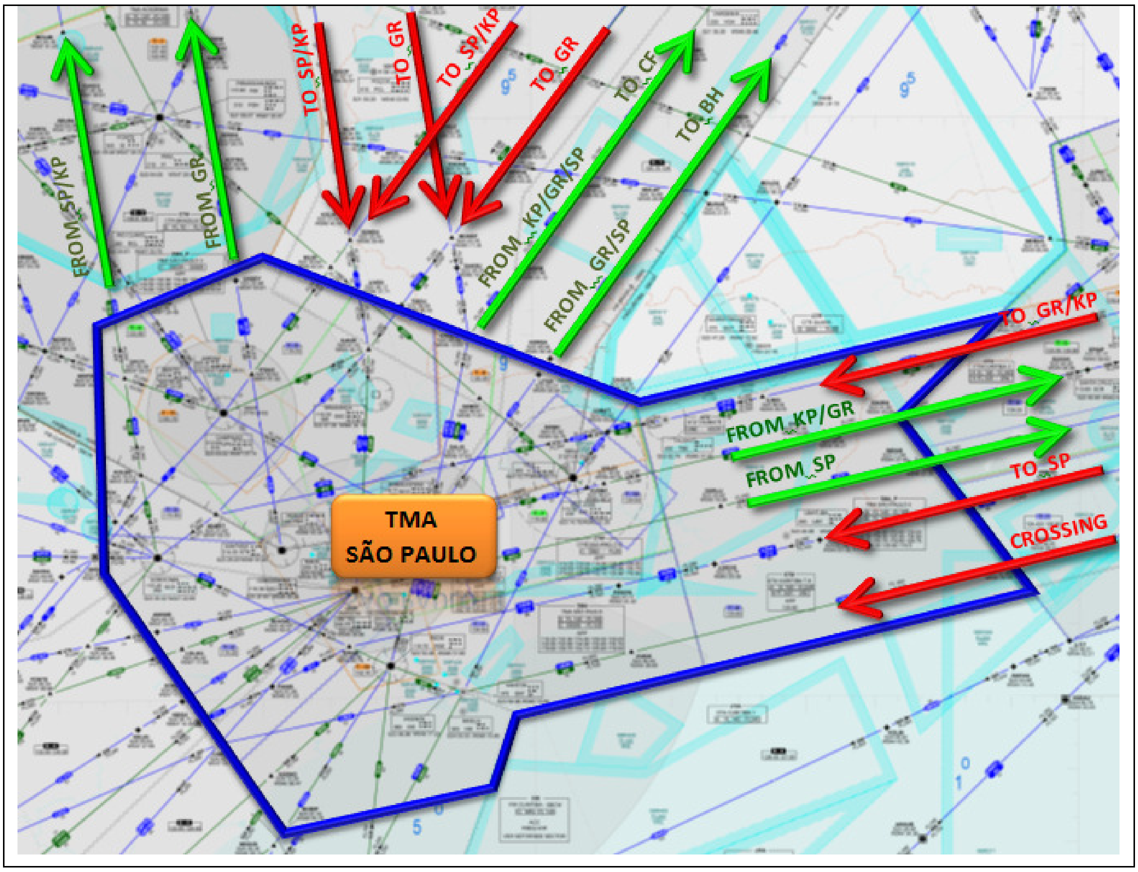


Figure 1 – Redesigned routes around São Paulo TMA.

3.6 The routes destined to/coming from Rio de Janeiro TMA (Figure 2) were redesigned in order to meet:

a) The airways between the SBBR/SBGL connections were arranged in an independent manner.

b) The airways between SP and RJ connections were mentioned in the above item and were arranged in order to attend independent flows between aerodrome pairs;

c) Routes with destination to/origin from Vitória and Northeast Region were realigned, allowing the creation of arrival and departure sectors.

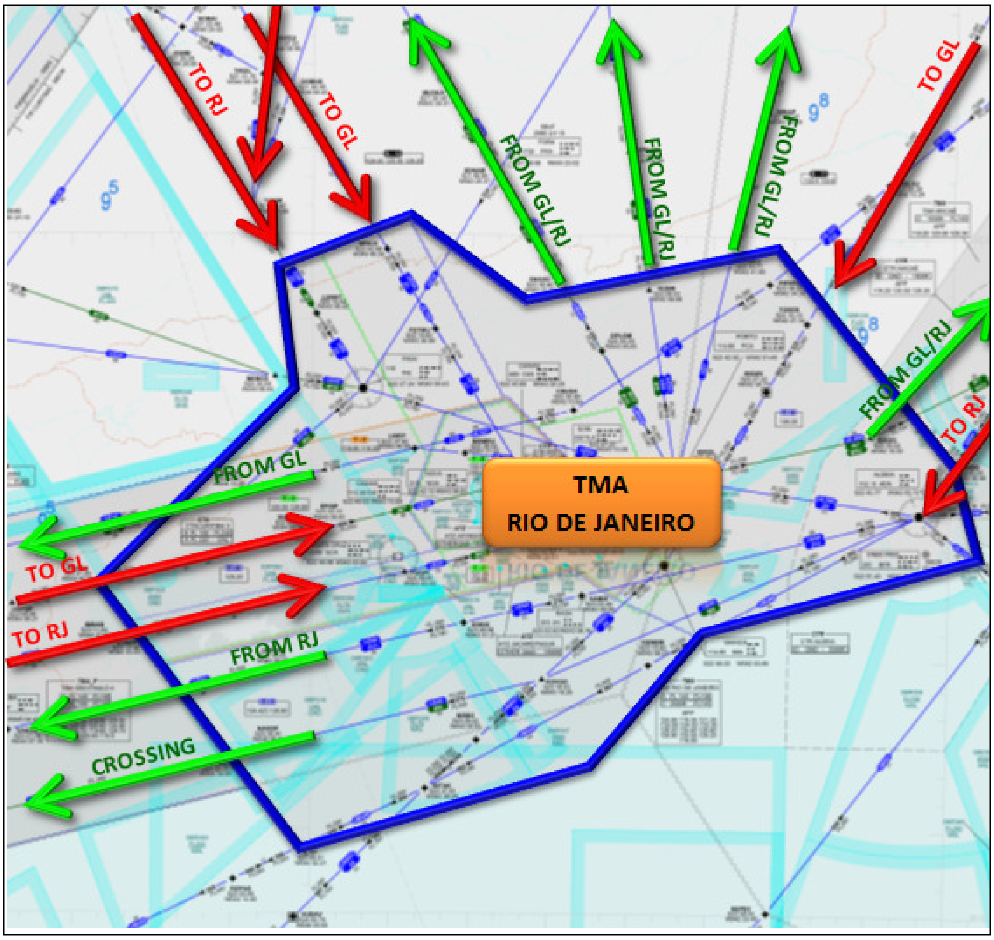


Figure 2 – Routes redesigned around Rio de Janeiro TMA.

3.7 The new implemented route structure has provided separation among flows of the TMA-RJ and TMA-SP main aerodromes. In the Tables 1, 2, 3 and 4 may be verified the main arrival and departure routes of TMA-RJ and TMA-SP. More details of the completed routes to be applied for flight planning must be obtained in the Aeronautical Information Publication and in the NOTAMs related to Preferential Routes, published by Air Navigation Management Center.

Table 1 - RNAV Route with destination to/origin from RJ TMA

TMA RJ – RNAV ROUTE					
SBGL					
AERODROME ORIGIN	ARRIVAL ROUTE		AERODROME DESTINATION	DEPARTURE ROUTE
SBSP	UZ42		SBSP	UZ44 / Z11
SBGR	UZ42		SBGR	UZ10 / Z10
SBKP	UZ42		SBKP	UZ10 / Z10
SBBR	UZ24 / Z1		SBBR	UM409
SBCF	UZ3		SBCF	UZ22
SBGO	UZ24 / Z1		SBGO	UM409
SBBH	UZ3		SBBH	UZ22
SBPA	UN857 / Z4		SBPA	UN857 / Z4
SBCT	UM400		SBCT	UZ45
SBFI	UM400		SBFI	UM400
SBFL	UN857 / Z4		SBFL	UN857 / Z4
SBSV	UN857		SBSV	UZ1
SBPS	UN857		SBPS	UN857
SBVT	UL327 / Z10		SBVT	UL206
SBRF	UN587		SBRF	UZ1
SBNT	UZ29		SBNT	UZ1
SBFZ	UZ29		SBFZ	UZ1

SBRJ				
AERODROME ORIGIN	ARRIVAL ROUTE		AERODROME DESTINATION	DEPARTURE ROUTE
SBSP	UZ37		SBSP	UZ44 / Z11
SBGR	UZ37		SBGR	UZ10 / Z10
SBKP	UZ37		SBKP	UZ10 / Z10
SBBR	UZ6 / Z2		SBBR	UM409
SBCF	UZ3		SBCF	UZ22
SBGO	UZ6 / Z2		SBGO	UM409
SBBH	UZ3		SBBH	UZ22
SBPA	UN857 / Z4		SBPA	UN857 / Z4
SBCT	UM400		SBCT	UZ45
SBFI	UM400		SBFI	UM400
SBFL	UN857 / Z4		SBFL	UN857 / Z4
SBSV	UZ44		SBSV	UZ1
SBPS	UZ44		SBPS	UN587
SBVT	UZ44		SBVT	UL206
SBRF	UZ44		SBRF	UZ1
SBNT	UZ29		SBNT	UZ1
SBFZ	UZ29		SBFZ	UZ1

Table 2 - Conventional Route with destination to /origin from RJ TMA

TMA-RJ – CONVENTIONAL ROUTE			
SBGL			
AERODROME ORIGIN	**ARRIVAL ROUTE**	**AERODROME DESTINATION**	**DEPARTURE ROUTE**
SBSP	W7	SBSP	W6
SBGR	W7	SBGR	W2
SBKP	W7	SBKP	W2
SBBR	W2	SBBR	W21
SBCF	W2	SBCF	W8
SBGO	W2	SBGO	W21
SBBH	W2	SBBH	W8
SBPA	W7	SBPA	W6
SBCT	W7	SBCT	W6
SBFI	W7	SBFI	W6
SBFL	W7	SBFL	W6
SBSV	W6	SBSV	W7
SBPS	W6	SBPS	W7
SBVT	W6	SBVT	W7
SBRF	W6	SBRF	W7
SBNT	W6	SBNT	W8
SBFZ	W2	SBFZ	W7

SBRJ			
AERODROME ORIGIN	**ARRIVAL ROUTE**	**AERODROME DESTINATION**	**DEPARTURE ROUTE**
SBSP	W53	SBSP	W6
SBGR	W53	SBGR	W2
SBKP	W53	SBKP	W2
SBBR	W2	SBBR	W21 / W32
SBCF	W2	SBCF	W8
SBGO	W2	SBGO	W21 / W32
SBBH	W2	SBBH	W8
SBPA	W53	SBPA	W6
SBCT	W53	SBCT	W6
SBFI	W53	SBFI	W6
SBFL	W53	SBFL	W6
SBSV	W6	SBSV	W7
SBPS	W6	SBPS	W7
SBVT	W6	SBVT	W7
SBRF	W6	SBRF	W7
SBNT	W6	SBNT	W8
SBFZ	W2	SBFZ	W8

Table 3 - RNAV Route with destination to /origin from SP TMA

TMA-SP – RNAV ROUTE				
SBSP				
AERODROME ORIGIN	**ARRIVAL ROUTE**		**AERODROME DESTINATION**	**DEPARTURE ROUTE**
SBGL	UZ44 / Z11		SBGL	UZ42
SBRJ	UZ44 / Z11		SBRJ	UZ37
SBRP	UZ31		SBRP	UZ25
SBBR	UZ2 / Z5		SBBR	UZ25
SBCF	UZ30		SBCF	UZ23
SBGO	UZ2 / Z5		SBGO	UZ25
SBBH	UZ30		SBBH	UZ14
SBBU	UZ42		SBBU	UZ21
SBPA	UZ23		SBPA	UM792 / UM788
SBCT	UZ23		SBCT	--
SBFI	UZ23		SBFI	UL310
SBFL	UZ23		SBFL	UM792 / UM788
SBSV	UZ30		SBSV	UZ14
SBPS	UZ44		SBPS	UZ14
SBVT	UZ44 / Z11		SBVT	UZ37 / UZ42
SBRF	UZ30		SBRF	UZ14
SBNT	UZ30		SBNT	UZ14
SBFZ	UZ30		SBFZ	UZ14

SBGR				
AERODROME ORIGIN	**ARRIVAL ROUTE**		**AERODROME DESTINATION**	**DEPARTURE ROUTE**
SBGL	UZ10 / Z10		SBGL	UZ42
SBRJ	UZ10 / Z10		SBRJ	UZ37
SBRP	UZ38 / Z6		SBRP	UZ26 / Z7
SBBR	UZ38 / Z6		SBBR	UZ26 / Z7
SBCF	UZ21		SBCF	UZ23
SBGO	UZ38 / Z6		SBGO	UZ26 / Z7
SBBH	UZ21		SBBH	UZ14
SBBU	UZ22		SBBU	UZ21
SBPA	UM548 / UM671		SBPA	UM792 / UM788
SBCT	UM548		SBCT	--
SBFI	UM548		SBFI	UL310
SBFL	UM548 / UM671		SBFL	UM792 / UM788
SBSV	UZ21		SBSV	UZ14
SBPS	UZ44		SBPS	UZ14
SBVT	UZ10 / Z10		SBVT	UZ37 / UZ42
SBRF	UZ21		SBRF	UZ14
SBNT	UZ21		SBNT	UZ14
SBFZ	UZ21		SBFZ	UZ14

SBKP					
AERODROME ORIGIN	ARRIVAL ROUTE		AERODROME DESTINATION	DEPARTURE ROUTE
SBGL	UZ10 / Z10		SBGL	UZ42
SBRJ	UZ10 / Z10		SBRJ	UZ37
SBRP	UZ31		SBRP	UZ25
SBBR	UZ2 / Z5		SBBR	UZ25
SBCF	UZ30		SBCF	UZ23
SBGO	UZ2 / Z5		SBGO	UZ25
SBBH	UZ30		SBBH	UZ23
SBBU	UZ42		SBBU	UZ21
SBPA	UZ25 / Z7		SBPA	--
SBCT	UZ25 / Z7		SBCT	--
SBFI	UZ25 / Z7		SBFI	--
SBFL	UZ25 / Z7		SBFL	--
SBSV	UZ30		SBSV	UZ14
SBPS	UZ30		SBPS	UZ14
SBVT	UZ10 / Z10		SBVT	UZ37 / UZ42
SBRF	UZ30		SBRF	UZ14
SBNT	UZ30		SBNT	UZ14
SBFZ	UZ30		SBFZ	UZ14

Table 4 - Conventional Route with destination to/origin from SP TMA

TMA-SP – CONVENTIONAL ROUTE				
SBSP				
AERODROME ORIGIN	ARRIVAL ROUTE		AERODROME DESTINATION	DEPARTURE ROUTE
SBGL	W6		SBGL	W7
SBRJ	W6		SBRJ	W53
SBRP	W13		SBRP	W30
SBBR	G449		SBBR	W30
SBCF	W57		SBCF	W45
SBGO	G449		SBGO	W30
SBBH	W57		SBBH	W45
SBBU	W7		SBBU	W16
SBPA	UW47		SBPA	UW24
SBCT	UW47		SBCT	UW24
SBFI	UW47		SBFI	UW24
SBFL	UW47		SBFL	UW24
SBSV	W57		SBSV	W45
SBPS	W57		SBPS	W45
SBVT	W6		SBVT	W7 / W53
SBRF	W57		SBRF	W45
SBNT	W57		SBNT	W45
SBFZ	W57		SBFZ	W45

SBGR			
AERODROME ORIGIN	**ARRIVAL ROUTE**	**AERODROME DESTINATION**	**DEPARTURE ROUTE**
SBGL	W2	SBGL	W7
SBRJ	W2	SBRJ	W53
SBRP	W19	SBRP	W30
SBBR	G449	SBBR	W30
SBCF	W1	SBCF	W45
SBGO	G449	SBGO	W30
SBBH	W1	SBBH	W45
SBBU	W19	SBBU	W16
SBPA	UW21	SBPA	UW24
SBCT	UW21	SBCT	UW24
SBFI	UW21	SBFI	UW24
SBFL	UW47	SBFL	UW24
SBSV	W1	SBSV	W45
SBPS	W1	SBPS	W45
SBVT	W2	SBVT	W7 / W53
SBRF	W1	SBRF	W45
SBNT	W1	SBNT	W45
SBFZ	W1	SBFZ	W45

SBKP			
AERODROME ORIGIN	**ARRIVAL ROUTE**	**AERODROME DESTINATION**	**DEPARTURE ROUTE**
SBGL	W6	SBGL	W7
SBRJ	W6	SBRJ	W53
SBRP	W13	SBRP	W30
SBBR	G449	SBBR	W30
SBCF	W57	SBCF	W45
SBGO	G449	SBGO	W30
SBBH	W57	SBBH	W45
SBBU	W7	SBBU	W16
SBPA	--	SBPA	UA310
SBCT	--	SBCT	UA310
SBFI	--	SBFI	UA310
SBFL	--	SBFL	UA310
SBSV	W57	SBSV	W45
SBPS	W57	SBPS	W45
SBVT	W6	SBVT	W7 / W53
SBRF	W57	SBRF	W45
SBNT	W57	SBNT	W45
SBFZ	W57	SBFZ	W45

4. AIRSPACE REDESIGN

4.1 RIO DE JANEIRO TMA

4.1.1 SECTORIZATION

4.1.1.1 The TMA-RJ limits were designed to meet the arrival and departure flows, favoring the sectors of higher demand and enabling better management of traffic on the STAR. The portion of the airspace, in which there is no departure or arrival procedure, has been reduced.

4.1.1.2 The redesign of RJ TMA was established as shown in Table 5 below:

Table 5 – RJ TMA Limits		
VERTICAL LIMIT	**HORIZONTAL LIMIT**	
	LATITUDE	**LONGITUDE**
FL075 – FL195	23 48 30.49 S	044 02 12.57 W
	23 01 51.16 S	044 40 35.83 W
	22 27 34.33 S	044 03 26.49 W
2500´ – FL195	22 05 49.34 S	044 06 53.41 W
	21 57 07.34 S	043 41 55.64 W
	22 20 15.33 S	043 08 20.09 W
	22 11 24.41 S	042 25 04.09 W
	22 40 15.03 S	041 59 33.62 W
	22 56 43.85 S	041 54 53.07 W
	23 10 37.22 S	042 46 46.67 W
	23 34 07.54 S	043 08 09.21 W

4.1.1.3 The RJ TMA Sectors were designed to meet the needs related to SBGL and SBRJ flows independently. Some of the traffic characteristics that were taken into account: Arrival, departure or approach. The new limits and functions are described in Table 6.

Table 6 – RJ TMA Sectors		
SECTOR	**LIMITS**	**FUNCTION**
T1	Laterals: According to RJ/SP ARC Verticals: 2500 FT up to FL 195	**Departures** from SBGL and SBRJ to SOUTH and WEST; and **Arrivals** to SBGL coming from SOUTH and **Arrivals** to SBRJ coming from SOUTH and T5**.**
T2	Laterals: According to RJ/SP ARC 7000 FT overlapping T6, FL 120 overlapping T3 and T7, and FL 195 overlapping T4; up to UNL (CW ACC delegation)	**Departure** from SBRJ destined to TUBULÃO (SBGR and SBKP), **Departure** from SBGL destined to TUBULÃO (SBGR and SBKP), **Crossings** to the TUBULÃO coming from the EAST (SBVT/Africa) and NORTH (UZ10 UN857) **Crossings** from TUBULÃO destined to SBVT**.**
T3	Laterals: According to RJ/SP ARC Verticals: 2500 FT up to FL 120	**Arrival** to SBRJ coming from TUBULÃO, NORTH and SOUTH (T1).

T4	Laterals: According to RJ/SP ARC Verticals: 120 FT up to FL 195	**Arrival** to SBGL coming from TUBULÃO, NORTH, SOUTH (T1) and EAST (T5).
T5	Laterals: According to RJ/SP ARC Verticals: 2500 FT up to FL 195.	Departures from SBGL and SBRJ to NORTH, TUBULÃO and EAST; SBGL Arrival from EAST (SBVT UN857). SBRJ **Arrival** coming from EAST (SBVT**).**
T6	Laterals: According to RJ/SP ARC Verticals: 2500 FT up to FL 120	Galeão Final - SBGL
T7	Laterals: According to RJ/SP ARC Verticals: 2500 FT up to 7000 FT	Santos Dumont Final - SBRJ
T8	Laterals: SC-CTR According to RJ/SP ARC Verticals: 2500 FT up to 7000 FT	Air Traffic Service provided in the SC- CTR; Air Traffic Service for Offshore helicopters destined to Santos Basin, by T3 delegation; Flight Information at DELTA REA.

4.2 STAR AND SID PROCEDURES

4.2.1 The arrival and departure procedures were created with the objective of allowing more direct and independent air flows between SBGL and SBRJ aerodromes, as well as matching the topographic factors and ATC capacity. **4.2.2** The arrival procedures were structured so that the runway changes had minimal impact on air flow, both for arrival and departure.

4.2.3 For the SBRJ aerodrome there are two possibilities of arrival procedures coming from the South Region of the country. However, arrival via “Boca da Barra” should be preferred. The arrival via “Afonsos” is used only when enables a better sequencing of air traffic in the RJ-TMA.

4.2.4 Figures 3 and 4 represent the structure of SBGL aerodrome arrival and departure procedures, respectively, and Figures 5 and 6 represent the structure of SBRJ aerodrome arrival and departure procedures, respectively.

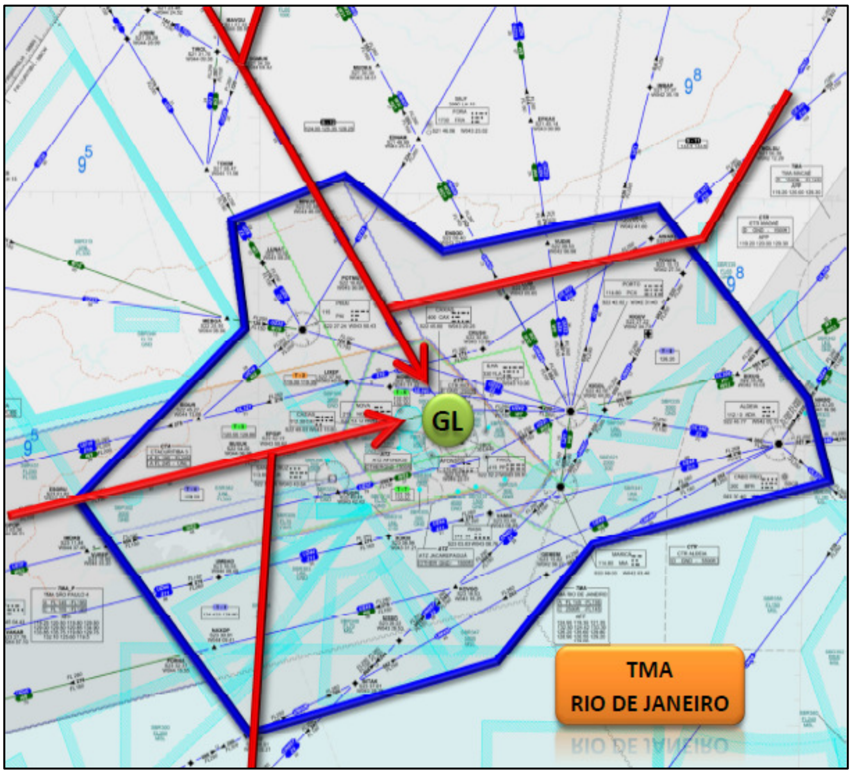


Figure 3 – SBGL STAR Structure

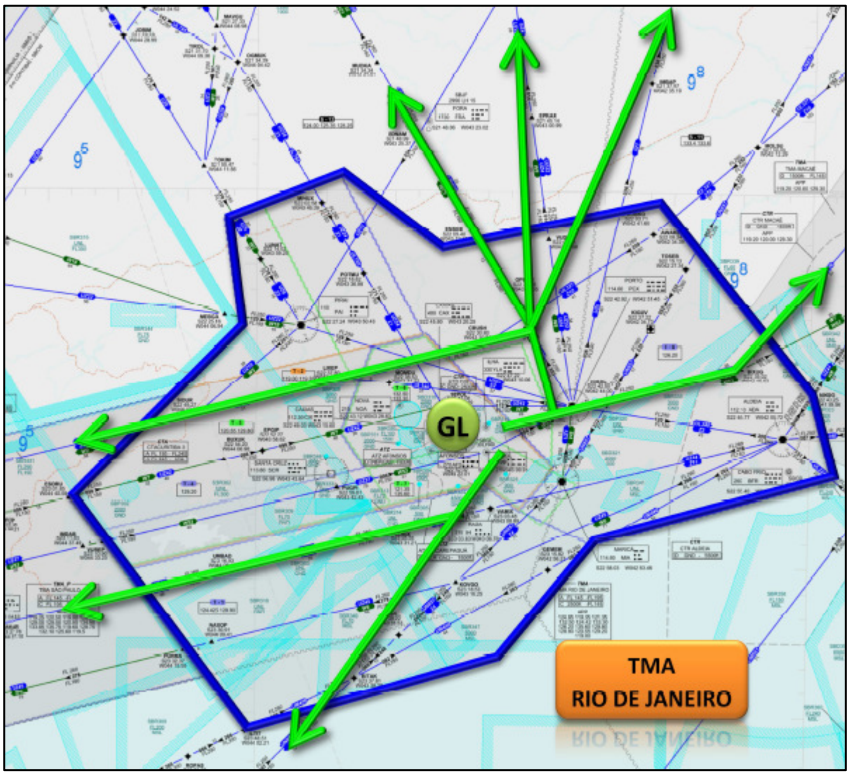


Figure 4 – SBGL SID Structure

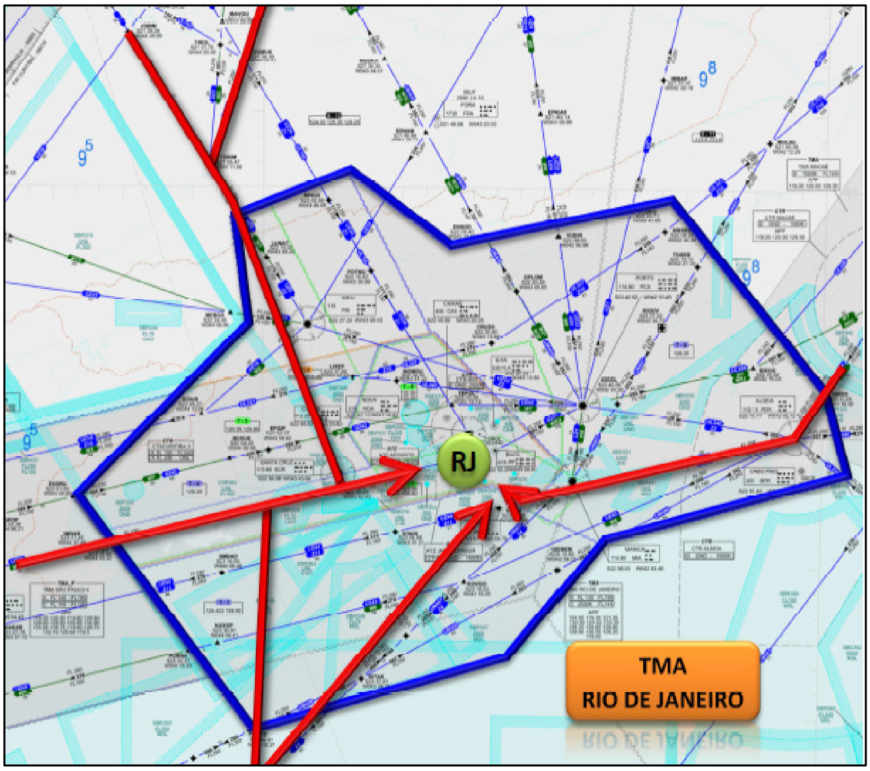


Figure 5 – SBRJ STAR Structure

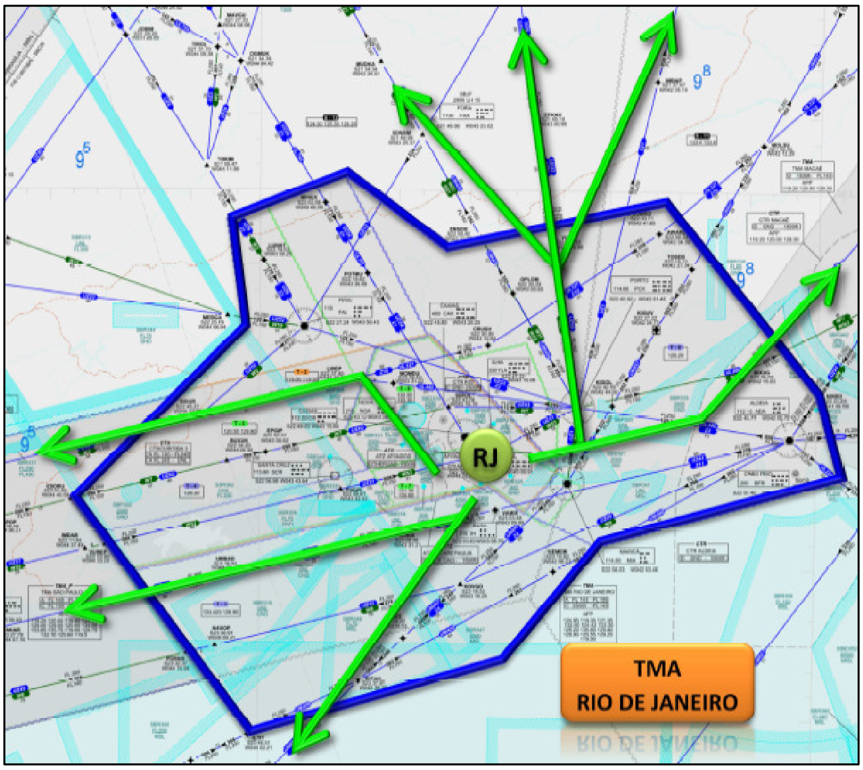


Figure 6 – SBRJ SID Structure

4.3 SÃO PAULO TMA

4.3.1 SECTORIZATION

4.3.1.1 The TMA-SP limits were designed to meet the arrival and departure flows, favoring the sectors of higher demand and enabling better management of traffic on the STAR. The portion of airspace in the RJ TMA and SP TMA connection was designated as SP TMA almost completely, covering SBSJ locality and extending the limit to the vicinities of Paraty locality.

4.3.1.2 The redesign of SP TMA was established as shown in Table 7 below:

Table 7 – SP TMA Limits

VERTICAL LIMIT	HORIZONTAL LIMIT	
FL055 – FL195	**LATITUDE**	**LONGITUDE**
	23 37 46.50 S	044 11 05.50 W
	23 01 51.09 S	044 40 35.91 W
	22 41 01.75 S	044 17 59.18 W
	22 58 55.74 S	045 37 41.62 W
	22 45 15.51 S	046 13 49.58 W
	22 36 06.60 S	046 37 42.60 W
	22 27 53.07 S	046 59 06.28 W
	22 42 02.80 S	047 34 28.07 W
	23 32 23.68 S	047 34 18.17 W

	24 26 51.41 S	046 55 35.36 W
	24 18 20.76 S	046 09 54.21 W
	24 03 47.03 S	046 03 47.04 W

4.3.1.3 The SP TMA Sectors were designed to meet the needs related to SBGR, SBSP and SBKP flows independently. Arrival sectors were separated by aerodromes, allowing a greater ATC capacity within the TMA.

4.3.1.4 Some of the traffic characteristics that were taken into account: arrival, departure or approach. The new limits and functions are described in Table 8.

Table 8 – SP TMA Sectors

SECTOR	LIMITS	FUNCTION
T1	Laterals: According to RJ/SP ARC Verticals: FL120 overlapping T7; up to FL 195.	**Arrivals** to SBGR and SBSP coming from SOUTH and TUBULÃO; **Arrival** to SBSJ coming from SOUTH**;** **Departure** from SBSJ to SOUTH coming from T7**.**
T2	Laterals: According to RJ/SP ARC Verticals: 5500 FT up to FL 195.	**Departures** from SBGR destined to SOUTH and WEST and **Departures** from SBSP destined to NORTH, SOUTH and WEST.
T3	Laterals: According to RJ/SP ARC Verticals: 5500 FT up to FL120 below T4 and 5500 FT up to FL195.	SBKP **Arrivals and Departures** coming from WEST**.**
T4	Laterals: According to RJ/SP ARC Verticals: FL 120 up to FL 195	**Arrivals** to SBSP and SBKP coming from NORTHEAST**,** NORTH and WEST; **Departures** from SBGR and SBSP destined to NORTH coming from T2.
T5	Laterals: According to RJ/SP ARC Verticals: 5500 FT up to FL120 below T4 and 5500 FT up to FL195.	**Arivals** to SBKP coming from NORTHEAST**;** **Departure** from SBKP to NORTHEAST and NORTH, **Departure** from SBGR to NORTH.
T6	Laterals: According to RJ/SP ARC Verticals: 5500 FT up to FL 195.	**Arrival** to TUBULÃO SBGR and NORTHEAST**,** SBKP **Arrival** coming from T7**, Arrival** NORTH and NORTHEAST SBSJ; and **Departure** SBGR 09 to NORTHEAST, **Departure** SBSJ to NORTH and NORTHEAST.
T7	Laterals: According to RJ/SP ARC Verticals: 5500 FT up to FL120 below T1 and 5500 FT up to FL 195; and FL 195 up to UNL (BS ACC DELEGATION)	**Departures** from SBSP to NORTHEAST and TUBULÃO**,** **Departure** from SBKP to TUBULÃO, **Departure** from SBSJ to SOUTH, **Departure** from SBGR 27 to NORTHEAST and 27/09 to TUBULÃO; **Arriva**l from SBKP coming from T8.
T8	Laterals: According to RJ/SP ARC Verticals: FL 105 up to FL 195 and FL 195 up to UNL (BS ACC DELEGATION).	**TUBULÃO:** traffic destined to and coming from RJ TMA and SP TMA; **Arrivals and Departures** from SBSJ to WEST**.**
T9	Laterals: According to RJ/SP ARC Verticals: 5500 FT up to FL 100.	GUARULHOS Final - SBGR
T10	Laterals: According to RJ/SP ARC Verticals: 5500 FT up to FL 100.	CONGONHAS Final - SBSP
T11	Laterals: According to RJ/SP ARC Verticals: 5500 FT up to FL 100.	CAMPINAS Final - SBKP
T12	Laterals: According to RJ/SP ARC Verticals: 5500 FT up to FL 100.	SÃO JOSÉ DOS CAMPOS Final - SBSJ

4.4 STAR AND SID PROCEDURES

4.4.1 The arrival and departure procedures were established with the objective of allowing more direct and independent air flows between SBGR, SBSP and SBKP aerodromes, as well as matching the topographic factors and ATC capacity.

4.4.2 The arrival procedures were designed so that the runway changes had minimal impact on air flow, both during the arrival and departure.

4.4.3 Figures 7 and 8 represent the structure of arrival and departure procedures, respectively, from the SBGR aerodrome and Figures 9 and 10 represent the structure of arrival and departure procedures, respectively, from the SBSP aerodrome and Figures 11 and 12 represent the structure of arrival and departure procedures, respectively, from the SBKP aerodrome.

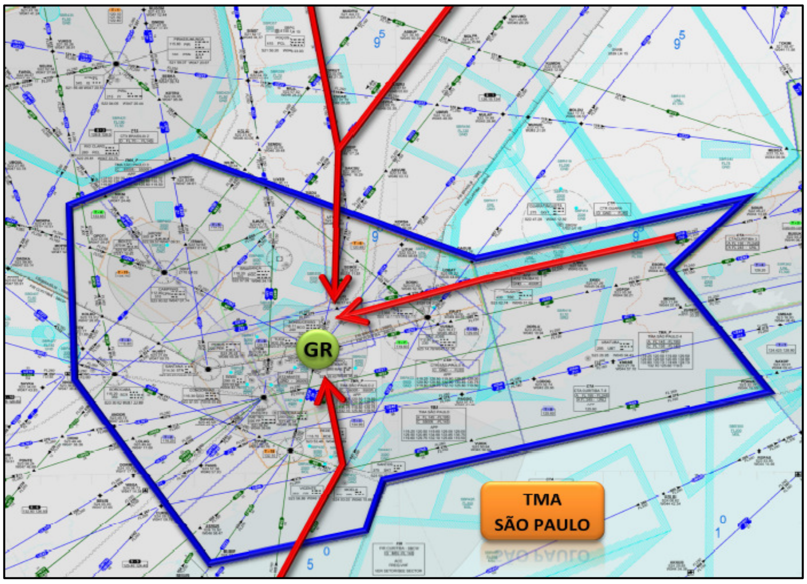


Figure 7 – SBGR STAR Structure

Figure 8 – SBGR SID Structure

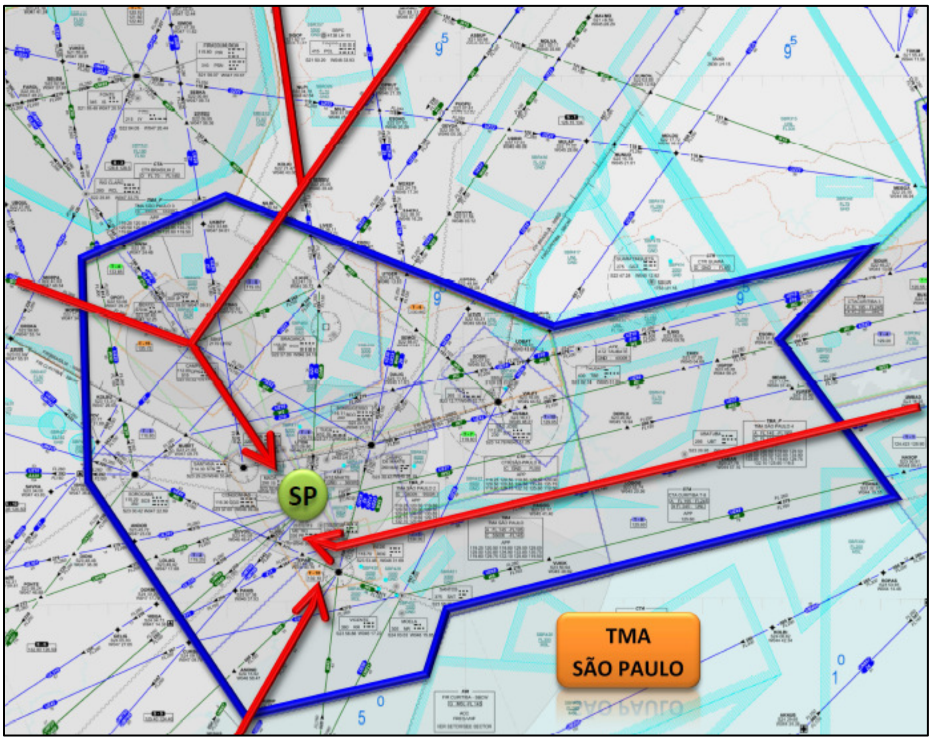


Figure 9 – SBSP STAR Structure

Figure 10 – SBSP SID Structure

Figure 11 – SBKP STAR Structure

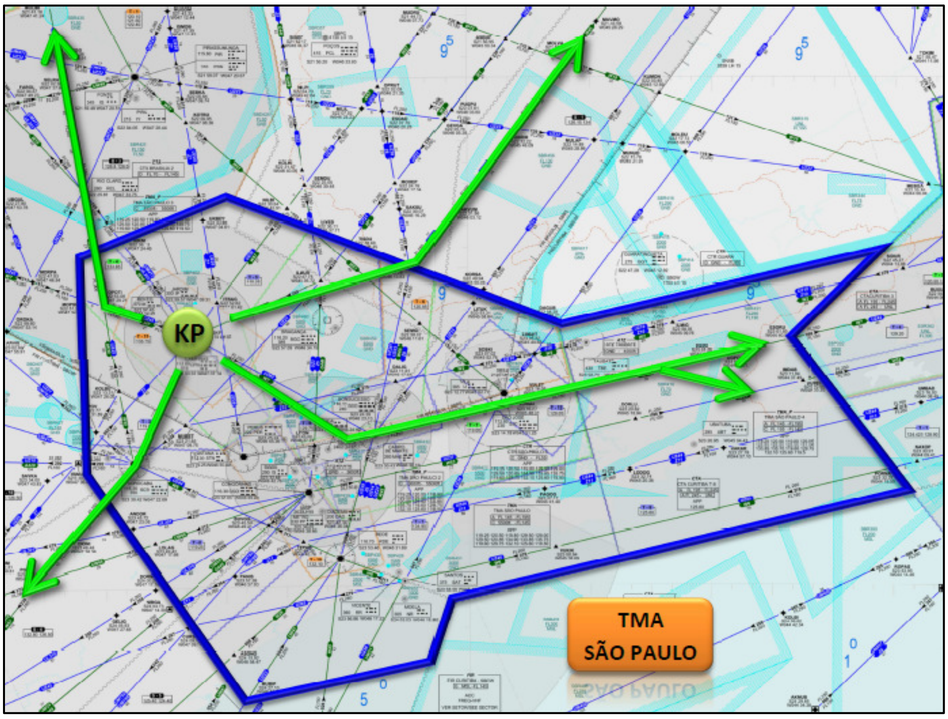


Figure 12 – SBKP SID Structure

5 SPECIFIC PROCEDURES

5.1 IMPLEMENTATION OF CONCEPTS OF OPEN AND CLOSED STAR

5.1.1 With the implementation of PBN Concept, the STARs were prepared according to the concept of OPEN STAR and/or CLOSED STAR.

5.1.2 All STAR procedures for SBGR, SBKP, SBSP, SBGL and SBRJ aerodromes were developed as closed STAR. Thus, a STAR waypoint/fix coincides with the Initial Approach Fix (IAF) and the aircraft, after the arrival procedure, may begin the approach procedure, according to the ATC unit authorization.

5.1.3 Some procedures at SBGR, SBKP, SBSP and SBGL aerodromes may present the possibility of open or closed STAR in the same chart. The procedure of open STAR will be used when the authorization for an approach procedure is not possible, due to the need of the air traffic sequencing.

5.1.4 In all procedures where the open STAR is a possibility, the last waypoint/fix has a defined path, parallel to the runway and opposite to the landing direction, from which the aircraft waits vectoring by the ATC unit to intercept the final approach.

5.1.5 Publication of the procedures according to the concept of open STAR allows, in a moment of high traffic volume, predefine an initial heading and limits to the communications failure in order to reduce the time of ground-air communications, maintaining the air operations safety.

5.1.6 At any point of the STAR an aircraft may be vectored if necessary, in accordance with the provisions in the legislation in force, regardless of the concept of open or closed STAR.

5.2 FLEXIBLE USE OF AIRSPACE - XAVANTE AREA, BARREIRO AREA AND PARAÍBA AREA

5.2.1 The limits of SBR301 Barreiro, SBR 315 Paraíba 1, SBR 362 Paraíba 2, SBR 417 Xavante 1 and SBR418 Xavante 2 Special Use Airspaces, at North of RJ-TMA/SP-TMA connection, were changed in order to enable the use of airway UZ10 (RJ TMA connection with Guarulhos and Campinas aerodromes) through the FUA (Flexible Use of Airspace) Concept which allows the use of such airspace by other users when there is no air activities within such areas.

5.2.2 Xavante 1 and 2 Areas were redesigned and subdivided, totaling six new areas. Activation of some of these areas will impact on airway UZ10, so aircraft will have to deviate during Xavante area activation, as specified:

a) Aircraft crossing RJ TMA or destined to Guarulhos and Campinas cease to follow on UZ10 and must use airway UZ44; and

b) Aircraft crossing RJ TMA or destined to Congonhas must cease to follow on UZ44 and must use airway UZ45.

5.2.3 During Xavante area activation, SP TMA will no longer receive traffic to Guarulhos and Campinas, via UZ10. The arrival and departure procedures listed below, available for the SP TMA, will be employed only when the Xavante areas special use airspaces are activated:

a) STAR to SBKP:

RWY 15 ILSOR 1B STAR; RWY 15 ILSOR 1A STAR RNAV; RWY33 ILSOR 1B STAR and RWY33 ILSOR STAR RNAV.

b) SID to SBGR:

RWY09 NASAL IVRAG 1B SID; RWY09 IVRAG 1A TRNS UBRIR, TRNS VUMEV SID RNAV ;RWY27 SUMRA 1B SID and RWY27 RNAV SUMRA 1A TRNS UBRIR, TRNS VUMEV SID.

c) SID to SBSP:

RWY17 IMBID 1B SID; RWY17 RNAV IMBID 1A TRNS VUMEV, TRNS UBRIR SID; RWY35 IMBID 1B SID; and RWY35 SID RNAV IMBID 1A TRNS VUMEV, TRNS UBRIR SID.

d) SID to SBSJ:

RWY33 SIKEM 1B TRNS EKIDI, TRNS IMDAB SID; RWY33 RNAV SIKEM 1A TRNS EKIDI, TRNS IMDAB SID;RWY33 EVLOK 1B SID; RWY33 RNAV KORSA 1A TRNS UBRIR, TRNS USAMO SID ; RWY15 EVLOK 1B SID; and RWY15 RNAV KORSA1A TRNS UBRIR, TRNS USAMO SID.

5.2.4 The Xavante areas will be activated from Monday to Friday from 14:00UTC to 21:00UTC. However they may be activated at any moment by their users (IPEV or EMBRAER), respecting the minimum time of 04:00h prior to activation together with CGNA.

6 HORIZONTAL SEPARATION OF 3 NM

6.1 In order to optimize the air flow and ensure the safety and regularity of air operations, DECEA, after careful evaluation and analysis of operational risk, has redesigned the RJ-TMA and SP-TMA sectors, as well as the approach procedures of the referred aerodromes.

6.2 For the RJ TMA, the proximity between SBGL and SBRJ aerodromes, as well as the various and possible configurations of runways, has always been a restrictive factor to the simultaneous landing and takeoff operations at these aerodromes.

6.3 RJ-TMA was redesigned with the adoption of two distinct and final sectors, one for the SBGL aerodrome and other for SBRJ. The establishment of such sectors not only ensured a greater ATC capacity but also increased the situational awareness of the air traffic controller in this function.

6.4 The most critical altered procedures were the missed approach segments of the approach procedures and the takeoff segments, both from the SBGL runway 10/15 system, as well as the SBRJ approach procedures. Such changes to the procedures ensure a separation greater than or equal to 3NM between the paths of the related procedures.

6.5 Procedures in the SP-TMA and RJ-TMA were redesigned in order to ensure the minimum lateral separation of 3 NM between the aircraft. This lateral separation, therefore, will be ensured by the accomplishment of such procedures, so RJ-APP and SP-APP traffic control and the crews must strictly follow the established IFR procedures.

6.6 Technical and operational conditions that must be observed for the minimum lateral separation of 3 NM on RJ-TMA and SP-TMA and conditions in which they suspend its implementation are defined in DECEA specific publications.

6.7 The minimum lateral separation of 3 NM will be applied to the RJ-TMA and SP-TMA portions, according to the airspace classification and within the airspace comprised by the lateral limits of the sectors:

a) In the RJ-TMA FINAL RJ, FINAL GL, RJ-CTR, with the lower vertical limit of 1500 feet and higher vertical limit of 7000 feet.

b) In the SP-TMA FINAL SP, FINAL GR, FINAL KP, CTR SP1, SP2 and SP3, with the lower vertical limit of 4500 feet and higher vertical limit of 9000 feet.

7 EFFECTIVE DATE

7.1 The redesign of the Rio de Janeiro and São Paulo TMA air flow will be effective on 12 DEC 2013, at 02:00 UTC.

7.2 In order to reduce the number of procedures for the same locality, all effective air navigation procedures (IAC, SID and STAR) of SBGR, SBKP, SBSP, SBSJ, SBGL e SBRJ aerodromes will be cancelled and replaced by the new procedures conceived to redesign the referred TMA, on the date and time mentioned above.

8. FINAL ARRANGEMENTS

8.1 DECEA provides a communication channel to send questions, suggestions, comments, criticisms, praise and error notifications through the Citizen Service Center at the following address: http://servicos.decea.gov.br/sac/index.cfm, by selecting the CONTATO (“Contact”) option in the Area (“Área”) menu.

8.2 The other rules remain in force and applicable to the PBN Concept, except for the procedures described in this AIC.

8.3 The approval of this AIC was published in DECEA Internal Bulletin nº 211 of 29 of October

8.4 Cases not provided for in this Circular shall be settled by the Head of DECEA’s Operations Subdepartment.

TABLES OF MAIN FLOWS IN THE LIMA FIR AIRSPACE

INTERNATIONAL FLOWS – JUNE

FLOW	ROUTES	OPERATIONS JUN 2014
OSAKI-LIM	UL312	12
AMERO-LIM	UL344	43
ANPAL-LIM	UL308	81
ARNEL-LIM	UG436-UV1	231
PAGUR-LIM	UB696-UV1	21
VAKUD-ATOGO-LIM	UL780-UG436/UV1	520
VAKUD-ISREN-LIM	UL780-UL308	44
EKUMO/EVLIM-LIM	UM674	169
LOBOT-LIM	UM795	31
TERAS-LIM	UL305	315
PLG-LIM	UA321-UM414-UT228	9
ILMUX-LIM	UM414	72
SIGOB-LIM	UM527	108
SELVA-LIM	UL306	19
OBLIR-LIM	UM668-UV11	19
DOBNI-MEXUR-LIM	UM415	190
DOBNI-CEDRO-LIM	UM415-UA304	72
ELAKO-CEDRO-LIM	UA320/UA304	30
ELAKO-MEXUR-LIM	UA320/UA304-UM415	93
KOMPA-LIM	UM793	5
	UT222	6
ORALO-LIM	UA573-UV1	8
DORKA/ALDAX-LIM	UL550	256
IREMI-LIM	UL302	312
	TOTAL	**2666**

INTERNATIONAL FLOWS – AUGUST

FLOW	ROUTES	OPERATIONS AGO 2014
OSAKI-LIM	UL312	17
AMERO-LIM	UL344	36
ANPAL-LIM	UL308	90
ARNEL-LIM	UG436 - UV1	323
PAGUR-LIM	UB696-UV1	9
VAKUD-ATOGO-LIM	UL780 -UG436 -UV1	513
VAKUD-ISREN-LIM	UL780-UL308	47
EKUMO/EVLIM-LIM	UM674	148
LOBOT-LIM	UM795	21
TERAS-LIM	UL305	294
PLG-LIM	UA321-UM414-UT228	25
ILMUX-LIM	UM414	74
SIGOB-LIM	UM527	117
SELVA-LIM	UL306	17
OBLIR-LIM	UM668-UV11	1
DOBNI-MEXUR-LIM	UM415	193
DOBNI-CEDRO-LIM	UM415-UA304/UA320-UV11	71
ELAKO-CEDRO-LIM	UA304-320-UM415	68
ELAKO-MEXUR-LIM	UA304-320	19
KOMPA-LIM	UM793	2
KOMPA-SCO-LIM	UM793-UT222	0
ORALO-LIM	UA573-UV1	0
DORKA/ALDAX-LIM	UL550	305
IREMI-LIM	UL302	390
	TOTAL	**2780**

DOMESTIC FLOW

JUNE

FLOWS	OPERATIONS	FLOWS	OPERATIONS	TOTAL
SPIM-SPZO	919	SPZO-SPIM	918	1837
SPIM-SPQU	479	SPQU-SPIM	482	961
SPIM-SPQT	275	SPQT-SPIM	284	559
SPIM-SPCL	188	SPCL-SPIM	192	380
SPIM-SPST	283	SPST-SPIM	275	558
SPIM-SPRU	218	SPRU-SPIM	228	446
SPIM-SPHI	190	SPHI-SPIM	190	380
SPIM-SPUR	287	SPUR-SPIM	282	569
			TOTAL	**5690**

AUGUST

FLOWS	OPERATIONS	FLOWS	OPERATIONS	TOTAL
SPIM-SPZO	1135	SPZO-SPIM	1141	2276
SPIM-SPQU	556	SPQU-SPIM	562	1118
SPIM-SPQT	312	SPQT-SPIM	314	626
SPIM-SPCL	187	SPCL-SPIM	190	377
SPIM-SPST	295	SPST-SPIM	290	585
SPIM-SPRU	223	SPRU-SPIM	225	448
SPIM-SPHI	180	SPHI-SPIM	187	367
SPIM-SPUR	278	SPUR-SPIM	278	556
			TOTAL	**6353**

GENERAL REPORT ON FUEL SAVINGS
(INTERNATIONAL FLOWS)

Scenario	Old Fuel Consumption in Kg	New Fuel Consumption in Kg	Savings in Kg	Savings(%)
AMERO-LIM	417200	416500	-700	-0.1
ANPAL-LIM	736200	735500	-700	-0.1
ARNEL-LIM	1342200	1343800	1600	-0.2
DOBNI-CEDRO-LIM	272700	248400	-24300	-13.0
DOBNI-MEXUR-LIM	991500	978400	-13100	-1.7
DORKA/ALDAX-LIM	1468900	1498300	29400	3.1
EKUMO/EVLIM-LIM	736400	715100	-21300	-3.4
ELAKO-CEDRO-LIM	266200	259800	-6400	-2.4
ELAKO-MEXUR-LIM	218500	188500	-30000	-20.0
ILMUX-LIM	613600	592700	-20900	-6.3
IREMI-LIM	1691800	1665600	-26200	-2.0
KOMPA-LIM	36600	35800	-800	-1.9
KOMPA-SCO-LIM	118800	113100	-5700	-4.7
LOBOT-LIM	77500	78400	900	1.0
OBLIR-LIM	116700	113000	-3700	-3.1
OSAKI-LIM	144800	144200	-600	-0.4
PAGUR-LIM	52800	52700	-100	-0.2
PLG-LIM	127000	115600	-11400	-9.0
SELVA-LIM	179800	179500	-300	-0.1
SIGOB-LIM	999400	987100	-12300	-1.2
TERAS-LIM	1479900	1465500	-14400	-0.5
VAKUD-ATOGO-LIM	2497100	2468000	-29100	-2.8
VAKUD-ISREN-LIM	437900	437400	-500	-0.1

Total Savings in Kg	-190600

DETAILED REPORT ON FUEL SAVINGS
(INTERNATIONAL FLOWS)

Scenario	Old Climb Fuel in Kg	New Climb Fuel in Kg	Climb Savings in Kg	Old Descend Fuel in Kg	New Descend Fuel in Kg	Descend Savings in Kg	Old Level Fuel in Kg	New Level Fuel in Kg	Level Savings in Kg
AMERO-LIM	164700	164400	-300	22300	22300	0	230200	229800	-400
ANPAL-LIM	297600	296900	-700	42600	42600	0	396000	396000	0
ARNEL-LIM	545100	545100	0	102800	102800	0	694300	695900	1600
DOBNI-CEDRO-LIM	103700	103600	-100	25100	22100	-3000	143900	122700	-21200
DOBNI-MEXUR-LIM	414700	414600	-100	81600	81600	0	495200	482200	-13000
DORKA/ALDAX-LIM	680800	680800	0	115400	121000	5600	672700	696500	23800
EKUMO/EVLIM-LIM	322000	322000	0	62400	62400	0	352000	330700	-21300
ELAKO-CEDRO-LIM	112400	111600	-800	20400	20400	0	133400	127800	-5600
ELAKO-MEXUR-LIM	81700	81700	0	18700	14400	-4300	118100	92400	-25700
ILMUX-LIM	322000	322000	0	32800	30900	-1900	258800	239800	-19000
IREMI-LIM	844500	844500	0	145800	145800	0	701500	675300	-26200
KOMPA-LIM	14600	14500	-100	2800	2800	0	19200	18500	-700
KOMPA-SCO-LIM	47900	47800	-100	7900	7900	0	63000	57400	-5600
LOBOT-LIM	32200	32200	0	6500	6800	300	38800	39400	600
OBLIR-LIM	50400	50100	-300	8900	8900	0	57400	54000	-3400
OSAKI-LIM	54900	54800	-100	7400	7400	0	82500	82000	-500
PAGUR-LIM	22900	22700	-200	5000	5000	0	24900	25000	100
PLG-LIM	44600	44100	-500	6200	5900	-300	76200	65600	-10600
SELVA-LIM	108100	107800	-300	9900	9900	0	61800	61800	0
SIGOB-LIM	618300	616600	-1700	49700	49700	0	331400	320800	-10600
TERAS-LIM	571600	571700	100	110900	113800	2900	797400	780000	-17400
VAKUD-ATOGO-LIM	1156600	1156500	-100	211200	206000	-5200	1129300	1105500	-23800
VAKUD-ISREN-LIM	213400	212300	-1100	29100	29100	0	195400	196000	600
			-6400			-5900			-178300

GENERAL REPORT ON FUEL SAVINGS
(DOMESTIC FLOW)

	Scenario	Old Fuel Consumption in Kg	New Fuel Consumption in Kg	Savings in Kg	Savings (%)
DEPARTURES	SPIM-SPCL	284500	286700	2200	0.8
	SPIM-SPHI	407600	409200	1600	0.4
	SPIM-SPQT	838000	863100	25100	3.0
	SPIM-SPQU	1249700	1200400	-49300	-3.9
	SPIM-SPRU	337700	337000	-700	-0.2
	SPIM-SPST	548400	573100	24700	4.5
	SPIM-SPUR	834100	832900	-1200	-0.1
	SPIM-SPZO	1894900	1881500	-13400	-0.7
ARRIVALS	SPQT-SPIM	776700	772100	-4600	-0.6
	SPQU-SPIM	1219600	1158900	-60700	-5.0
	SPRU-SPIM	257000	258100	1100	0.4
	SPST-SPIM	475600	458400	-17200	-3.6
	SPUR-SPIM	710200	711100	900	0.1
	SPZO-SPIM	1806500	1722000	-84500	-4.7
	SPCL-SPIM	254400	250800	-3600	-1.4
	SPHI-SPIM	328800	330300	1500	0.5
			Total Savings in Kg	-178100	

DETAILED REPORT ON FUEL SAVINGS
(DOMESTIC FLOW)

	Scenario	Old Climb Fuel in Kg	New Climb Fuel in Kg	Climb Savings in Kg	Old Descend Fuel in Kg	New Descend Fuel in Kg	Descend Savings in Kg	Old Level Fuel in Kg	New Level Fuel in Kg	Level Savings in Kg
DEPARTURES	SPIM-SPCL	186900	184200	-2700	17700	16800	-900	80000	85600	5600
	SPIM-SPHI	220100	216200	-3900	20100	20100	0	167400	172900	5500
	SPIM-SPQT	323300	338700	15400	43500	41000	-2500	471200	483400	12200
	SPIM-SPQU	608600	608600	0	78600	78600	0	562400	513100	-49300
	SPIM-SPRU	219700	215900	-3800	20200	20200	0	97800	101000	3200
	SPIM-SPST	309400	309400	0	30400	28000	-2400	208600	235700	27100
	SPIM-SPUR	385800	369400	-16400	35300	35300	0	413000	428100	15100
	SPIM-SPZO	1189200	1080100	-109100	85700	89800	4100	620000	711600	91600
ARRIVALS	SPQT-SPIM	237200	240200	3000	26500	26500	0	513000	505400	-7600
	SPQU-SPIM	369900	369300	-600	65200	65200	0	784400	724400	-60000
	SPRU-SPIM	164000	166000	2000	24400	24400	0	68600	67800	-800
	SPST-SPIM	222100	225100	3000	34700	34700	0	218700	198500	-20200
	SPUR-SPIM	279700	283400	3700	41800	41800	0	388700	385900	-2800
	SPZO-SPIM	627100	625600	-1500	124300	124300	0	1055100	972100	-83000
	SPCL-SPIM	141500	143100	1600	21800	21800	0	91100	85900	-5200
	SPHI-SPIM	161800	160100	-1700	24100	24100	0	142800	146100	3300
				-111000			-1700			-65300

Agenda Item 4: Criteria and procedures for the approval of performance-based navigation operations

4.1 Under this agenda item, the Meeting reviewed the following working papers:

a) WP/07 – *Follow-up on review of advisory circulars of the SRVSOP on aircraft and operators approval for advanced RNP (A-RNP) and RNP 0.3 operations* (presented by the Secretariat); and
b) IP/12 – *Aircraft capacity* (presented by the Secretariat).

Follow up on review of advisory circulars of the SRVSOP on aircraft and operators approval for advanced RNP (A-RNP) and RNP 0.3 operations

4.2 The Meeting recalled that, at the Thirteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/13), under Agenda item 3 – Criteria and procedures for the approval of performance-based navigation operations, the meeting had taken note of the progress made by the Latin American Regional Safety Oversight Cooperation System (SRVSOP) concerning the drafting of the following advisory circulars:

- ✓ CA 91-007- Approval of aircraft and operators for advanced RNP operations; and
- ✓ CA 91-012 – Approval of aircraft and operators for RNP 0.3 operations.

4.3 In this regard, the SAM/IG/13 meeting agreed that the Secretariat should request the Regional Office to send, through a State Letter, both advisory circulars for the corresponding analysis and comments prior to their approval at the SAM/IG/14 meeting.

4.4 The Meeting took note that the South American Regional Office had sent advisory circulars CA 91-007 – Advanced RNP (A-RNP) and CA 91-012 - RNP 0.3 through Letter No. LT 11/49-SA291 dated 19 June 2014 for review by SAM States, requesting them to submit their comments by 15 September 2014.

4.5 During that period, Venezuela submitted four (4) comments, Colombia sent one (1) comment, and Brazil's DECEA reported that it had no comments on the text of both advisory circulars. **Appendix A** to this part of the report contains a summary of the comments sent by the States and the action taken by the Secretariat. The comments made by Venezuela and Colombia were analysed and included in advisory circulars as applicable.

4.6 Despite the fact that there were no aircraft operations and airworthiness experts present, the Meeting considered that CA 91-007 and CA 91-012 could be considered as approved, since they had already been reviewed by the States through the aforementioned letter.

Inclusion of a text on the South American RAIM availability prediction service (SATDIS) in SRVSOP advisory circulars

4.7 The Meeting took note that GNSS (GPS) integrity shall be provided through receiver autonomous integrity monitoring (RAIM) or an equivalent means within a multi-sensor navigation system. Likewise, the RAIM integrity availability of the GPS must be confirmed before a flight (foreseen route and duration) through the use of a prediction programme.

4.8 In this regard, the SAM Region hired DW International to provide the RAIM availability prediction service in South America. This service is available at the following website: (www.satdis.aero). Access to the service can be obtained by contacting the focal point of each State.

4.9 The Meeting was informed that, as follow-up to Conclusion SAM/IG/13/7 – *Implementation of the RAIM availability prediction service in the SAM Region,* the following text on the RAIM availability prediction service in South America (SATDIS) had been included in each of the SRVSOP RNAV and RNP advisory circulars:

a) The RAIM availability prediction service for the SAM Region (SATDIS) is available at the website: www.satdis.aero
b) This service is provided for GNSS-equipped aircraft.
c) For information on this service, ask your CAA focal point registered in the cited webpage.

Survey on aircraft PBN capacity

4.10 The Meeting took note that Regional Project RLA/06/901 had developed a web application for the collection on data on aircraft PBN capacity. This application allows each State to enter data on its aircraft and subsequently see the general status of its fleet in terms of PBN capacity, and export data to Excel to facilitate any other type of analysis it may require.

4.11 **Appendix B** to this part of the report shows views of this application, which is in the final stage of development and is expected to be completed by late November for its publication on the RLA/06/901 website.

4.12 Regarding the security of the application and use of the data, the Meeting was informed that there were three levels of access: the lowest, where access is through a code given to the airline to enter data concerning its aircraft, and only data queries and modifications can be done; the second level involves access using a code given to the State, whereby the State can validate the data of its airlines, and enter, modify, and query all the data on the fleet of the State; and the third level of access is through the Regional Office for use by the SAM/IG and improvement programmes that require aircraft capacity data.

4.13 The Regional Office will manage the access codes. The States will ask the Office for the codes they need, including the airline codes, if so required.

4.14 The Meeting considered that the aircraft PBN capacity database was fundamental for the development of the SAM PBN implementation project, and of the PBN implementation projects of each SAM State. In this sense, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-9 Aircraft and operator PBN capacity database

That the ICAO SAM Office send to SAM States information on the use of the aircraft and operator PBN capacity database, requesting that the aforementioned database be completed by 15 March 2015.

Appendix A
State Comments on AC 91-007 - A-RNP

Changes proposed by Venezuela

Original Texts Doc 9613 and AC 91-007 – A-RNP	Text proposed by **Venezuela**	SRVSOP Comments
<u>Doc 9613</u> **4.2.2 Communications and ATS surveillance considerations** 4.2.2.1 ATS surveillance by ATS may be used to mitigate the risk of gross navigation errors, provided that the procedure lies within the ATS surveillance and communications service volumes, and the ATS resources are sufficient for the task. For certain A-RNP navigation applications, radar surveillance may be required. **<u>AC 91-007</u>** **6.2 Communications and ATS surveillance** a) ATS surveillance may be used to mitigate the risk of gross navigation errors, provided that the procedure lies within the ATS surveillance and communications service volumes, and the ATS resources are sufficient for the task. For certain A-RNP navigation applications, radar surveillance may be required.	The word radar is proposed to be changed by ATS in the following paragraph: **6.2 Communications and ATS surveillance** a) ATS surveillance can be used to mitigate the risk of gross navigation errors. Provided that the procedures lies within the ATS surveillance and communications services volumes, and the ATS resources are sufficient for the task. For certain A-RNP navigation applications, ATS surveillance may be required.	The comment **<u>proceeds</u>** because the correct word is ATS surveillance, and also because it includes other surveillance systems, such as ADS-B and multilateration

Original Texts Doc 9613 and AC 91-007 – A-RNP	Text proposed by **Venezuela**	SRVSOP Comments
<u>Doc 9613</u> **4.3.2 Approval process** 4.3.2.2 …….. For the operators it is expected that operator procedures, maintenance, dispatch and other operations processes that satisfy the A-RNP criteria will be considered acceptable for RNAV 1, RNAV 2, RNAV 5, RNP 2, RNP 1 and RNP APCH, Part A. …………. **<u>AC 91-007</u>** **7. AIRWORTHINESS AND OPERATIONAL APPROVAL** 7.4 ………. For the operators it is expected that operator procedures, maintenance, dispatch and other operations processes that satisfy the A-RNP criteria will be considered acceptable for RNAV 1, RNAV 2, RNAV 5, RNP 2, RNP 1 and RNP APCH operations down to LNAV and LNAV/VNAV minima (see SRVSOP AC 91-008)……..	To include **and RNP APCH down to LP and LPV minima (see SRVSOP CA 91-011)** in the following paragraph: 7.4 ………..For the operators it is expected that operator procedures, maintenance, dispatch and other operations processes that satisfy the A-RNP criteria will be considered acceptable for RNAV 1, RNAV 2, RNAV 5, RNP 2, RNP 1 and RNP APCH down to LNAV and LNAV/VNAV minima (see SRVSOP AC 91-008) **and RNP APCH down to LP and LPV minima (see SRVSOP CA 91-011)** ………..	The comment **<u>does not proceed</u>** due to the following reason: According to Doc 9613, Part C, Chapter 5, RNP APCH Section A corresponds only to LNAV and LNAV/VNAV minima. In order to clarify this issue, consultation to ICAO HQs is in process.
<u>Doc 9613</u> **4.3.2 Approval process** 4.3.2.4 Existing manufacturer compliance	To add **and RNP APCH down to LP and LPV minima (see SRVSOP AC 91-011 del SRVSOP)** in the following paragraph:	The comment does not proceed due to the following reason:

Original Texts Doc 9613 and AC 91-007 – A-RNP	Text proposed by **Venezuela**	SRVSOP Comments
findings and operator approvals that follow regulatory guidance consistent with the navigation specifications for RNAV 1, RNAV 2, RNAV 5, RNP APCH Part A, RNP 1, and RNP 2 are not impacted by this navigation specification for the associated operations. ……………. **AC 91-007** **7. AIRWORTHINESS AND OPERATIONAL APPROVAL** 7.6 Existing manufacturer compliance findings and operator approvals that follow regulatory guidance consistent with the navigation specifications for RNAV 1, RNAV 2, RNAV 5, RNP APCH operations down to LNAV and LNAV/VNAV minima, RNP 1, and RNP 2 are not impacted by this navigation specification for the associated operations………….	7.6 Existing manufacturer compliance findings and operator approvals that follow regulatory guidance consistent with the navigation specifications for RNAV 1, RNAV 2, RNAV 5, RNP APCH down to LNAV and LNAV/VNAV minima, **RNP APCH down to LP and LPV minima**, RNP 1 and RNP 2, are not impacted by this navigation specification for the associated operations ………	According to Doc 9613, Part C, Chapter 5, RNP APCH Section A corresponds only to LNAV and LNAV/VNAV minima. In order to clarify this issue, consultation to ICAO HQs is in process.
Doc 9613 **Appendix 1 to PART C** **RADIUS TO FIX (RF) PATH TERMINATOR** **5. OPERATIONAL REQUIREMENTS**	To improve the wording of the following paragraph: 5.5.7 When **published**, the pilot must not exceed maximum airspeeds associated with the flyability (design) of the RF leg.	Venezuela's comment **proceeds** to favor clear language. Text should say: 5.5.7 When published, the pilot must not exceed maximum airspeeds associated with

Original Texts Doc 9613 and AC 91-007 – A-RNP	Text proposed by **Venezuela**	SRVSOP Comments
5.5 Operating procedures 5.5.7 Where published, the pilot must not exceed maximum airspeeds associated with the flyability (design) of the RF leg. **<u>AC 91-007</u>** **APPENDIX 4** **RADIUS TO FIX (RF) PATH TERMINATOR** **5. OPERATIONAL REQUIREMENTS** 5.5.7 Where published, the pilot must not exceed maximum airspeeds associated with the flyability (design) of the RF leg.		the flyability (design) of the RF leg

Changes proposed by Colombia

Original Texts of AC 91-007 – A-RNP	Text proposed by **Colombia**	SRVSOP Comments
8.2 **Aircraft requirements** c) In order to determine systems eligibility, the CAA should consider accepting compliance documentation of the manufacturer for A-RNP, for example, FAA AC 90-105 (), 20-138 () or equivalent.	To eliminate FAA CA references since in the new amendments these could have more demanding requirements than those demanded in Doc 9613. In Section 8.2 paragraph C, AD 91-007 indicates that: "In order to determine systems eligibility, the CAA should consider accepting compliance documentation of the manufacturer for A-RNP, for example, FAA AC 90-105 (), 20-138 () or equivalent." To consider possible difference with the referred document, taking into account that according to FAA NEXGEN planning, FAA AC 90-105 is being considered within ACs being modified. This, in its next revision, namely version 90-105A, will establish scalability as a compulsory requirement, while AC91-007 being proposed, considers this requirement as optional in its Appendix 1, 1.4a.	The comment is accepted. Paragraph 8.2 c) will be eliminated from AC 91-007 to avoid additional requirements that AC 90-105A will demand when this is published by the FAA.

APPENDIX B

AIRCRAFT CAPACITY

WEB APPLICATION

Project RLA/06/901

CAPACIDAD DE AERONAVES APLICACIÓN WEB

Proyecto RLA06/901

PANTALLA DE INGRESO A LA APLICACIÓN

http://srvsop/CapacidadAeronaves

Capacidad Aeronaves

Gabriela Diaz Zapata

- Nuevo Registro
- Instrucciones
- Ver Listado
- Reportes
- Exportar Excel

Instrucciones para el llenado de la Tabla / Instructions for filling out the Table

La responsabilidad de verificar los datos incluidos en este formato es de cada una de las Autoridades de la Aviacion Civil de cada Estado

Estado/State Indique el nombre del Estado que reporta

1. Explotador/Operator: Complete el nombre del explotador, por ejemplo: CONDOR/Complete the name of the operator, for example: CONDOR.

2. Aeronave/Aircraft: En este punto se encuentran tres columnas que permiten identificar a la aeronave/At this point there are three columns which permit aircraft identification:

- en la columna titulada "Matricula", indique la matrícula de la aeronave/In column titled "License", please indicate aircraft license..
- en la columna titulada "Modelo", indique el modelo de la aeronave, por ejemplo B767-300./In column titled "Model" indicate the aircraft model, for example B767/300.
- en la columna titulada "Fabricante", indique el nombre del fabricante./In column titled "Manufacturer" indicate the manufacturer name.
- en la columna titulada "FL superior a 250", indique si la aeronave vuela por encima del FL 250./In column titled "FL above 250" indicate if the aircraft flight above FL 250.

3. Capacidad RNAV: marque con una X, según corresponda, si la aeronave dispone de capacidades RNAV con los valores de confinamiento señalados en las columnas, de acuerdo a lo indicado en
RNAV Capacity: Notas/Notes:

- Si el AFM indica la capacidad RNP10, esta debe considerarse como válida en la opción RNAV 10./If AFM indicates RNP10 capacity, it should be considered as valid in option
- Si el AFM indica la capacidad B-NAV, esta debe considerarse como válida en la opción RNAV 5./If AFM indicates B-NAV capacity, it should be considered as valid in option

4. Capacidad RNP: marque con una X, según corresponda, si la aeronave dispone de capacidades RNP con los valores señalados en las columnas, de acuerdo a lo indicado en el Airplane Flight

5. Baro-VNAV: marque con una X, según corresponda, si la aeronave dispone de capacidad Baro-VNAV, de acuerdo a lo indicado en el Airplane Flight Manual (AFM) o en el Pilot Operating

6. Sensores de Navegación/ Navigation sensors: marque con una X, según corresponda, los sensores de navegación con que dispone la aeronave./Mark with an X, as required, the navigation sensors of the aircraft.

7. GPS Primario/Primary GPS: marque con una X, según corresponda, si la aeronave dispone de equipos DPS single o dual, certificados como equipos de navegación primarios y que cumplen con las TSO

8. IntegridadIntegrity: marque con una X, según corresponda, si el sistema GNSS de la aeronave dispone de medios para asegurar la integridad de los señales de navegacion GPS (Vigilancia

9. FMS: marque con una X, según corresponda, en caso la aeronave disponga de FMS o No./Mark with an X as required, in case the aircraft has FMS or No.


Capacidad Aeronaves
Gabriela Diaz Zapata
Nuevo Registro
Instrucciones
Ver Listado
Reportes
Exportar Excel

Listado de Capacidad de Aeronaves

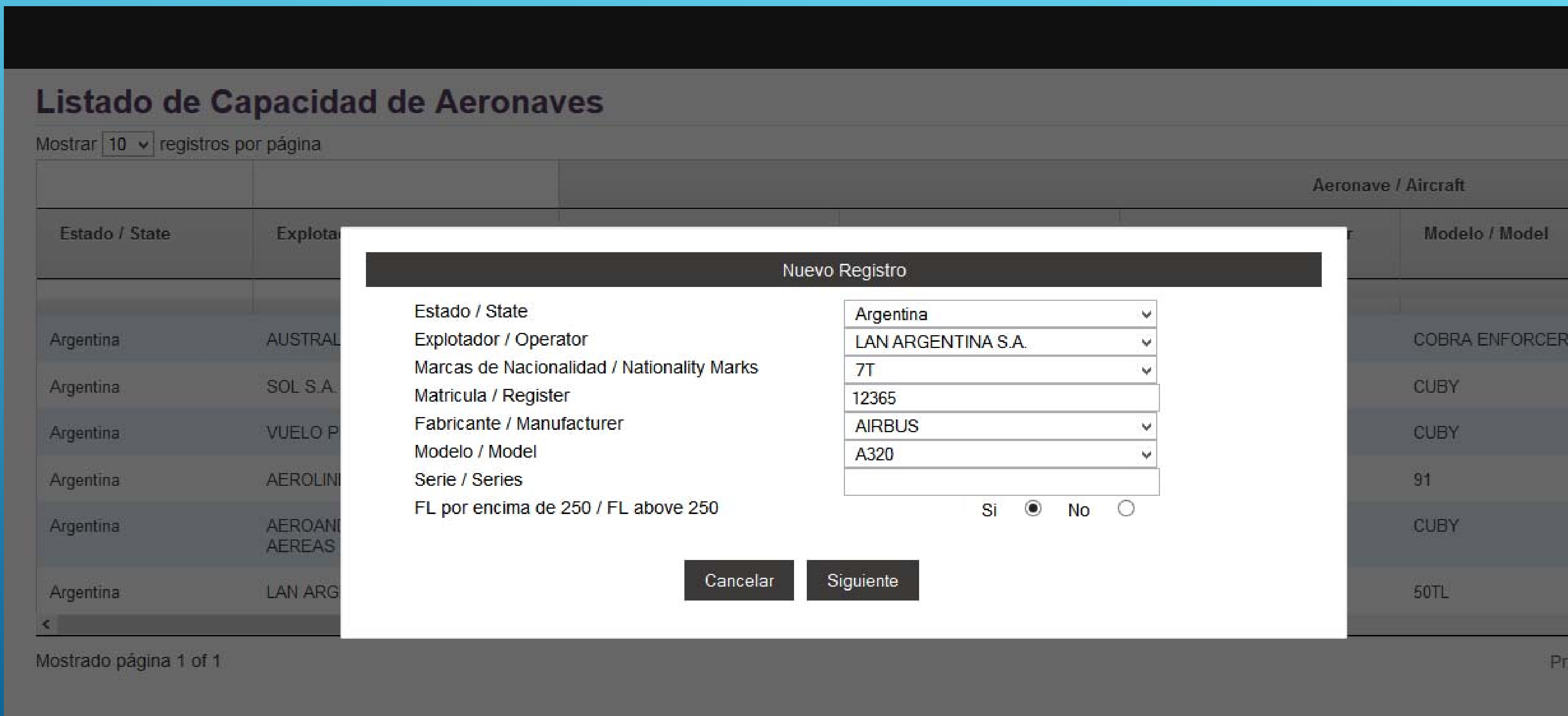
Mostrar 10 registros por página   Buscar :

		Aeronave / Aircraft				
Estado / State	Explotador / Operator	Marcas de Nacionalidad / Nationality marks	Matricula / Register	Fabricante / Manufacturer	Modelo / Model	Serie / Series
Argentina	AUSTRAL - CIELOS DEL SUR S.A.	LV	aaaaa3	ADVANCED AVIATION	COBRA ENFORCER	
Argentina	SOL S.A. LINEAS AEREAS	D2	bbbbb	ACES HIGH	CUBY	
Argentina	VUELO PRIVADO	VP-A	XXXX	ACES HIGH	CUBY	123423
Argentina	AEROLINEAS ARGENTINAS	VH	SSSS	SAAB	91	
Argentina	AEROANDES - ANDES LINEAS AEREAS	D2	33	ACES HIGH	CUBY	
Argentina	LAN ARGENTINA S.A.	D	UYYY3	AERONCA	50TL	

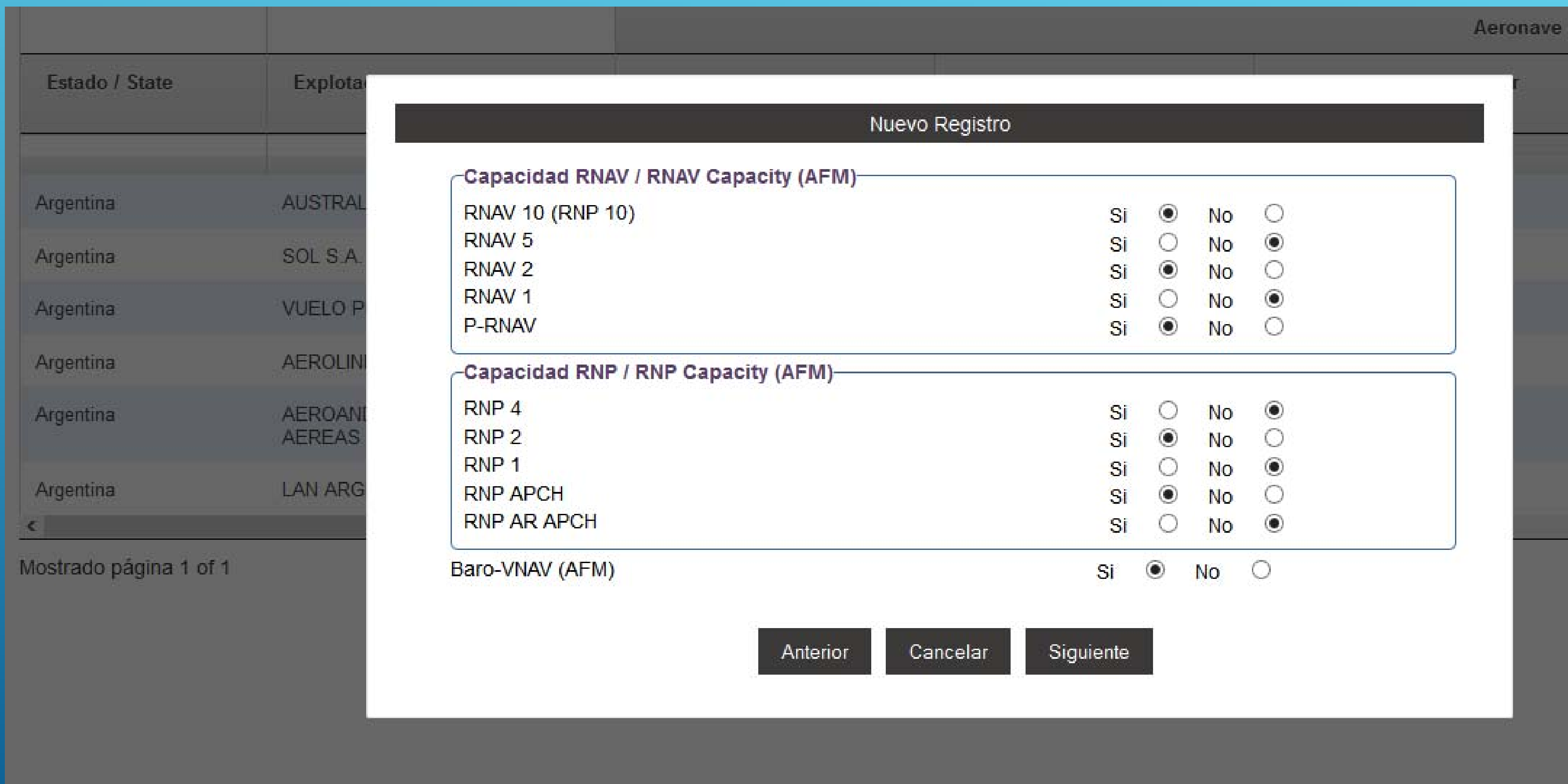
Mostrado página 1 of 1

Primero Anterior 1 Siguiente Último

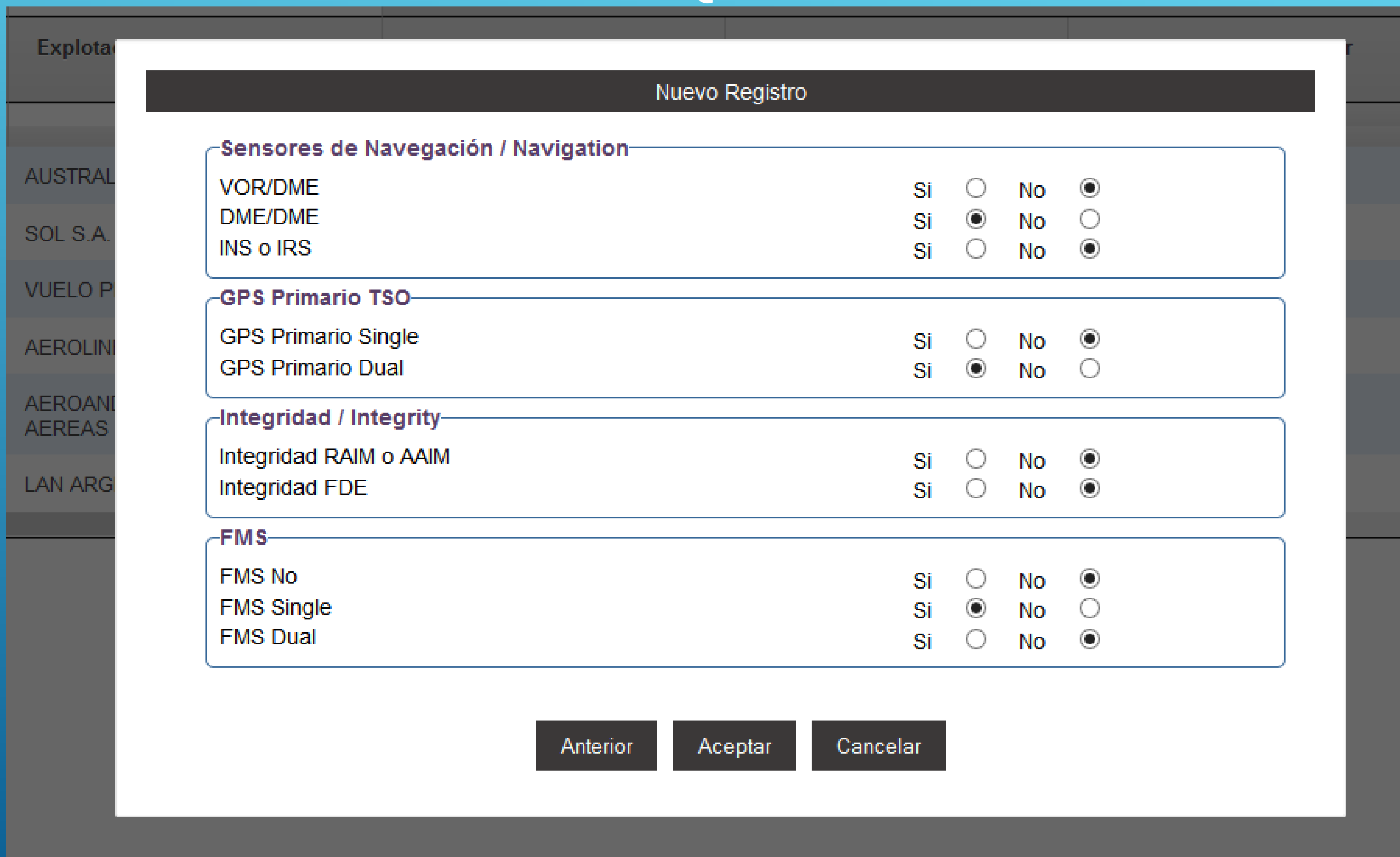
INGRESO DE UN NUEVO REGISTRO



SE VA SELECCIONANDO SI/NO DE CONTAR CON EL EQUIPO



SE VA SELECCIONANDO SI/NO DE CONTAR CON EL EQUIPO



PANTALLA DE TODOS LOS REPORTES

Gabriela Diaz Zapata

Reporte Capacidad RNAV

FL por encima de FL250 Si

Estado Argentina

Explotador LAN ARGENTINA S.A.

Fabricante AIRBUS Modelo Todos

Mostrar 10 registros por página

Buscar :

Estado	Aeronaves	RNAV 10 (RNP 10)	RNAV 5	RNAV 2	RNAV 1	P-RNAV
Argentina	1	1	0	1	0	1
Total	1	1	0	1	0	1

Mostrado página 1 of 1

Primero Anterior 1 Siguiente Último

Cuadro de Porcentajes del total de aeronaves

Mostrar 10 registros por página

Buscar :

Estado	RNAV 10 (RNP 10)	RNAV 5	RNAV 2	RNAV 1	P-RNAV
Argentina	100.00%	0.00%	100.00%	0.00%	100.00%
Total	100.00%	0.00%	100.00%	0.00%	100.00%

Mostrado página 1 of 1

Primero Anterior 1 Siguiente Último

Cuadro de Porcentajes del total de aeronaves de cada país

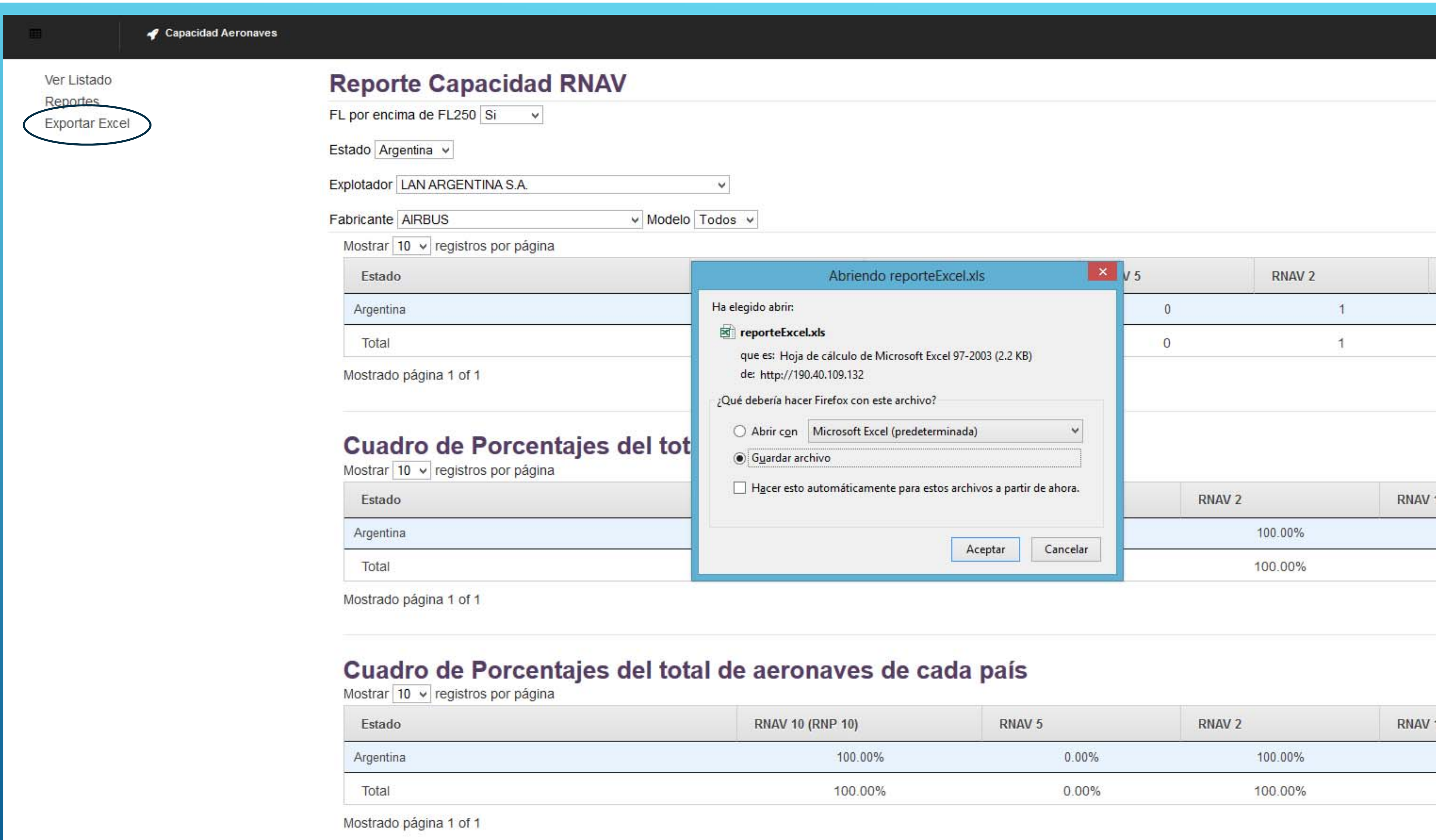
Mostrar 10 registros por página

Buscar :

Estado	RNAV 10 (RNP 10)	RNAV 5	RNAV 2	RNAV 1	P-RNAV
Argentina	100.00%	0.00%	100.00%	0.00%	100.00%
Total	100.00%	0.00%	100.00%	0.00%	100.00%

Mostrado página 1 of 1

Primero Anterior 1 Siguiente Último


Capacidad Aeronaves
Ver Listado
Reportes
Exportar Excel
Reporte Capacidad RNAV
FL por encima de FL250 Si
Estado Argentina
Explotador LAN ARGENTINA S.A.
Fabricante AIRBUS
Modelo Todos
Mostrar 10 registros por página
Estado
V 5
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Argentina 0 1
Total 0 1
Mostrado página 1 of 1
Abriendo reporteExcel.xls
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que es: Hoja de cálculo de Microsoft Excel 97-2003 (2.2 KB)
de: http://190.40.109.132
¿Qué debería hacer Firefox con este archivo?
Abrir con Microsoft Excel (predeterminada)
Guardar archivo
Hacer esto automáticamente para estos archivos a partir de ahora.
Aceptar
Cancelar
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Estado
RNAV 2
RNAV 1
Argentina 100.00%
Total 100.00%
Mostrado página 1 of 1
Cuadro de Porcentajes del total de aeronaves de cada país
Mostrar 10 registros por página
Estado
RNAV 10 (RNP 10)
RNAV 5
RNAV 2
RNAV 1
Argentina 100.00% 0.00% 100.00%
Total 100.00% 0.00% 100.00%
Mostrado página 1 of 1

Gabriela Diaz Zapata

Reporte Capacidad RNP y Baro-VNAV

FL por encima de FL250 Si

Estado Todos

Explotador Todos

Fabricante Todos Modelo Todos

Mostrar 10 registros por página Buscar :

Estado	Aeronaves	RNP 4	RNP 2	RNP 1	RNP APCH	RNP AR APCH	Baro-VNAV(AFM)
Argentina	4	0	2	1	1	0	1
Bolivia	1	1	0	0	0	0	0
Brazil	1	0	0	0	0	0	1
Peru	1	1	0	1	0	0	0
Total	7	2	1	2	1	0	2

Mostrado página 1 of 1 Primero Anterior 1 Siguiente Último

Cuadro de Porcentajes del total de aeronaves

Mostrar 10 registros por página Buscar :

Estado	RNP 4	RNP 2	RNP 1	RNP APCH	RNP AR APCH	Baro-VNAV(AFM)
Argentina	0.00%	28.57%	14.29%	14.29%	0.00%	14.29%
Bolivia	14.29%	0.00%	0.00%	0.00%	0.00%	0.00%
Brazil	0.00%	0.00%	0.00%	0.00%	0.00%	14.29%
Peru	14.29%	0.00%	14.29%	0.00%	0.00%	0.00%
Total	28.57%	28.57%	28.57%	14.29%	0.00%	28.57%

Mostrado página 1 of 1 Primero Anterior 1 Siguiente Último

Cuadro de Porcentajes del total de aeronaves de cada país

Mostrar 10 registros por página Buscar :

Estado	RNP 4	RNP 2	RNP 1	RNP APCH	RNP AR APCH	Baro-VNAV(AFM)

Agenda Item 5: Implementation of Air Traffic Flow Management (ATFM)

5.1 Under this agenda item, the Meeting analysed the following papers:

a) WP/08 – *Follow-up to the implementation of ATFM* (presented by the Secretariat);
b) WP/17 – *States' comments and proposals to the Second Part of ICAO Doc 9971* (presented by the Secretariat);
c) WP/18 – *ATFM teleconferences* (presented by the Secretariat);
d) WP/24 – *DECEA's measures for ATFM optimisation during the FIFA Brazil 2014 World Cup* (presented by Brazil);
e) WP/26 – *Flow control measures applied at the Ezeiza FIR* (presented by Paraguay);
f) IP/06 – *Runway capacity calculation at the Jorge Chávez International Airport (AIJCH)* (presented by Peru);
g) IP/09 – *Operational coordination outcomes – FIFA Brazil 2014 World Cup* (presented by Argentina);
h) IP/13 – *Air Defence Identification Zone – North of Argentina (ANADIZ)* (presented by Argentina)

Follow-up to the status of implementation of ATFM

5.2 The Secretariat recalled that, at the RAAC/13 meeting (Colombia, December 2013), the civil aviation authorities of the Region, through the Bogota Declaration, undertook to attain the goal of having at least one FMU or FMP in the ACCs by 2016. In this regard, further efforts need to be made to complete the implementation and meet the deadline.

5.3 The increased demand foreseen for the SAM Region may have a domino effect on many States and could cause delays and, consequently, losses to users, aside from the work overload in ATC units due to lack of sufficient management units for capacity/demand balancing.

5.4 The Meeting took note that in 2013, 57% of SAM States did the corresponding runway capacity calculations. In 2014, Ecuador did runway capacity calculations in Quito and Guayaquil, and French Guiana submitted its runway capacity information for Cayenne, leaving Guyana, Panama, Suriname and Uruguay still to complete such calculations. Progress to date amounts to 14% with respect to 2013.

5.5 Peru highlighted the need to update runway capacity calculations, taking into account that many factors related to this calculation have changed. In this sense, Peru did a new runway capacity calculation in June this year, as shown in **Appendix A** to this part of the report, in order to update the runway capacity value for the Jorge Chávez International Airport.

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

2013 57%	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**
	YES	YES	YES	YES	YES	NO	N/A	NO	NO	YES	YES	NO	NO	YES
2014 71%	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**
	YES	YES	YES	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO	YES

5.6 Regarding the implementation of flow management units or positions, 36% of States met the goal in 2013 (Brazil, Chile, Colombia, Paraguay and Venezuela). The Meeting took note that no progress had been made in the implementation of flow management units in 2014.

Percentage of States that have implemented ATFM in flow management units (FMUs) or flow management positions (FMPs)

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

5.7 ATFM service is provided in 45 of the 100 international airports of the SAM Region (27 in Brazil, 8 in Colombia, 1 in Chile, 2 in Paraguay and 7 in Venezuela), accounting for 45% of all regional airports. This percentage does not include airports of those States that are in the process of implementation. See table below:

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

5.8 The States that responded to the ATFM survey as part of the ATFM implementation plan designed during the SAM/IG/11 meeting were the following: Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela. This survey appears in **Appendix B** and must be completed by those States that have not done it yet.

5.9 A summary of survey outcomes, based on responses sent by the States mentioned in the previous paragraph, is shown in **Appendix C**. The summary was assessed by the SAM ATFM Implementation Group (SAM/ATFM/IG) to define the actions needed to meet the goal established in the Bogota Declaration.

5.10 It was noted that, on many occasions, Project RLA/06/901 had invested in the training of experts from the States participating in the Project, but courses had not been replicated as required.

5.11 When reviewing this matter, the Meeting considered that it was extremely important for experts attending the ATFM courses sponsored by the Project to take on the responsibility of immediately replicating such courses in their respective States, as part of the activities in preparation for ATFM implementation.

5.12 In this regard, Uruguay informed that the course on runway and ATC sector capacity calculation had been conducted locally last week, with the participation of 20 controllers. Chile has trained 7 experts to do runway calculations.

5.13 In this regard, the Meeting felt that those States that had not yet established ATFM units or positions in their control centres should start ATFM preparatory activities as soon as possible. Accordingly, it formulated the following conclusion:

Conclusion SAM/IG/14-10 ATFM preparatory activities

That SAM States do their utmost to:

a) increase the number of ATFM-trained personnel to the extent required to fulfil ATFM functions; and

b) provide ATFM training to their personnel through national courses conducted by instructors trained in courses provided within the framework of Project RLA/06/901, with a view to multiplying training.

5.14 The Meeting noted that some States had not done the runway capacity calculations to show the corresponding acceptance rate in the AIP as had been requested for 5 years, and concluded that these calculations were extremely important for ATFM management and could not be delayed any longer.

5.15 Likewise, the Meeting noted that it was also necessary to update the runway calculations already done, taking into account traffic growth, changes in infrastructure, procedures or airspace design. Furthermore, it was imperative to calculate ATC sector capacity, both for human resource planning as well as for safe air traffic management.

5.16 In view of the above, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-11 Conduction and updating of runway and ATC sector capacity calculations

a) conduct runway capacity calculations at the main international airports and publish them in the AIP no later than the SAM/IG/16 meeting;

b) update runway capacity calculations at the main international airports and publish them in the AIP when:

- the difference between calculated values and the actual acceptance values is 20% or more;
- separations are reduced or sequencing is improved; and/or
- new procedures or airspace designs are implemented that have a direct or indirect impact on the acceptance rate declared based on runway capacity calculations;

c) conduct or update sector capacity calculations at ATC units, and determine the need for adjusting the number of controllers assigned, at least every two years.

Apron capacity calculation

5.17 Regarding apron capacity calculations, the Meeting concluded that this calculation should be done by experts from the airport administration, and identified the need to establish a harmonised calculation methodology, since this calculation was very important as supplementary information to be taken into account for the strategic and tactical ATFM management phases.

5.18 The Meeting noted that the simple calculation of spaces or positions available on the apron was not even close to reality, given the different types of aircraft that, depending on their size, occupy one or two designated positions.

5.19 Regarding ATFM focal points, some States updated the information contained in **Appendix D** to this part of the Report, taking into account the need to keep these focal points updated in order to be in contact -via e-mail or teleconference- to further tasks during the period between SAM/IG meetings.

5.20 Likewise, the meeting reviewed the current ATFM action plan, and completed the information on progress made in the tasks by the States and on the parties responsible thereof. Said plan appears in **Appendix E** to this part of the Report.

5.21 The Meeting reviewed the terms of reference and work programme of the SAM/ATFM/IG Group, based on a proposal prepared by the Secretariat, and approved the TORs shown in **Appendix F** to this part of the Report.

Improving traffic flow through sequencing (B0-RSEQ)

5.22 In this regard, the Secretariat recalled that the SAM/IG/13 meeting had noted that the PBN-based airspace concept relied to a large extent on proper air traffic flow management, with the corresponding strategic, pre-tactical and tactical ATFM measures. The interaction between RNAV/RNP arrivals and departures with CDO/CCO, and the proper linkage between STARs and approaches depends on optimised sequencing of arrivals and departures, where the air traffic controller uses radar vectors only in very specific situations.

5.23 Aside from not allowing flights in their optimum profiles, another harmful consequence of using radar vectoring in a “PBN environment”, with a larger number of paths, is that the workload involved in ensuring aircraft separation is greater since the new paths used with radar vectors are not “guaranteed” by “altitude windows for crossings.”

5.24 Accordingly, the SAM/IG/13 meeting noted that strategic ATFM measures should provide an optimum air traffic flow that prevented TMA overloading, in addition to enabling the implementation of pre-tactical ATFM measures and especially, tactics to ensure optimum sequencing of arrivals and departures, thus avoiding unnecessary use of radar vectoring and holding procedures, among other measures, that would result in non-compliance with optimum flight profiles.

5.25 Based on the discussion on the relationship between PBN and ATFM, the SAM/IG/13 meeting considered that the ATFM action plan should be updated to include activities that facilitate PBN-ATFM integration, including practical strategic, pre-tactical and tactical ATFM measures to expedite the implementation of PBN airspace concepts.

5.26 Based on the foregoing, the Meeting approved the proposal, for its inclusion in the SAM ATFM action plan.

FIFA 2014 Brazil World Cup

5.27 The Secretariat recalled that the SAM/IG/13 meeting had agreed on the adoption of various actions to allow SAM States and ICAO to contribute to a proper air traffic flow management during the FIFA 2014 Brazil World Cup.

5.28 Based on the above, some SAM States established a Basic Action Plan, with the necessary measures for proper flow management, including, *inter alia,* the following: preventive and corrective maintenance strategy for navigation and communication equipment, strengthening of operational and maintenance personnel, establishment of daily operational briefings for air traffic controllers, etc.

5.29 Likewise, the ICAO SAM Regional Office coordinated the holding of 3 teleconferences on 9 and 30 May, and 5 June 2014, so that DECEA/CGNA could clarify any doubts SAM States might have regarding the air traffic flow management strategy developed by Brazil.

5.30 Furthermore, some SAM States circulated AIC A05/14 and AIC A08/14, as well as other relevant information within their territory to inform users about the rules to be observed for entering and operating in Brazilian airspace.

5.31 At the same time, some SAM States took the necessary, urgent actions to avoid or reduce the adoption of unilateral flow restricting measures, especially those based on time that did not consider the possibility of vertical separation. Inasmuch as possible, distance-based separations were applied, taking advantage of existing ATS surveillance tools.

5.32 Teleconferences were held between the South American ATC units and CGNA with a view to coordinating operational actions and any ATFM measures that might be required during the course of each day. These teleconferences, initially scheduled on a daily basis, were then limited to an as-needed basis during the course of the event.

Measures taken by DECEA to optimise ATFM during the FIFA 2014 Brazil World Cup

5.33 The Meeting took note of the information provided by Brazil concerning the 2014 World Cup. The World Cup was very successful, despite the high demand experienced during that period of time. The implementation of the appropriate tactical and strategic air traffic flow management (ATFM) measures ensured the efficiency of (ATS) services during the event.

5.34 For the 2016 Rio Olympic and Paralympic Games, DECEA will have the responsibility of providing the ideal conditions to prepare the airspace for the expected growth in demand. In this regard, the positive experience and lessons learned in the management of the 2014 World Cup would be of help.

5.35 The commitment of DECEA and consequently, the successful planning of the World Cup were confirmed upon analysing the statistics obtained during the World Cup and in the acknowledgments expressed by national and international media that had covered the World Cup in Brazil.

5.36 A detailed analysis that could help in future regional events is shown in the Appendix to working paper SAM/IG/14-WP/24.

Action taken before, during, and after the World Cup

5.37 Action taken by DECEA for the FIFA 2014 World Cup was defined in the DECEA Action Plan for Large Events, in which the Brazilian State defined the necessary modules to prepare the Airspace Control System (SISCEAB) to host the World Cup and the 2016 Rio Olympic Games, among other events. Within this context, the measures taken by ATFM before the World Cup took into account the provisions of the DECEA Action Plan for Large Events.

5.38 Before the World Cup, the Brazilian government, through the SAC (Secretariat of Civil Aviation) established the rules for allotting SLOTs to authorities and other parties involved in the event.

5.39 Accordingly, DECEA, in coordination with airport coordinators, defined the rules for dividing the SLOTs amongst the aerodromes involved in the event, in accordance with government priorities.

5.40 Before the World Cup, DECEA, through the Air Navigation Management Centre (CGNA), adopted the following measures:

- Updated the published ATC and runway capacity values of the bodies involved in the event;
- Projected the demand for the period of the World Cup;
- Identified the critical navigation aids that could impact ATFM;
- Adjusted FIR/TMA sectors;
- Identified possible impact of air defence exclusion areas on domestic flows;
- Changed flows at terminals to increase traffic absorption capacity;
- Developed alternate IFR procedures so as not to affect flows; and
- Conducted videoconferences with air defence control bodies.

5.41 During the World Cup, ATFM adopted pre-tactical and tactical measures based on the results of the games. The growing demand by the general aviation during the event required specific and quick action by DECEA to avoid exceeding runway, apron and ATC capacities and thus generating risks for aircraft operations.

5.42 Once the World Cup started, and based on the results, DECEA saw the need to adjust its plans and took some measures to optimise ATFM, such as:

- Identified critical games and their possible impact on flows;
- Conducted videoconferences for the ATC of the venues involved, during and after each critical game;
- Started operating the FMP-BH (Belo Horizonte-MG);
- Established the actual workload at 100% for runway capacity, and up to 130% for ATC sector capacity, in accordance with the level of expertise of expert controllers;
- Created teams of flow experts and AIS officials to support FMPs and AIS rooms at the venues of the games; and
- Created arrival and departure flows before and after critical games.

5.43 Following the World Cup, DECEA maintained some operational procedures that helped meet the high demand during the event, and optimise ATFM. The main procedures were implemented through the following actions:

- The operation of the FMP-BH (Belo Horizonte-MG) was maintained, facilitating the exchange of information among ACC-BS, APP-BH and CGNA;
- The SIGMA (Integrated aircraft movement management system) VSP (runway display) module was adopted as a tool to support tactical decisions;
- Together with ATC, studies were started to apply the procedures created during the World Cup, in periods of intense flow or during seasonal events where high demand is expected; and
- A working group was created to optimise the Flight Plan Handling System, so as to identify the impact for the 2016 Rio Olympics.

5.44 Regarding the above, Argentina informed that the air navigation service provider had organised, at national level, dissemination and coordination meetings with national focal points from the ACCs, the main airports concerned, the CNS area, ANAC, airline and general aviation representatives, and at regional level, with the authorities of DINACIA of Uruguay, in order to give more flexibility to coordination between the ATCs of both States.

5.45 Likewise, Argentina participated in scheduled daily teleconferences and in others derived from specific coordination needs between FIRs adjacent to Resistencia and Ezeiza.

5.46 The Meeting recognised the efforts made by all the States of the Region that contributed to the success of this event, and congratulated Brazil for the excellent organisation and efficacy, where some parameters exceeded the expected values but, thanks to careful and thorough planning, the impact could be absorbed through proper strategic preparatory and tactical measures.

2014 Programme of ATFM activities under Project RLA/06/901

5.47 The Meeting noted the importance of conducting a theoretical/practical course on ATFM procedures for the appropriate personnel from the States, lasting 10 days, at the CGNA of Brazil, if possible during the second half of 2014.

5.48 In this regard, the Secretariat informed about coordination to this effect with CGNA, and that this course would be held on 17-28 November 2014, at the aforementioned centre, located in Rio de Janeiro. The course was addressed to air traffic controllers, supervisors and/or personnel in charge of ATFM tasks, who had received training in ATFM, CDM, airport and ATC sector capacity calculation, and/or who were involved in ATFM implementation and development processes in their States, especially those related to the attainment of the goal of the Bogota Declaration established at the RAAC/13 meeting (December 2013): *"100% of area control centres (ACCs) providing air traffic flow management (ATFM) services."*

5.49 For the purpose of optimising the training of experts participating in this course, it is deemed advisable that they have an expectation of staying with the Administration for no less than 5 years after training, in order to make sure that knowledge is transmitted to other experts and that an optimum management of ATFM processes is achieved.

5.50 The course would be conducted in Portuguese, and the corresponding documentation would be prepared in Portuguese and Spanish. The relevant material would be posted in due time on the website of the ICAO South American Regional Office (http://www.icao.int//SAM/Pages/ES/meetings_ES.aspx - *Theoretical/practical course on ATFM procedures*. The course programme is shown in **Appendix G**.

5.51 The Meeting considered of high priority that experts following the aforementioned course present a subsequent training plan to train experts in their States, replicating the course taken, in compliance with the deadlines established in the ATFM Action Plan.

Comments by States concerning the second part of ICAO Doc 9971

5.52 The Secretariat noted that the SAM/IG/13 meeting had analysed the supplementary section, Part II of ICAO Doc 9971, which deals with collaborative air traffic management. This manual contains information on how should ATFM be implemented and applied, using collaborative decision-making for demand-capacity balancing with different airspace volumes and airport environments.

5.53 In the meantime, Headquarters informed the Secretariat that Part II had already been published as a living document that would be periodically revised, and therefore comments made would be taken into account to improve it. Likewise, this initiative was acknowledged, since it pursued the enhancement of the document.

5.54 The Meeting reviewed the changes proposed by Brazil, Chile and Colombia, and approved the changes proposed by Brazil and Colombia. The comments made by Chile on the document referred to examples and, therefore, were not considered applicable in this case. Furthermore, the Meeting agreed to apply track changes to facilitate translation and reflect in the document the suggestions made by this Region, as shown in **Appendix H** to this part of the report.

ATFM teleconferences and ATFM data exchange

5.55 The Secretariat recalled that SAM/ATFM/IG meetings had noted that States should hold teleconferences among flow management units or positions as part of the ATFM implementation process in the Region. In addition to ensuring a channel of communication and information among ACCs, this practice helped to give the personnel some training in these activities.

5.56 The SAM/IG/05 meeting addressed the issue of ATFM teleconferences for the first time. Since then, the issue had been addressed at SAM/IG meetings. An extract of SAM/IG meeting reports on this matter is shown in Appendix A to working paper SAM/IG/14-WP/18**.**

5.57 The SAM/IG/06 and SAM/IG/07 meetings considered that, for different reasons, States were not ready yet to conduct daily teleconferences, but concluded that ATFM teleconferences between flow management units or positions (FMUs/FMPs) should be held on a weekly basis.

5.58 Likewise, the SAM/IG/08 meeting agreed that e-mail or SKYPE were valid tools that States could use to start handling flow management information. These tools have been considered as the simplest way of disseminating the ATFM philosophy in the Region.

5.59 At that meeting, the SAM/ATFM/IG had adopted an ATFM data exchange form that was being used by some SAM States (Argentina, Bolivia, Chile, Paraguay, Peru and Venezuela) in a more or less regular manner, depending on the State.

5.60 This form was modified by the Meeting, which added a field it deemed necessary to record construction events (WIP) or other works that, with or without machinery or personnel, could affect the safety of the operations area. The form is contained in **Appendix I** to this part of the report**.**

5.61 The SAM/IG/10 meeting defined the format of the data exchange form to be used during operational teleconferences. This form is contained in **Appendix J** to this part of the report.

5.62 In this regard, the Meeting agreed to maintain the information by e-mail for daily exchange of ATFM data. Argentina, Bolivia, Ecuador and Uruguay did not support the initiative of sending the form on a daily basis because they lacked a specialised ATFM unit. The other States supported that daily delivery of the ATFM data exchange form, since they considered that it would be of great help in terms of capacity, efficiency and safety management.

5.63 The Meeting analysed the convenience of providing a monthly executive summary of the main factors that caused congestion and delays in the airspace and at the main airports. Argentina informed that, as ATFM implementation proceeded, it would start sending the monthly summary, since it currently lacked a specialised ATFM unit. The other States attending the meeting supported the monthly exchange of the summary among ATFM focal points and the SAM Regional Office, in order to record and assess the necessary data, with a view to identifying problems that affected efficiency and reduced the capacity of the airspace under consideration.

5.64 On this matter, IATA made a presentation on the ITOP tool (IATA TACTICAL OPERATIONS PORTAL) that was currently being applied with great success and which, in addition to being an immediate and simple communication tool, offered the possibility of obtaining statistical data that could help improve ATFM management.

5.65 The ITOP tool is very simple and has two interfaces: one in the United States and the other in Brazil. Through this tool, IATA Brazil would be the interface that would act as a node for the SAM Region. IATA would provide the code to the ATFM focal point of the State that wished to use it. Furthermore, IATA would provide, in March and September, statistics on its use to report to SAM/IG at its regular meetings in May and October.

5.66 This tool obtained information in a faster way, and after it becomes official, is disseminated immediately among stakeholders and users. The ICAO Regional Office would also have an access code, since another possibility of the tool was its use as a node for teleconferences.

5.67 Based on the above, the Secretariat requested IATA to provide information to SAM/IG meetings on delays and congestions, in order to better identify and quantify the impact on capacity and efficiency of operations.

Delivery of ATFM forms by States since the SAMIG/13 meeting and during the World Cup

5.68 The Meeting took note of the forms delivered by the States since the SAMIG/13 on occasion of the FIFA 2014 World Cup.

Argentina

5.69 The Argentinian Administration sent 23 forms since 11 June 2014. The most outstanding examples taken from those forms are listed below:

a) The main flow management problem during this period was the flow control procedure at the Mendoza FIR, which specified the entry of an ACFT every 10 minutes, regardless of flight level, with the exception of medical, humanitarian and State flights;

b) During the 2014 World Cup, Mendoza and Santiago coordinated flow management of one ACFT every 5 minutes at the position ASIMO, in order to reduce the impact of flights from Chile to Brazil. In this sense, the delegation of Argentina informed that the measure had been effective and flights had not been affected during the aforementioned sporting event.

Bolivia

5.70 The Bolivian Administration sent 19 forms from 3 June to 30 September 2014. The most outstanding examples taken from those forms are listed below:

a) Route UM548, segment ORALO-PILCO, suspended from 6 June to 6 September. NOTAM renewed, extending the suspension until 4 December.

b) Installation of DVOR/DME TAR.

Chile

5.71 From June to September, the Chilean Administration sent 26 forms. The most outstanding examples taken from those forms are listed below:

a) Aerodromes without delays.

b) Restrictions in Argentinian airspace affected operations in the Santiago airport, requiring the publication of a NOTAM stating that IFR take-offs of non-scheduled flights headed to Argentina should be coordinated 24 hours in advance at the ARO Offices.

c) Works in SCEL runways (September 2014 to March 2015), with increased spacing between arrivals and departures and changes in runway segregation. No delays.

d) NOTAM indicating possible delays due to ILS checking.

e) Entry into the Santiago FIR every 5 minutes at the UMKAL and ASIMO positions.

Paraguay

5.72 Between 13 June and 30 September, the Paraguayan Administration sent 47 forms, showing there were no delays in SGAS and in the Asunción FIR. Information on the main NOTAMs is quite comprehensive.

Peru

5.73 Between 8 June and 30 September, the Peruvian Administration sent 83 forms, showing there were no delays in SPIM and in the Lima FIR. Forms were sent on a daily basis, including weekends, taking into account that they were assigned to the Lima ACC.

Venezuela

5.74 Between 9 June and 30 September, the Venezuelan Administration sent 28 forms, mostly concentrated during the FIFA 2014 World Cup, including the publication of a specific NOTAM on the subject. There were no delays in SVMI and in the Maiquetía FIR.

Flow control measures applied in the EZEIZA FIR

5.75 Paraguay recalled that the ATS/01 Multilateral meeting held in Bolivia in February 2014 and the SAM/IG/13 meeting had decided to include a text on flow control measures that had a domino effect and reduced operational efficiency and capacity in adjacent FIRs, mostly affecting small FIRs that did not have sufficient airspace to absorb measures unrelated to the flow control management philosophy.

5.76 The text used by the participating States in their letters of agreement was as follows:

<u>FLOW CONTROL MEASURES</u>: Flow control measures shall be applied with as little impact as possible on the ACCs involved. Restrictions that involve time spacing regardless of flight level, which affect the capacity and efficiency of the airspace involved and other non-adjacent FIRs will be avoided at transfer of control points. Likewise, the supervisors of the two ACCs will agree on the flexibility of the measures and will consider special cases, establishing, if necessary, holding points in the FIR that implements the measure.

5.77 The Meeting was emphatic in that this type of measures, if applied outside the ATFM context and without the required justification, jeopardised the safety of some FIRs. Accordingly, the State that implemented these measures should apply the duly supported Contingency Plan or otherwise accommodate delays within its airspace.

Air defence identification zone – Northern Argentina (ANADIZ)

5.78 On this matter, the Meeting was informed that in Argentina, the military authorities of the Air Force, the National Civil Aviation Administration, and the Air Traffic Control General Directorate as air navigation service provider, were coordinating the implementation, in the short term, of an ADIZ from GND/ILM, called Air Defence Identification Zone - Northern Argentina (ANADIZ), shown in Appendix A to information paper SAM/IG/14-IP/13, which would partially affect Argentinian airspace corresponding to the Cordoba and Resistencia FIRs and the border FIRs of La Paz, Asuncion and Curitiba.

5.79 In this regard, Argentina would establish the requirement that all aircraft flying to/from Argentina should be equipped with an operational SSR (transponder), Mode A and C, so that they can be identified when entering or exiting the airspace affected by the ANADIZ.

5.80 Regarding this procedure, the Meeting took note that State aircraft and humanitarian flights (SAR, medical or disaster relief) were exempt.

5.81 The validity of the foregoing would be initially published in a NOTAM and subsequently in the AIP of Argentina.

5.82 In this sense, the Meeting requested that these implementations be communicated TWO AIRAC CYCLES in advance in order to allow the other States to properly disseminate the information to users.

RUNWAY CAPACITY CALCULATION
"JORGE CHÁVEZ" INTERNATIONAL AIRPORT (SPIM)

Assessed period: 07 to 11 and 14 to 18 June 2014
Total of days analyzed: 10 days

DETERMINATION PROCESS OF DECLARED RUNWAY CAPACITY, 15/33 AIJCH

I. Data collection

A. Collection of runway occupancy time during takeoff (TOPD) see table1
B. Collection of runway occupancy time during landing (TOPP) see table2

II. Calculation of arithmetic mean of runway occupancy times by aircraft category

A. Arithmetic mean of runway occupancy times during landing by aircraft category (MTOPP)

CATEGORY	∑ TOPP cat	MTOPP
A	00:00:00	00:00:00
B	00:09:47	00:00:59
C	01:04:05	00:00:57
D	00:01:46	00:01:46
E	00:00:00	00:00:00

B. Arithmetic mean of runway occupancy times during takeoff by aircraft category (MTOPD)

CATEGORY	∑ TOPD cat	MTOPD
A	00:02:04	00:02:04
B	00:30:41	00:01:55
C	01:48:47	00:01:57
D	00:00:00	00:00:00
E	00:00:00	00:00:00

C. Arithmetic mean of runway capacity times by aircraft category (MATOP)

CATEGORY	MATOP
A	00:01:02
B	00:01:27
C	00:01:27
D	00:00:53
E	00:00:00

III. Calculation of aircraft mix

CATEGORY	∑	MIX %
A	1	0.66
B	26	17.22
C	123	81.46
D	1	0.66
E	0	0.00

IV. Calculation of runway occupancy time average (TMOP)

$$TMOP = \frac{\sum(MATOP_{CATX} . MIX_{CATX})}{100}$$

CATEGORY	MATOP X MIX
A	00:00:41
B	00:24:56
C	01:58:04
D	00:00:35
E	00:00:00
∑	02:24:17

TMOP	
00:01:27	
87	Seconds

V. Calculation of physical runway capacity

CFP = 3600 / TMOP	
41.38	ACFT

VI. Calculation of runway utilization percentage (PU)

RUNWAY	% OF UTILIZATION (PU)
15	96.2593 %
33	3.7407 %

AIRCRAFT MONTHLY MOVEMENT

MONTH	**RUNWAY 15**	**RUNWAY 33**	**MONTHLY MOVEMENT**
JANUARY	12023	766	12789
FEBRUARY	11016	721	11737
MARCH	11730	866	12596
APRIL	11827	467	12294
MAY	12443	399	12842
JUNE	11765	439	12204
JULY	12763	436	13199
AUGUST	12648	337	12985
SEPTEMBER	12341	251	12592
OCTOBER	12775	275	13050
NOVEMBER	12203	401	12604
DECEMBER	12435	302	12737
TOTAL			151629

VII. Calculation of theoretical runway capacity

A) Flight average time between DALNA and THR 15

CATEGORY	ACFT NUM	∑ T cat	SEC	TM Sec	TM MIN
A	0	00:00:00	0.00	0.00	00:00:00
B	10	00:28:00	1680.00	168.00	00:02:48
C	67	02:48:21	10101.00	150.76	00:02:30
D	1	00:02:10	130.00	130.00	00:02:10
E	0	00:00:00	0.00	0.00	00:00:00

B) Calculation of approach speed between DALNA and THR 15

SAF=5.9 NM (Distance of APCH final segment)

CATEGORY	TM Sec	TM MIN	NM/MIN	VEL (KT)
A	0.00	00:00:00	0.00	0.00
B	168.00	00:02:48	2.11	126.43
C	150.76	00:02:30	2.35	140.89
D	130.00	00:02:10	2.72	163.38
E	0.00	00:00:00	0.00	0.00

C) Final approach average speed (VM)

CATEGORY	VEL (KT)	MIX	VELxMIX
A	0.00	0.66	0.00
B	126.43	17.22	2176.92
C	140.89	81.46	11476.07
D	163.38	0.66	108.20
E	0.00	0.00	0.00

VM(KT)	VM(NM/MIN)	VN(NM/SEC)
137.61	2.29	0.04

D) Determination of safety separation (SS)

SS=VMxTMOP

SS=	3.33	NM

E) Determination of total separation between two consecutive landings (ST)

ST=SS+SMR

ST=	8.33	NM

F) Determination of the time-weighted average between two consecutive landings, considering the total separation (TMST)

TMST=ST/VM

TMST=	217.80	SEG

G) Determination of number of landings in one hour interval (P)

P=HOUR/TMST

P=	16.53	ACFT

H) Determination of number of takeoff in one hour interval (D)

D=P-1

D=	15.53	ACFT

I) Determination of theoretical runway capacity

THEORETICAL RUNWAY CAPACITY		
CTP=P+D		
CTP=	32.06	
CTP=	32.00	ACFT

VIII. Determination of declared capacity of the runway set CDP

RUNWAY	% OF UTILIZATION (PU)
15	96.2593 %
33	3.7407 %

Declared capacity

CA=(PU 15*CTP)+(PU33*CTP)/(PU15+PU33)

CA= 32.057

CA= 32

100%, 95% and 90% declared capacity

CA	100%	32.057	32 ACFT
	95%	30.455	30 ACFT
	90%	28.851	28 ACFT

SURVEY ADDRESSED TO SAM STATES AS PART OF THE ATFM IMPLEMENTATION PLAN

Country /State: __________________ Airport:___________________________

Person responding the survey:____

Date: __________________

1. Regarding the SAM ATFM implementation plan, indicate if FMU/FMP units have been established. If the answer is YES, indicate the responsible unit. If the answer is NO, indicate plans for ATFM implementation based on regional requirements.

____
____
____
____

2. Indicate if you have personnel trained in ATFM implementation and if such personnel is currently performing the corresponding functions in accordance with the implementation plan.

____
____
____
____

3. If NO trained personnel is available, indicate the number of people available for receiving training in the ATFM implementation plan.

____
____
____
____

4. In your State/country, how many airports have runway capacity calculation? List the most important ones. If your answer is NONE, indicate what airports have runway capacity calculation. List the most important ones. If your answer is NONE, indicate what airports you consider require such calculation.

____

____

____

____

5. In your State/country, how many airports have apron capacity calculation? List the most important ones. If your answer is NONE, which airports to you consider require such calculation?

____

____

____

____

6. In your State/country, what airports have ATS sector capacity calculation? List the most important ones. If your answer is NONE, what airports you think require it?

____

____

____

____

7. For the airport that you consider of greatest importance, indicate the following in terms of the number of operations per hour:

- Runway capacity: _____________
- Apron capacity: _____________
- ATS sector capacity: _____________

8. For the airport that you consider of greatest importance, indicate the number of trained people in a position to calculate, in terms of operations per hour:

- Runway capacity: ____________
- Apron capacity: ____________
- ATS sector capacity ____________

9. List the airports in which demand exceeds runway capacity and indicate the operational factors affecting them.

____
____
____
____
____
____

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

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

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

ATFM SURVEY	ARG (ANAC)	ARG (DGCTA)	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	REMARKS
5. How many airports in your State/country have apron capacity calculations? List the main ones. If the answer is NONE, indicate which airports you think require such calculations.	**0**	**0**	**0**	**1**	**0**	**0**	**0**			**0**	**0**	**0**		**0**	**0**	**Brazil:** Apron capacity calculations have been performed for one airport (Guarulhos international airport in São Paulo-SP). This information was provided by GRU- (Guarulhos Airport Administration). **Chile:** We believe that SCEL, SCIE, and Loa de Calama require this calculation. **Colombia**: None. It is required for several airports since airport capacity is not being managed to address growing demand. **Ecuador**: None of the airports in the country has apron capacity calculations. However, I think the airports of Quito, Guayaquil, Nueva Loja, Coca, Shell Mera, Cuenca, and Manta require these calculations. **Paraguay**: These calculations have not been performed due to lack of experts (specialists) duly trained for this purpose. Calculations are required for the two international airports mentioned above: “Silvio Pettirossi” in Asunción and “Guaraní” in Minga Guazú. **Peru**: Two airports require these calculations. **Uruguay**: SUMU and SULS. **Venezuela**: None. We still do not have personnel duly trained to conduct these calculations, which would be required for the international airport of Maiquetía.

ATFM SURVEY	ARG (ANAC)	ARG (DGCTA)	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	REMARKS
6. How many airports in your State/country have ATS sector capacity calculations? List the main ones. If the answer is NONE, indicate which airports you think require such calculations.	**0**	**0**	**1**	**OBS**	**0**	**1**				**1**	**1**	**1**		**0**	**1**	**Argentina (ANAC)**: They are needed for: EZE FIR, Baires TMA, Ezeiza AD, Aeroparque AD, and San Fernando AD **Argentina (DGCTA)**: The airports of Aeroparque, Ezeiza, San Fernando, and Córdoba are being considered. **Brazil**: For most of them, it can be derived from the Brazilian ATC capacity. **Chile**: We think the airports of SCEL, SCIE, and Loa de Calama require these calculations. **Colombia**: One, at El Dorado; arrival sector; in process, north, south of the Bogota TMA and upper sectors of the SKED FIR. **Ecuador**: ATC sector calculations have not been established for any of the airports of the country. However, given the importance of this matter and knowing the limitations that exist in most airports and aerodromes, I think a study and analysis should be made for all of them in order to identify actions and recommendations for better operational management and safety. **Paraguay:** These calculations only exist for the international airport "Silvio Pettirossi" in Asunción and should also be conducted for the "Guaraní" airport in Minga Guazú. **Peru**: Lima. **Uruguay**: SUMU (TWR), SUMU (APP Radar) and SUEO (ACC Radar). **Venezuela**: Only the international airport of Maiquetía.
7. Number of operations per hour at the airport considered to be the most important one:																**Chile**: SCEL **Peru:** SPIM.
Runway capacity	**X**	**X**		**SBGR 47**	**SCEL 40**	**70 SKBO**	**29**				**SGAS 23**	**SPIM 32**		**X**	**SVMI 34**	
Apron capacity	**X**	**X**	**X**		**X**		**0**				**X**			**X**	**X**	
ATS sector capacity	**X**	**X**	**10 Sector 2 FIR**		**X**	**30 arrivals SKBO**	**0**				**8 (number N)**	**TMA 8**		**X**	**Sector 1 26 Sector**	

ATFM SURVEY	**ARG (ANAC)**	**ARG (DGCTA)**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**REMARKS**
			BS												**2 28**	
8. For the airport considered to be the most important one, number of trained personnel capable of providing, in terms of operations per hour, calculations for:																
Runway capacidty	**X**	**2**	**0**		**09**	**4**	**1**			**2**	**1**	**6**		**20**	**2**	
Apron capacity	**X**	**X**	**X**		**X**		**X**			**X**	**X**	**X**		**X**	**0**	
ATS sector capacity	**X**	**X**	**1**		**SCEL 02**	**4**	**1**			**2**	**1**	**6**		**20**	**2**	
9. List the airports in which demand exceeds runway capacity, and indicate the operational factors affecting them.																**Argentina (ANAC)**: We do not have this information. **Argentina (DGCTA)**: We do not have the necessary information. **Brazil**: There are no airports in Brazil that operate above their capacity, since critical airports have been coordinated by CGNA. However, the airport of SBGR sometimes requires ATFM capacity/demand balancing measures, since its aprons and gates are being expanded; however, when the reduction of ATC separation minima proposed for final approach is completed, its capacity will increase. **Chile:** At peak hours, SCEL exceeds its declared capacity (40 acft/h). The factors that cause this imbalance are: airline schedules; operation of CAT A and B aircraft; adverse weather conditions (low visibility-wind); and maintenance of the manoeuvering area. **Colombia**: El Dorado; factors involved: capacity of arrival/departure sectors; fleet mix; runway distribution; DEP parallel approaches. **Ecuador**: Quito airport: routes need to be redefined; ATC sectors and airspaces, in general, need to be improved and optimised; the airport

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

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

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

State/ Estado	**STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO**	**OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS**
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BOLIVIA (Plurinational State of) / **BOLIVIA (Estado Plurinacional de)***	ATCO Daniel Bustamante Leyton Dirección General de Aeronáutica Civil (DGAC) Inspector ATM/SAR Cel.: +591 7220-1865 E-mail: dbustamante@dgac.gob.bo	ATCO. Marco Sergio Barrios Barzola Supervisor ACC La Paz Jefe Navegación Aérea Reg. La Paz Tel/Fax: +591 2 281-0203 (ACC/La Paz) Tel/Fax: +591 2 282-1717 (Nav. Aérea) Tel: +591 2 223-8339 (Home/domicilio) Cel.: +591 7 052-3884 E-mail: mbarrios@aasana.bo masebarbar@hotmail.com

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
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State/ Estado	**STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO**	**OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS**
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State/ Estado	**STATE ATFM FOCAL POINTS** **PUNTOS FOCALES ATFM DEL ESTADO**	**OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS** **PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS**
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State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
FR.GUIANA / GUYANA FRANCESA		
GUYANA		
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State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
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State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
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VENEZUELA (Bolivarian Republic of) / **VENEZUELA (República Bolivariana de)***	Maribel Mayora Vallenilla Responsable ATFM Tel: +58212 303-4532 (13:00 – 21:00 UTC) Cel: +58416 611-0607 (H24) E-mail: atfm@inac.gob.ve m.mayora@inac.gob.ve Wilfredo Gil Sánchez Jefe ACC-Maiquetía Tel: +58212 355-2912 (13:00 – 21:00 UTC) Cel: +58416 632-6204 (H24) E-mail: w.gil.@inac.gob.ve	ACC-Maiquetía Tel: +58212 355-2216 (H24) Cel: +58416 623-6427 (H24) E-mail: Maruska Borges Rodríguez Unidad FMU/ATFM/Venezuela ATC/Aeropuerto Int´l. Maiquetía Tel.: +582 12 303-4532 (13:00 – 21:00 UTC) Cel: +584 14 299-3995 (H24) E-mail: ma.borges@inac.gob.ve

* Updated SAM/IG/14 / Actualizados en la SAM/IG/14

ACTION PLAN FOR THE IMPLEMENTATION OF ATFM AT SAM AIRPORTS

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

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

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
5.4 Monitor the training of the ATM community.	SAM/IG/11	SAM/IG/15	States	**PERMANENT**
6. Final implementation decision				
6.1 Review factors that may affect the implementation decision.			States	**VALID**
6.2 Declare the pre-operational implementation in the defined area.			States	**VALID**
6.3 Declare the final operational implementation in the defined area.			States	**VALID**
7. Monitor system performance				
7.1 Develop performance indicators according to CDM manual.	SAM/IG/11	SAM/IG/14	States	**VALID** States will present an information paper concerning the performance indicators.
7.2 Develop a performance indicators follow-up programme	SAM/IG/11	SAM/IG/15	States	**VALID**
7.3 Develop and implement an ATFM post-implementation follow-up programme at airports.	SAM/IG/13	SAM/IG/15	States	**VALID**

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

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
2.1. Pre-tactic and mainly tactic ATFM measures that guarantee an optimal sequencing of arrivals and departures, avoiding application of radar vectors and holdings.	SAM/IG/14	SAM/IG/16	SAM/ATFM/IG States	**VALID**
3. Coordination with the ATM community				
3.1.Promote seminars to the ATFM community considering the airspace capacity concept for the implementation of ATFM and initiate corresponding coordination.	SAM/IG/11	Permanent	States	**VALID**
4. Infrastructure and database				
4.1 The ATFM/IG Group will present the basic requirements for a regional automated system.	SAM/IG/12	SAM/IG/13	ATFM/IG	**VALID** Brazil has already implemented. Colombia presented their preliminary requirements.
4.2 Coordinate implementation activities with the Automation Group.	SAM/IG/13		ATFM/IG	**VALID** Depends on information of 4.1.
5. Policy, standards, and procedures	TBD	Jun 2013	States	
5.1 Develop a regional strategy and framework for the implementation of Centralized ATFM units.	2008	2016	Project RLA/06/901	**VALID**
5.2 Develop template/contents for operational agreements between Centralized ATFM units for interregional demand/capacity balancing.	2008	2016	Project RLA/06/901	**VALID**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
5.3 Define common elements of situational awareness between FMUs; • common traffic displays; • common weather displays (Internet); • communications (teleconferences, web): • IATA ITOP tool	2008		States	**PERMANENT**
5.4 Review the regional ATFM implementation roadmap to be used by States as FMU/FMP implementation guide.	SAM/IG/11	Permanent	States	**VALID**
5.5 Apply a national strategy to implement the use of a flexible upper airspace (FUA), on the basis or the Guideline for the Implementation of the Flexible Use of Airspace (FUA) Concept in the South American Region: • evaluate the management processes in the use of the airspace; • improve the current domestic airspace management to adjust dynamic changes to the traffic flows in tactical stages; • introduce improvements to the ground ATS systems and associated procedures for the extension of the FUA with dynamic management processes in the use of the airspace; • dynamically implement ATC sectorization with the aim of providing a better balance between demand and capacity that responds in real time to changing situations in the traffic flows and to accommodate in the short-term the users preferred trajectories.	2008	2015	States	**VALID**
6. Training				
6.1 Train personnel in the sector capacity calculation and subjects related to ATFM for the airspace.	Dec 2014	SAM/IG/16	States	**PERMANENT**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
6.2 Prepare plans and ATFM training material	Dec 2014	SAM/IG/15	States	**VALID**
6.3 Conduct training of personnel involved.	Dec 2014	SAM/IG/16	States	**VALID**
7. Final implementation decision				
7.1 Analyse factors affecting the implementation decision.	N/A		States	**VALID**
7.2 Declare pre-operational implementation in the area defined.	N/A		States	**VALID**
7.3 Declare definitive operational implementation in the area defined.	N/A		States	**VALID**
8. Monitor system performance				
8.1 Draft performance indicators	2010		Project RLA/06/901	**VALID**
8.2 Develop an indicators follow-up programme.	TBD		States	**VALID**

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

1. TERMS OF REFERENCE

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

2. WORK PROGRAMME

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

3. COMPOSITION

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

4. RAPPORTEUR

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

COMANDO DA AERONÁUTICA
DEPARTAMENTO DE CONTROLE DO ESPAÇO AÉREO

COURSE ON ATFM PROCEDURES
(Rio de Janeiro, Brazil, 17 to 28 November 2014)

WEEK: 1/2 WEEKLY WORKING SCHEDULE TURN: 01/2014

COURSE ON ATFM PROCEDURES				
DATE	**SCHEDULE**	**ACTIVITY**	**INSTRUCTOR**	**SITE**
17/11/14 Monday	08:00-08:45	REGISTER	CGNA TEAM	AUDITORIUM
	08:55-09:40	OPENING	CHIEF OF CGNA	
	09:40-10:10	COFFEE BREAK	-	RECREATION AREA
	10:20-11:05	GENERAL INFORMATION	BRA	AUDITORIUM
	11:15-12:00	PRESENTATION OF THE COURSE	BRA	
	13:00-13:45	ATM EVOLUTION	FLO	
	13:55-14:40			
	14:50-15:35	ATFM SERVICE	FLO	
	15:45-16:30			
18/11/14 Tuesday	08:00-08:45	ATFM SERVICE	FLO	
	08:55-09:40			
	09:40-10:10	COFFEE BREAK	-	RECREATION AREA
	10:20-11:05	ATFM SERVICE	FLO	AUDITORIUM
	11:15-12:00			
	13:00-13:45	CDM	FLO	
	13:55-14:40			
	14:50-15:35	CDM	FLO	
	15:45-16:30			
19/11/14 Wednesday	08:00-08:45	GETA	REN	
	08:55-09:40	PLCO	JOR	
	09:40-10:10	COFFEE BREAK	-	RECREATION AREA
	10:20-11:05	AGR	SAN	AUDITORIUM
	11:15-12:00	AIS	JOR	
	13:00-13:45	METEOROLOGY	RES	
	13:55-14:40	MOSU	MAM	
	14:50-15:35	CIS	MON	
	15:45-16:30	GEA	CAR	
20/11/14 Thursday	08:00-08:45	ASM	PAT	
	08:55-09:40			
	09:40-10:10	COFFEE BREAK	-	RECREATION AREA
	10:20-11:05	ASM	PAT	AUDITORIUM
	11:15-12:00			
	13:00-13:45	RUNWAY CAPACITY	PIN	
	13:55-14:40			
	14:50-15:35	ATC CAPACITY	BRI	
	15:45-16:30			
21/11/14 Friday	08:00-08:45	STATISTICS	GUI	
	08:55-09:40			
	09:40-10:10	COFFEE BREAK	-	RECREATION AREA
	10:20-11:05	PLN A/B/C	JAD	AUDITORIUM
	11:15-12:00			
	13:00-13:45	SIGMA	MAR	
	13:55-14:40			
	14:50-15:35			
	15:45-16:30	VISIT TO CGNA	CGNA TEAM	

GENERAL COORDINATOR: Ten Cel Av Ricardo
INSTRUCTION COORDINATOR: 1° Ten CTA Brasil
INSTRUCTORS: Cel R1 Freitas Lopes (FLO), Maj Marcelo (MAR), Cap Armstrong (ARM), Cap Patrício (PAT), Cap Resende (RES) Cap R1 Mamede (MAM), Ten Carlos (CAR), Ten Jorge (JOR), Ten Renato (REN), Ten Brito (BRI), Ten Pinheiro (PIN), Ten Santarone (SAN), Ten Guimarães (GUI), 2S Mills (MIL), 2S Jader e CV Mônica (MON).

COMANDO DA AERONÁUTICA
DEPARTAMENTO DE CONTROLE DO ESPAÇO AÉREO

COURSE ON ATFM PROCEDURES
(Rio de Janeiro, Brazil, 17 to 28 November 2014)

WEEK: 2/2 WEEKLY WORKING SCHEDULE TURN: 01/2014

COURSE ON ATFM PROCEDURES				
DATE	**SCHEDULE**	**ACTIVITY**	**INSTRUCTOR**	**SITE**
24/11/14 Monday	08:00-08:45 08:55-09:40	ICA 100-22	ARM	AUDITORIUM
	09:40-10:10	COFFEE BREAK	-	RECREATION AREA
	10:20-11:05 11:15-12:00	ICA 100-22	ARM	AUDITORIUM
	13:00-13:45 13:55-14:40	ICA 100-22	ARM	AUDITORIUM
	14:50-15:35 15:45-16:30	AIP BRAZIL	MIL	AUDITORIUM
25/11/14 Tuesday	08:00-08:45 08:55-09:40	NOGEF – ATFM OPERATIONAL STANDARDS	REN	AUDITORIUM
	09:40-10:10	COFFEE BREAK	-	RECREATION AREA
	10:20-11:05 11:15-12:00	NOGEF – ATFM OPERATIONAL STANDARDS	REN	AUDITORIUM
	13:00-13:45 13:55-14:40	PROCESSES AND FLOWCHARTS	SAN	AUDITORIUM
	14:50-15:35 15:45-16:30	PROCESSES AND FLOWCHARTS	SAN	AUDITORIUM
26/11/14 Wednesday	08:00-08:45 08:55-09:40	SUPERVISED OPERATIONAL PRACTICE	ATFMU TEAM	OPR. ROOM
	09:40-10:10	COFFEE BREAK	-	COPA
	10:20-11:05 11:15-12:00 13:00-13:45 13:55-14:40 14:50-15:35 15:45-16:30	SUPERVISED OPERATIONAL PRACTICE	ATFMU TEAM	OPR. ROOM
27/11/14 Thursday	08:00-08:45 08:55-09:40	EVALUATION	CGNA TEAM	AUDITORIUM
	09:40-10:10	COFFEE BREAK	-	RECREATION AREA
	10:20-11:05 11:15-12:00	EVALUATION DISCUSSION	CGNA TEAM	AUDITORIUM
	13:00-16:00	FRATERNIZATION	GUESTS	RECREATION AREA
28/11/14 Friday	08:00-08:45 08:55-09:40	CRITICS ON THE COURSE	CGNA TEAM	AUDITORIUM
	09:40-10:10	COFFEE BREAK	-	RECREATION AREA
	10:20-11:05 11:15-12:00	CLOSING	CHIEF OF CGNA	AUDITORIUM
	13:00-16:00	---	------------------------	-------------------

Approved by: Ary Rodrigues Bertolino – Cel Av
Chief of CGNA

Doc 9971

PART II

AIR TRAFFIC FLOW MANAGEMENT (ATFM)

DRAFT

FOREWORD

This guidance material contains information on how air traffic flow management (ATFM) should be implemented and applied by using collaborative decision-making (CDM) processes in order to balance capacity and demand within different volumes of airspace and airport environments. It highlights the need of close cooperation among different stakeholders by providing flexibility in the use of the airspace and airport resources and optimize the use of available infrastructure. It provides therefore guidance applicable to:

a) air navigation service providers;
b) airspace users;
c) airline operation centers;
d) airport operators;
e) airport ground handlers;
f) airport slot coordinators;
g) regulators;
h) military authorities;
i) security authorities;
j) meteorological agencies; and
k) industries related to aviation.

Key objectives of this guidance material are to:

a) establish globally consistent ATFM planning and operating practices;
b) encourage a collaborative and harmonized approach to ATFM between States and regions; and
c) encourage a systemic approach to ATFM, including all ATM community members.

This guidance material is designed to provide answers to the following questions:

a) What is the starting point regarding the development of an ATFM service? (Chapter 1);
b) What are the foundational objectives and principles of ATFM? (Chapter 1);
c) What are the benefits of implementing an ATFM service? (Chapter 1);
d) How does an ATFM service operate? (Chapter 2);
e) How is an ATFM service structured and organized? (Chapter 3);
f) What are the roles and responsibilities of the stakeholders in the ATFM service? (Chapter 3);
g) How is the capacity of an airspace sector and airport determined? (Chapter 4);
h) How are ATFM processes applied in order to balance the demand and capacity within its area of responsibility? (Chapter 4);
i) How is an ATFM service implemented? (Chapter 5);
j) What are ATFM Measures and how are they established and applied? (Chapter 6);
k) What data and information are exchanged in an ATFM service? (Chapter 7);
l) What terminology/phraseology is used in ATFM? (Chapter 8); and
m) What resources are available to States regarding the various aspects of ATFM? (Appendices).

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GLOSSARY

ABBREVIATIONS/ACRONYMS

FOLLOWING TABLE IS PROPOSED TO BE INSERTED

Acrónimo	Meaning	Significado	Definitions and explanationion of terms
AAR	Aerodrome Acceptance Rate	Régimen de Aceptación de Aeródromo	A dynamic parameter that specifies aircraft quantity arriving to airport, together with arrival terminal airspace sector, apron, parking space and terminal facilities able to attend under specific conditions, during a consecutive period of time. (60, 30, 15 o 10 minutes).
ACARS	Aircraft Communications Addressing and Reporting System	Sistema de Direccionamiento e Informe para Comunicaciones de Aeronaves	ACARS system is an air/ground communications network; it is used to transmit or receive data in automatic or manual form.
ACC	Area Control Center	Centro de Control de Área	Unit established to provide air traffic control services to flights controlled in the control area under its jurisdiction.
A-CDM	Airport Collaborative Decision Making	Toma de Decisiones en Colaboración a Nivel de Aeropuerto	CDM is a process whereby decisions can be taken combining all pertinent and precise sources of information, ensuring that data reflect, the best posible way, the situation as it is known, assuring that all parties involved (from the airport) have the opportunity to influence in the decision.
ACGT	Actual Commence of Ground Handling Time	Hora Real en la que Inicia la Asistencia en Tierra	Actual time in which ground handling of aircraft starts; can be same to ARDT (to be determined locally).
ACISP	Airport CDM Information Sharing Platform	Plataforma para el Intercambio de Información CDM de Aeropuerto	Generic term used to describe the technologic platform for the CDM information sharing in airport.
ADEP	Aerodrome of Departure	Aeródromo de Salida	ICAO indicator for aerodrome of departure
ADES	Aerodrome of Destination	Aeródromo de Destino	ICAO indicator for aerodrome of destination

ADP	*ATFM Daily Plan*	*Plan Diario ATFM*	ADP should be a set of proposed ATFM tactical measures (for example enrouting scenarios activation, secuence miles, etc.) developed by the ATFM unit and agreed by all involved parties during the planning phase. ADP should evolve throughout the day and be updated and published periodically.
ADR	*Aerodrome Departure Rate*	*Regimen de Salida de Aeródromo*	A dynamic parameter that specified aircraft quantity departing from airport, together with departure terminal airspace sector, apron, parking space and terminal facilities able to attend under specific conditions, during a consecutive period of time. (60, 30, 15 o 10 minutes).
AEGT	*Actual End of Ground handling Time*	*Hora Real de Finalización de Asistencia en Tierra*	Actual time in which ground handling of aircraft ends; can be same to ARDT (to be determined locally).
AFTN	*Aeronautical Fixed Telecommunication Network*	*Red de Telecomunicaciones Fijas Aeronáuticas*	Complete and global system of aeronautical fixed circuits provided as part of the aeronautical fix service for the exchange of messages and/or digital data among aeronautical fix stations with identical or compatible communications characteristics.
AGHT	*Actual Ground Handling Time*	*Tiempo Real de Asistencia en Tierra*	Total duration of aircraft ground handling. Metrics ACGT – AEGT.
AIBT	*Actual In-Block Time*	*Hora Real de Ingreso a Calzos*	Actual time in which aircraft enters in-block; (for airlilne, it is equivalent to actual arrival time ATA, ACARS = IN).
AIM	*ATFM Information Message*	*Mensaje de Información ATFM*	ATFM message providing information, recommendations and ATFM instructions to the parties involved, according to projected capacity in an ATFM strategical phase.
ALDT	*Actual Landing Time*	*Hora Real de Aterrizaje*	Time in which aircraft lands in a runway (For ATC, time in which aircraft lands ATA, ACARS = ON).
AMAN	*Arrival Manager*	*Gerente de Llegadas*	An arrival flow management tool which optimises TMA and/or runway traffic by calculating the landing objective time considering various limitations.
ANM	*ATFM Notification Message*	*Mensaje de Notificación ATFM*	ANM is an information by which a demand higher than the capacity is foreseen.

ANSP	*Air Navigation Service Provider*	*Proveedor de Servicios de Navegación Aérea*	Any entity, public or private, that is responsible for the provision of air navigation services for general air traffic.
AO	*Aircraft Operator*	*Operador de Aeronave*	Aircraft operator. Person, organization or company responsible for the operation of an aircraft.
AOBT	*Actual Off-Block Time*	*Hora Real de Fuera de Calzos*	Actual time in which aircraft starts with movements for departure. This can be the actual time initiating town recoil or starting of engines. (For aircraft, equivalent to actual departure time ATD, ACARS = OUT)
APP	*Approach Control Unit*	*Dependencia de Control de Aproximación*	Unit established to provide anticollision control and advisory services to flights arriving or departing to/from one or more aerodromes.
ARDT	*Actual Ready Time (for Movement)*	*Hora real lista (para el movimiento)*	When aircraft is ready for town recoil/starting up of engines, immediately after receiving control authorization, and complying with requirements established by TOBT definition.
ARR	*Arrival*	*LLegada*	Flight arriving.
ASAT	*Actual Start Up Approval Time*	*Hora Real de Aprobación de Inicio de Motores*	Actual time in which aircraft receives approval to start up engines.
ASBT	*Actual Start Boarding Time*	*Hora Real Inicio de Abordaje*	Actual time starting boarding of passengers.
ASM	*Airspace Management*	*Gestión de Espacio Aéreo*	Process to select and apply airspace options in order to satisfy airspace user requirements.
A-SMGCS	*Advanced Surface Movement Guidanceand Control System*	*Sistema Avanzado de Guia y Control de Movimento de Superficie*	Airport system has a consistent infrastructure surveillance monitoring non-cooperative and cooperative surveillance.
ATA	*Actual Time of Arrival*	*Hora real de llegada*	Actual time of arrival
ATC	*Air Traffic Control*	*Control de Tránsito Aéreo*	Air traffic control service.
ATD	*Actual Time of Departure*	*Hora real de salida*	Actual time of departure.
ATFCM	*Air Traffic Flow and Capacity Management*	*Gestión de Afluencia de Tránsito Aéreo y Capacidad*	A service that optimises the relation between system capacity and air traffic demand, maximizing the use of available capacity in order to ensure optimal air traffic flow.

ATFM	*Air Traffic Flow Management*	*Gestión de Afluencia de Tránsito Aéreo*	A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent posible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.
ATM	*Air Traffic Management*	*Gestión de Tránsito Aéreo*	Management of demand and use of airspace.
ATOT	*Actual Take Off Time*	*Hora Real de Despegue*	Time in which aircraft takes off from runway (equivalent to actual departure time ATD, ACARS = OFF).
ATS	*Air Traffic Services*	*Servicios de Tránsito Aéreo*	A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (área control service, approach control service or aerodrome control service).
ATTT	*Actual Turn-Around Time*	*Tiempo Real de Transito*	Is the actual time taken by aircraft from entering in-block until initiating movement associated with departure. Metrics AOBT – AIBT.
AU	*Airspace User*	*Usuario del Espacio Aéreo*	Refers to comercial, military and general aviation operators that use the sovereign airspace of States/Territories/Organizations. Its objective is to comply with their planned itinerary.
AXIT	*Actual Taxi-In Time*	*Tiempo Real de Rodaje de Llegada*	Actual time between landing and entering in-block. Metrics AIBT – ALDT.
AXOT	*Actual Taxi-Out Time*	*Tiempo Real de Rodaje de Salida*	Actual time between leaving in-block and take off. Metrics ATOT – AOBT.
CBA	*Cost-Benefit Analysis*	*Análisis Costo-Beneficio*	Cost-benefit analysis
CFMU	*Centralized Flow Management Unit*	*Unidad Centralizada de Gestión de Afluencia de Tránsito Aéreo*	Centralized flow management unit. Unit responsible for planning, coordinating, promulgating and implementing ATFCM measures within their area of responsibility, aiming to achieve the optimum utilization of air navigation system capacity, maintaining the balance between capacity and demand.
CHG	*Modification message*	*Mensaje de Modificación*	Standard message sent to CFMU to modify flight plan data.
CNL	*Flight Plan Cancellation*	*Cancelación de Plan de Vuelo*	Standard message sent to oerations network to cancel flight plan.
CTA	*Controlled Time of Arrival*	*Hora Controlada de Llegada*	Arrival time assigned to a flight according to an ATFM initiative. Same can be modified due to adjustments in said initiative.

CTO	*Controlled Time Over*	*Tiempo Controlado Sobre*	Crossing time over a point or radioaid assigned according to an ATFM initiative.
CTOT	*Calculated Take Off Time*	*Hora Calculada de Despegue*	Time calculated and issued by the Air Traffic Flow Management Unit as a result of a tactical allocation.
DCL	*Departure Clearance (Data link)*	*Autorización de Salida (Enlace de Datos)*	-
DEP	*Departure*	*Salida*	Flight departing
DLA	*Delay message*	*Mensaje de Demora*	Standard message sent to the operations network for a flight plan with delay regarding OBT.
DMAN	*Departure Manager*	*Gerente de Salidas*	Planning system to improve airport departure flows by calculating the take-off objective time and the engine start approval objective time for each flight, having multiple limitations.
EET	*Estimated Elapsed Time*	*Hora Estimada Transcurrida*	Estimated time required to proceed from an important point to another.
EIBT	*Estimated In-Block Time*	*Hora Estimada de Ingreso a Calzos*	Estimated time for aircraft in-block entry. (For aircraft, ETA, estimated arrival time).
ELDT	*Estimated Landing Time*	*Hora Estimada de Aterrizaje*	Estimated aircraft landing time. (Equivalent for ATC as ETA, estimated arrival time = landing).
EOBT	*Estimated Off-Block Time*	*Hora Estimada de Fuera de Calzos*	Estimated time for aircraft to initiate departure movement. This can be the estimated time to begin with town recoil or starting engines.
ETA	*Estimated Time of Arrival*	*Hora Estimada de Llegada*	Estimated Time of Arrival
ETD	*Estimated Time of Departure*	*Hora Estimada de Salida*	Estimated Time of Departure
ETO	*Estimated Time Over*	*Hora Estimada Sobre*	Estimated time for crossing over a point or radioaid assigned according to an ATFM initiative.
ETOT	*Estimated Take Off Time*	*Hora Estimada de Despegue*	Estimated take off time considering EOBT + EXOT (equivalente for ATC to estimated time of departure ETD).
ETTT	*Estimated Turn-Around Time*	*Tiempo Estimado de Tránsito*	Estimated time by aircraft operator or ground handler for flight turn around during the day of operation, considering operational limitations.
EXIT	*Estimated Taxi-In Time*	*Tiempo Estimado de Rodaje de llegada*	Estimated time between landing and in-block entering.

EXOT	*Estimated Taxi-Out Time*	*Tiempo Estimado de Rodaje de Salida*	Estimated time between off-block and take off.
FIDS	*Flight Information Display System*	*Sistema de Visualización de Información de Vuelo*	-
FIR	*Flight Information Region*	*Region de Información de Vuelo*	An airspace of defined dimensions within which flight information services and alerting service are provided.
FLS	*Flight Suspension message*	*Mensaje de Suspensión de Vuelo*	Standard message sent from CFMU for the suspension of flight plan OBT.
FMP	*Flow Management Position*	*Posición de Gestión de Afluencia*	Provides vital information flow from ATC to CFMU concerning current situation within ACC and operational situation at airport.
FMU	*Flow Management Unit*	*Unidad de Gestión de Afluencia*	FMU monitor and balance traffic flows within their areas of responsibility in accordance with air traffic management directives. FMU is delegated the authority to direct traffic flows and to implement TMIs approved jointly or by indications of the surveillance authority. It also coordinates ATFM subordinated units.
FPL	*Filed Flight Plan*	*Plan de Vuelo Presentado*	Specified information concerning an aircraft planned flight or a portion of a flight which is submitted to air traffic services units.
FUM	*Flight Update Message*	*Mensaje de Actualización de Vuelo*	Message sent from CFMU to CDM Airport, providing an ELDT, ETO and flight level at the last point of the route.
GDP	*Ground Delay Program*	*Programa de Demoras en Tierra*	GDP is an air flow management process by which aircraft are retained in ground in order to manage capacity and demand through a given volume of airspace or at a particular airport.
GH	*Ground Handler*	*Asistente en Tierra*	Responsible for the handling of an aircraft during its transit at airport.
GS	*Ground Stop*	*Inmovilización en Tierra*	Is a process by which aircraft complying some specific criteria have to remain at ground as a result of an ATFM initiative.

HMI	*Human-Machine Interface*	*Interfaz Hombre-Máquina*	The set of media by which people, users interact with the system of a particular machine, device, software or other complex tools.
IATA	*International Air Transport Association*	*Asociación del Transporte Aéreo Internacional*	International Air Transport Association (IATA) is the comercial global association of air industry.
ICAO	*International Civil Aviation Organisation*	*Organización de la Aviación Civil Internacional*	The International Civil Aviation Organization (ICAO) is considered the only international organization that is able to efficiently coordinate global ATM implementation activities, leading to become real a continuous global ATM system.
IFR	*Instrument Flight Rules*	*Reglas de Vuelo por Instrumentos*	Flight effected according to instrument flight rules.
KPI	*Key Performance Indicator*	*Indicador Clave de Performance*	Is a measure of the performance level of a process: the indicator value is directly related to a target in advance. It is normally expressed as a percentage.
LoA	*Letter of Agreement*	*Carta de Acuerdo*	-
LVP	*Low Visibility Procedures*	*Procedimientos de Baja Visibilidad*	Procedures applied in an aerodrome in order to ensure safety during precision approach CAT I, CAT II, CAT III, as well taxiing and take off with low visibility.
MIT	*Miles-in-Trail*	*Millas en secuencia*	Is a tactical ATFM measure. Is the quantity of miles to be maintained between aircraft to satisfy a specific sequencing criteria.
MoU	*Memorandum of Understanding*	*Memorando de Entendimiento*	-
MTTT	*Minimum Turn-Around Time*	*Tiempo Minimo de Tránsito*	Minimum turn-around time in accordance to an AO/GH for a specified flight or aircraft type.
MVT	*Movement message*	*Mensaje de Movimiento*	Message in IATA standard template, containing flight departure data, sent via SITA to airport of destination, AO and other recipients.
NAVAID	*Navigation Aid*	*Ayuda para la Navegación*	Expression that designates NAVAID based in ground or in the avaliable airspace to satisfy requirements of navigation specifications.
OCD	*Operational Concept Document*	*Documento Concepto Operacional*	-
PAX	*Passengers*	*Pasajeros*	Passengers
REA	*Ready message*	*Mensaje Listo*	-

REJ	*Rejection message*	*Mensaje de rechazo*	-
RWY	*Runway*	*Pista*	A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.
SIBT	*Scheduled In-Block Time*	*Hora Programada(itinerario) de Ingreso a Calzos*	Time in which aircraft is scheduled by itinerary to arrive to its parking position.
SIT1	*CFMU Slot Issue Time*	*Slot Fuera de tiempo según la CFMU*	Time when CFMU issues the SAM (Slot Allocation Message). This happens normally two hours before EOBT.
SLC	*Slot Cancellation Message*	*Mensaje de Cancelación de Slot*	Standard ATFM message, sent when flight regulations are cancelled.
SOBT	*Scheduled Off-Block Time*	*Hora Programada (itinerario)Fuera de Calzos*	Time in which aircraft is scheduled by itinerary to depart from its parking position.
SRM	*Slot Revision Message*	*Mensaje Revisión de Slot*	-
SSR	*Secundary Surveillance Radar*	*Radar de Secundario de Vigilancia*	Surveillance radar system which uses Sistema radar de vigilancia que usa transmitters/receivers (interrogators) and transponders.
STAR	*Standard Arrival Route*	*Llegada Normalizada*	Designated standard arrival route by instruments, from the en-route to approach phase. A designated instrument flight rule (IFR) arrival route linking a significant point, normally on an ATS route, with a point from which a published instrument approach procedure can be commenced.
STTT	*Scheduled Turn-Around Time*	*Tiempo de Tránsito Programado(itinerario)*	Is the time by scheduled itinerary which leasts the aircraft from its entering in-block to the beginning of departure movement. Metrics SOBT – SIBT.
TLDT	*Target Landing Time*	*Hora Objetivo de Aterrizaje*	Objective time as a result of the assignment of an ATFM slot which considers an ATFM delay for landing within an arrival process, considering the sequence and operational limitations.
TMA	*Terminal control Area*	*Área de Control Terminal*	A control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes.
TOAT	*Target off Block approval Time*	*Hora Objetivo de Aprobación de Fuera de Calzos*	Objective time as a result of the assignment of an ATFM slot, considering TSAT and the traffic situation which an aircraft can expect to initiate push back.

TOBT	*Target Off-Block Time*	*Hora Objetivo Fuera de Calzos*	Objective time as a result of the assignment of an ATFM slot, considering an ATFM delay for aircraft to start departure movement. This can be the objective time initiating the town recoil or engine start.
TOD	*Top Of Descent*	*Punto de Inicio del Descenso*	Intended point where the descent begins and where the cruise phase ends.
TSAT	*Target Start Up Approval Time*	*Hora Objetivo de Aprobación de Inicio de Motores*	Objective time provided by ATC, considering TOBT, CTOT and/or traffic situation and in which aircraft can receive the start up/push back approval.
TTOT	*Target Take Off Time*	*Hora Objetivo de Despegue*	Objective time for take-off, considering TSAT/TOAT+EXOT.
TWR	*Aerodrome Control Tower*	*Torre de Control de Aeródromo*	A unit especially established to provide air traffic control services to aerodrome traffic.
VFR	*Visual Flight Rules*	*Reglas de Vuelo Visual*	Flight operated according to visual flight rules.
VMC	*Visual Meteorological Conditions*	*Condiciones Meteorológicas de Vuelo Visual*	Meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, equal to or better than specified minima, according to the Rules of the Air.

~~AAR Airport acceptance rate~~
~~ADP ATFM daily plan~~
~~A-CDM Airport CDM~~
~~AIM Aeronautical information management~~
~~ANM ATFM notification message~~
~~ANSP Air navigation service provider~~
~~AO Aircraft operator~~
~~AOBT Actual off-block time~~
~~ASM Airspace management~~
~~ATFM Air traffic flow management~~
~~ATFMU Air traffic flow management unit~~
~~ATFCM Air traffic flow and capacity management~~
~~ATM Air traffic management~~
~~ATOT Actual take-off time~~
~~ATS Air traffic services~~
~~AU Airspace user~~
~~CDM Collaborative decision-making~~
~~CEF Capacity enhancement function~~
~~CFMU Central flow management unit~~
~~CGNA Air navigation management centre~~
~~CTA Calculated time of arrival~~
~~CTO Calculated times over~~
~~CTOT Calculated take-off time~~

~~EOBT Estimated off-block time~~
~~ETA Estimated time of arrival~~
~~ETD Estimated time of departure~~
~~ETO Estimated time over a reference point~~
~~ETOT Estimated take-off time~~
~~FAP Future ATM profile~~
~~FMP Flow management position~~
~~FMU Flow management unit~~
~~GDP Ground delay programme~~
~~GS Ground stop~~
~~IATA International Air Transport Association~~
~~IFR Instrument flight rules~~
~~MDI Minimum departure interval~~
~~NAVAIDs Navigation aids~~
~~MIT Miles-in-trail~~
~~R&D Research and development~~
~~TMA Terminal control area~~
~~ToD Top of descent~~
~~VFR Visual flight rules~~
~~VMC Visual meteorological condition~~

REFERENCES

Global Air Traffic Management Operational Concept (Doc 9854) Manual
on Air Traffic Management System Requirements (Doc 9882) Manual on
Global Performance of the Air Navigation System (Doc 9883)
Manual on Flight and Flow – Information for a Collaborative Environment (Doc 9965)
Civil/Military Cooperation in Air Traffic Management (Cir 330-AN/189)
Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444)

Chapter 1

INTRODUCTION

1.1 Air traffic flow management philosophy

1.1.1 Air traffic flow management (ATFM) is an enabler of air traffic management (ATM) efficiency and effectiveness. It contributes to the safety, efficiency, cost effectiveness, and environmental sustainability of an ATM system. It is also a major enabler of global interoperability of the air transport industry and it is important to recognize that, over time, two associated concepts will take shape:

a) standardized ATFM processes will be implemented globally; and

b) global ATFM will take shape.

1.1.2 What is the starting point regarding the development of an ATFM service?

1.1.2.1 The level of an ATFM service required in a given setting will depend on a number of factors that will be addressed in this manual It is important to note that an ATFM service may be simple or complex, depending on the environment and its requirements. Even relatively simple ATFM services, when properly designed and implemented, can be as effective as complex services and thus enable Air Navigation Service Providers (ANSPs) to effectively provide the required service.

1.1.2.2 One key to the successful implementation of an effective ATFM service is achieving a robust coordination among aviation stakeholders. It is envisioned that ATFM is performed as a collaborative decision-making process where airports, ANSPs, Airspace Users (AU), military entities, and other stakeholders work together to improve the overall performance of the ATM system. It is likewise envisioned that such coordination will take place within a Flight Information Region (FIR), between FIRs, and ultimately, between regions.

Note – For the purpose of this guidance the term airspace user includes, but is not limited to, airline, air taxi, charter, general aviation, and military operators.

1.1.2 3 ATFM and its applications may not be restricted to one State or FIR because of their far-reaching effects on the flow of traffic elsewhere. The *Procedures for Air Navigation Service – Air Traffic Management* (PANS-ATM, Doc 4444) recognises this important fact, stating that ATFM should be implemented on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement.

1.2 Air traffic flow management objectives and principles

1.2.1 What are the foundational objectives and principles of ATFM?

1.2.1.1 The objectives of ATFM are to:

a) enhance the safety of the ATM system by ensuring the delivery of safe traffic densities and minimizing traffic surges;

b) ensure an optimum flow of air traffic throughout all phases of the operation of a flight by balancing demand and capacity;

c) facilitate collaboration among system stakeholders to achieve an efficient flow of air traffic through multiple volumes of airspace in a timely and flexible manner that supports the attainment of the business or mission objectives of Airspace Users (AUs) and provides optimum operational choices;

d) balance the legitimate, but sometimes conflicting, requirements of all AUs, thus promoting equitable treatment;

e) consider ATM system resource constraints and economic and environmental priorities;

f) facilitate, by means of collaboration among all stakeholders, the management of constraints, inefficiencies, and unforeseen events that affect system capacity in order to minimize negative impacts of disruptions and changing conditions; and

g) facilitate the achievement of a seamless and harmonised ATM system while ensuring compatibility with international developments.

Following objectives are proposed to be included:

h) reduce delays in ground and route;

i) maximize capacity and optimize air traffic flow;

j) inform and provide possibility to choose a delay in ground, a rerouting or a level/altitude selection;

k) Support ATS dependencies in the planning and management of future workload;

l) Provide air traffic flow management solutions to severe meteorological forecasts;

m) Balance demand and capacity of ATC sectors;

n) Manage flexible use of restricted airspace sectors.

1.2.1.2 The principles of ATFM are to:

a) optimize available airport and airspace capacity without compromising safety;

b) maximize operational benefits and global efficiency while maintaining agreed safety levels;

c) promote timely and effective coordination with all affected parties;

d) foster international collaboration leading to an optimal, seamless ATM environment;

e) recognize that airspace is a common resource for all users and ensure equity and transparency, while taking into account security and defence needs;

f) support the introduction of new technologies and procedures that enhance system capacity and efficiency;

g) enhance system predictability and help to maximise aviation economic efficiencies and returns, and support other economic sectors such as business, tourism and cargo; and

h) evolve constantly to support an ever-changing aviation environment.

1.3 Air traffic flow management benefits

1.3.1 What are the benefits of implementing an ATFM service?

1.3.1.1 The benefits of ATFM lie in various domains of the ATM system:

a) operational;

1) enhanced ATM system safety;

2) increased system operational efficiency and predictability through collaborative decision-making processes;

3) effective management of capacity and demand through data analysis and planning;

4) increased situational awareness among stakeholders and a coordinated, collaborative development and execution of operational plans;

5) reduced fuel burn and operating costs; and

6) effective management of irregular operations and effective mitigation of system constraints and consequences of unforeseen events;

b) societal:

1) improved quality of air travel;

2) increased economic development through efficient and cost-effective services to the projected increased levels of air traffic;

3) reduction of aviation-related greenhouse gas emissions; and

4) mitigation of the effects of unforeseen events and situations of reduced capacity and effective, rapid recovery from them.

Chapter 2

THE ATFM SERVICE

2.1 How does an ATFM service operate?

2.1.1 ATFM is relevant to any ATM stakeholder when that stakeholder's effect on aviation is viewed from a systemic perspective.

2.1.2 The guiding principles of "first come, first served" and "equitable access to airspace" have traditionally been very important to the ATM system. The global ATM system is evolving, however, to consider net results in terms of overall system efficiency, the environment, and operating costs. To support this evolution, ATFM service may focus on other priorities such as "most capable aircraft" in order to achieve optimum ATM system performance. Likewise, equitable access to airspace may be viewed on a longer time scale than the short term "first come, first served" model.

2.1.3 ATFM service relies on a number of supporting systems, processes and operational data in order to function effectively. The maturity level of these systems and processes will determine the level of ATFM service that is established. Some elements to be considered are:

a) ATM resources:

ATFM recognizes that airspace and aerodromes are common resources shared by all AUs and that equity and transparency must be maintained to the highest standard;

b) traffic demand:

A timely, accurate depiction of predicted flight activity for all flights utilizing an ATM resource (e.g., airport, en route sector, etc.). Data should be aggregated from all operational data sources; e.g., airline schedules, flight plan data, airport slot management systems, ATM operational systems, and AU intentions;

c) the tactical, dynamic traffic situation:

Accurate data derived from surveillance and flight information, to increase the accuracy of short to medium term prediction;

d) Knowledge of seasonal events that may cause in increase in the demand and consequently, an imbalance in the available capacity;

~~d~~e) The forecast and dynamic meteorological situation:

The integration and display of a variety of meteorological data for ATFM planning and operational execution;

~~e~~f) the status and availability of airspaces under restrictions or reservations as it affects the flow of air traffic;

~~f~~g) shared ATFM tools and data interoperability:

Tools that enable common situational awareness through the sharing of data and operational information among stakeholders. ATFM tools draw from a variety of databases to accurately display meteorological and air traffic information; and

h~~g~~) institutional arrangements:

Formalized agreements between all ATFM stakeholders in the relevant area and appropriate arrangements with adjacent ATFM units.

2.1.4 Whenever measures to control the flow of air traffic have to be applied in the form of delays, AUs should be notified by ATC while the aircraft are on the ground rather than in flight. A strategy to safely and efficiently balance ground and airborne delays shall be collaboratively agreed upon between the ATFM units, affected ATS facilities and AUs in advance.

2.1.5 AUs should be informed as early as possible regarding the nature and location of ATM constraints so that information can be integrated into the operational plan of the flight.

2.1.6 In addition to airborne holding, the management of airborne delays can be accomplished by slowing aircraft well before top of descent (ToD) and making use of required time of arrival (RTA) aircraft capabilities in order to reduce operating costs, environmental impact, and ATC workload.

2.1.7 When ATFM measures are necessary to manage a constraint, they should be applied in a timely manner and only for the period when expected air traffic demand will exceed the capacity in the constrained area. ATFM measures should be kept to the minimum and, whenever possible, be applied selectively only to that part of the system that is constrained.

2.1.8 Information on anticipated overload situations should be provided to affected AUs as soon as possible.

2.1.9 ATFM measures should be established and coordinated in such a way as to avoid, if at all possible, having cumulative or contradictory effects on the same flights.

2.1.10 Automated tools should be implemented and utilized to allow for effective collaboration and dissemination of ATFM information.

2.1.11 CDM should be utilized to manage flows of traffic through all components of the ATM system. CDM should also occur within and between regions where significant traffic flows exist and interact with each other.

2.1.12 The most efficient utilization of available airspace and airport capacity can be achieved only if all relevant elements of the ATM system have been considered during the planning stage. Moreover, ATFM planning should, whenever required, focus on regional ATFM and be prioritized for appropriate major traffic flows.

2.1.13 ATFM traffic data analysis can yield significant strategic benefits, especially when used in conjunction with airspace and ATS route planning, in terms of future ATM systems and procedure improvements. This is part of a continuous safety and service improvement loop (see Figure 1).

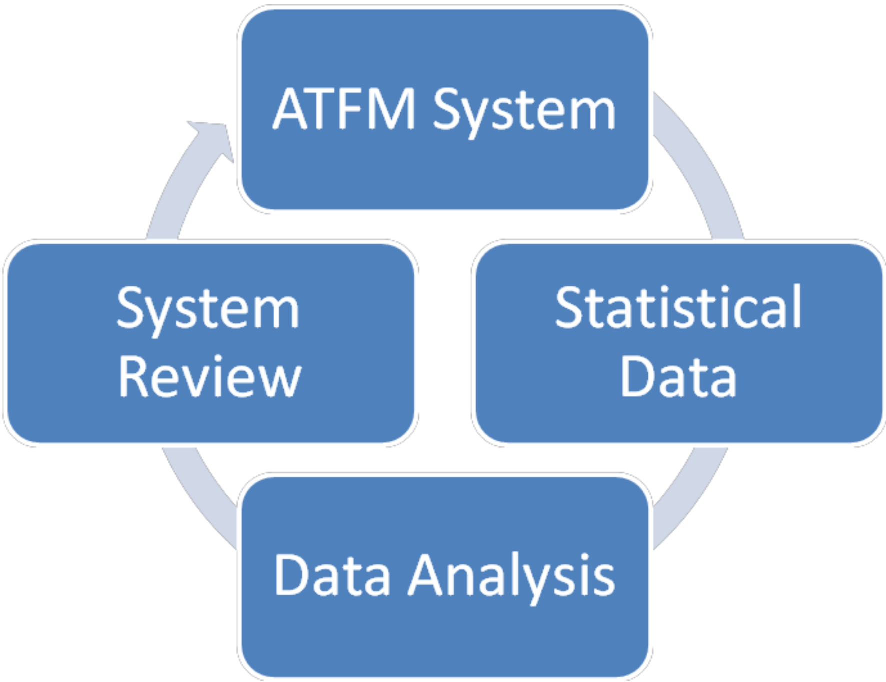


Figure 1. ATFM cycle of review and improvement

2.1.14 States may choose to prioritize or exempt certain classes of flight from ATFM control measures. Examples of such flights include but are not limited to:

a) flights experiencing an emergency, including aircraft subjected to unlawful interference;

b) flights on search and rescue or fire-fighting missions;

c) urgent medical evacuation flights specifically declared by medical authorities;

d) flights with 'Head of State' status; and

e) other flights as specifically required by State authorities.

Note – After medical flights have completed their mission they should be subject to ATFM measures. Scheduled passenger transfer flights are, by their nature, non-urgent and should not be given priority under normal operational situation. Notwithstanding any exemption from ATFM measures, exempted aircraft are included in the airport/airspace demand estimation.

2.1.15 Appropriate automated tools could be used to enable and enhance the effective application of ATFM.

2.2 What is Collaborative decision-making (CDM) in the context of ATFM?

2.2.1 CDM is the process which allows decisions to be taken by amalgamating all pertinent and accurate sources of information, ensuring that the data best reflects the situation as known, and ensuring that all concerned stakeholders are given the opportunity to influence the decision. This in turn enables decisions to best meet the operational requirements of all concerned.

2.2.2 The CDM process is a key enabler of an ATFM strategy allowing the sharing of all relevant information between the parties involved in making decisions and supporting an on-going dialogue between the various stakeholders throughout all phases of flight. This enables the various organisations to update each other continuously on events from the strategic level to real-time.

2.2.3 CDM is a supporting process applied to activities such as airspace management and demand/capacity balancing and can be applied across the timeline of activities from strategic planning to tactical operations. CDM is not an objective in itself, but rather a way to reach the performance objectives of the processes it supports. These performance objectives are expected to be agreed upon collaboratively.

2.2.4 Although information sharing is an important enabler for CDM, the sharing of information is not sufficient to realize CDM and the objectives of CDM. Successful CDM also requires agreed upon procedures and rules to ensure that collaborative decisions will be made expeditiously and fairly.

2.2.5 CDM ensures that decisions are taken transparently based on the best information available as provided by the participants in a timely and accurate manner.

2.3 How is the CDM Organization and Structure?

2.3.1 The organization and structure of the CDM process depends on the complexity of the ATFM system in place. The structure must be designed to ensure that the affected stakeholders, service providers and airspace users alike, can discuss airspace, capacity and demand issues through regular sessions and formulate plans that consider all pertinent aspects and points of view.

2.3.2 Frequent tactical briefings and conferences can be used to provide an overview of the current ATM situation, discuss any issues and provide an outlook of operations for the coming period. These briefings should be scheduled depending on the traffic patterns and their intensity applicable to the area. They should occur at least daily but may also be scheduled to occur more frequently depending on the traffic and capacity situation (e.g. an evolving meteorological event may require that the briefing frequency be increased). Participants should include involved ATFM and ATS units, chief or senior dispatchers, affected military authorities and airport authorities, as applicable.

2.3.3 The output of these daily conferences should be the publication of an ATFM daily plan (ADP) and subsequent updates. The ADP should be a proposed set of tactical ATFM measures (e.g. activation of routing scenarios, miles-in-trail, etc.) prepared by the ATFM unit and agreed to between all partners concerned during the planning phase. The ADP should evolve through the day and be periodically updated and published.

2.3.4 Feedback and review of the ADP received from ANSPs, AUs, and from the ATFM unit itself represent very important input for further improvement of the Pre-Tactical planning. This feedback helps the ATFM unit identify the reason(s) for ATFM measures and determine corrective actions to avoid reoccurrence. Systematic feed-back from AUs should be gathered via specifically established links.

2.3.5 In addition to the daily conferences, the ATFM unit should consider holding periodic and event specific CDM conferences, with an agenda based on experience. The objective should be to make sure that ATFM measures to be applied are decided through a CDM process and agreed to by all affected stakeholders.

2.4 Which are CDM Requirements and Benefits?

2.4.1 Through the application of a transparent CDM process, the involved stakeholders will gain the necessary situational awareness and ensure that the optimum measures are applied in any given situation. CDM will also create an environment where stakeholders better understand the issues of all concerned.

2.4.2 Regular CDM conferences provide stakeholders with the opportunity to propose enhancements that could benefit them, to follow up on any issue, and to monitor the equity of the flow management process.

2.5 Which are the processes of ATFM, CDM, and Civil/Military Coordination?

2.5.1 ATFM principles are equally applicable to both civil and military flights operated in accordance with civil rules. Civil/military coordination will provide more flexibility to AUs, thanks to the greater availability of both information and airspace. There will continue to be a need to accommodate missions that are incompatible with civil aviation. These missions may be military operations, support of security requirements, live weapons firing, space operations or others. The degree of civil/military coordination in terms of air traffic management within each State continues to be a matter of national policy and, therefore, military participation in a regulated aeronautical information infrastructure will be subject to national considerations.

2.5.2 The processes aiming to a flexible use of airspace involves an optimum sharing of airspace under appropriate civil/military coordination to achieve the proper separation between civil and military flights, thus reducing the need for permanent airspace segregation.

2.5.3 Benefits of civil/military coordination include:

a) operational savings for flights through distance, time and fuel reductions;

b) route network optimization for the provision of ATS and the associated sectoring, providing ATC capacity increases and a reduction of delays of air traffic in general;

c) more efficient air traffic flow separation procedures;

a) reduced ATC workload through a reduction in congestion and choke points;

e) real-time provision of capacity according to the AUs operational requirements; and

f) definition and use of temporary reservation of airspace more in keeping with operational military requirements, in a way that responds optimally to their specific requirements.

2.5.4 It is recommended that States and/or service providers develop and document a collaborative process with users of airspace under restrictions or reservations that enables the use of these airspaces by civilian traffic when not in active use by the primary user in order to increase efficiency.

2.5.5 When applicable, such agreements and procedures should ideally be established on the basis of a regional air navigation agreement. The agreements and procedures aiming to a flexible use of airspace should specify, inter alia:

a) the horizontal and vertical limits of the airspace concerned;

b) the classification of any airspace made available for use by civil air traffic;

c) units or authorities responsible for the airspace;

d) conditions for transfer of the airspace to/from the ATS unit concerned;

e) periods of availability of the airspace;

f) any limitations on the use of the airspace concerned;

g) the means and timing of an airspace activation warning if not permanently active; and

h) any other relevant procedures or information.

Chapter 3

ATFM STRUCTURE AND ORGANIZATION

3.1 How is an ATFM service structured and organized?

3.1.1 It is understood that different levels of ATFM oversight will exist. The main concept, however, is for each State to assign responsibility for the collection, dissemination, monitoring, and surveillance of ATFM activities within its respective FIR(s). This will ensure that all stakeholders have timely and efficient access to applicable ATFM information.

3.1.2 Each State will ensure that an ATFM organizational structure that meets the needs of the aviation community is developed. This structure should address, at a minimum, management and oversight of the following:

a) the air traffic flow management service;

b) coordination/exchange of information, both internally and externally;

c) a line of authority for the implementation of decisions; and

d) compliance with mission requirements.

3.1.3 A line of authority to support the ATFM service is required. This may include the following:

a) manager of the ATFM service;

b) the flow management unit (FMU) that provides ATFM service for a specific set of ATS units; and

c) flow management positions (FMPs) subordinated to a FMU at specific ATS units responsible for the day-to-day ATFM activities.

3.1.4 A prototype ATFM service could be designed as follows:

a) an aerodrome control tower can be served by an FMP. This duty can be assigned to an existing position or it may require a dedicated position. The control tower FMP coordinates with the FMP at the approach control unit or directly with the FMU;

b) an approach control unit can be served by an FMP. This duty can be assigned to an existing position in the approach control unit or it may require one or more dedicated positions, depending on workload. The approach control unit FMP coordinates with the FMP at an area control centre (ACC) or directly with the FMU;

c) an ACC can be served by a FMU. This ATFM structure in an ACC is more complex and may consist of a number of traffic management coordinator positions to meet the needs of the ACC and its subordinate units. The following functions at an ACC FMU may require dedicated staff, depending on workload:

1) approach control coordination;
2) departure control coordination;
3) en route coordination;
4) meteorological briefing/forecasting coordination;
5) airspace user liaison;
6) military liaison;
7) airport coordination; and
8) additional support functions, such as administrative and information technology coordination may be required. The additional functions of crisis management

coordinator and post-operations analyst may also be required, as applicable.

d) a series of ACCs can be served by a national or sub-regional ATFM centre. This is one of the most complex ATFM structures and includes multiple functions. Each function may require dedicated staff or it may be combined, depending on workload. The functions may include:

1) traffic management coordination;
2) traffic planning;
3) modelling, implementation and review of ATFM measures/initiatives for the different capacity resources in the area of responsibility defined , according to requirements of subordinated dependencies (FMU or FMP);
~~3~~4) meteorological briefing/forecasting coordination;
~~4~~5) NOTAM/messaging coordination;
~~5~~6) flight calibration / flight check coordination;
~~6~~7) airspace user liaison;
~~7~~8) military liaison;
~~8~~9) information technology coordination and operational data management;
~~9~~10) technical operations coordination (concerning infrastructure and systems such as NAVAIDs, radar, VHF communication sites, etc.);
~~10~~11) crisis management coordination; and
~~11~~12) operations analysis.

f) the national or sub-regional ATFM or FMU centre is responsible for dissemination and coordination among facilities within its respective area of responsibility and for national, intra-region and inter-regional coordination; and

g) depending on traffic density and size of the ACC units, some of the functions above may be combined.

3.1.5 The purpose of this coordination methodology is to establish a protocol for each level of the organization to be informed of ATFM information in a timely and accurate manner. This is a generic organizational model that can be modified to meet the needs of each specific environment.

3.1.6 It is desirable that letters of agreement (LOA) or other appropriate documentation be developed in order to attain the necessary standardization.

3.2 Roles and responsibilities of the stakeholders in an ATFM service

3.2.1 What are the roles and responsibilities of the stakeholders in an ATFM service?

3.2.1.1 Flow management unit (FMU)/flow management position (FMP)

3.2.1.1.1 FMUs/FMPs monitor and balance traffic flows within their areas of responsibility in accordance with air traffic management directives. FMUs/FMPs direct traffic flows and implement approved traffic management measures in conjunction with, or as directed by, the oversight authority. FMU/FMP duties may include:

a) creating and distributing the ATFM daily plan (ADP) based on prior consultation with the designated facilities and stakeholders;

b) collecting all relevant information, such as meteorological conditions, capacity constraints, infrastructure outages, runway closures, automated system outages, and procedural changes that affect ATS units. This may be accomplished through various means available, such as teleconferences, e-mail, internet, automated data gathering, etc.;

c) analysing and distribute all relevant information;

d) documenting a complete description of all ATFM measures (for example, ground delay programmes, miles-in-trail) in a designated log, which must include, among other data, the times of start and end, the affected stakeholders and flights, and the justification;

e) coordinating procedures with the affected stakeholders;

f) creating a structure for dissemination of information; for example, a website;

g) conducting daily telephone and/or web conferences, as required; and

h) continuously monitoring the ATM system, make service delivery adjustments where necessary, manage ATFM measures and cancel them when no longer required.

3.2.1.2 Airspace users

3.1.2.2.1 The AU participates in the ATFM process by providing and updating flight plan information as well as participating in CDM processes (e.g., discussion of ATFM strategies to improve flight efficiency and participation in user driven prioritisation processes). The participation of AUs in the ATFM process will be supported by CDM telephone conferences and/or web-based interfaces.

3.3 Training requirements for the stakeholders in an ATFM service

3.3.1 FMU/FMP personnel

3.3.1.1 Personnel performing ATFM functions will require standardized and recurrent training in order to maintain currency in a constantly changing environment. A detailed ATFM training plan will ensure that personnel attain an optimized operational efficiency in their respective FMU/FMP. This will allow them to successfully face the important changes in their operational environments and provide the highest possible level of service.

3.3.2 Other ATFM stakeholders

3.3.2.1 All stakeholders involved in the ATFM system must be given the training required to allow for an efficient ATFM service. ATS personnel, as well as AUs, must have the knowledge required to carry out their respective responsibilities.

Chapter 4

CAPACITY, DEMAND AND ATFM PHASES

4.1 How is the capacity of an airspace sector and airport determined?

4.1.1 The capacity of an ATM system depends on many factors, including traffic density and complexity, the ATS route structure, the capabilities of the aircraft using the airspace, weather-related factors, and controller equipment and workload. Every effort should be made to provide sufficient capacity to cater for both normal and peak traffic levels; however, in taking any actions to increase capacity, the responsible ATS authority shall ensure that safety levels are not jeopardized.

4.1.2 The number of aircraft provided with an air traffic service shall not exceed that which can be safely handled by the ATS unit concerned under the prevailing circumstances. In order to define the maximum number of flights which can be safely managed, the appropriate ATS authority should assess and declare the ATC capacity for control sectors (en route and terminal control area) and for airports.

4.1.3 ATC capacity should be expressed as the maximum number of aircraft that can be accepted over a given period of time at an ATM resource (airspace sector, waypoint, airport, etc.). Examples include the sustainable hourly traffic flow or the flow by 15-minute increments.

4.1.4 ATC capacities are not static values. They vary with traffic complexity and other factors. Consideration should be given to tolerance thresholds around standard capacity values that may vary in either direction.

4.1.5 Capacity measurement and calculation methodologies should be developed according to the requirements and conditions of their operational environment. Calculation methodologies have already been established by States in various ICAO regions and they have different levels of complexity. Examples are provided in Appendices C, D and E.

4.2 Balancing demand and capacity

4.2.1 How are ATFM processes applied in order to balance the demand and capacity within its area of responsibility?

4.2.1.1 In order to minimise the effects of ATM system constraints, a methodology to balance demand and capacity should be developed. This can be accomplished through the application of an “ATFM Planning and Management” process. This is a collaborative, interactive capacity and airspace planning process, where airport operators, ANSPs, AUs, military authorities, and other stakeholders work together to improve the performance of the ATM system (see Figure 2).

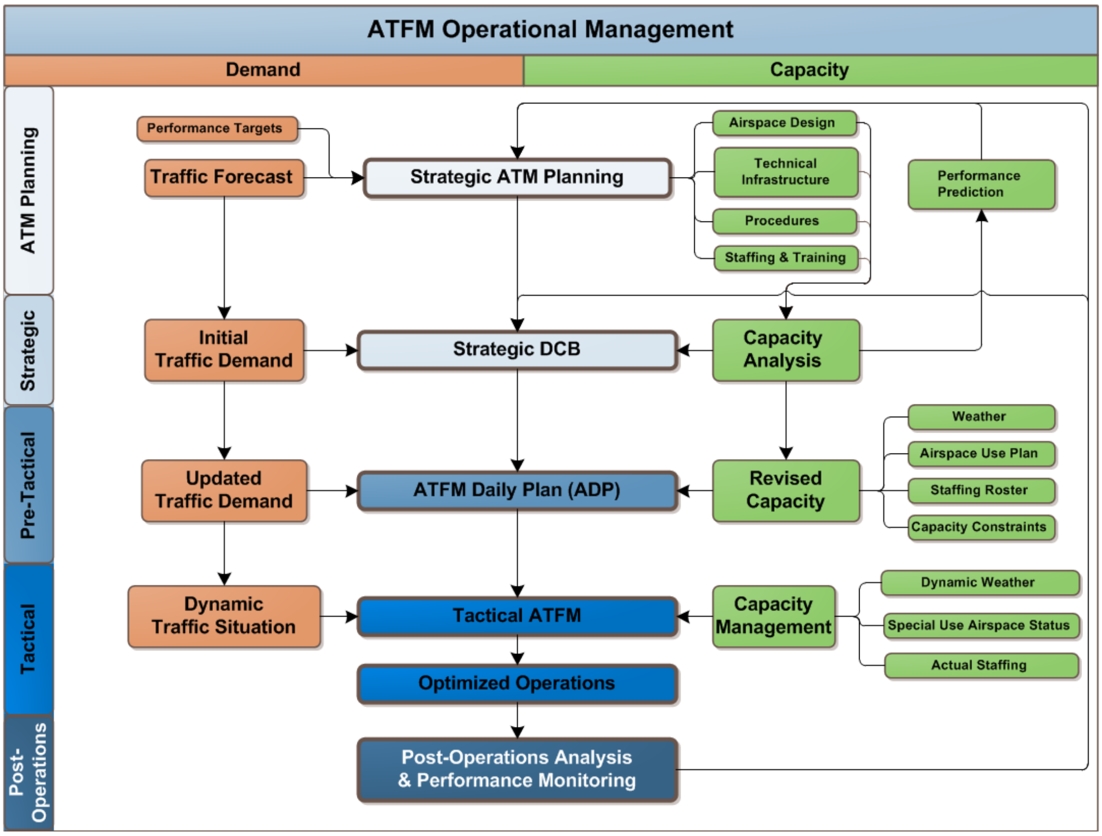


Figure 2. ATFM Operational Management

4.2.1.2 This CDM process allows AUs to optimize their participation in the ATM system while mitigating the impact of constraints on airspace and airport capacity. This also allows for the full realisation of the benefits of improved integration of airspace design, airspace management (ASM), and ATFM. The process contains three equally important phases: ATM Planning, ATFM Execution, and Post-Operations Analysis.

ATM Planning

4.2.1.3 In order to optimise ATM system performance in the ATM Planning phase, available capacity is established and then compared to the forecasted demand and to the established performance targets. Measures taken in this step include:

a) reviewing airspace design (route structure and ATS sectors) and airspace utilisation policies to look for improvements;

b) reviewing the technical infrastructure to assess the possibility of improving capacity through upgrading various ATM support tools;

c) reviewing and updating ATM procedures as required by changes to airspace design and technical infrastructure;

d) reviewing staffing practices to evaluate potential for matching staffing resources with workload and the eventual need for an increase in staffing levels; and

e) reviewing the training that has been developed and delivered to ATFM stakeholders.

4.2.1.4 Such analysis will provide an idea of the magnitude of a possible imbalance between demand and capacity and based on the imbalance, mitigating measures may need to be developed. However, before this is done, it is very important to:

a) establish an accurate picture of the expected traffic demand through the collection, collation, and analysis of air traffic data.

- In order to identify a demand excess, airports and airspaces should be monitored in order to identify significant changes in:

  - forecast demand;
  - ATM system performance targets;

- Demand data can be obtained from different sources, such as:

  - Comparison of recent traffic history (e.g., comparing the same day of the previous week or comparing seasonal high-demand periods);
  - Traffic trends provided by national authorities, user organizations (e.g., IATA), etc.; and
  - Other related information (e.g., air shows, major sports events, large scale military manoeuvres).

b) take into account the complexity and cost of these measures in order to ensure optimum performance, not only from a capacity point of view but also from an economic perspective.

4.2.1.5 The analysis made and the measures taken will result in a declared ATC capacity, and only in those cases where demand exceeds the declared capacity should there be a requirement to consider the utilisation of ATFM measures in the next phase, ATFM execution.

ATFM Execution

4.2.1.6 ATFM execution, consists of three phases: Strategic, Pre-tactical, and Tactical. These phases should not be considered as discrete steps, but rather as a continuous plan, act and review cycle that is fully integrated with the ATM planning and post operations processes. It is important that operational stakeholders are fully involved in each phase.

Strategic phase or planning

4.2.1.6.1 The ATFM strategic phase encompasses measures taken more than one day prior to the day of operation and much of this work is accomplished two months or more in advance.

4.2.1.6.1.1 This phase applies the outcomes of the ATM Planning activities. It takes advantage of the increased dialog between AUs and capacity providers, such as ANSPs and airports, in order to analyse airspace, airport and ATS restrictions, seasonal meteorological condition changes and significant meteorological phenomena. It also seeks to identify, as soon as possible, any discrepancies between demand and capacity in order to jointly define possible solutions with the least impact on traffic flows. These solutions are not to be frozen in time, but may be adjusted according to the demand foreseen in this phase.

4.2.1.6.1.2 The strategic phase includes:

a) a continuous data collection and interpretation process with a systematic and regular review of procedures and measures;

b) a process to review available capacity; and

c) if imbalances are identified, take the necessary steps to maximize and optimize all available capacity to adequately cope with projected demand and achieve performance targets.

4.2.1.6.1.3 The main output of this phase is the creation of a list of hypotheses, some of which are disseminated in aeronautical information publications that, through capacity forecasts, allow planners to find solutions for problematic areas while improving support to ATFM by anticipating the solution to possible traffic configurations.

Pre-Tactical phase or anticipation

4.2.1.7 The ATFM pre-tactical phase encompasses measures taken one day prior to the operation.

4.2.1.7.1 This phase studies the demand for the day of the operation, compares it with the predicted available capacity on that day, and makes any necessary adjustments to the plan that was developed during the Strategic phase.

4.2.1.7.2 The main objective of the pre-tactical phase is to optimize capacity through an effective organization of resources (e.g., sector configuration management, use of alternate flight procedures, etc.).

4.2.1.7.3 The work methodology is based on a CDM process between the stakeholders (e.g., FMU, airspace managers, AUs).

4.2.1.7.4 The final result of this phase is an ATFM plan (i.e. ADP) that describes the necessary capacity resources and the measures still pending for managing the traffic. This activity uses hypotheses developed in the Strategic phase and adjusts them to the expected situation. The time limits of the activity are related to the precision of the forecasts and to the capabilities of the different stakeholders.

4.2.1.7.5 The ADP must be developed collaboratively and seeks to optimize efficiency of the ATM system and balance demand and capacity. The objective is to develop strategic and tactical outlooks for the applicable airspace or airport that can be used by stakeholders as a planning forecast.

4.2.1.7.6 It is recommended that, as a minimum, the ADP cover a 24-hour period. The plan may cover a shorter period provided that mechanisms are in place to update the plan on a regular basis.

4.2.1.7.7 The flight intentions of AUs should be consistent with the ADP developed during the strategic phase and with the adjustments made during the pre-tactical phase.

4.2.1.7.8 Once the process has been completed, the agreed measures, including ATFM measures, should be disseminated through an ATFM message, which may be distributed through the various aeronautical communication networks or other means such as internet, email, etc.

4.2.1.7.9 The tasks to be performed during this phase may include the following:

a) determine the capacity available in the various areas, based on the particular situation that day;

b) determine or estimate the demand;

c) conduct a comparative demand/capacity analysis;

d) study the airspace/airports that are expected to be saturated, flows affected, calculating the acceptance rates to be applied according to system capacity;

e) prepare a summary of ATFM measures to be proposed and submit them to the ATFM community for collaborative analysis and discussion; and

f) at an agreed-upon number of hours before the operation, conduct a last review in consultation with the affected ATS units and other stakeholders in order to determine the ATFM measures which will be published through the corresponding ATFM messaging system.

Tactical phase or reaction

4.2.1.8 During the ATFM tactical phase, measures are adopted on the day of the operation. Tactical management of traffic flows and capacity involves considering, in real time, those events that affect the plan and making the necessary modifications to it.

4.2.1.8.1 The tactical phase is aimed at ensuring that:

a) the measures taken during the strategic and pre-tactical phases solve the demand/capacity imbalances in the flows or areas of application;

b) the measures taken are the minimum required, and that unnecessary measures are avoided;

c) the existing capacity is maximized without jeopardizing safety; and

d) the measures are applied with due regard to equity and overall system optimization.

4.2.1.8.2 This phase seeks to minimize disturbances and take advantage of any opportunities that may arise. The need to adjust the original plan may result from staffing problems, significant meteorological phenomena, crises and special events, unexpected opportunities or limitations related to ground or air infrastructure, more precise flight plan data, the revision of capacity values, etc.

4.2.1.8.3 The provision of accurate information is of vital importance in this phase, since it permits short-term forecasts, including the impact of any event. There are different types of solutions that may be applied, depending on whether the aircraft are already airborne or about to depart.

4.2.1.8.4 Proactive planning and management requires the use of all the information available in forecasts. It is of vital importance to regularly assess the impact of ATFM measures and to adjust them, as much as possible, based on the information received from the various units that constitutes the system.

Post Operations Analysis

4.2.1.9 The final step in the ATFM planning and management process is the post-operations analysis phase.

4.2.1.9.1 During the post-operations analysis phase, an analytical process is carried out that measures, investigates and reports on operational processes and activities throughout all domains and external units relevant to an ATFM service. This process enables the development of best practices and/or lessons learnt for improving upon those operational processes and activities.

Note – A best practice is a method, process, or activity that upon evaluation demonstrates success, has had an impact, and can be repeated. A lesson learned documents the experience gained during an event, and provides valuable insight with respect to identifying method, process, or activity to avoid in specific situations.

4.2.1.9.2 While most of the post-operations analysis process may be carried out internally within the ATFM unit, there is a requirement for close coordination and collaboration with external stakeholders in order to optimize the output of the analysis process. By including ATFM stakeholders in the feedback process, collaboration fosters a more efficient and reliable way to achieve optimum results.

4.2.1.9.3 The post-operations analysis should be accomplished by evaluating, along with other items, the ATFM daily plan. Issues reported should be evaluated and analysed in order to learn from the actions reported and make appropriate adjustments and improvements in the future.

4.2.1.9.4 The post-operations analysis includes analysis of items such as anticipated and unanticipated events, ATFM measures and delays, the use of predefined scenarios, flight planning and airspace data issues. It compares the anticipated outcome (where assessed) with the actual measured outcome, generally in terms of delay and route extension, while taking into account performance targets.

4.2.1.9.5 All stakeholders within the ATFM service should provide feedback, preferably in a standardized electronic format, enabling information to be used in the post-operations analysis in an automated manner.

4.2.1.9.6 In complex areas, and in order to support the post-operations analysis process, an automated replay support tool, including graphical display, is recommended.

For the post-operational analisis and ATM performance management a CDM process is required, establishing in an harmonized way the performance evaluation areas, common indicators and metrics, in order that different analysis are conducted with a holistic vision and to specific viewpoints related to safety, capacity, efficiency, accessibility and environment.

4.2.1.9.7 Post-operations analysis may be used to:

a) identify operational trends or opportunities for improvement;

b) further investigate the cause and effect relationship of ATFM measures to assist in the selection and development of future actions and strategies;

c) gather additional information with the goal of optimizing ATM system efficiency, or relating to ongoing events;

d) perform analysis of specific areas of interest, such as irregular operations, special events, or the use of reroute proposals; and

e) make recommendations on how to optimize ATM system performance while applying the minimum measures necessary.

4.2.1.9.8 It is important to ensure that applicable ATFM stakeholders be made aware of the results. The following process is recommended:

a) collection and assessment of data including comparison with targets;

b) broad review and further information gathering at a daily briefing;

c) weekly operations management meeting to assess result and recommend procedural, training and system changes where necessary to improve performance; and

d) periodic operations review meetings with stakeholders.

Figure 3 below provides an overview of the post-operations analysis cycle.

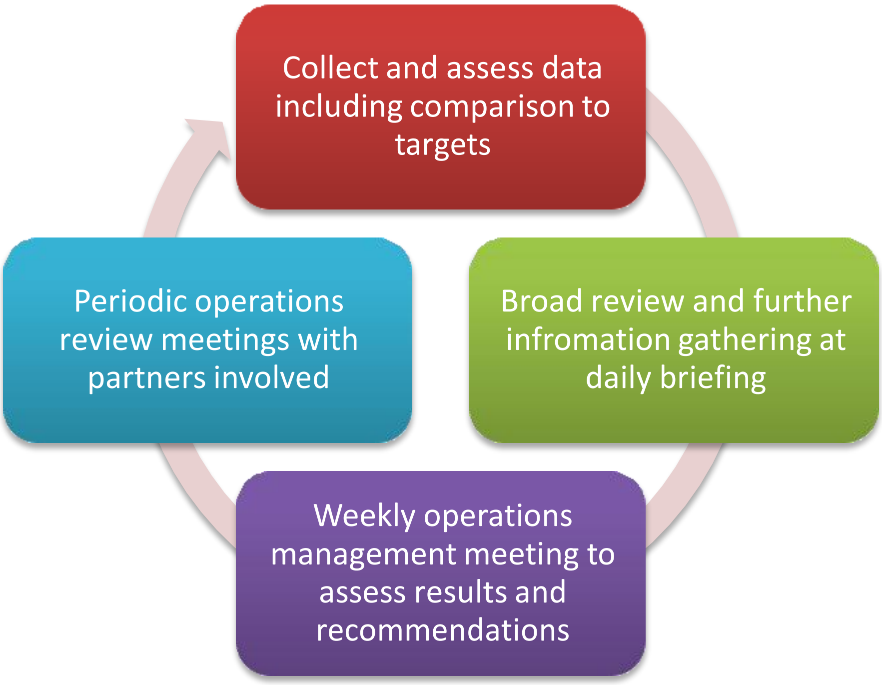


Figure 3. The Cycle of Post-Operations Analysis

Chapter 5

ATFM IMPLEMENTATION

5.1 How is an ATFM service implemented?

5.1.1 The ATFM implementation strategy should be developed in phases in order to ensure maximum utilization of the available capacity and enable all concerned parties to obtain sufficient experience. In order to maximize the use of all resources available, whether in terms of personnel, equipment, facilities and/or automated systems, the ATFM service should be planned, developed and implemented in stages.

5.1.2 The experience acquired in other regions and by some States permits ANSPs to apply basic ATFM procedures without the immediate need for a national or sub-regional ATFM Centre. While a number of sub-regional ATFM Centres already exists, the development of new sub-regional ATFM Centres will require additional study.

5.1.3 Over time, and in order to maximize the operational efficiency of airspaces and airports, consideration should be given to the establishment of Regional ATFM Centres to oversee subregional ATFM Centres in the provision of the ATFM service. If there are no sub-regional ATFM Centres, the Regional ATFM Centre would oversee the national ATFM units or the ATFM service provided by the ACCs.

5.1.4 It is also important that the procedures applied during the implementation process be developed in a harmonious manner among the various States to avoid risks to operational safety and efficiency. This entails establishing a national, sub-regional, and regional strategy to facilitate and harmonize the implementation process

5.1.5 In its initial applications, ATFM need not to involve complex procedures or sophisticated tools. The goal is to collaborate with system stakeholders and communicate operational information to AUs, ANSPs, and other stakeholders in a timely manner.

5.1.6 In the initial applications, this can be accomplished via point-to-point telephone calls designed to exchange pertinent meteorological information, system constraints, and other information of operational significance. Examples include relaying information on known runway closures, equipment maintenance, staffing constraints, volcanic activity, and reroute information. Significant benefits can be realized by applying such an initial level of ATFM service.

5.1.7 ATFM development: Initial steps

5.1.7.1 The following initial steps provide guidance concerning the development of an ATFM service:

a) establish the objectives, project management plan, and oversight of ATFM;

b) identify the personnel who will lead the development of ATFM;

c) identify and brief the stakeholders;

d) define the ATFM structure that will be established;

e) consider the facilities and equipment that will need to be procured for the implementation of ATFM;

f) develop or adopt and apply a model for establishing the Airport Acceptance Rate (AAR) at the appropriate airports;

g) develop or adopt and apply a model for establishing en route sector and terminal sector capacity;

h) identify the appropriate locations for FMUs and FMPs;

i) identify the personnel and operational phone numbers that will serve as the point of contact for ATFM issues at each stakeholder location. For example:

1) area control centre;
2) approach control;
3) control tower;
4) airline operations centre;
5) meteorological office;
6) military flight operations centre;
7) general aviation operations centre;
8) airport operations centre; and
9) other;

j) define the elements of common situational awareness:

1) identify and utilize meteorological information that can be collaboratively used to assess meteorological impact to the system such as:

i) METAR and TAF information;
ii) prognostic websites and charts;
iii) satellite websites and charts; and
iv) meteorological radar;

2) identify and utilize traffic display tools that can be collaboratively used to display traffic and geographical information.

k) identify the appropriate means of ATFM communication:

1) telephone conferencing systems
2) web-based conferencing systems
3) web-based information dissemination and discussion portal similar to a blog format
4) e-mail dissemination portal
5) electronic chat to support tactical discussion
3) operational information web pages

l) develop the applicable ATFM Operational Letters of Agreement.

m) develop the procedures and training materials for FMUs and FMPs.

n) develop the procedures and training materials for stakeholders.

o) discuss and develop the ATFM measures that will be applied in order to balance air traffic demand and capacity.

p) establish an implementation date for the ATFM service;

q) train the appropriate personnel regarding the processes and procedures necessary for ATFM implementation;

r) Implement the processes and procedures; and

s) evaluate the results and coordinate changes as necessary.

Chapter 6

ATFM MEASURES

6.1 What are ATFM Measures and how are they established and applied?

6.1.1 ATFM measures are techniques used to manage air traffic demand according to system capacity. Some ATFM measures must be considered as control instructions or procedures. The determination is based on the size of the event, the coordination process, and the duration of the event.

6.1.2 ATFM measures are important initiatives for managing the flow of air traffic and are applicable when it is necessary to manage fluctuations in the air traffic demand, but they do cause an impact to the AUs. It is important to consider this impact and implement the measures that are necessary for maintaining the safety and efficiency of the system. Therefore, air traffic management personnel should employ the least restrictive methods available in order to minimize delays.

6.1.3 The set of ATFM measures applicable to any given area should be discussed collaboratively between the ANSP and AUs during an ATFM strategy conference. Application parameters, processes and procedures will be understood by all stakeholders from the outset which will avoid misunderstandings during operations. Any foreseeable capacity reductions (e.g. scheduled runway maintenance) or addressing a significant growth in demand in face of a limited capacity during certain periods of time (e.g. special or unforeseen events) would also be discussed at that time.

6.1.4 ATFM measures may only be required during certain periods of time when airports and ATC sectors experience delays due to demand and capacity related issues.

6.2 Types of AFTM Measures

6.2.1 ATFM measures can take a variety of forms and typically span the pre-tactical and tactical phases of the ATFM time horizon. The list below is not exhaustive and provides guidance on where the various measures fall on the ATFM timeline. Figure 4 summarizes these ATFM measures.

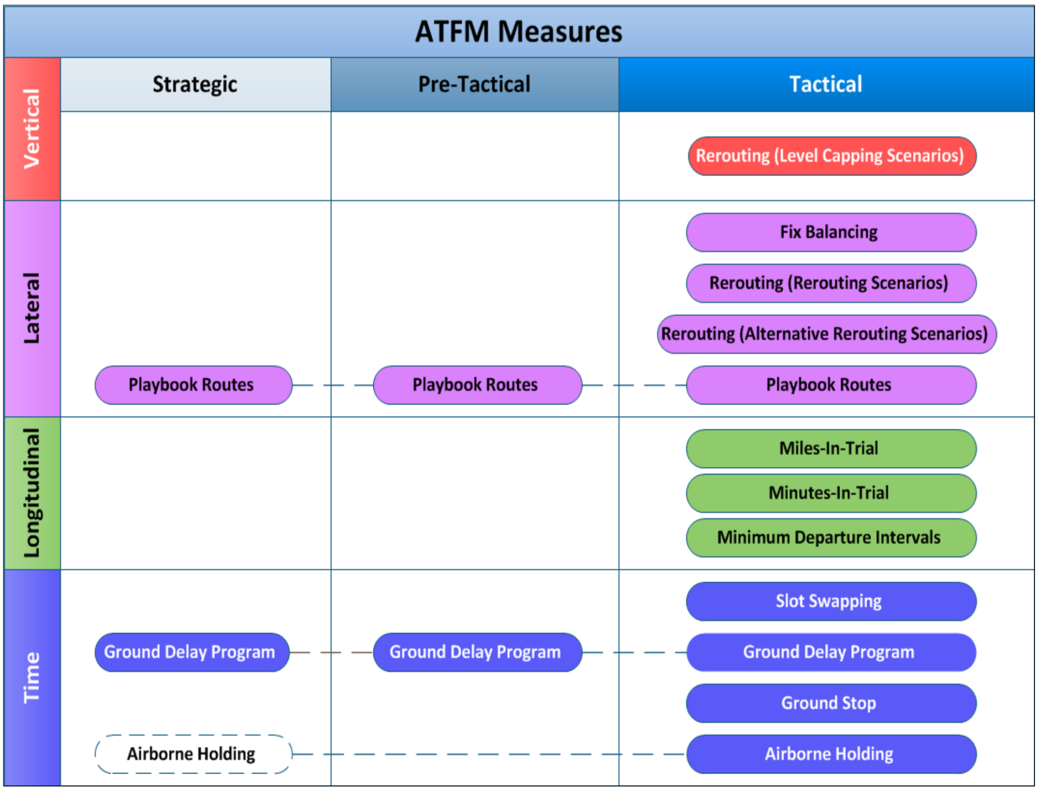


Figure 4. ATFM Measures

6.2.1.1 **Miles-in-trail (MIT).** A tactical ATFM measure. It is the number of miles required between aircraft that meet a specific criterion. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are used to organize traffic into manageable flows, as well as to provide space to accommodate additional traffic (merging or departing) in the traffic flow.

6.2.1.2 **Minutes-in-trail (MINIT).** A tactical ATFM measure. It is the number of minutes required between successive aircraft. It is normally used in airspace that is not provided with surveillance, when transitioning from surveillance to non-surveillance airspace, or when the spacing interval is such that it would be difficult for a sector controller to measure it in terms of miles.

6.2.1.3 **Fix balancing.** A tactical ATFM measure. This is assigning an aircraft an arrival or departure fix other than that in the filed flight plan in order to distribute demand and avoid delays. This can be used, for example, during periods of convective weather where a standard instrument arrival (STAR) or a standard instrument departure (SID) is unusable.

6.2.1.4 **Rerouting.** A tactical ATFM measure. It is an ATC-assigned routing other than the one shown in the filed flight plan. Rerouting can take a variety of forms, depending on the tactical situation.

6.2.1.4.1 **Rerouting scenarios:** Mandatory diversion of flows to offload traffic from certain constrained areas.

6.2.1.4.2 **Level capping scenarios:** Carried out by means of flight level restrictions (e.g., flights from London to Paris TMA shall file below FL245).

6.2.1.4.3 **Alternative routing scenarios:** Routes which are made available to AUs on an optional basis to offload traffic from certain areas.

6.2.1.4.4 A rerouting is normally issued to:

a) ensure that aircraft operate along with a required flow of traffic;

b) remain clear of airspace under restrictions or reservations;

c) avoid excessively congested airspace; and

d) avoid areas of known meteorological conditions that aircraft are circumventing or refusing to fly through.

6.2.1.5 **Minimum Departure Intervals (MDIs).** A tactical ATFM measure. Carried out when ATC sets a departure flow rate of, for example, 3 minutes between successive departures. MDIs are typically applied for no more than 30 minutes at a time and are typically applied when a departure sector becomes excessively busy or when capacity is suddenly reduced (e.g., equipment failure, meteorological conditions, etc.).

6.2.1.6 Slot Swapping. A tactical ATFM measure. Can be applied either manually or via automated means. The ability to swap departure slots provides AUs the possibility to change departure order of their flights that are filed through a constrained area. This measure provides AUs with the ability to better manage their business model in a constrained environment.

6.2.1.7 **Playbook routes.** A strategic, pre-tactical, or tactical ATFM measure. These are a set of collaboratively developed, published, pre-defined routes to address reoccurring route scenarios. They aid in expediting route coordination during periods of system constraint.

6.2.1.8 **Ground delay programme (GDP).** A strategic, pre-tactical, or tactical ATFM measure. A GDP is an air traffic management process where aircraft are held on the ground in order to manage capacity and demand through a specific volume of airspace or at a specific airport. In the process, departure times are assigned that correspond to available entry slots to the constrained airspace or arrival slots to the constrained airport. The purpose of a GDP is to minimize airborne holding. It is a flexible programme and may be implemented in various forms depending upon the needs of the air traffic management system. GDPs are developed in a collaborative manner and are typically administered and managed by an FMU or national/subregional ATFM centre. If a GDP is scheduled to last for several hours, it may be necessary to revise the slots to reflect changing conditions. There must be a system in place to advise pilots of departure slots and any changes to the GDP.

6.2.1.9 **Ground stop (GS).** A tactical ATFM measure. It is a process that requires aircraft that meet specific criteria to remain on the ground. Due to a ground stop's potential impact on AUs, alternative ATFM measures should be explored and implemented prior to a GS, if time and circumstances permit. GS will only be applied during the time required in order to establish normality or until other measures can be implemented to satisfy demand. The GS is typically used:

a) in cases where capacity has been severely reduced at airports due to significant meteorological events or due to aircraft accidents/incidents;

b) to preclude extended periods of in-flight holding; to preclude sector/centre reaching near saturation levels or airport grid lock;

c) in the event a facility is unable or partially unable to provide air traffic services due to unforeseen circumstances; and

d) when routings are unavailable due to severe meteorological or catastrophic events.

Due to the damming of demand caused by the execution of a GS, the need of application of other ATFM measures should be considered after a GS. If the deemed traffic is released without restriction, a new imbalance between demand and capacity would be originated.

6.2.1.10 **Airborne Holding.** A tactical ATFM measure that has been designed strategically. It is a process that requires aircraft to hold at a waypoint in a pre-defined standard in order to cope with short notice demand and capacity imbalances or to provide an inventory of aircraft that are in position to take advantage of short notice temporary increases in capacity such as during certain types of meteorological events.

6.2.1.10.1 During the strategic planning phase, stakeholders collaborate to determine suitable locations for the holding patterns. Analysis has shown that the optimal flight levels for airborne holding from a fuel efficiency perspective are FL200 – FL280. These flight levels provide a balance between the lesser fuel consumption for turbine-powered aircraft and the holding area size. Depending on the situation being considered, a lower altitude holding area can be designed in order to provide a small ready supply of holding aircraft that can take advantage of a short notice opportunity. Holding altitudes should be compatible with normal descent profiles in order to avoid excessive rates of descent and airspeeds and also to avoid inefficient holds at low altitudes.

6.2.1.10.2 Airborne holding is in tandem with Ground Delay Programmes and Ground Stops. Airlines may, in collaboration with the ANSP, choose to request that a small inventory of holding aircraft be maintained during periods of congestion in order to maintain arrival demand pressure on the approach and to avoid losing opportunities when departure demand is not constant or meteorological conditions are variable.

6.2.1.10.3 Airborne holding is a high workload measure for air traffic controllers and for pilots. Every effort must be made to simplify the procedures and minimize communications during the process. Consideration must also be given to potentially reduced sector capacity during airborne holding periods.

6.3 ATFM Measure Approval Authority

6.3.1 The coordination and approval of ATFM measures must be in accordance with the collaborative decision-making process established for the provisions of the ATFM service. Publication in national AIPs and/or regional supplementary procedures is recommended.

6.4 ATFM Measures Processing

6.4.1 Prior to implementation, the designated authority responsible for ATFM must identify the need for an ATFM measure, examine alternative options, and develop a justification for the ATFM measure. The ATFM authority will:

a) discuss and coordinate the proposed ATFM measure with the receiving facility and stakeholders prior to implementation;

b) notify affected facilities and stakeholders of the implementation in a timely and appropriate manner;

c) continuously monitor and assess the ATFM measures to ensure they are producing the desired results;

d) make any necessary adjustments, including the development of an exit strategy; and

e) coordinate with and notify affected facilities and stakeholders of modifications and cancellations in a timely and appropriate manner.

6.5 Application of ATFM Solutions

6.5.1 ATFM continuously and pro-actively considers all possible air traffic flow management solutions through an iterative process, from the strategic planning phase through to the execution of operations. The anticipation of any events according to new information makes it possible to minimise their impact on the ATM system or to take benefit of any opportunity and fine tune the plan accordingly.

6.5.2 To resolve capacity shortfalls and improve the management of the system while minimising constraints, a variety of air traffic flow management solutions may have to be considered. Examples are shown in Figure 5 below.

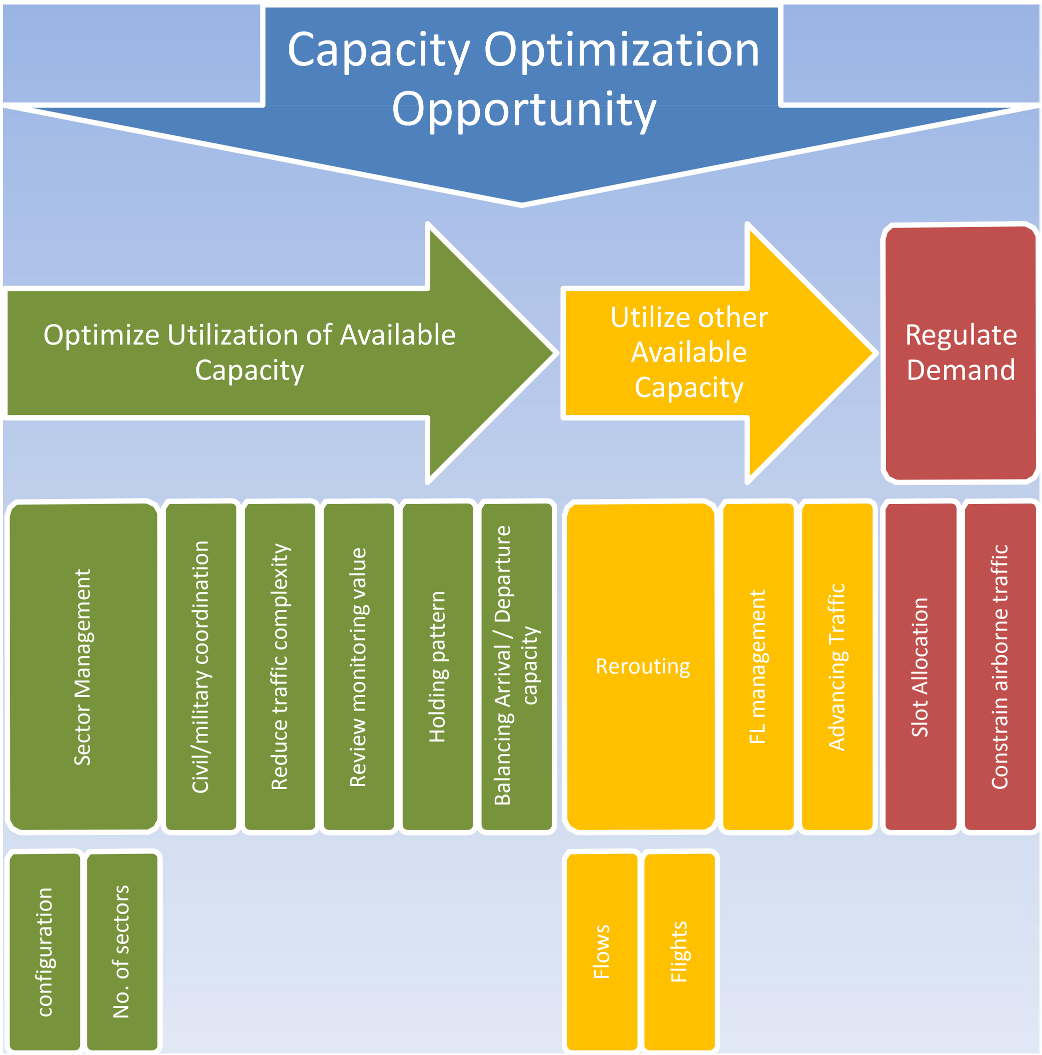


Figure 5. Capacity Optimization

6.5.3 Once the declared and available capacities have been established, air traffic demand can be monitored and assessed and ATFM measures can be coordinated and implemented to attain a balance in the system.

6.5.4 The following example provides a general idea of the steps involved in the actions/analyses to optimize the use of the ATM system:

a) determine capacities: review/assess airport/airspace sector capacities for accuracy;

b) assess demand: determine foreseen demand for a specific time frame, 15-minute period(s), hour(s), etc.;

c) analyse and compare: analyse and compare demand and capacity levels, as well as the periods in which the demand exceeds the available capacity. Automated tools greatly enhance the ATFM analytical process;

d) check if there exists any planned event that may cause imbalance between demand and capacity. Example: climate effects, aerial activities, radar disruption, etc.

~~d~~e) apply the CDM model: communicate the situation to the facilities/parties involved through the means available, using the CDM processes;

~~e~~f) determine the action required for mitigating a demand/capacity imbalance: after collecting and requesting information, determine the ATFM measures that are appropriate for the situation;

~~f~~g) disseminate information: inform the parties involved about the ATFM measures applied using the means available to that end;

~~g~~h) monitor the situation: examine the situation periodically, as necessary, to make sure that the ATFM measure applied is mitigating the imbalance. If necessary, re-assess and make the corresponding adjustments; and

~~h~~i) conduct an analysis after the event: following the event, conduct an analysis to determine the effectiveness of the ATFM measure, and catalogue the best work practices. This analysis may be conducted by reviewing the weekly or monthly report of the FMU/FMP.

6.6 ATFM Efficiency Calculation

6.6.1 ATFM measures should be based on principles set down in this guidance and all parties in the ATFM system should adhere to rules that ensure ATM system capacity is optimized in a safe and efficient manner and to the maximum extent possible. Efficiency takes into consideration fuel consumption and time factors and it should be noted that in some cases, the actions taken by ATFM units to balance capacity and demand will cause delay.

6.6.2 Delays have a great impact on AUs. Their route networks and schedules are built upon connections. The quality of these connections enables passengers to board on-going flights, ensures that aircraft are available for the next leg of flight, and manages the gate availability for subsequent aircraft. To AUs, the required service level requires on-time performance. From AUs perspective, every minute counts and delays represent costs. Although this perspective is understandable, it is not currently practical to measure ATFM delays to that degree. However, delays need to be accounted for and be analyzed so that impacts system performance.

6.6.3 As of yet, standardized ATFM delay calculation metrics across ANSPs have not yet been developed. This is due in part to the difficulties of defining what constitutes a delay as well as determining which, if any, party (such as ANSPs, airport authorities and AUs) has control over how delays are imposed or mitigated. In order to measure system efficiency and to identify issues affecting system performance, a global effort is needed to harmonize the definition of delay and methods of delay reporting. This effort should be a shared responsibility of the ANSPs, airports, AUs, and other stakeholders.

6.7 Principles of delay analysis

6.7.1 For practical and pragmatic reasons, the following considerations should be taken into account with regard to delays:

a) common definitions must be agreed upon across ANSPs and other stakeholders;

b) some ANSPs and airport authorities measure airlines On Time Departure performance, which then makes that metric important; and

c) delays should be calculated for each phase of flight.

6.7.1.1 Departure

a) all time in airline ramp/gate area should be measured;

b) taxi time should be as short as possible for environmental and cost reasons. Aircraft should be held at the gate (or at a suitable intermediate location) until they can taxi to the departure runway with minimal time spent in the departure queue;

c) all movement area delays should be measured, including taxi-out duration past normal taxi-out time; and

d) all time in penalty box/de-ice pads/etc should be measured.

6.7.1.2 En route

a) all airborne holding delays should be measured;

b) linear hold (route extensions, use of RTA, etc.) delays need to be measured; and

c) sub-optimal routes imposed due to ATM infrastructure should be measured at a macro level and discussed during strategic Collaborative Decision-Making conferences.

6.7.1.3 Arrival

a) on time arrival is more financially important to airlines than on time departure;

b) consequential delays caused by cascading effects, if these can be determined, should only be measured once (e.g., Flight 2 has a delayed departure due to the aircraft being delayed on the inbound leg should not count as an additional delay); and

c) all movement area delays should be measured, including taxi-in duration past normal taxi-in time.

6.8 Attribution and Accountability for ATFM Measures

6.8.1 There is a need for a common understanding among all ATFM actors on the reasons for ATFM measures and their accountable agencies (e.g. airport infrastructure, ANSP, external hazard, etc.). Appropriate and agreed definitions should be contained in local ATFM procedures. This is important both for a good operational understanding between operations staff and for performance reporting and regulatory oversight of the ATFM function where relevant. A set of guidelines of reasons for ATFM measures and accountable agencies is described below.

6.8.1.1 Factors under ANSP control

a) flight calibration/flight check;

b) equipment maintenance or failure;

c) ANSP staffing;

d) availability of mitigating strategies to mitigate the impact of capacity reductions due to

e) abnormal meteorological conditions;

f) flight arrival and departure sequencing; and

g) non-optimization of capacity and configurations.

6.8.1.2 Factors under State control

a) activation of restrictions or reservations of airspace that affects capacity;

b) special events: airshow, VIP activity, special sports events; and

c) availability of special use airspace during periods of adverse meteorological conditions or other constraints.

6.8.1.3 Factors under airport control

a) airport infrastructure and configuration;

b) airport construction affecting capacity;

c) runway closure;

d) taxiway closure;

e) de-icing delays (exceeding unimpeded normal processing time);

f) runway decontamination (sweeping, plowing);

g) runway capacity reduced by airport operator failure to decontaminate;

h) delay in completing a flight (deplaning) due to gate unavailability; and

i) delay in completing a flight (deplaning) due to service unavailability (ground transport, handling, customs, etc.).

6.8.1.4 Factors under airspace user control

a) inability to depart at ETD due to:

   1) delayed inbound aircraft; and

   2) flight preparation;

b) inability to depart at a controlled departure (slot) time that is at or later than ETD.

6.8.1.5 Uncontrollable

a) capacity reductions due to significant meteorological conditions or unforeseen events.

6.8.1.6 Delay classifications

a) departure delay (actual versus planned departure time) e.g. ATOT minus ETOT or AOBT minus EOBT;

b) ATFM delay, e.g. first CTOT minus EOBT;

c) airline scheduling practices;

d) time spent waiting in queue for take-off;

e) total airborne holding minutes;

f) route extension in time and distance, by flight phase; and

g) arrival delay (actual versus planned arrival time).

CDM DELAY CODES

Following table shows a form that could be adopted for the various related analyses

CÓDIGOS DE DEMORA						
TMI	CÓDIGO	UBICACIÓN DE LA REGULACIÓN	EJEMPLO	CÓDIGO	CAUSA DEMORA IATA	EJEMPLO CÓDIGO REGULACIÓN
Capacidad ATC	C	D	Demanda excede la Capacidad	89	Restriccion en Aeropuerto de Salidas	CD 89
		E		81	ATFM debido a ATC en ruta Demanda/Capacidad	CE 81
		A		83	ATFM debido a restricciones en el aeropuerto de destino	CA 83
Acciones ATC	I	D	Huela de Controladores	89	Restricciones en el aeropuerto de salida	ID 89
		E		82	ATFM debido a ATC equipo en ruta/personal	IE 82
		A		83	ATFM debido a restricciones en el aeropuerto de destino	IA 83
ATC ROUTEINGS	R	E	Aplicación de nuevos procedimientos	81	ATFM debido a ATC en ruta Demanda/Capacidad	RE 81
Personal ATC	S	D	Enfermedades, Demoras por tráfico en la autopista	89	Restriccion en Aeropuerto de Salidas	SD 89
		E		82	ATFM debido a ATC equipo en ruta/personal	SE 82
		A		83	ATFM debido a restricciones en el aeropuerto de destino	SA 83
Equipos ATC	T	D	Falla de radar, falla de frecuencias.	89	Restriccion en Aeropuerto de Salidas	TD 89
		E		82	ATFM debido a ATC equipo en ruta/personal	TE 82
		A		83	ATFM debido a restricciones en el aeropuerto de destino	TA 83
Accidente/ Incidente	A	D	Pista cerrada debido a un Accidente	89	Restriccion en Aeropuerto de Salidas	AD 89
		A		83	ATFM debido a restricciones en el aeropuerto de destino	AA 83
Capacidad de Aeropuerto	G	D	Falta de areas de parqueo,calles de rodaje cerradas,areas cerradas por mantenimiento,la demanda excede la capacidad declarada del	87	Instalaciones del Aeropuerto	GD 87
		A		87	Instalaciones del Aeropuerto	GA 87

			aeropuerto			
Equipo no ATC	E	D	Falla de luces en pista y Calles de Rodaje	87	Instalaciones del Aeropuerto	ED 87
		A		87	Instalaciones del Aeropuerto	EA 87
Acción Industrial no ATC	N	D	Huelga de Bomberos	98	Acción industrial externa a la propia aerolínea	ND 98
		A		98	Acción industrial externa a la propia aerolínea	ND 98
Actividad Militar	M	D	Código Azul.	89	Restriccion en Aeropuerto de Salidas	MD 89
		E		82	ATFM debido a ATC equipo en ruta/personal	ME 82
		A		83	ATFM debido a restricciones en el aeropuerto de destino	MA 83
Eventos Especiales	P	D	Copa mundo FIFA, visita de personajes ilustres	89	Restriccion en Aeropuerto de Salidas	PD 89
		A		83	ATFM debido a restricciones en el aeropuerto de destino	PA 83
Meteorología	W	D	Tormentas, baja visibilidad, vientos.	89	Restriccion en Aeropuerto de Salidas	WD 89
		E		73	Tiempo en ruta o alternativo	WE 73
		A		84	ATFM debido a tiempo en destino	WA 84
Cuestiones Ambientales	V	D	Ruido.	89	Restriccion en Aeropuerto de Salidas	VD 89
		A		83	ATFM debido a restricciones en el aeropuerto de destino	VA 83
Otros	O	D	Asignación de slot por el aeropuerto inicial.	89	Restriccion en Aeropuerto de Salidas	OD 89
		E		81	ATFM debido a ATC en ruta Demanda/Capacidad	OE 81
		E		00	Asignación de slot Aeropuerto	OE 00
		A		83	ATFM debido a restricciones en el aeropuerto de destino	OA 83

6.9 Reporting

6.9.1 For reporting purposes, stakeholders should report delays at least monthly and include trend analyses. Delays should be broken down by reason and geographically to support analysis. ANSPs are encouraged to provide the data electronically in a format that would support further processing by stakeholders.

6.9.2 Following the publication of delay reports, ANSPs should meet with stakeholders to discuss the results and attempt to identify mitigations and corrective actions to improve performance.

6.9.3 Studies' have shown that there is roughly a 4:1 difference in cost between applying ground delays versus applying delays via airborne holding.

[1] FAA Economic Information for Investment Analysis, dated April19, 2012

Chapter 7

DATA EXCHANGE

7.1 What data and information are exchanged in an ATFM service?

7.1.1 As a key enabler to support the global development and further harmonization of ATFM, the cooperation and coordination of ATFM activities between States must be enhanced. Therefore States should ensure that operational data from ANSPs (e.g. flight data information, delay information, meteorological information which have to be derived from a valid and authoritative source) are exchanged not only within their ICAO 4egions but also across ICAO regional boundaries, so that more efficient traffic flows can be achieved.

7.1.2 Data exchange is the sharing of information required for the effective provision of ATFM service. As depicted in Figure 6 below, the data to be shared include information related to the flight plan, capacity, demand, and ATFM measures for the purpose of cooperation and coordination of air traffic flow management activities between ATFM stakeholders.

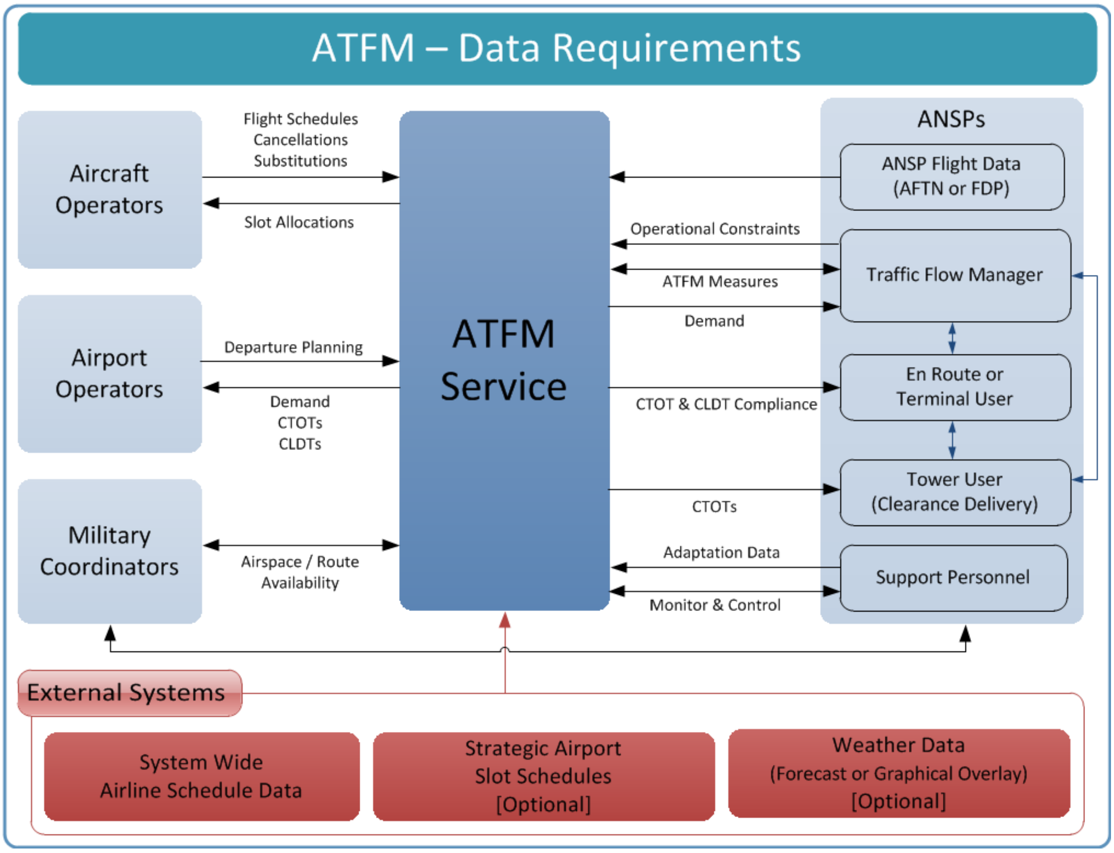


Figure 6. Data requirements.

7.1.3 The requirement for data sharing covers many different areas. As described earlier in this Manual, there is a requirement for the ATFM function to be constantly updated with information on the overall ATM resource (e.g., airspace status and airport infrastructure).

7.1.3.1 Many established ATFM units rely on databases that contain comprehensive details of the ATS organisation in their areas of responsibility. These databases contain essential information to ATFM planning and daily operations including ATS routes and routing systems, airports, SIDs, STARs, navigational aids (NAVAIDs), ATC sectorisation, etc.

7.1.3.2 Where such databases are available, the effectiveness of the ATFM service depends to a large extent on the completeness and accuracy of the associated information and on the timely exchange of data.

7.1.4 The ATFM unit also needs access to accurate and timely data with regards to the ATC demand. Throughout the various stages of the ATFM planning horizon (strategic, pre-tactical, tactical), AUs must provide descriptions of all flights intending to operate in the area under the responsibility of the ATFM unit. Accurate aircraft performance characteristics and meteorological models are also required in order to be able to correctly assess the impact of various operations.

7.1.5 It is of critical importance that the ATFM unit is provided with current information on the dynamic airport and airspace traffic demand and capacity situation in order to increase the accuracy of the tactical prediction.

7.1.6 Data information exchanged among stakeholders is applied to facilitate:

a) Strategic planning:

1) evaluate air traffic flows patterns;
2) evaluate capacity and demand problems and patterns;
3) collaborate and communicate with operational stakeholders;
4) validate and implement strategic ATFM measures for future events;

Note: the strategic planning phase could contain airport slots coordination processes

b) Pre-tactical planning:

1) monitor air traffic flows;
2) evaluate changing capacity and demand situations;
3) collaborate and communicate with operational stakeholders;
4) implement, revise, or cancel ATFM measures;

c) Tactical planning:

1) monitor air traffic flows;
2) evaluate changing capacity and demand situations;
3) collaborate and communicate with operational stakeholders;
4) implement, revise, or cancel ATFM measures;

d) Post operational analysis:

1) review and analyse previous day's (or even hour's) operation;
2) support and improve future planning functions and processes.

7.2 Benefits of Data Exchange

7.2.1 Data sharing and exchange facilitates the collaboration and interaction between national, as well as international, ATFM units and enables common situational awareness. It also allows for a coordinated and comprehensive system response to ever-changing conditions in the ATM system.

7.2.1.1 This enablement leads to increased safety and efficiency in air traffic operations, including: increased efficiency for traffic flows, reduced delays, enhanced predictability and reliability of AU schedules, and reduced impacts on the environment from greenhouse gas emissions and noise pollution.

7.2.1.2 It also optimizes contingency responses to unforeseen events and system disruptions.

7.3 International Data Exchange Specifications

7.3.1 To support the global development and harmonization of ATFM, ANSPs must ensure that the data shared is from a valid and authoritative source. ANSPs should utilize methodologies capable of data exchange that are secure, efficient, and in compliance with all applicable identified and agreed upon standards.

7.3.2 Flight data information is provided to ATFM units and operational stakeholders for the purpose of air traffic management. Such data should not be released to third parties unless this is covered by a pre-defined data policy.

7.3.3 Specifications for connectivity should conform to existing standards for this type of data exchange and be documented by interface control documents.

7.4 Data Type Description and Harmonization

7.4.1 Automated ATC information contained in ICAO message types is the foundation for data exchange programmes. Examples of the ICAO message types are listed below:

a) flight plan

b) flight amendment;

c) flight plan cancellation;

d) flight departure;

e) flight coordination; and

f) flight arrival.

7.5 ATFM Tools

7.5.1 Depending on the size and complexity of the ATFM service to be provided, a set of ATFM tools may be implemented to enable partial automation of ATFM. Figure 7 provides an overview of ATFM tools to support planning, prediction, execution and analysis of ATFM measures.

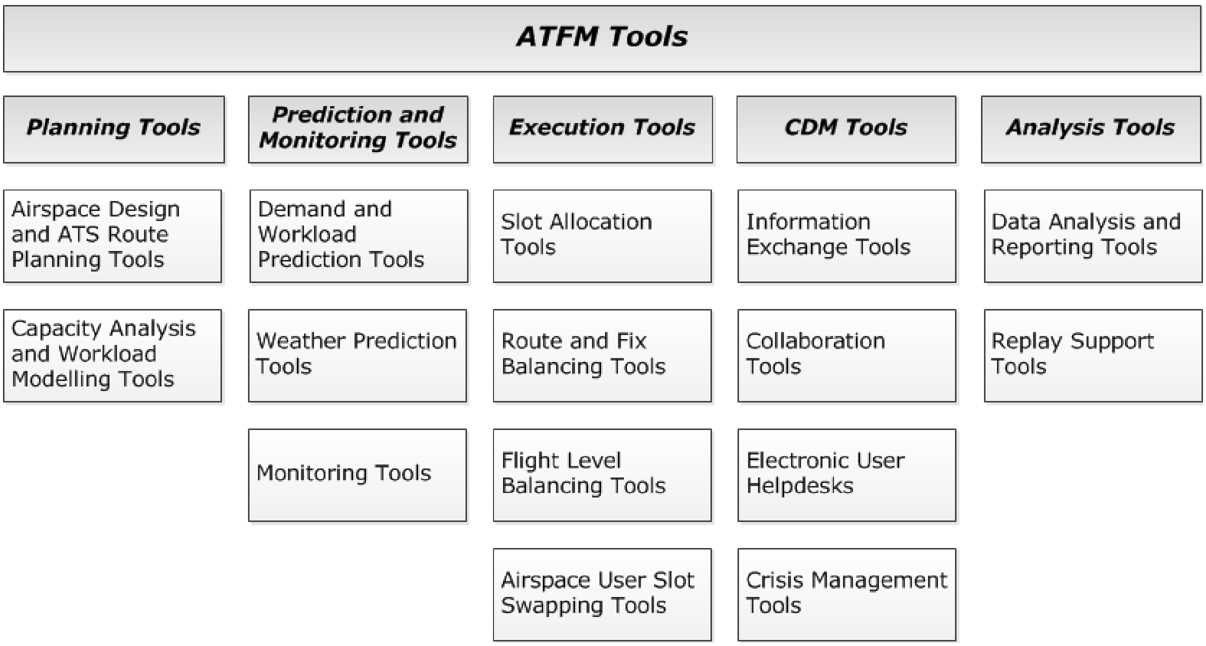


Figure 7. ATFM Tools

Note – If available, it is recommended to couple ATFM execution tools with ATC sequencing and metering tools, such as arrival and departure management systems (AMAN/DMAN), to achieve further capacity and efficiency benefits.

Chapter 8

ATFM COMMUNICATION

8.1 Communication

8.1.1 The communication and exchange of operational information among stakeholders on a real-time basis forms the backbone of ATFM. This exchange may be accomplished by a variety of means including telephone calls, web conferences, e-mail messages, electronic data exchange and web page displays. The purpose of the information exchange is to increase stakeholder situational awareness, improve operational decision-making, and enhance ATM system efficiency.

8.2 Stakeholder ATFM Communication

8.2.1 An ATFM unit requires several layers of communication. As a basis for the exchange of information, NOTAM and AIP supplements could be used to distribute instructions relating to the application of ATFM measures. For example, strategic ATFM routing information and certain ATFM operating procedures could be published as a NOTAM or in the AIP Supplement.

8.2.2 As the functionality of an ATFM unit develops, consideration should be given to developing a more ATFM specific communication structure for the notification of ATFM measures.

8.2.2.1 For example, to facilitate AU awareness, the ATFM unit could produce and distribute the ADP on the day prior to the operation in order to provide a summary of planned operations and ATFM measures in their area of responsibility and to distribute any specific instructions or communications requirements associated with those measures. This communication could also be updated by ADP amendments.

8.2.2.2 In order to ensure that AUs and other stakeholders can properly use and apply this information, a standard format should be employed.

8.2.3 In addition to the production and distribution of ADPs, the ATFM unit could produce ATFM Information Messages to provide information and guidance.

8.2.3.1 These messages could be used for the initial publication of changes to the availability of runways, ATS routes and airspace in the area, and serve as the vehicle for the initial publication of new and amended ATFM operating procedures which affect all users.

8.2.4 The ADPs and ATFM Information Messages could be transmitted via agreed-upon means to ATC units, AUs, and other stakeholders who wish to be included on the distribution list. These messages could also be made available on associated ATFM unit websites.

8.2.5 Each national AIP could include ATFM information on specific arrangements for dealing with ATFM issues and coordination matters. The AIPs could also include the telephone numbers of relevant ATFM units to contact for ATFM advice and information.

8.3 ATFM Communication Oversight

8.3.1 For consistency, the appropriate authority should ensure that there is a single office responsible for collecting, disseminating, monitoring, and providing oversight of the dissemination of ATFM information and ATFM measures. This oversight will ensure that applicable information is shared by all ANSPs and operational stakeholders in a timely and efficient manner.

8.3.2 Examples of applicable ATFM information include but are not limited to:

a) tactical level information such as current airport runway configurations;

b) airport acceptance rates;

c) airport departure demand;

d) en route sector demand and capacity imbalances;

e) runway closure or airport conditions;

f) NAVAID outages;

g) ATM infrastructure; and

h) activities on airspace under restrictions or reservations.

8.3.2.1 Specific categories of information will be determined by the ATFM unit in collaboration with stakeholders.

8.3.3 ATFM units should develop an internal operations manual for their respective facilities to address the ATFM measures process. For example, the operations manual could include provisions for:

a) procedures for coordinating, implementing and disseminating ATFM measures through specified means such as telephone calls, aeronautical messages, web pages, or any other suitable method;

b) constant monitoring and adjusting of ATFM measures; and

c) timely cancellation of ATFM measures.

8.4 Communicating ATFM Information

8.4.1 There is a requirement for AUs and ATFM units to communicate and exchange information for the purposes of CDM and information dissemination.

8.4.2 Because the involvement of ATFM units and AUs may vary significantly, the tools for exchange of information must be geared to meet the stakeholder capabilities and requirements.

8.4.3 When selecting communication methods, consideration should be given to maximizing the value and content of the information and minimizing the time and workload required.

8.4.4 The following communication methods are offered as examples:

a) scheduled telephone (or web) conferences. This consists of defining times at which the ATFM units will hold daily operational conferences to exchange ATFM information and to meet their operational needs;

b) tactical telephone conferences. This consists of establishing a procedure to convene non-scheduled ATFM teleconference, held in real-time and at a tactical level, in order to make the necessary operational adjustments; and

c) automated web page or ATFM operational information system. ATFM units may create a web page or an information system, containing relevant ATFM information (e.g. ADP). The purpose is to share information about the ATM system in order to develop a common situational awareness and minimize workload.

8.5 ATFM Web Pages

8.5.1 For ATFM units that elect to create web pages with relevant ATFM information, examples could include:

a) airport operational status information:

1) current and planned active runway configuration;
2) airport acceptance rate/departure rate;
3) information concerning delays – duration and outlook;
4) meteorological information;
5) scheduled flight inspections/calibrations;
6) ATFM measures;
7) low visibility procedures;
8) de-icing operations; and
9) airport or runway closures;

b) airspace operational status information:

1) actual and planned capacity by sector;
2) anticipated demand by sector;
3) meteorological conditions likely to affect capacity or demand;
4) special use airspace status; and
5) ATFM measures;

c) ATFM stakeholder planning teleconferences:

1) schedules; and
2) joining instructions;

d) ATFM strategic, pre-tactical, and tactical plans; and

e) links to ATFM-related information:

1) weather websites;
2) ACC and APP contact information;
3) Letters of Agreement;
4) route information;
5) GNSS operational status;
6) ATFM-related NOTAMs; and
5) contingency plans.

8.6 ATFM Terminology

8.6.1 What terminology/phraseology is used in ATFM?

8.6.2 One goal of this manual is to develop and promote standard terminology and phraseology for the exchange of ATFM telephone and automated messages. The information contained herein is intended to reflect the current use of plain language and provide a basis for harmonization.

8.6.3 ATFM operations should be conducted in a common language in a simple, concise, non-verbose manner. The use of local or regional colloquial terms or acronyms should be avoided due to possible confusion.

Note. In order to establish a common terminology, the list of acronyms and definitions shown at the beginning of this document should be noted.

8.6.3.1 The exception would be coordination with stakeholders where the use of English may be required.

8.6.3.2 For interregional ATFM coordination, the English language should be used unless there is consensus to use another common language.

8.6.4 The use of standardized terminology as contained in this manual should be employed to guarantee global consistency on how ATFM messages are communicated among ATFM units. This includes the concept of modular and structured ATFM messages and defines the components as who, what, when, where and why.

8.6.5 As with any communication model, it is the responsibility of both parties (sender and receiver) to ensure that the message is clear, concise, correctly understood and applied as requested.

STRUCTURE OF ATFM MESSAGES

8.6.6 Each ATFM coordination message should have five components (who, what, when, where, why) that contain plain language elements and when combined provide a complete ATFM message.

a) **WHO**: This identifies the parties involved. Who is transmitting and receiving the message.

Examples: CGNA THIS IS COLOMBIA FMU
CENAMER ACC THIS IS PANAMA ACC
CCFMEX THIS IS ATCSCC
JCAB THIS IS CFMU

b) **WHAT**: This identifies the objective to be achieved.

Examples: REQUEST 30 MILES IN TRAIL
REQUEST 3 MINUTES IN TRAIL
REQUEST GROUND STOP

c) **WHEN**: This identifies the time and/or duration of the ATFM objective to be achieved.

Examples: FROM NOW UNTIL 1700 UTC
FROM 2000 UTC TO 2130 UTC

d) **WHERE**: This identifies the location of the ATFM objective to be achieved. It is often preceded by a modifying clause, indicating what aircraft or traffic the restriction will apply to. The modifying clause and the location combination are used to construct the "where" component.

Examples: FOR ALL AIRCRAFT LANDING EL DORADO INTERNATIONAL AIRPORT
FOR ALL TRAFFIC LANDING CAIRO INTERNATIONAL AIRPORT
FOR ALL TRAFFIC FILED VIA B881

e) **WHY**: This identifies the reason for the ATFM objective.

Examples: DUE TO SEVERE WEATHER OVER EL DORADO INTERNATIONAL AIRPORT
DUE TO A LONG-RANGE RADAR OUTAGE
DUE TO EXCESS SECTOR DEMAND
DUE TO AN AIRCRAFT INCIDENT

8.6.7 Message example. The following is an example of a complete message:

CGNA THIS IS COLOMBIA FMU. REQUEST 30 MILES IN TRAIL FOR ALL AIRCRAFT LANDING EL DORADO INTERNATIONAL AIRPORT FROM NOW UNTIL 1700 UTC DUE TO SEVERE WEATHER OVER EL DORADO INTERNATIONAL AIRPORT

8.6.8 Message amendment. The amendment of an ATFM message should include similar elements but with additional modifiers. These modifiers may include:

a) CHANGE;

b) AMEND;

c) REDUCE;

d) INCREASE; and

e) DECREASE.

8.6.8.1 Message amendment example.

GUAYAQUIL FMP THIS IS LIMA FMP, REDUCE YOUR MILES-IN-TRAIL TO JORGE CHAVEZ INTERNATIONAL AIRPORT FROM 30 MILES-IN-TRAIL TO 20 MILES-IN-TRAIL FROM 1400 UTC TO 1700 UTC DUE TO IMPROVING METEOROLOGICAL CONDITIONS AT JORGE CHAVEZ INTERNATIONAL AIRPORT

8.6.9 Message cancellation. The cancellation of an ATFM message should contain a cancelling word or phrase. Cancellation messages should also identify which message is being cancelled because several ATFM measures could be in place at one time. Normally, it is not necessary to state the reason for the cancellation, but it may be included. A cancelling word or phrase may include:

a) CANCEL;

b) RESUME;

c) RESUME NORMAL; and

d) RELEASE.

8.6.9.1 Message cancellation example.

CARACAS FMU THIS IS GEORGETOWN FMU, CANCEL THE GROUND STOP FOR CHEDDI JAGAN INTERNATIONAL AIRPORT DUE TO THE RUNWAY NOW OPEN

What resources are available to States regarding the various aspects of ATFM?

The information in the following Appendices pertains to the implementation of ATFM between 2006 and 2011 and represents the experiences of some States/International Organizations in the planning, implementation and application of ATFM. It provides samples and examples of information that can be used as resources and is designed to be helpful information with regard to implementing an ATFM service.

APPENDIX A

SAMPLE INTERNATIONAL ATFM OPERATIONS PLANNING TELEPHONE CONFERENCE FORMAT

Note.– This Appendix provides a sample format that can be used by an ATFM unit for facilitating an ATFM operations planning telephone (or web) conference.

<u>Greeting and introduction</u>

xxxxZ planning telcon
Covering the timeframe from xxxx UTC to xxxx UTC

<u>Situation</u>
The current situation is:

<u>Issues</u>
We will be discussing:

<u>Common Weather Products</u> – working from
1) the ICAO Area "_" Prog Chart, valid xxxx UTC for (Date)
2) the ICAO Area "_" IR Satellite photo, xxxx UTC for (Date)

<u>Planning discussion</u> – Recommend organizing the discussion by geographic areas (for example, from north to south, or east to west, in the regional airspace)

<u>Significant meteorological and atmospheric conditions</u>
Thunderstorm activity
Turbulence
Volcanic ash plumes

<u>Terminal discussion</u>
For select airports:
Airport/Sector Capacities
Projected terminal demand
Airport constraints, such as construction projects or NAVAID outages
<u>Anticipated traffic management measures</u>
Expanded miles-in-trail
Potential airborne holding
Potential ground stops

<u>En-route discussion</u>
En-route constraints, such as frequency outages or NAVAID outages
Route discussion and issues
<u>Anticipated traffic management measures</u>
Expanded miles-in-trail
Potential airborne holding

<u>Additions to the plan, including any pertinent tactical updates.</u>

<u>Stakeholder input, comments, and questions</u>

<u>Next Planning Telcon: xxxxZ</u>

APPENDIX B

SAMPLE ATM DATA EXCHANE AGREEMENTS

Note.– This Appendix provides a sample format regarding an agreement for the exchange of ATM data between States.

AGREEMENT ZZZZ

BETWEEN

(State name)

AND

(State name)

<u>THE EXCHANGE OF AIR TRAFFIC FLOW MANAGEMENT DATA</u>

ARTICLE I - <u>PURPOSE</u>

The purpose of this Agreement is to establish the terms and conditions for cooperation between (State name) and (State name) in the exchange of non-critical radar and flight data information. The exchange of data will enhance the cooperation and coordination of air traffic management (ATM) activities between (State name) and (State name).

ARTICLE II - <u>SCOPE OF WORK</u>

A. (State name) and (State name) agree to exchange flight data and other information concerning international and domestic instrument flight rules (IFR) aircraft to enhance the cooperation and coordination of ATM activities. This data will be used by each for the following purposes:

1. Maintenance of a complete and reliable database for such information;

2. Dissemination to aviation users; and

3. Enhancement of cooperation and coordination of air traffic flow management activities between (State name) and (State name).

ARTICLE III - <u>PROCEDURES</u>

A. Purpose of Use -- The exchange of flight data and other information shall be exclusively for the purposes set forth in this Agreement. The use of the information and data for purposes beyond the scope identified in this Agreement, or the release of any information or data to a third Party not identified in this Agreement, must be authorized in writing by the party from which the information or data originated.

B. Coordination -- The Parties will meet at such times and places as may be requested by either Party to jointly review the program and consider new procedures or requirements. Activities to accomplish the objectives will be discussed at bilateral/multilateral meetings and documented by Chairpersons in reports of those meetings.

C. Scope of Data -- The flight data or information to be exchanged shall not include any sensitive data on flights exempted by either Party for security or safety reasons. The exchange of flight data or information applicable to sensitive State and military aircraft will be provided for those areas where the Parties have responsibility for provision of air traffic services. The data shall be formatted to be usable in each system and exchanged using data communications systems as mutually agreed.

D. Types of Data -- Types of data to exchange include non-critical radar and flight data information concerning international and domestic instrument flight rules (IFR) aircraft, including flight and flight plan modifications, cancellations, amendments and related changes.

E. Communications Protocol -- The information shall be exchanged using agreed data communications protocol. Communications protocol and other necessary requirements shall be arranged as mutually agreed. The Parties agree to provide, at the earliest possible date, notice of proposals for the development of changes to hardware, software and documentation applicable to traffic management data and supporting interfaces.

F. Responsibility of Provision -- Except for technical or operational reasons, information and data will be exchanged continuously as it becomes available. Each Party shall operate and maintain communication hub(s) and line(s) to be used for data exchange.

ARTICLE IV - RELEASE OF DATA TO THIRD PARTIES

A. Data on State and military aircraft shall not be released to a third Party, unless approved through mutual agreement by both Parties.

B. All data may be released by (State name) or (State name) to aviation stakeholders through programs under the same terms and conditions found in the agreements entered into between the (State name) or (State name). Air Navigation Service Providers, aircraft operators, national security or safety authorities and research and development (R&D) institutes for ATM improvement are defined as aviation stakeholders. (State name)and (State name) shall be responsible for data administration in the provision for those Parties.

C. Each Party shall make every effort to ensure that the other Party's air traffic flow management data is not released or re-broadcast through unrestricted, public access mass media communications technology, such as the internet, without the written consent of the other Party.

ARTICLE V - FINANCIAL PROVISIONS

Each Party shall bear the cost of any activity performed by it under this Agreement.

ARTICLE VI - IMPLEMENTATION

A. The designated points of contact between xxx and yyy for coordination and management of this Agreement are:

1. For (State name): Manager
   Address- phone-fax-e-mail
2. For (State name): Manager
   Address- phone-fax-e-mail

B. The designated points of contact between (State name) and (State name) for technical issues under this Agreement are:

1. For (State name):

2. For (State name):

ARTICLE VII - ENTRY INTO FORCE AND TERMINATION

This Agreement will enter into force upon the date of the last signature and remain in effect for the duration of its associated Annex. Either Party may terminate the Agreement on six (6) months' written notice to the other Party.

ARTICLE VIII - AUTHORITY

The (State name) and (State name) agree to the terms of this Agreement as indicated by the signatures of their duly authorized officers.

____

(State name):_________________________	(State name):_________________________
By:________________________________	By:________________________________
Title:_____________________________	Title:_____________________________
Date:_____________________________	Date:_____________________________

APPENDIX C

DETERMINING AIRPORT ACCEPTANCE RATE

Note.– This Appendix provides an example of a simplified methodology for determining the acceptance rate at an airport. This methodology is based on the scientific process developed by the Federal Aviation Administration for establishing the acceptance rate.

- Definitions:

1) **Airport Acceptance Rate (AAR):** A dynamic parameter specifying the number of arrival aircraft that an airport, in conjunction with terminal airspace, ramp space, parking space, and terminal facilities can accept under specific conditions during any consecutive time period (60, 30, 15 or 10 minutes).

2) **Airport Primary Runway Configuration**: An airport configuration which handles 3 percent or more of the annual operations.

- Administrative considerations:

1) Identify the organization responsible for the establishment and implementation of AARs at select airports.

2) Establish optimal AARs for the airports identified.

3) Review and validate the airport primary runway configurations and associated AARs at least once each year.

- Determining AARs:

1) Calculate optimal AAR values for each airport runway configuration for the following weather conditions:

a) Visual Meteorological Conditions (VMC) - weather allows vectoring for visual approaches

b) Marginal VMC - weather does not allow vectoring for visual approaches, but visual

c) Instrument Meteorological Conditions (IMC) – visual approaches and visual separation on final are not possible

d) Low IMC – weather dictates Category II or III operations

- Calculate the optimal AAR as follows:

1) Determine the average ground speed crossing the runway threshold and the spacing interval required between successive arrivals

2) Divide the groundspeed by the spacing interval to determine the optimum AAR

3) FORMULA: Ground speed in knots at the runway threshold divided by spacing interval at the runway threshold in miles

NOTE: when the quotient is a fraction, round down to the next whole number

Example: 130 KTS / 3.25 nm = 40 Optimum AAR = 40 arrivals per hour

125 KTS / 3.0 nm = 41.66 round down to 41

Optimum AAR = 41 arrivals per hour

Or

Use table below

Nautical miles between aircraft at the Runway Threshold										
	3	3.5	4	4.5	5	6	7	8	9	10
	Potential AAR									
Ground Speed at the Runway Threshold										
140 knots	46	40	35	31	28	23	20	17	15	14
130 knots	43	37	32	28	26	21	18	16	14	13
120 knots	40	34	30	26	24	20	17	15	13	12
110 knots	36	31	27	24	22	18	15	13	12	11

Table 1. Optimum AAR

- Identify any conditions that may reduce the optimum AAR. Conditions include:

1) Intersecting arrival and departure runways

2) Lateral distance between arrival runways

3) Dual use runways – runways that share arrivals and departures

4) Land and Hold Short operations

5) Availability of high speed taxiways

6) Airspace limitations and constraints

7) Procedural limitations (noise abatement, missed approach procedures)

8) Taxiway layouts

9) Meteorological conditions

- Determine the adjusted AAR using the previous factors for each runway used in an airport configuration.

1) Add the adjusted AARs for all runways used in an airport configuration to determine the optimal AAR for that runway configuration.

2) Real-time factors may require dynamic adjustments to the optimal AAR. These include:

a) Aircraft type and fleet mix on final

b) Runway conditions

c) Runway/taxiway construction

d) Equipment outages

e) Approach control constraints

3) Formula:

POTENTIAL AAR – ADJUSTMENT FACTORS = ACTUAL AAR

RUNWAY CONFIGURATION	AAR for VMC	AAR for MARGINAL VMC	AAR for IMC
RWY 13	24	21	19
RWY 31	23	20	17

Table 2. Actual AAR - Example

APPENDIX D

DETERMINING SECTOR CAPACITY

Note.– This Appendix provides an example of a simplified methodology for determining sector capacity at an ACC. This methodology is based on the scientific process developed by the Federal Aviation Administration for establishing the sector capacity.

1) Sector capacity is determined using the average sector flight time in minutes from 7am to 7pm Monday through Friday.

2) For any 15-minute time period.

3) The formula used to determine sector capacity is:

$$\frac{(average\ sector\ flight\ time\ in\ minutes)\times(60\ seconds)}{36\ seconds} = Sector\ Capacity\ Value_{Optimum}$$

4) Steps:

   a) manually monitor each sector, observe, and record the average flight time in minutes.

   b) after that time is determined:

      1) multiply that value by 60 seconds in order to compute the average sector flight time in seconds;

      2) then divide by 36 seconds because each flight takes 36 seconds of a controller's work time; and

      3) this is the sector capacity value (optimum).

5) Adjustments:

   a) the optimum value for a sector is then adjusted for factors such as:

      1) airway structure;

      2) airspace volume (vertically and laterally);

      3) complexity;

      4) climbing and descending traffic;

      5) terrain, if applicable;

      6) number of adjoining sectors that require interaction; and

      7) military operations.

Alternatively the table below can be used.

Average sector flight time (in minutes)	Optimum sector capacity value (aircraft count)
3 minutes	5 aircraft
4	7
5	8
6	10
7	12
8	13
9	15
10	17
11	18
12 minutes or more	18

Table 1. Simplified method

APPENDIX E

CAPACITY PLANNING AND ASSESSMENT PROCESS

Note.– This Appendix provides information developed by EUROCONTROL to provide information related to the ATFM capacity and planning assessment process.

1. A performance-driven process

The overriding objective is to develop a capacity assessment process that contributes to the requirement to:

"provide sufficient capacity to accommodate the demand in typical busy hour periods without imposing significant operational, economic or environmental penalties under normal circumstances."

To address this, an annual capacity planning and assessment process, a cyclical process that identifies and quantifies the capacity requirements for the short and medium-term, should be put in place.

To effectively determine future capacity requirements, it is necessary to monitor current capacity performance. The following indicators should be used:

- **Average ATFM Delay per flight**

  The average Air Traffic Flow Management (ATFM) delay per flight is the ratio between the total ATFM delay and the number of flights in a defined area over a defined period of time.

  The ATFM delay is described as the duration between the last take-off time requested by the aircraft operator and the take-off slot allocated by the ATFM function, in relation to an airport (airport delay) or sector (en-route delay) location.

- Effective Capacity

  "Effective capacity" is defined as the traffic volume that the ATM system in the area concerned could handle with one minute per flight average en-route ATFM delay. This capacity indicator is derived from a linear relationship between delay variation and traffic variation.

2. Methodology to Assess Future Capacity Requirements

The objective of a medium term planning and assessment exercise is to provide predictions of the capacity requirement for the ATM system. This can be done in different ways, but preferably through the use of a Future ATM Profile (FAP), a combination of different modelling and analysis tools.

FAP comprises ATFM simulation facilities as well as spreadsheet and macro-based analysis and reporting tools that assesses and quantifies how much capacity is delivered by specific airspace volumes within the current ATM system, and evaluates the current and future capacity requirements, at ACC and sector group level.

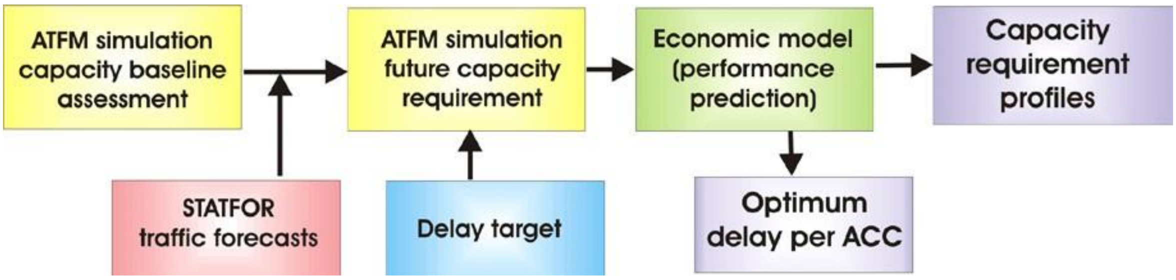
Step 1: In order to provide an accurate prediction of the capacity requirements of the concerned area, it is necessary to know the **current capacity offered.** FAP should establish a **capacity baseline** for each ACC and defined sector group.

Step 2: The next task is to provide a **prediction of the future demand** on each ACC (and defined sector group) over the next 5 years, according to the expected traffic growth and distribution over the future route network.

Step 3: FAP should carry out **an economic analysis**, balancing the cost of capacity provision and the cost of delay, on the assumption that each ACC is operating at or close to its economical optimum, and that the target level of delay has been achieved.

Step 4: FAP should then produce, for each ACC in the area concerned (if more than one) and each of the defined sector groups, a **5 year capacity requirement profile**. Percentage increases with respect to the measured capacity baseline are provided.

Figure 2: Key FAP processes:



3. **Expected Demand on the Future Route Network**

3.1 Medium-term capacity requirements

Medium-term capacity requirements at ACC or sector group level can only be assessed once one have a picture of the expected traffic volume and distribution over the future route network in the area concerned.

The expected demand at ACC or sector group level should be assessed by the FAP tool, from:

- the forecast traffic growth;
- the future route network evolution and traffic distribution, simulated by an airspace modelling tool;
- airport capacity constraints, assessed from information gathered from various sources on current and planned airport capacities.

3.2 Future Route Network Evolution and Traffic Distribution

The capacity requirement for an ACC or sector group is clearly dependent on the distribution of traffic over the network in the area concerned, horizontally and vertically. The demand to be accommodated in the future is determined, taking into account the desire of users to fly the most direct routes and optimum vertical profiles, in the context of the anticipated evolution of the route network.

Changes to the route network and traffic distribution can induce significant changes in terms of the demand (and therefore the required capacity) at individual ACCs, even during periods of reduced traffic growth.

It is assumed that aircraft will follow the shortest routes available on the network between city pairs according to the future route network, on essentially unconstrained vertical profiles. Nevertheless, some existing structural traffic distribution scenarios are retained. There is no 'dispersion' of flights between equivalent routes between city pairs.

Traffic flows respecting these assumptions should be simulated by the appropriate tools, and serve as an input to the FAP simulations. The result of these simulations should be a horizontal and vertical traffic distribution over the future route network, allowing the determination of the unconstrained demand in each ACC.

4. **Cost Data and Economic Modelling**

Capacity has a cost, but insufficient capacity, which in turn generates delay, has an even larger cost. Both capacity and delay costs are borne by airspace users. It is therefore necessary to determine the level of ATC capacity which can be justified from a cost point of view i.e. the optimum trade-off between delay and cost of ATC capacity.

The cost of capacity and the cost of delay are regional parameters depending on:

- total capacity provided
- marginal capacity cost (ATC complexity, price index, equipment, etc)
- total delay generated
- delay sensitivity (network effects, hourly traffic distribution)

- cost per minute of delay (traffic mix)

Consequently, each ACC has its own capacity cost and delay cost curves. These curves interrelate as network effects within the area concerned change according to changes in capacity offered at other ACCs.

The total cost curve (the sum of the delay cost and the capacity cost) determines the optimum cost model capacity for each ACC for the current traffic demand. However, to assess capacity requirements for the future, it is necessary to incorporate the future demand into the model in an updated total cost curve for each ACC.

4.1 Calculation of the Required Capacity Profiles

After the economic analysis or cost optimisation for the future traffic demand is carried out, the final step in the process takes place. FAP carries out another iterative ATFM simulation by increasing capacity at the ACC offering the best Return on Investment (ROI), until the overall delay target is reached.

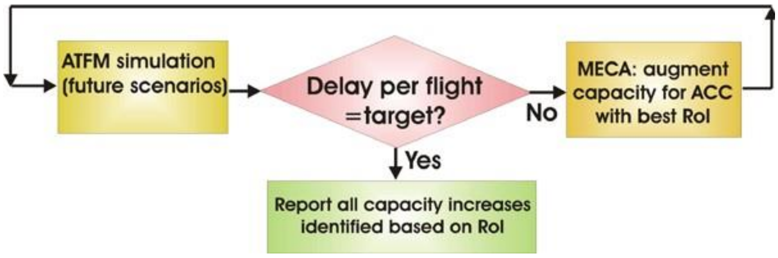


Figure 3: Iterative ATFM network simulations with best ROI to achieve target delay

When the agreed target delay is reached, the capacity target for each ACC is expressed in terms of the capacity increase that was necessary in order for the convergence to be achieved. Simulations are carried out for the final year of the planning cycle and for any year that there are changes to ACC or sector group configurations. Capacity levels are interpolated for intermediate years.

The capacity target level corresponds to the cost optimum delay for the ACC, to meet the overall delay target adopted by the appropriate authority, and represents the ACC capacity required to cover:

- the expected demand, and (if appropriate),
- the current capacity shortfall, i.e., the difference between the optimum capacity and the current capacity (as described in the previous section).

Figure 4 shows an ACC with a capacity surplus (blue), an ACC with a capacity shortfall (red) and an ACC with optimum capacity (green). For the ACC with optimum capacity, the requirement is only to cover the forecast traffic increase. For the ACC with a capacity shortfall, the requirement is to cover both the shortfall and the traffic increase, and for the one with a surplus, the requirement is to achieve the optimum capacity in the medium term, without costly over provision.

If the network delay is close to the target delay, the optimum delay at ACC level is an effective tool to identify areas that still have a capacity gap.

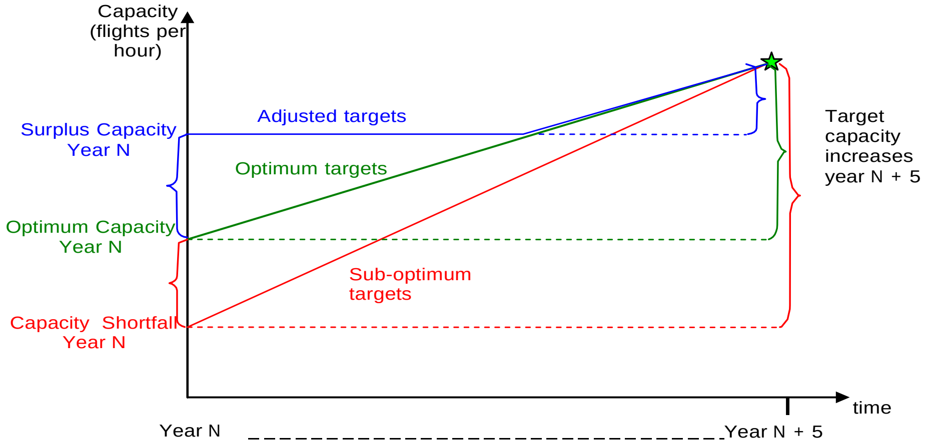


Figure 4: Current v. Target capacity

5. The Capacity Planning Work Programme

5.1 The table below describes the different phases of the annual work programme and lists the required actions and responsibilities.

EVENT	ACTION ATFM Function	ACTION ANSPS
<u>Oct- Dec</u> **Capacity planning meetings for the short- and medium-term**	Provide all relevant data to enable the ANSP to prepare a first draft of the local capacity plan • as data becomes available, and • at least 2 weeks before the meeting	Prepare the draft capacity plan prior to the meeting with capacity enhancement function (CEF) Ensure the participation of both planning and operational staff at the meeting
<u>Nov - Dec</u> **Completion of the capacity plan**	Complete the capacity chapter • by the end of December	Finalize the capacity plan • by the end of November
<u>Nov -Feb</u> **ATFM and capacity report for previous year**	Coordinate and agree with ANSPs the content with respect to the analysis of ACC performance • by end January Finalize report • by end February	Review and agree the ACC performance analysis content provided by ATFM Function • by end January
<u>January</u> **Agreement and development of the medium-term capacity profile scenarios**	Prepare the airspace scenario data for profile calculation following coordination with ANSPs • by end February	Provide ATFM Function with details of configuration changes (planned or proposed) during the 5 year planning cycle for ACCs and requested sector groups • by the end of January

<u>February</u> **Release of short- and medium-term traffic forecasts**	Convene meetings and provide the forum for all relevant information to be included in the short- and medium-term forecast • during the calendar year Provide the new Medium-Term traffic forecast • by the end of February Merge the short- and the medium-term traffic forecasts	To attend the user group meetings and to ensure that all information relevant to the traffic forecast is provided to the ATFM Function • by the end of December
<u>March</u> **Calculation of medium-term capacity profiles (including optimum delay per ACC)**	Calculate the optimum delay for each ACC • by mid March Calculate the capacity requirement profiles for ACCs and requested sector groups • by mid March	To agree the capacity profiles and optimum delay per ACC for use as a basis for the local capacity plan • by end April
<u>March</u> **Calculation of the delay forecast for the coming vacation season and next 2 years**	Make the delay forecast for the coming vacation season and the next 2 years • by mid March	To ensure that the local capacity plan is up-to-date and accurate and to communicate any changes to ATFM Function • before mid February
<u>March</u> **The annual meeting of a capacity planning task force**	Organize the task force meeting, invite contributions, compile the agenda and write the report	To attend the meeting, with the appropriate planning & operational participation and be prepared to share best practice capacity planning
<u>April</u> **Publication of the operations plan for the coming vacation season**	Incorporate the vacation capacity plans into the plans by mid March Release the first version of the vacation plan • by mid March	To ensure that up-to-date capacity information for the coming vacation season is made available, and that any changes are communicated to the ATFM Function for inclusion in the plan • by end February • as they occur, throughout the vacation season
<u>May</u> **Coordination and agreement of medium term capacity profiles**	Coordinate bilaterally with ANSPs and agree the profiles that will be used as the basis for local capacity planning in the medium-term • by end March	

	Present the capacity profiles to the next meeting of the appropriate authorities for approval • May meeting	
<u>June</u> **Publication of the medium-term ATM capacity plan**	Collect and consolidate all the local medium-term capacity plans and complete an analysis of the expected situation at network and local level • by end of April	
<u>July</u> **ACC capacity requirement profiles published**	To release document • by end of July	
<u>Jul - Aug</u> **ACC/sector group capacity baseline assessment period**	Inform ANSPs of the reference dates and request confirmation of data quality • by the end of June	To confirm that fully accurate sector capacity and opening scheme data will be provided to the ATFM Function • 1 week before the reference period
	Calculate the baselines for ACCs and requested sector groups, according to the airspace structure scenarios defined for the capacity profiles • by end August	
	In addition to the baseline assessment, calculate the capacity baselines using appropriate simulation and calculation tools • by end August	To ensure that the sector capacity and opening scheme data is sufficiently accurate for the baseline assessment • two AIRAC cycles before the start of the AIRAC containing the measurement period
<u>Sep - Oct</u> **ACC capacity baselines coordinated with the ANSPs**	Communicate the baseline results to ANSPs on a bilateral basis for discussion and agreement • by mid September	To agree the capacity baselines for the next planning cycle • prior to meeting of the appropriate authorities
	present the agreed ACC baselines to the next meeting of the appropriate authorities • October meeting	

Table1. Actions, Deadlines and Responsibilities

5.2 Capacity Planning Meetings

Once per year, the ATFM Function should visit the majority of ANSPs in the area concerned to collect information on capacity plans for the next five years and the coming vacation season. It is essential to the improvement of ATM capacity at overall network level for each ACC to have a robust capacity planning process and a realistic capacity plan.

ANSP capacity plans for each ACC should be published in a local implementation plan, together with other relevant capacity information (e.g. capacity delivered during the previous vacation season, future capacity requirements, expected performance in the medium term and the current and expected capacity of major airports).

Prior to each meeting, the ATFM Function provides the ANSP with a set of data to enable them to prepare the preliminary capacity plan, tailored to local conditions. The data set should include the following:

- A report and analysis of capacity delivered during the previous vacation season
- The value of the (vacation) capacity baseline indicator for each ACC and requested sector group
- The optimum delay for each ACC, to meet the network target delay
- A set of 5-year ACC capacity requirement profiles for high, low and medium traffic growth (shortest available routes over the future route network) and for the current route network
- Similar capacity requirement profiles for requested sector groups
- Detailed medium-term traffic forecast
- The latest short-term traffic forecast per State
- Short and medium-term delay forecast for each ACC
- Differences in demand between current routes and shortest routes and current routes and cheapest routes scenarios
- Other relevant capacity information

ANSPs prepare a first draft of the capacity plan for the meeting, which is discussed and updated in an interactive session, using appropriate simulation and calculation tools. To facilitate the discussion and ensure a realistic capacity plan, ANSPs should ensure the presence of both planning and operational staff.

The plan should detail the capacity enhancement actions planned each year of the capacity planning cycle, together with a realistic assessment of the contribution of these initiatives to the overall annual capacity increase.

Attachment A: Definitions of terms used in this Appendix

Elementary Sector: Primary component of the airspace structure, one or more of which may be combined to form a sector. In some cases the elementary sector can be the same as the operational sector; in other cases, the elementary sector is never open operationally without being combined with one or more other elementary sectors.

Sector: Primary operational component of the airspace structure that can be considered as an elementary capacity reference of the ATM system. A sector is made up of one or more elementary sectors.

Sector Group: Group of sectors that strongly interact with each other through close and complex coordination, satisfying the agreed concept of operations.

Traffic Volume: Airspace component based on traffic flow that serves as a reference to design the ATC sectors.

Sector capacity: The maximum number of flights that may enter a sector per hour averaged over a sustainable period of time (e.g. 3 hours), to ensure a safe, orderly and efficient traffic flow. Some ANSPs manage sector capacities tactically over a shorter period of time (e.g. 15 minutes). However, for global assessment purposes, the hourly figure is used as standard.

Declared Sector Capacity or Monitoring Value: The value the ANSP declares to the CFMU as the maximum number of flights per hour that can enter a sector before the application of an ATFM regulation becomes necessary. Several values may exist - depending on the ATC environment at the time (airspace, equipment, traffic pattern, staffing, weather etc.). The value can change according to the situation at the ACC.

Declared Traffic Volume Capacity: The capacity for a given period of time for a given traffic volume, as made known by the ANSP to the ATFM Function, so that it can provide the ATFM service. As with Sector Capacity, the value can change depending on the ATC environment at the time at the ACC.

ACC/ Sector Group Capacity: The theoretical maximum number of flights that may enter an ACC or sector group per hour, over a period of time (e.g. 3 hours), without causing excessive workload in any of the sectors. This capacity indicator is used for capacity planning and monitoring purposes and has no operational value. The indicator is calculated mathematically using a validated methodology.

Capacity Baseline: The value of the capacity indicator (see above) for the ACC and defined sector groups

Capacity Profile: The evolution of required capacity over the five-year planning cycle, considering certain assumptions, for a specified volume of airspace (ACC or defined sector group), in terms of absolute demand (flights per hour) and annual percentage increases. These values are published annually and are used as a basis for local capacity planning by ANSPs.

Network Effect: The network effect is the phenomenon where regulations placed on parts of the network affect the demand structure observed in other parts of the network. Network effects range from simple interactions of cause and effect, to more complex interactions between groups of sectors, where causes are repeatedly re-triggered by effects, involving several oscillations before a stable equilibrium is reached. Affected sectors could be adjacent, in the same region, or distant sectors located on the far side of the ECAC zone.

APPENDIX F

PLANNING PROCESS FOR ATFM IMPLEMENTATION

1. Initial Planning Steps

1.1 The first step is to conduct an ATM system review to understand the basic systems and to collect critical data. Terminal airspace analysis should include a terrain and environmental (including noise abatement) assessment as part of the review. At a minimum, the review should ensure that there is feedback from:

- aerodrome operators (including adjacent aerodromes);
- airspace users (including military agencies);
- ATS units;
- instrument flight procedure design organizations; and
- meteorological offices.

1.2 The following eight phases should be considered for the review and initial planning:

1. Briefings for senior decision-makers on the scope, objectives, and expected deliverables of the project.
2. Review Planning – preparation of questionnaires, timetable, personnel and resources required.
3. Specialist familiarization visits, interviews and data collection, which includes:
    - capacity assessment;
    - ATS communication and surveillance capabilities;
    - barriers to optimal use of available capacity;
    - possible capacity enhancements and costs of those enhancements; and
    - future changes that may affect the ATM system with regard to capacity.
4. Completion of current system review and analysis of options.
5. Stakeholder consultation of draft recommendations.
6. Analysis of stakeholder feedback and draft report preparation.
7. Stakeholder agreement.
8. Report for senior decision-makers.

2. Planning for Implementation

2.1 The decision to implement ATFM can be for en-route operations, or for a specific aerodrome and/or the terminal control area serving that aerodrome, or for all flight phases within a specific volume of airspace, as appropriate.

2.2 The following six phases need to be considered during ATFM implementation:

1. Consideration and procurement of ATFM facilities and tools.
2. Procedure development.
3. Training needs analysis.
4. Training development.
5. Initial ATFM implementation.
6. Review and measurement of outcomes.

2.3 The implementation of tactical ATFM capability can involve optimization of processes and the establishment of practices supporting ATFM at this operational phase such as:

- Airspace and ATS route re-design;
- Instrument flight procedure re-design;
    - Segregation of all SIDs from all STARs;
    - Simplification of SIDs and STARs.
- Establishment of agreed acceptance rates;

- Amendment of holding patterns to allow continuous descent operations (CDO) if possible and an orderly flow to the Initial Approach Fix (IAF) or TMA “gate”;
- Establishment of agreed flow “gates”;
  - Repositioning feeder fixes at uniform distances from the aerodrome.
- Prioritization of landing aircraft;
- Determination and industry notification of any periods where carriage of additional fuel for traffic delays is required;
- Establishment of flow coordination agreements between ACC and ATFM units when necessary;
- Training organization and simulation for ATFM;
- Enhancement of ATFM related knowledge, skills and procedures, for ATC personnel including:
    - use of standard phrases for delaying action (ICAO Doc 4444);
    - early advice to pilots of expected delays;
    - absorbing delays in the cruise if and where possible;
    - maximizing the use of speed control to achieve delays;
    - optimization of separation minima;
    - use of vectoring to:
      - Increase track miles to adjust time;
      - Meet set course times or Required Time of Arrival (RTA) if the aircraft does not have this internal capability;
      - Continuous descent during vectoring.
  - development of ATC skills in vectoring and holding for efficient sequencing;
  - any holding and vectoring for delay to be conducted outside congested terminal airspace;
  - terminal operations (re-sequencing missed approaches, speed control within terminal airspace, wind monitoring and runway change procedures, non-normal events such as short notice runway closure, rejected approaches);
  - aerodrome operations (wind monitoring, runway change procedures, non-normal events); and
  - use of new ATFM tools and terminologies.
- Development of any required additional competency measurements for inclusion in local ATC performance assessment tools;
- Enhancement of communication systems related to ATFM and CDM;
- ATM system adaptation changes; and,
- Industry engagement in ATFM policy decisions.

2.4 Definition of responsibilities

2.4.1 In establishing ATFM each stakeholder have specific responsibilities:

- Directorate-General of Civil Aviation
  - Authorization, regulation and oversight of the ATFM Plan.
- ANSP Headquarters (Programme Sponsor):
  - Agreement on objectives;
  - Providing progress briefings within HQ and to the DGCA;
  - Coordination with ATC managers;
  - Approval of procedure changes, training plans and competency criteria changes; and
  - Review of outcomes.
- ATS unit management
  - Management oversight and local sponsorship of the plan;
  - Provision of progress briefings and reporting to Program Sponsor;
  - Allocation of specialist staff;
  - Local review and approval of proposed procedure changes, training plans and competency criteria changes;
  - Local implementation of agreed ATFM Procedures;
  - Review of outcomes;
  - Quality Assurance/Safety Management Specialist;

- Oversight En-route ATC aspects of the ATFM plan;
  - Ensure proposals comply with safety regulations; and
  - Inter-unit coordination agreements (as amended by the ATFM plan).
- Training Specialist
  - Training needs analysis and training development;
  - Development of specific competency criteria;
  - Close coordination and cooperation with ATS unit specialists;
  - Provision of expert information and advice on the current operating environment and control practices;
  - Data gathering activities;
  - Procedure recommendations;
  - Advice on training needs analysis and training development; and
  - Review of outcomes.

2.5 In order to determine a safe, orderly and ATC achievable per-hour arrival rate to each runway the following information must be considered for the training needs analysis:

- Radar separation standards.
- Wake turbulence separation standards.
- Visual separation by tower.
- Number of required departures per hour.
- Runway Occupancy time.
- Language and other airline-specific issues.

2.6 As a guide, the following underpinning knowledge and practical skills should be included in ATFM related competency assessment:

- Aircraft performance.
- Aircraft speed data.
  - holding pattern requirements
  - descent speed limitations
- Establishing a sequence.
- Coordinating the sequence.
- Changing the sequence.
- Vectoring for sequencing.
- Holding for sequencing.
- Application of available separation standards.
- Use of standard phraseologies.

3. **Structure**

3.1 The planned ATFM unit may be composed of Flow Management Units and Positions such as:

- Strategic management unit;
- Pre-Tactical Management Unit;
- Tactical Management Unit;
- Capacity Unit;
- Operability Monitoring Unit;
- Coordination and Decision Unit; and
- Flow Management Positions (established in the Area Control Centres and also in the Approach Control in the area of responsibility of the unit.

3.2 Duties

ATFM unit:

Strategic management unit – it is the duty of the strategic management unit to analyze, with at least more than one prior to the day of operation, the behavior of the demand and the volume of airspace, identifying situations of imbalance between demand and capacity, taking into consideration only scheduled flights and an estimation of general aviation flights, and planning the SLOT distribution at airports and volumes of airspace that present congestion and saturation scenarios.

Pre-tactical management unit – it is the duty of the pre-tactical management unit to update the plan set in the strategic management unit with more accurate information on the evolution of capacity and flight intentions (demand), taking into account the meteorological data, infrastructure, special events, etc. Usually, this update is carried out within a period of one day prior to day of the flight until the beginning of the tactical operation. And, during this time:

- Some traffic flows can be redirected;
- Less congested routes can be coordinated;
- Tactical measures will be decided; and
- The details of the ATFM planning for the next day will be disseminated to all concerned.

The evolution of the capacity and flight intentions request a growing volume of CDM interactions, involving, gradually, levels of decision making closer to the operation. The information to be processed in the pre-tactical management unit are the RPL, the FPL, the operations observed in the correlate days of the previous weeks, weather forecasts, inoperability due to scheduled or corrective maintenance, and other updated data that can contribute to the evaluation of the strategic planning. In this unit, measures are defined, for tactical application, with the purpose of mitigating possible impacts in case the scenarios provided above are confirmed.

Tactical Management Unit – Considering that the previous units provided an updated planning of the operations that will take place in the aerodromes and airspace, the duty of the tactical management unit is to track the occurrence of unexpected factors that may affect the capacity and/or demand, applying and monitoring the measures that will mitigate the impacts on the flow.

When the traffic demand exceeds, or is expected to exceed, the capacity of a particular volume of airspace or aerodrome, the unit shall inform the flow management position of the ATS unit concerned and other responsible ATS units. The airspace users who planned to fly in the affected area should be informed, as soon as possible, about the restrictions that will be applied.

In this unit, it also takes place a detailed monitoring of the weather, equipment and/or systems inoperability, and any other factors affecting capacity. At the same time, the demand must be permanently examined, observing the incoming of ATS messages. The proposed air traffic flow management measures should be evaluated within a CDM environment and, once set, disseminated to all interested parties. From then on, the established measures are continuously monitored and adjusted until their cancellation. All actions carried out in the tactical management unit must be registered and consolidated in a daily management report in order to support a quality evaluation of the services provided, creating indicators for the airspace and airport infrastructure planning.

Capacity Unit – It is the duty of the capacity unit to calculate the values for ATC capacity, according to the recommended methodology, as well as to evaluate those values periodically.

Operability Monitoring Unit – It is the duty of the operability monitoring unit to:

- Compile all information on the operational status of the elements that affect the air traffic flow, keeping other units informed about degradations;

- Generate operational reliability indexes of the elements that support the airport, terminal control area and enroute operations;

- Establish the operational priority for the maintenance and restoration of the degraded, inoperative or unavailable technical elements; and

- Monitor the actions carried out by maintenance, aiming at predicting the date and time normality is restored.

Coordination and Decision Unit – It is the duty of the coordination and decision unit to support CDM and the necessary coordination between airspace users, airport operators and civil and military aviation authorities. It is, usually, equipped with teleconference equipment; and

Flow Management Positions - It is the responsibility of the flow management positions (FMP) to:

- Inform, immediately, to the ATFM unit to which they are related to all changes on the infrastructure supporting airport, terminal control area and enroute operations that may generate an impact on the system (unavailability and/or restriction of aids, communication systems, radars, visualization and data processing systems, changes on procedures that affect the TMAs or FIRs, meteorological conditions, airport infrastructure unavailability, etc.);
- Coordinate with the ATFM unit, whenever deemed necessary, the adoption of ATFM measures in a given location or volume of airspace;
- Develop, monitor and analyze, together with the ATFM unit, ATFM measures, procedures and initiatives that are specific to their area of responsibility;
- Keep a complete record of all ATFM measures and procedures used, including description, start and end times, units involved and reasons;
- Develop, together with the FMP of adjacent units or with the APP supervisors and in coordination with the ATFM unit, strategies for arrival and departure of aircraft in order to balance demand and capacity for each aerodrome;
- Inform the ATFM unit on any use of air traffic flow control by the ATS units and monitor the impacts until its cancelation;
- Propose to the ATFM unit the cancelation of the ATFM measures when they are no longer necessary;
- Coordinate with the local airport administration in order to minimize the impact of blockages as regards the runways, taxiways, parking lots and others aerodrome facilities;
- Notify the units involved on ATFM measures; and
- In addition to the duties set forth in the preceding paragraphs, the FMP installed on ATS units must have knowledge of the procedures contained in the operational documentation pertinent to the unit, with the aim of supporting supervisors on duty in special situations that may arise.

OPERATIONAL REQUIREMENTS

For the implementation of its activities, the ATFM unit should have:

- Means (system or process) to monitor the functioning of all systems and equipment which are requisite for air navigation and air traffic management;
- Immediate access to all information made available by the aeronautical information management (AIM) units;
- Detailed meteorological information, including systems for reproducing images originating from weather satellites and/or meteorological radars;
- A database with appropriate coverage, reliability, consistency and integrity to carry out its activities. This database should contain, among other things, information about:
  - airports;
  - ATC capacity;
  - air traffic demand;
  - airspace structure;
  - navigation aids; and
  - statistics on the use of airports and volumes of airspace.
- Access to regular flight schedules and estimates of non-scheduled flights, looking towards the strategic and pre-tactical planning of air traffic flow management;

- Access to all flight plan messages and messages correlated for the tactical operation;
- Radar information, when available, with coverage of its respective area of responsibility and equipped with selection and filtering resources;
- Automated resources needed for performing its activities, particularly for the general knowledge of the whole system status, decision support, effectiveness evaluation of specific measures and performance indicators. Among others, it is recommended to automate the processes of:
  - data gathering, analysis and distribution;
  - data base maintenance;
  - demand evaluation;
  - sequencing of en route traffic aiming at and within terminal control area;
  - departure sequencing;
  - slot allocation; and
  - proposal of alternative routes.
- Means of voice and data communications required for systemic functional relations. The means of voice and data communications should include teleconference with, among others, the following units and/or users:
  - main airlines;
  - main ATS units;
  - flow management positions;
  - bodies related to aeronautical meteorology; and
  - military users.
- Qualified, experienced and, depending on the job, duly authorized staff to perform its activities;
- A situation room, specially equipped to serve as a place for contingency and crisis management, special operations and severe deterioration;
- Facilities devoted to the simulation, revisualization of events and training of its operations, and
- Charts of the airspace and airport structure.

Note – The FMP, depending on the implementation strategy of the ATFM service, should have the same requirements above, in smaller proportions in order to serve only the area of responsibility corresponding to the ATS unity they support.

OPERATIONAL CRITERIA

Moreover, for carrying out the Air Traffic Flow Management service, the ATFM unit and/or FMP should consider the following:

- The restoration of the technical means, after occasional inoperability, will take place according to the priorities established by the ATFM unit/FMP, based on the impact on the system capacity. In this activity, it should be given due consideration to the issues regarding the civil-military integration of the system;
- The use of airspaces reserved or under restrictions by other interested parties will be permitted only upon express manifestation of the ATFM unit/FMP following established procedures;
- The necessary measures to solve preventively the occurrence of saturation and congestion of volumes of airspace should be established collaboratively by ATS supervisors, involved airspace users and ATFM unit/FMP. In the absence of an agreement, the ATFM unit/FMP will arbitrate the measures it deems most appropriate, according to established procedures;
- The automation of the processes inherent to the ATFM unit/FMP should consider human factors. The architecture of the automated processes should consider the best relationship between the remote processing of data and the communications means;
- The requirement of experience in the selection of human resources for the ATFM unit/FMP should be understood as experience in ATS units in charge of areas of significant air traffic density;

- The ATFM unit/FMP will ensure continuity of the civil-military cooperation and optimal utilization of existing resources; and
- The determination of capacity values will be effected according to specific methodology and parameters, validation of results and periodic assessment.

-END-

TELE-CONFERENCE FORM (v1.0)

1. STATE:	

2. REPRESENTATIVE:	

3. DATE/UTC TIME:	

4. AERODROME 1:	

4.1	Without delay	
	With delay	

Time:

4.1.1 Aerodrome characteristics:

a. RWY:	

NOTAM Nº

b. Nav. Aids:	

NOTAM Nº

c. Impact	

d. Works under development	

4.1.2 Meteorology

Phenomena:

FORMULARIO DE INTERCAMBIO DE DATOS ENTRE UNIDADES ATFM

DATA EXCHANGE FORM AMONG ATFM UNITS

Impacto en la Unidad ATFM (nombre) / Impacts on ATFM Unit (name)

Fecha/Date:	**Responsables/Responsible**	1) Jose + (*name of ATFM unit*) / (nombre de la unidad ATFM)
		2) Carlos + (*name of ATFM unit*) / (nombre de la unidad ATFM)

Aeropuertos/Airports [*name + (IATA code)*]	**Impacto/Impact**	**Observaciones/Remarks**
Lima (LIM)	Yes ( )	NIL
La Paz (LPB)	Yes (X)	ISOLD TS/SH TODAY & TOMORROW
…	Yes ( )	…

Observaciones / Observations

NIL

Después de llenar el formulario, enviar para el correo siguiente: xxx@xxx
After fill the form, send it to the following email address: xxx@xxx

Guía para el Formulario de intercambio de datos entre Unidades ATFM /

Guidance for the data Exchange form among ATFM Units

Saludos e introducción / Greetings and introductions

18:00 UTC TELCON planificada / planning TELCON

Período de Tiempo considerado desde 20:00 UTC a 20:00 UTC (período de 24-horas para iniciar) / Covering timeframe from 20:00 UTC to 20:00 UTC (24-hour period, to start)

Productos meteorológicos comunes / Common Weather Products

http://www.redemet.aer.mil.br/img_sat/img_sat.php?ID_REDEMET=njnvvoklfs0p8p0s6ln2flg8e4

1- Sudamérica [fecha del *briefing*] 18:30 (UTC); / South America [date] 18:30 (UTC);
2- Sudamérica Realzada [fecha del *briefing*] 18:30 (UTC); y / South America highlighted [date] 18:30 (UTC); y
3- Sudamérica Visible [fecha del *briefing*] 18:30 (UTC). / South America visible [date] 18:30 (UTC)

Discusión de planificación - trabajo de los flujos principales / Planning discussion – Work from main flows

Condiciones meteorológicas y atmosféricas significativas / Significant weather and atmospheric conditions

Actividad de tormenta / Thunderstorm activity

Turbulencia / Turbulence

Nubes de ceniza volcánica / Volcanic ash clouds

Discusión del área terminal / Terminal Area discussion

Para aeródromos seleccionados definido por los Estados. / For selected aerodromes: Definido por los Estados

Tasa de aceptación de aeródromo (AAR) – utilizaremos la capacidad del aeródromo (llegadas + salidas)

Aerodrome Acceptance Rate (AAR) – We are going to use Aerodrome capacity (arrivals + departures)

Demanda proyectada en el área terminal / Projected terminal area demand

Restricciones del aeródromo tal como proyectos de construcciones o inoperabilidad de NAVAIDs / Aerodrome constraints, such as constructions projects or NAVAID outages

Iniciativas de gestión de tránsito aéreo anticipadas / Anticipated traffic management initiatives

Millas in-trail expandidas / Expanded miles-in-trail

Posibles esperas en los despegues / Potential airborne holdings

Posibles “ground stops” /Potential ground stops

<u>Discusión de operaciones en ruta / En-route discussion</u>

Restricciones de operaciones en ruta tales como interrupciones en frecuencias o NAVAIDS / En-route constraints, such as frequency outages or NAVAID outages

Discusión de operaciones en ruta y problemas relacionados/ Route discussion and issues

Iniciativas de gestión de tránsito aéreo anticipadas / Anticipated traffic management initiatives

Millas in-trail expandidas / Expanded miles-in-trail

Posibles esperas en los despegues / Potential airborne holdings

<u>Adiciones al plan, incluyendo cualquier actualización táctica / Additions to the plan, including any pertinent tactical updates</u>

<u>Información de la parte interesada, comentarios y preguntas / Stakeholder input, comments and questions</u>

<u>Siguiente TELCON planificada - Next Planning TELCON</u> – XX:XX UTC

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

6.1 Under this agenda item, the following papers were analysed:

a) WP/09 – *Follow-up to the implementation of the REDDIG II* (presented by the Secretariat);
b) WP/19 – *ANSP access to SITA data link via REDDIG* (presented by SITA);
c) WP/10 – *Follow-up to the implementation of the RAIM availability prediction service* (presented by the Secretariat);
d) WP/22- *Operational use of the RAIM prediction service using the SATDIS tool* (presented by Venezuela);
e) WP/20- *Status of the low-latitude ionosphere threat model for GBAS* (presented by Brazil);
f) WP/11 – *Follow-up to the activities under Project D2 –Ground-ground and ground-air ATN applications* (presented by the Secretariat);
g) WP/21- *AMHS interconnection* (presented by Brazil);
h) IP/03- *Action plan for improving communication, navigation, and surveillance systems to meet short- and medium-term operational requirements for en-route and terminal area operations* (presented by Argentina);
i) IP/08 – *Implementation of new CNS systems in the Asunción FIR*, (presented by Paraguay); and
j) IP/11- *Communications between boarder adjacent centres* (presented by Brazil).

6.2 The aforementioned working papers covered the following topics:

- Activities carried out under the SAM ATN Architecture Project, D1
- Activities carried out under the ground-ground and air-ground ATN applications project, D2
- RAIM prediction service
- GBAS
- CNS improvement action plans

Activities carried out under the ATN Architecture Project - D1

Progress in the implementation of the REDDIG II

6.3 The Meeting was informed that the new REDDIG II digital network would be the first regional digital network in the world to transport aeronautical voice and data services, using a mixed satellite/ground network totally based on the IP protocol. The main equipment units of the REDDIG II satellite network are the CISCO 2900 routers, the SKYWAN IDU 7000 satellite modems, which will act as masters (Manaus and Ezeiza), and the SKYWAN IDU 1070 modems in the remaining REDDIG II nodes, which will act as slaves. The ground network will be a fibre optics network based on the MPLS protocol. Access to ground network services is through the CISCO 1921 router. Each node has an access capacity of 256k bits/sec.

6.4 The Meeting took note that, in preparation for the effective implementation of the REDDIG II:

a) In-factory training (FT) was provided from 21 April to 9 May this year for staff of the Manaus and Ezeiza NCCs and for the network administrator.

b) Factory acceptance tests (FAT) were conducted on 12-16 May this year, with the participation of four (4) representatives of the States and two (2) representatives of the Project Management. The group accepted the FAT with some observations, which shall be resolved prior to the PSAT.

c) The third Technical/Operational Meeting was held in Bogota, Colombia, on 28-29 July this year, generating important conclusions for all focal points.

d) Following the aforementioned meeting, an Introductory Course to the REDDIG II was conducted on 29 July-1 August, also in Bogota, Colombia, with a view to providing basic theoretical-practical knowledge on IP devices to the delegates designated to participate in the theoretical-practical course on the REDDIG II to be held in Rio.

e) The four phases and two rounds of the theoretical-practical course were completed on 11 to 22 August (1st round) and on 25 August to 5 September (2nd round) in Rio.

f) In order to coordinate customs clearance with focal points, periodic teleconferences are being held since 1 October to share details about each local clearance process and to learn about MPLS last mile implementations by Level 3.

6.5 More information on the aforementioned activities can be found in WP/09 and in the website of project RLA/03/901 www1.lima.icao.int/reddig.

6.6 Upon analysing the activities carried out for the implementation of the REDDIG II, the Meeting took note that most of the personnel that had received training in the REDDIG courses had no experience with IP technology and probably did not take full advantage of training in router programming, with many participants having difficulties with it, despite being the most important part of the REDDIG II.

6.7 In this regard, the Meeting considered that this was mainly due to lack of basic knowledge of IP networks, thus the importance for every individual to be designated for REDDIG II maintenance and operation to have basic knowledge of IP networks and CISCO routers and switches.

6.8 Taking into account that basic courses on CISCO networks, routers and switches are conducted in practically all REDDIG II member States, the Meeting considered that aeronautical administrations should provide these training courses to all their technical personnel in charge of maintenance and operation of communication systems, since IP networks and devices exist everywhere nowadays.

6.9 The Meeting also noted that the Fifteenth Meeting of the REDDIG II Coordination Committee (RCC/15) to be held in March 2015 would analyse the possibility of approving the conduction of a basic course on CISCO IP routers and switches. A model of the required course was presented as Appendix E to working paper SAMIG/14-WP/09. In this regard, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-12 Requirement for a basic course on CISCO routers and switches for personnel in charge of REDDIG II maintenance and operation

That the Fifteenth Meeting of the REDDIG Coordination Committee, to be held in Lima, in March 2015 consider approving the conduction of a basic course on CISCO IP routers and switches, the content of which is presented in **Appendix A** to this agenda item.

6.10 The Meeting was informed that the operational installation of the REDDIG II was to be completed by the third week of January 2015 and the provisional acceptance testing of nodes (PSAT) by REDDIG II focal points, by the last week of January 2015. The operational installation and the PSATs were foreseen for November 2014, but equipment delivery by the company was delayed two months due to customs problems in France.

6.11 Almost all REDDIG member States have been able to clear customs in a short period of time (many in one week) with a view to installing the REDDIG II before the end of 2014. But since some States will be completing customs clearance by the end of November 2014 and given the delays in the implementation of the last mile link to the ground network by Level 3, the operational installation and PSAT would take place by the end of January 2015.

New MEVA REDDIG interconnection

6.12 The Meeting took note of the activities for the implementation of the new MEVA III satellite network. In this sense, it was noted that MEVA III was foreseen to start operations by the end of the first quarter of 2015 and the new provider would be COMSOFT. In this regard, the REDDIG administration, together with the ICAO technical cooperation section in Montreal, prepared a new contract (22501528) for the provision of services between REDDIG II and MEVA III. The new contract would have an initial duration of five years. The costs were practically the same as in the current MEVA II REDDIG interconnection contract (22500187), which will remain in force until March 2015.

Renewal of the INTELSAT space segment lease contract

6.13 The Meeting noted that REDDIG II uses the same space segment as REDDIG I. Taking into account that the lease contract with INTELSAT ends at the end of 2014, the REDDIG Administration, through the ICAO technical cooperation section, renewed the contract for an additional period of 4 years, at the same annual cost.

Implementation of domestic IP networks

6.14 The implementation of domestic IP networks is a regional implementation priority since, according to the Bogota Declaration, 80% of the States of the Region should have installed IP networks by 2016. In this regard, the Meeting was reminded of the need to follow the *Guide for the implementation of national digital IP networks in support of current and future aeronautical applications.* Although it was recognised that, with the implementation of AMHS, most States of the Region have improved their communication links, increased their bandwidth, and established the IP protocol in their links, it is extremely important that all IP-based aeronautical services be implemented on the same network rather than on different ones. The guide can be downloaded from the following website: http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS.

Communications between adjacent border centres

6.15 The Meeting analysed the problem of speech communications between adjacent border control towers, whether from different TMAs or from the same one. In this regard, it was recognised that there was a broad variety of communication media between them (VHF, private telephony links, radio links, satellite links of up to 3 hops end-to-end), with the various problems that entails.

6.16 Following an in-depth analysis of the proposal contained in SAM/IG/14-IP/11, the Meeting agreed that:

a) SAM States should report the existing ATS speech circuits between adjacent control towers, the means of communication used for this service, and measures being taken (or foreseen to be taken) for enhancing them. The information should be sent to the South American Regional Office by 15 December 2014.

b) An expert of the Region should conduct a study of safe and low-cost means of communication that could be used to support the aforementioned speech circuits and submit it to the SAM/IG/15 meeting.

c) The SAM/IG/15 meeting should review the aforementioned study and if the implementation is approved, analyse the feasibility of applying technical cooperation mechanisms for such implementation.

Follow-up to activities under Project D2 – ATN ground-ground and air-ground applications

Follow-up to the operational interconnection of AMHS systems

6.17 The Meeting took note that, in addition to the existing operational interconnections (Peru – Colombia, Peru – Ecuador, Argentina – Paraguay), the greatest progress had been achieved in the following interconnections:

- *Brazil – Spain*: significant progress was made in the trials, which will be completed (as scheduled) this week (10-14 November 2014). A list of procedures (aligned with the respective AMHS interconnection guide) was used for the trials, which the Meeting adopted for all the remaining pre-operational trials, as shown in **Appendix B** to this agenda item.
- *Brazil – Peru*: they will be resumed on the week starting next 17 November.
- *Brazil – Argentina*: once Brazil-Peru trials are completed, these will restart (tentatively on 24 November this year) with the systems in operation.
- *Peru – Argentina*: after the necessary exchange of information, these trials will begin the following week (starting 1 December 2014).
- *Brazil – Paraguay*: will start once Brazil-Argentina trials have been completed.

6.18 Finally, note was taken of the remaining AMHS interconnections, as foreseen and presented in **Appendix C** to this agenda item, which had been previously coordinated and are fully aligned with the Bogota Declaration.

6.19 The Meeting considered that, for the remaining AMHS interconnection trials, the list of procedures contained in Appendix B to this agenda item would be used, and formulated the following conclusion:

Conclusion SAM/IG/14-13 AMHS interconnection trial procedures

That SAM States, when conducting AMHS interconnection trials, use as a reference the list of procedures aligned with the SAM AMHS interconnection guide shown in **Appendix B** to this agenda item.

Operational integration of international AIDC connections in the SAM Region

6.20 This issue will be addressed in detail under Agenda Item 7.

Ground-air data link applications

ANSP access to SITA data link via REDDIG

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

6.22 Use of REDDIG by the ANSPs (air navigation service providers) to access the SITA ACARS service, as proposed by SITA, would replace the current access to the ground network provided by SITA and would generate the following benefits:

- ANSPs would benefit from using an extremely safe and reliable network designed for ATC purposes, to access the data link service that is increasingly important in ATC operations.
- REDDIG would give added value to ANSPs, since they would not have to pay SITA for the current access links from the ground network provided by SITA to SITA's ACARS service.
- The transition of ANSPs from the current links provided by SITA to the REDDIG IP links would not require any changes to ANSP system interfaces.

6.23 Likewise, the following must be taken into account when considering accepting the proposal:

- The deployment by SITA to meet DECEA requirement of an ACARS processor in Brazil implies access to an ACARS processor via REDDIG through the Recife node.
- Subject to the specific terms and conditions to be established with the SAM Regional Office, the other ANSPs with access to the REDDIG could use the Recife access point of the REDDIG to communicate with the ACARS processor at regional level.
- SITA will give backup to any ANSP that wishes to try the REDDIG to access the ACARS service, and will work with the REDDIG service provider to establish such access, without losing sight of all the requirements of the two networks.
- SITA is ready to prepare and provide the South American States and the ICAO Regional Office a traffic analysis to define the proper dimensions to meet current and projected traffic loads, and to make sure that projected traffic will not overload the REDDIG.
- To achieve this, SITA recommends that all ANSPs provide the ICAO Office with their current and future ACARS traffic estimates for planning purposes.

6.24 In view of the above, the Meeting requested SITA to present the aforementioned information at the next coordination committee meeting of Project RLA/03/901 to be held in Lima, Peru, on 2-4 March 2015. In this regard, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-14 Implementation of the SITA data link service through the REDDIG II

That SITA provides to the Fifteenth meeting of the Coordination Committee of Project RLA/03/901 (RCC/15) to be held in Lima, Peru, on 2-4 March 2015, detailed technical information on bandwidth requirements for each of the States of the Region that use SITA data link, and on the costs that the States of the Region currently pay through the SITA communication network, so that the RCC/15 meeting may analyse the feasibility of using the REDDIG to transport the data links to SITA data processors in Brazil through the Recife node.

Action plan for the implementation of ground-air data link

6.25 Regarding activities related to ground-air data link implementation, the Meeting took note that Uruguay had already implemented the CPDLC and ADS-C service in its oceanic FIR through the SITA service provider. This is in addition to those already existing in the Cayenne ACC, Atlantic ACC, Ezeiza ACC, Comodoro Rivadavia ACC, and Lima ACC, all through SITA. Other SAM States that have an oceanic FIR and have not yet installed CPDLC and ADS-C are urged to begin studies for the implementation of these services.

6.26 The Meeting took note of, and endorsed, the timetable of activities for ground-air data link implementation, in alignment with the Regional Performance-based Implementation Plan (PBIP). The timetable of activities appears in **Appendix D** to this agenda item.

6.27 The Meeting reminded the States that, in support of ground-air data link implementation they should use the guide for the implementation of ground-air data link developed in the SAM Region under Project RLA/06/901. The document is available in the following website: http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=CNS).

Implementation of a RAIM availability prediction tool in the SAM Region

6.28 The Meeting took note/recognised that:

a) On 30 May 2014, the ICAO Technical Cooperation Bureau signed Contract 22501411 with DWI.

b) On 16 June this year, the company submitted the project document (SDD).

c) The focal points designated by the States will be responsible for managing the prediction service at national level, and for assigning website access codes.

d) The format of the RAIM availability prediction service website, the logo that will identify the service and the name of the website were defined. These activities were communicated to, and reviewed by, project member States through the exchange of electronic messages with focal points for service monitoring purposes, and a web-based teleconference attended by the service provider, DWI, on 11 June 2014.

e) Provisional factory acceptance trials were conducted on 13-15 August 2014, with the participation of one representative of a member State of RLA/06/901 (Uruguay) and one ICAO representative from the SAM Regional Office. Acceptance was granted with comments (see Appendix D to working paper SAM/IG/14-WP/10).

f) Two remote web-based courses were conducted on 15-16 September 2014, one in English and the other in Spanish, basically to explain the operation of the tools posted on the SAM RAIM availability prediction service (SATDIS) website, the code assignment procedure, data import and export, and the query and failure response procedure. The course was attended by all focal points and other participants designated by the States.

g) All focal points received from the service provider their user name and the respective password to access SATDIS as administrators.

h) The SATDIS website started operating in three languages (Spanish, Portuguese and English) on 17 September 2014 for the prediction of en-route operations, with waypoint data still to be delivered by the provider; meantime, it can be inserted manually.

i) The SATDIS final acceptance test (FSAT) will take place on 18 November this year.

j) Likewise, in WP/22, Venezuela proposed that the RAIM availability prediction service be implemented in two phases: a first phase for free dissemination from 15 December 2014 to 15 October 2015, and a second phase to be analysed by the SAM/IG/16 meeting, which will define whether or not the prediction service will continue to have free access.

6.29 Regarding the use of RAIM availability prediction, the Meeting formulated the following conclusion:

Conclusion SAM IG/14-15 Use of the RAIM availability prediction service

That the operational implementation of the RAIM prediction service be carried out in two stages: a first stage of free dissemination from 15 December 2014 to 15 October 2015, and a second phase, to be analysed at the SAM/IG/16, to define whether or not the prediction service will continue to have free access.

Status of the low-latitude ionosphere threat model for GBAS

6.30 The Meeting acknowledged the efforts made by Brazil for the implementation of GBAS, and noted the usefulness of ionosphere threat models in medium and low latitudes.

6.31 Likewise, there was consensus on the need to conduct a seminar/workshop during the second semester of 2015, as a regional cooperation measure to assist States in GBAS implementation. Brazil and the FAA would support the conduction of the seminar/workshop.

6.32 In this sense, the Meeting considered the support of Project RLA/06/901 through the assignment of one scholarship for each member State, and coverage of simultaneous translation costs during the seminar/workshop. The RCC/8 meeting will analyse the approval.

Action plans for CNS improvement

6.33 Regarding document "*Action plan for CNS systems improvement in the short- and medium-term in order to meet operational requirements for en-route and terminal area operations*", the Meeting was reminded of the need to keep current the national action plans submitted by the States and posted on the website of the Regional Office, particularly the national IP networks.

6.34 The Meeting took note of the action plan for communication, navigation and surveillance systems to meet short- and medium-term operational requirements for en-route and terminal area operations in Argentina, and commended Argentina for the work done. The Meeting also took note of the CNS improvement plan of Paraguay. In this regard, the Meeting invited Paraguay to amend the CNS improvement action plan with the information submitted.

6.35 In this regard, and taking into account that this database has become a basic planning tool, those States that had not done it yet were urged to update them in time for their submission at the SAM/IG/15 meeting.

APPENDIX A

CCNA Routing and Switching

Basic CISCO Curse

CCNA Routing and Switching

At-A-Glance

The Cisco Networking Academy® CCNA Routing and Switching curriculum is designed for students who are seeking entry-level ICT jobs or plan to pursue more specialized ICT skills.

CCNA Routing and Switching provides comprehensive coverage of networking topics, from fundamentals to advanced applications and services, with opportunities for hands-on practical experience and career skills development.

Cisco Certifications

Students will be prepared to take the Cisco CCENT® certification exam after completing a set of two courses and the CCNA® Routing and Switching certification exam after completing a set of four courses.

Features and Benefits

The CCNA Routing and Switching curriculum offers the following features and benefits:

- Students learn the basics of routing, switching, and advanced technologies to prepare for the CCENT and CCNA certification exams, networking related degree programs, and entry-level careers.
- The language used to describe networking concepts is designed to be easily understood by learners at all levels and embedded interactive activities help reinforce comprehension.
- Courses emphasize critical thinking, problem solving, collaboration, and the practical application of skills.
- Multimedia learning tools, including videos, games, and quizzes, address a variety of learning styles and promote increased knowledge retention.
- Hands-on labs and Cisco® Packet Tracer simulation-based learning activities help students develop critical thinking and complex problem solving skills.
- Embedded assessments provide immediate feedback to support the evaluation of knowledge and acquired skills.

Course Description

CCNA Routing and Switching teaches comprehensive networking concepts, from network applications to the protocols and services provided to those applications by the lower layers of the network. Students will progress from basic networking to more complex enterprise and theoretical networking models later in the curriculum.

There are four courses in the recommended sequence:

- Introduction to Networks
- Routing and Switching Essentials
- Scaling Networks
- Connecting Networks

In each course, Networking Academy™ students will learn technology concepts with the support of interactive media and apply and practice this knowledge through a series of hands-on and simulated activities that reinforce their learning.

Course	Description
Introduction to Networks	Introduces the architecture, structure, functions, components, and models of the Internet and computer networks. The principles of IP addressing and fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. By the end of the course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.
Routing and Switching Essentials	Describes the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with RIPv1, RIPv2, single-area and multi-area OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks.
Scaling Networks	Describes the architecture, components, and operations of routers and switches in a large and complex network. Students learn how to configure routers and switches for advanced functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with OSPF, EIGRP, STP, and VTP in both IPv4 and IPv6 networks. Students will also develop the knowledge and skills needed to implement DHCP and DNS operations in a network.
Connecting Networks	Discusses the WAN technologies and network services required by converged applications in a complex network. The course enables students to understand the selection criteria of network devices and WAN technologies to meet network requirements. Students learn how to configure and troubleshoot network devices and resolve common issues with data link protocols. Students also develop the knowledge and skills needed to implement IPSec and virtual private network (VPN) operations in a complex network

Skills and Competencies

Here are some examples of tasks students will be able to perform after completing each course.

Introduction to Networks	Routing and Switching Essentials
Describe the devices and services used to support communications in data networks and the Internet	Describe enhanced switching technologies such as VLANs, VLAN Trunking Protocol, Rapid Spanning Tree Protocol, and 802.1q
Describe the role of protocol layers in data networks	Describe basic switching concepts and the operation of Cisco switches
Describe the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments	Configure and troubleshoot basic operations of a small switched network
Design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 network	Configure and troubleshoot basic operations of routers in a small routed network
Build a simple Ethernet network using routers and switches	Configure and troubleshoot VLANs and inter-VLAN routing
Use Cisco command-line interface (CLI) commands to perform basic router and switch configurations	Describe the operations of Dynamic Host Configuration Protocol and Domain Name System for IPv4 and IPv6

Scaling Networks	Connecting Networks
Configure and troubleshoot DHCP and DNS operations for IPv4 and IPv6	Describe the operations and benefits of virtual private networks (VPNs) and tunneling
Describe the operations and benefits of the Spanning Tree Protocol (STP)	describe different WAN technologies and their benefits
Configure and troubleshoot STP operations	Configure and troubleshoot serial connections
Describe the operations and benefits of link aggregation and Cisco VLAN Trunk Protocol (VTP)	Configure and troubleshoot broadband connections
Configure and troubleshoot basic operations of routers in a complex routed network for IPv4 and IPv6	Configure and troubleshoot IPSec tunneling operations
Configure and troubleshoot advanced operations of routers and implement RIP, OSPF, and EIGRP routing protocols for IPv4 and IPv6	Monitor and troubleshoot network operations using syslog, SNMP, and NetFlow
Manage Cisco IOS® Software licensing and configuration files	Design network architectures for borderless networks, data centers, and collaboration

About Cisco Networking Academy

In partnership with schools and organizations around the world, Cisco Networking Academy delivers a comprehensive learning experience to help students develop ICT skills for career opportunities, continuing education, and globally recognized career certifications.

To learn more, visit: **www.netacad.com**.

Aena- ASA

AMHS INTEROPERABILITY TRIALS

SPAIN – BRASIL
AMHS INTEROPERABILITY TRIALS

Aena- ASA

AMHS INTEROPERABILITY TRIALS

Document Control Log

Edition	Date	Comments	section/pages affected
1.0	12/07/2012	Creation of the document.	all
1.1	02/01/2013	General Parameter Information table	5 & 6
1.2	27/08/2014	Rewording of the document	all

1. Objective

The aim of this document is to describe the technical solution pertaining to the installations to be affected between AENA and ASA for the settlement of AMHS service, collecting the information to set the AMHS trials to be performed in order to ensure the end to end interoperability of the implementations under test.

These trials will not affect current aeronautical message exchange services or any other system already operative with other Comm Centers.

AMHS Service will be settled and operated following EUR AMHS MANUAL documentation. Parts may agree modifications on the procedures provided that no contradiction may arise with EUR AMHS Manual and appendixes.

The set of trials that will be made:

- Performing all the bilateral interoperability trials collected in the EUR AMHS Manual appendix E.
- If were possible, performing also the trilateral trials collected in the same appendix.
- If agreed, performing a subset of conformance trials, described in appendix D. The conformance tests that have to be performed are listed below:

    1. CT304– Reject a message, if DL expansion is prohibited
    2. CT306– Generate a NDR, if transfer fails
    3. CT407 – Convert or reject an IPM, if the ATS-message-text contains lines with more than 69 Characters

Aena- DECEA

AMHS INTEROPERABILITY TRIALS

4. CT418 – Convert an AFTN SVC "Unknown Addressee Indicator" to a NDR

Aena

Aena- ASA

AMHS INTEROPERABILITY TRIALS

DECEA

2. Common Infrastructure

Aena and DECEA will perform the Interoperability trials over test equipment, not affecting current operational services, following EUR AMHS MANUAL Appendix E structure.

CAFSAT will be used to perform AMHS InteroperabilityTrials

Once successfully tested parts will coordinate and perform the Preoperational Trials over Operational Systems and Network, following EUR AMHS MANUAL Appendix F structure.

2.1 Systems Description

2.1.1 Short Description of Brasil Messaging System

DECEA's Messaging TEST System is a ISODE integrated AFTN/AMHS switch which serves as the operational system in the DECEA COM CENTRE in Brasilia.

Component	Release
UA	
MTA	
MTCU	

2.1.2 Short Description of Spain Messaging System

AENAs Messaging TEST System (MACRAM) is a Telefónica integrated AFTN/CIDIN/AMHS switch which serves as the operational system in the Aena COM CENTRE in Madrid.

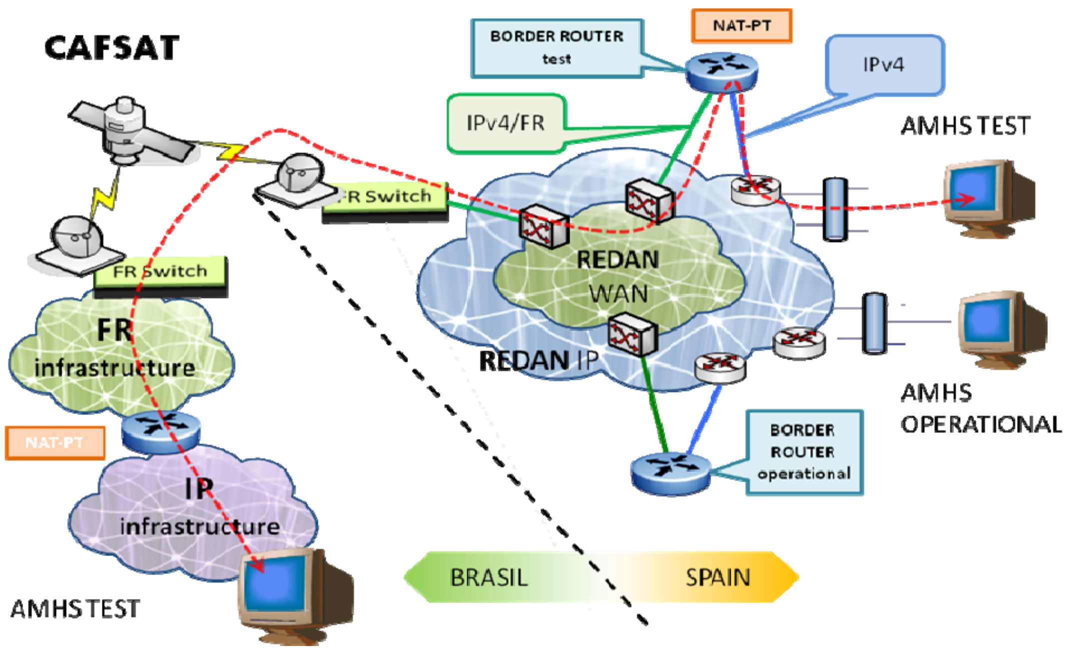
Component	Release
CRAM Integrated AFTN/CIDIN/AFTN gateway	Version 3.5 (November 2013)
CRAM UA/DUA Server	Version 4.2 (November 2013)
AMHS Server	Isode 14.6v16 (May 2010)
Red Hat Linux	Enterprise Advanced Server 4.8 (May 2009)
AMHS User Agent	AMHS message composer integrated in CRAM
AFTN Station	AFTN message composer integrated in CRAM

Aena- DECEA

AMHS INTEROPERABILITY TRIALS

2.2 Test Infrastructure

In this section there is included a scheme with the common test infrastructure and the main network information:



2.3 Communication Channels

Once put into operational, first line on contact is the telephone. Basic English is considered as the co-ordination speech to be employed by the correspondents. A technical specific glossary ought to be defined for this purpose. Telefax is always considered as a second line of contact E-mail could also be used.

While testing configuration and trials, first line on contact is email and telephone. Basic English is considered as the co-ordination speech to be employed by the correspondents

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AMHS INTEROPERABILITY TRIALS

2.4 Correspondants

- AENA

	Availability	Phone	e-mail
Test Coordinator	8:00 – 15:00 CET Monday - Friday	Gabriel García +34 91 3213210	ggarodriguez@aena.es
Technical Permanent	H24	+34 91 6785135	lecm_cgr@aena.es
Technical Service	9:00 – 17:00 CET Monday - Friday	Same	
Technical service escalate	9:00 – 17:00 CET Monday - Friday	Teresa Barberá Lado +34 916785190 Javier Lores Riesgo +34 916785297	tbarbera@aena.es jlores@aena.es

- DECEA (test platform)

	Availability	Phone	e-mail
Test Coordinator	8:00 – 15:00 Monday - Friday	Lucio Cavalcante +55 61 3364 8375	luciolac@cindacta1.aer.mil.br
Technical Permanent	H24	+55 61 3364 8377	
Technical Service Test issues	8:00 – 15:00 Monday - Friday		
Technical service escalate	8:00 – 15:00 Monday - Friday	Lucio Cavalcante +55 61 3364 8375	luciolac@cindacta1.aer.mil.br

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AMHS INTEROPERABILITY TRIALS

3. General Parameter Information

Parameter	Default Values		Remarks
	DECEA (TEST)	AENA (TEST)	
IP addresses	192.168.69.37	57.235.201.75	In line with the EUROCONTROL IP address allocation plan
TCP Port	102	102	Doc 9896, section 1.3
MTA name	MTA-SBBR-3	MTA-LEEE-1	As per AMHSM section 8.2
MTA password	PLAT-3	ICAO-LEEE-1	As per AMHSM section 8.2
Calling Presentation Address		Yes	Yes or No Depending on SW implementation, parameter may have to be Yes
Authentication requirements	Simple	Simple	Simple, strong or bilateral. Not mandated but may be agreed among test partners.
TSAP addresses	0x35 0x39 0x31 Text “591	0x35 0x39 0x31 Text “591”	Hex e.g. ‘544350’ (“TCP”) or ‘4D4853’ (“MHS”)
Protocol type	X.400/1988	X.400/1988	IPM 1984 phased out (AMHSM App.B)
Type of associations	Monologue	Monologue	Monologue or Two-way alternate (AMHSM App. B)
Number of associations incoming		5 max.	The number of incoming associations should be equal to the number of outgoing ones.
Number of associations outgoing		5 max.	
Connection		Dynamic (5 sec hold time)	Permanent or Dynamic
Minimum message size supported	2Mbytes	2Mbytes	(AMHSM App. B)
Addressing scheme	CAAS with single O	CAAS with single O	XF or CAAS with single or multiple O
	C = XX ADMD = ICAO PRMD = SB O = SBBR OU1 = SBBR CN = SBBRPLTC	C = XX ADMD = ICAO PRMD = SPAIN O = LEEE OU1 = LEEE CN = LEEEXXXX	

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AMHS INTEROPERABILITY TRIALS

Parameter	Default Values		Remarks
	DECEA (TEST)	AENA (TEST)	
Type of body part used in IPMs by UA	general-text body part with ISO646 repertoire	general-text body part with ISO646 repertoire	general-text body part with ISO646 repertoire

4. Interoperability Trials TEST RESULTS

TEST CASE	TESTED FUNCTIONALITY	RESULT	DATE	REMARKS
6,2 Submission, Transfer and Delivery Operation (AMHS to AMHS)				
IT101	**Submit, transfer and deliver an IPM (UA IUT-A to UA IUT-B)**			
IT101/TC01	A KK priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.			
IT101/TC02	A GG priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.			
IT101/TC03	An FF priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.			
IT101/TC04	A DD priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.			
IT101/TC05	An SS priority message will be submitted from the UA of IUT-A and delivered to the UA of IUT-B.			
IT102	**Submit, transfer and deliver an IPM (UA IUT-B to UA IUT-A)**			
IT102/TC01	A KK priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.			
IT102/TC02	A GG priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.			
IT102/TC03	An FF priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.			
IT102/TC04	A DD priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.			
IT102/TC05	An SS priority message will be submitted from the UA of IUT-B and delivered to the UA of IUT-A.			
6,3 Gateway Operations (AFTN to AMHS)				
IT201	**Convert an AFTN message to AMHS format (IUT-A)**			
IT201/TC01	A KK priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.			
IT201/TC02	A GG priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.			

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AMHS INTEROPERABILITY TRIALS

TEST CASE	TESTED FUNCTIONALITY	RESULT	DATE	REMARKS
IT201/TC03	An FF priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.			
IT201/TC04	A DD priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.			
IT201/TC05	An SS priority message will be sent from the AFTN terminal of IUT-A, converted to AMHS and received at the UA of IUT-B.			
IT202	**Convert an AFTN message to AMHS format (IUT-B)**			
IT202/TC01	A KK priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.			
IT202/TC02	A GG priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.			
IT202/TC03	An FF priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.			
IT202/TC04	A DD priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.			
IT202/TC05	An SS priority message will be sent from the AFTN terminal of IUT-B, converted to AMHS and received at the UA of IUT-A.			
6,4 Gateway Operations (AMHS to AFTN)				
IT301	**Convert an IPM to AFTN format (IUT-B)**			
IT301/TC01	A KK priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B.			
IT301/TC02	A GG priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B.			
IT301/TC03	An FF priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B.			
IT301/TC04	A DD priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B.			
IT301/TC05	An SS priority message will be submitted from the UA of IUT-A, converted to AFTN in IUT-B and received at the AFTN terminal of IUT-B.			
IT302	**Convert an IPM to AFTN format (IUT-A)**			
IT302/TC01	A KK priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.			

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AMHS INTEROPERABILITY TRIALS

TEST CASE	TESTED FUNCTIONALITY	RESULT	DATE	REMARKS
IT302/TC02	A GG priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.			
IT302/TC03	An FF priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.			
IT302/TC04	A DD priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.			
IT302/TC05	An SS priority message will be submitted from the UA of IUT-B, converted to AFTN in IUT-A and received at the AFTN terminal of IUT-A.			
6,5 Gateway Operations (AFTN to AMHS to AFTN)				
IT401	**Convert an AFTN message to AMHS and back to AFTN format (IUT-A to IUT-B)**			
IT401/TC01	An AFTN message with KK priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.			
IT401/TC02	An AFTN message with GG priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.			
IT401/TC03	An AFTN message with FF priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.			
IT401/TC04	An AFTN message with DD priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.			
IT401/TC05	An AFTN message with SS priority will be sent from the AFTN terminal of IUT-A to the AFTN terminal of IUT-B.			
IT402	**Convert an AFTN message to AMHS and back to AFTN format (IUT-B to IUT-A)**			
IT402/TC01	An AFTN message with KK priority will be sent from the AFTN terminal of IUT-B to the AFTN terminal of IUT-A.			
IT402/TC02	An AFTN message with GG priority will be sent from the AFTN terminal of IUT-B to the AFTN terminal of IUT-A.			
IT402/TC03	An AFTN message with FF priority will be sent from the AFTN terminal of IUT-B to the AFTN terminal of IUT-A.			
IT402/TC04	An AFTN message with DD priority will be sent from the AFTN terminal of IUT-B to the AFTN terminal of IUT-A.			
IT402/TC05	An AFTN message with SS priority will be sent from the AFTN terminal of IUT-B to the AFTN terminal of IUT-A.			
6.6 Gateway Operations – special cases				

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AMHS INTEROPERABILITY TRIALS

TEST CASE	TESTED FUNCTIONALITY	RESULT	DATE	REMARKS
IT501	**Distribute an IPM to AMHS and AFTN users**			
IT501/TC01	A message will be sent from a UA on IUT-A to IUT-B with Primary Recipients addressing an AFTN terminal and a UA in IUT-B.			
IT501/TC02	A message will be sent from a UA on IUT-B to IUT-A with Primary Recipients addressing an AFTN terminal and a UA in IUT-A.			
IT501/TC03	A message will be sent from a UA on IUT-A to IUT-B with PrimaryRecipients and Copy Recipients, addressing AFTN terminals and UAs in IUT-B.			
IT501/TC04	A message will be sent from a UA on IUT-B to IUT-A with Primary Recipients and Copy Recipients, addressing AFTN terminals and UAs in IUT-A.			
IT501/TC05	A message will be sent from a UA on IUT-A to IUT-B with Primary Recipients, Copy Recipients and Blind Copy Recipients, addressing AFTN terminals and UAs in IUT-B.			
IT501/TC06	A message will be sent from a UA on IUT-B to IUT-A with Primary Recipients, Copy Recipients and Blind Copy Recipients, addressing AFTN terminals and UAs in IUT-A.			
IT502	**Expand a DL addressing both AMHS and AFTN users**			
IT502/TC01	The message will be sent from a UA on IUT-A addressing a local DL which contains addresses of AFTN terminals and the UA in IUT-B.			
IT502/TC02	The message will be sent from a UA on IUT-B addressing a local DL which contains addresses of AFTN terminals and the UA in IUT-A.			
IT502/TC03	The message will be sent from a UA on IUT-A addressing a remote DL in IUT-B which contains addresses of AFTN terminals and the UA in IUT-B.			
IT502/TC04	The message will be sent from a UA on IUT-B addressing a remote DL in IUT-A which contains addresses of AFTN terminals and the UA in IUT-A.			
IT503	**Convert or reject an IPM, if the ATS-message-text contains more than 1800 characters**			
IT503/TC01	A message with normal priority and length of about 4500 characters is sent from the IUT-A to the IUT-B.			
IT503/TC02	A message with normal priority and length of about 4500 characters is sent from the IUT-B to the IUT-A			
IT504	**Split an incoming IPM addressing more than 21 AFTN users**			
IT504/TC01	A message with normal priority containing 50 recipients is sent from the IUT-A to the IUT-B.			
IT504/TC02	A message with normal priority containing 50 recipients is sent from the IUT-B to the IUT-A.			
IT505	**Probe Conveyance Test**			

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AMHS INTEROPERABILITY TRIALS

TEST CASE	TESTED FUNCTIONALITY	RESULT	DATE	REMARKS
IT505/TC01	The probe will be sent from a UA on IUT-A to IUT-B, addressing AFTN terminals and UAs in IUT-B.			
IT505/TC02	The probe will be sent from a UA on IUT-B to IUT-A, addressing AFTN terminals and UAs in IUT-A.			
IT505/TC03	The probe will be sent from a UA on IUT-A to IUT-B, containing the address of an AFTN terminal of IUT-B and two MF addresses which cannot be translated by the MTCU of IUT-B.			
IT505/TC04	The probe will be sent from a UA on IUT-B to IUT-A, containing the address of an AFTN terminal of IUT-A and two MF addresses which cannot be translated by the MTCU of IUT-A.			
6,7 Stress traffic situations				
IT601	**Stress load**			
IT601/TC01	After queuing of an amount of messages both IUTs start sending a burst of 100 messages.			
IT601/TC02	After queuing of an amount of messages both IUTs start sending a burst of 200 messages.			
IT601/TC03	After queuing of an amount of messages both IUTs start sending a burst of 400 messages.			
IT601/TC04	After queuing of an amount of messages both IUTs start sending a burst of 4000 messages.			
IT602	**Stress load with long messages**			
IT602/TC01	After queuing of an amount of messages both IUTs start sending a burst of 400 “long” messages.			
IT602/TC02	After queuing of an amount of messages both IUTs start sending a burst of 4000 “long” messages.			
7,1 Submission/Transfer/Delivery and Relay operations				
IT701	**Submission / Transfer / Delivery between the partner MTAs**			
IT701/TC01	An IPM submitted in IUT-A is transferred to IUT-B, IUT-C and delivered to the UAs of IUT-B, IUT-C.			
IT701/TC02	An IPM submitted in IUT-B is transferred to IUT-C, IUT-A and delivered to the UAs of IUT-C, IUT-A.			
IT701/TC03	An IPM submitted in IUT-C is transferred to IUT-A, IUT-B and delivered to the UA of IUT-A, IUT-B.			
IT702	**Relay operations**			
IT702/TC01	An IPM is routed via an intermediate MTA, transferred from IUT-A to IUT-C via “relay” IUT-B.			
IT702/TC02	An IPM is routed via an intermediate MTA, transferred from IUT-B to IUT-A via “relay” IUT-C.			
IT702/TC03	An IPM is routed via an intermediate MTA, transferred from IUT-C to IUT-B via “relay” IUT-A.			
7,2 Test of special situations				
IT801	**Alternate MTA routing**			

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AMHS INTEROPERABILITY TRIALS

TEST CASE	TESTED FUNCTIONALITY	RESULT	DATE	REMARKS
IT801/TC01	An ATS message (IPM) queued in one MTA (IUT-A) due to outage of the primary X.400 routing path is routed via an alternate MTA (IUT-C).			
IT801/TC02	An ATS message (IPM) queued in one MTA (IUT-B) due to outage of the primary X.400 routing path is routed via an alternate MTA (IUT-A).			
IT801/TC03	An ATS message (IPM) queued in one MTA (IUT-C) due to outage of the primary X.400 routing path is routed via an alternate MTA (IUT-B).			
IT802	**Loop detection**			
IT802/TC01	IUT-A detects that a message submitted in IUT-A is traversing a loop.			
IT802/TC02	IUT-A detects that a message submitted in IUT-B is traversing a loop.			
IT802/TC03	IUT-A detects that a message submitted in IUT-C is traversing a loop.			
IT802/TC04	IUT-B detects that a message submitted in IUT-A is traversing a loop.			
IT802/TC05	IUT-B detects that a message submitted in IUT-B is traversing a loop.			
IT802/TC06	IUT-B detects that a message submitted in IUT-C is traversing a loop.			
IT802/TC07	IUT-C detects that a message submitted in IUT-A is traversing a loop.			
IT802/TC08	IUT-C detects that a message submitted in IUT-B is traversing a loop.			
IT802/TC09	IUT-C detects that a message submitted in IUT-C is traversing a loop.			

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AMHS INTEROPERABILITY TRIALS

END OF DOCUMENT

APPENDIX C

AMHS INTERCONNECTION REQUIREMENT AND DATE OF IMPLEMENTATION

STATE	AMHS INTERCONNECTION REQUIREMENT/	DATE OF IMPLEMENTATION/	REMARKS
Argentina	Bolivia	Mar 2016	
	Brazil	Dec 2013	Operational implementation pending.
	Chile	TBD	Reported by Chile delegate during SAM/IG/13 Meeting. It will be implemented under the considerations of the Declaration of Bogota (Dec 2016)
	Paraguay	Mar 2012	Implemented
	Peru	Jul 2014	Reschedule date of implementation.
	Uruguay	Dec 2015	
Bolivia	Argentina	Mar 2016	
	Brazil	Apr 2016	
	Peru	May 2016	
Brazil	Argentina	Dec 2013	Operational implementation pending
	Bolivia	Apr 2016	
	Colombia	Dec 2014	Reschedule date of implementation. Delay due to Brazil priorities to handle air traffic control during Football World Cup
	Guyana	Mar 2015	
	French Guiana	TBD	AMHS implementation pending.
	Paraguay	Jul 2014	To Reschedule date of implementation. Delay due to Brazil priorities to handle air traffic control during Football World Cup
	Peru	Jul 2014	Operational implementation pending. To Reschedule date of implementation. Delay due to Brazil priorities to handle air traffic control during Football World Cup
	Suriname	Mar 2016	
	Uruguay	Dic 2015	
	Venezuela	Dic 2014	Reschedule date of implementation
Chile	Argentina	TBD	Reported by Chile delegate during SAM/IG/13 Meeting. It will be implemented under the considerations of the Declaration of Bogota (Dec 2016)
	Peru	TBD	Reported by Chile delegate during SAM/IG/13 Meeting. It will be implemented under the considerations of the Declaration of Bogota (Dec 2016)

STATE	AMHS INTERCONNECTION REQUIREMENT/	DATE OF IMPLEMENTATION/	REMARKS
Colombia	Brazil	Dec 2014	Reschedule date of implementation. Delay due to Brazil priorities to handle air traffic control during Football World Cup
	Ecuador	Dic 2014	
	Panama	Dic 2014	
	Peru	Sep 2010	Implantado
	Venezuela	Mar 2015	
Ecuador	Colombia	Dec 2014	
	Peru	Jul 2012	Implantado
	Venezuela	May 2015	
French Guiana (France)	Brazil	TBD	AMHS implementation pending
	Venezuela	TBD	AMHS implementation pending
Guyana	Brasil	Mar 2015	
	Suriname	Jun 2011	Implemented
	Venezuela	Dec 2014	
Panama	Colombia	Dec 2014	
Paraguay	Argentina	Mar 2012	Implemented
	Brazil	Jul 2014	Reschedule date of implementation. Delay due to Brazil priorities to handle air traffic control during Football World Cup
Peru	Argentina	Jul 2014	Reschedule date of implementation
	Bolivia	May 2016	
	Brazil	Jul 2014	Operacional implementation pending. Reschedule date of implementation. Delay due to Brazil priorities to handle air traffic control during Football World Cup
	Chile	TBD	Reported by Chile delegate during SAM/IG/13 Meeting. It will be implemented under the considerations of the Declaration of Bogota (Dec 2016)
	Colombia	Sep 2010	Implemented
	Ecuador	Jul 2012	Implemented
	Venezuela	Dec 2014	
Suriname	Brazil	Mar 2016	
	Guyana	Jun 2011	Implemented
	Venezuela	Mar 2016	
Uruguay	Argentina	Dec 2015	
	Brazil	Dec 2015	

STATE	AMHS INTERCONNECTION REQUIREMENT/	DATE OF IMPLEMENTATION/	REMARKS
Venezuela	Brazil	Dec 2014	Reschedule date of implementation.
	Colombia	Mar 2015	
	Ecuador	May 2015	
	Guyana	Dec 2014	
	French Guiana	TBD	AMHS implementation pending.
	Peru	Dec 2014	
	Suriname	Mar 2016	

ANALYSIS OF THE ACTIVITIES FOR THE IMPLEMENTATION OF AIR-GROUND DATA LINKS IN THE SAM REGION

DESCRIPTION OF TASKS	START	END	RESPONSIBLE PARTY	STATUS
1. ANALYSIS OF THE STATUS OF DATA LINK IN THE SAM REGION	**October 2011**	**December 2018**		
1.1 Identify the level of implementation of air data link in the SAM Region	October 2011	May 2012	REGIONAL OFFICE STATES	Completed. Information supplied in the CNS improvement action plans by SAM Region States http://www.icao.int/SAM/Pages/ES/eDocumentsDisplay_ES.aspx?area=CNS Updating required
1.2 Up-date CNS improvement action plan		SAM/IG/15	STATES	
1.3 Identify the data link capacity of the air fleet in the SAM Region and the airlines certified to operate data links	October 2011	May 2012	REGIONAL OFFICE STATES	Pending
2. STRATEGY FOR THE IMPLEMENTATION OF GROUND-AIR COMMUNICATION SYSTEMS IN THE SAM REGION	**2010**	**December 2014**		
2.1 Implementation strategy for the ground-air data links (Performance Based Regional Implementation Plan PBIP)	2010	December 2013	REGIONAL OFFICE STATES	Completed
2.2 Review FASID Table CNS 2 A		December 2014	REGIONAL OFFICE STATES	Pending Meeting review SAM/IG/14
2.3 Develop guidelines for the implementation of data link ground-air applications in the SAM Region	May 2012	October 2013	EXPERTS PROJECT RLA/06/901 RO	Finalized. Approved by SAM/IG/12 http://www.icao.int/SAM/Pages/ES/eDocumentsDisplay_ES.aspx?area=CNS

DESCRIPTION OF TASKS	START	END	RESPONSIBLE PARTY	STATUS
3. IMPLEMENTATION OF GROUND-AIR DATA LINK		**December 2018**		
3.1 Implementation of ground-air data link for oceanic area (CPDLC) HF support			SAM REGION STATES	The following oceanic FIRs has CPDLC implemented (FIR Cayena, Atlantic, Ezeiza, Comodoro and Santiago) FIR Montevideo in process of implementation
3.2 Implementation of DCL services in selected airdromes		2018	SAM REGION STATES	States are supposed to provide information during SAM/IG/14
3.3 Implementation of D-ATIS services in selected airdromes		2018	SAM REGION STATES	Only Brazil has reported an implementation plan
3.4 Implementation of VOLMET services (voice and data)		2018	SAM REGION STATES	Only Brazil has reported an implementation plan
4. TRAINING	**January 2016**	**December 2018**		
2.1 Develop training programmes and documentation for pilots, air traffic controllers and technical maintenance personnel		SAM/IG/15	REGIONAL OFFICE	
2.2 Conduct training programmes and seminars for pilots, air traffic controllers and technical maintenance personnel	January 2016	December 2018	REGIONAL OFFICE STATES EXPERTS PROJECT RLA/06/901	
5. STANDARDS AND PROCEDURES		**December 2015**		
5.1 Develop of model documents to support the implementation of data link ground-air on oceanic and continental areas (AIC, AIP supplements, advisory circulars)		SAM/IG/15	EXPERTS PROJECT RLA/06/901 RO	A two week mission of an expert in design, installation and ground-air data links operations is required.
5.2 Review of Procedures Manual of the ATS dependencies involved in route in oceanic and continental areas		SAM/IG/15	EXPERT PROJECT RLA/06/901 RO	

DESCRIPTION OF TASKS	START	END	RESPONSIBLE PARTY	STATUS
5.3 Update the letters of agreement between ATS units, if necessary, in view of the implementation of the ground-air data link for en-route oceanic and continental areas		December 2015	STATES	
5.4 Amendment to Document 7030, if necessary, in view of the implementation of ground-air data link in oceanic and continental areas		December 2015	REGIONAL OFFICE	
6. SYSTEM PERFORMANCE MONITORING	**October 2011**	**December 2015**		
6.1 Monitoring of implementation activities of ground-air data link	October 2010	December 2018	PROJECT AND PROGRAMME COORDINATOR	

- END -

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

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

a) WP/12 – *Follow-up to the operational interconnection of automated systems* (presented by the Secretariat);
b) WP/13 – *Follow-up to the implementation of ATM situational awareness in the SAM Region* (presented by the Secretariat);
c) WP/25 – *Guide for the preparation of SIGMETs in graphical format* (presented by the Coordinator of the Situational Awareness Project); and
d) IP/10 – *Implementation of the AIDC system at the Córdoba, Comodoro Rivadavia and Ezeiza ACCs* (presented by Argentina).

Follow-up to activities under Project C1 (ATM Automation)

7.2 The Meeting reviewed working paper WP/12, which showed the progress made in the interconnection between automated systems of the States for the exchange of radar data and information through AIDC.

7.3 To date, the AIDC service has not been implemented between adjacent ACCs in the SAM Region. Successful operational trials have been carried out between Argentina-Paraguay (March 2014) through their AMHS development systems. Likewise, AIDC trials were conducted with partially successful results between Argentina–Chile, Chile-Peru, Colombia-Ecuador, Colombia-Panama, Colombia-Peru and Ecuador-Peru (February– October 2014).

7.4 The Meeting updated the list of focal points in charge of coordinating the interconnection of automated systems (exchange of radar data and AIDC), as shown in **Appendix A** to this agenda item.

7.5 Taking into account the goals of the Bogota Declaration (1/2013, 8/2014 and 6/2015), the Meeting reviewed the proposed 2015 Plan of activities for AIDC implementation contained in **Appendix B** to this agenda item. According to this plan, the use of 4 experts with experience in installation, operation, and programming of AIDC databases will be submitted to the approval of the eighth meeting of the Coordination Committee of Project RLA/06/901 (RCC/8), in support of the technical completion of the exchange of AIDC messages between Santiago-Lima, Guayaquil-Lima, Bogota-Guayaquil, and the conduction of AIDC courses in these States.

7.6 The Plan of Activities also includes the conduction, on 21-26 September 2015, of a CAR/SAM workshop on implementation of ATM automation, ADS-B and multilateration, with the purpose of analysing the implementation of inter-regional AIDC connections.

Conclusion SAM/IG/14-16 Approval of the 2015 Plan of Activities for AIDC implementation

That the Coordination Meeting (RCC/8) review and approve the 2015 timetable of activities for AIDC implementation, shown in **Appendix B** to this agenda item.

7.7 Likewise, IP/10, presented by Argentina, reported that the area control centres of Córdoba, Comodoro Rivadavia. and Ezeiza had AIDC capability, and that the operational integration of AIDC connections of the aforementioned ACCs was underway, including refresher training for air traffic controllers to be completed in December 2014. Argentina estimated to complete automation in the remaining ACCs (Comodoro Rivadavia, Resistencia and Mendoza) before the end of the first semester of 2015.

7.8 Brazil informed that it would conduct internal AIDC trials between the Curitiba and Brasilia ACCs during the first semester of 2015 so as to start, during the second semester, trials with neighbouring States with which it has already signed MoUs.

Follow-up to activities under Project C2 (Improvement of ATM situational awareness)

7.9 The Meeting reviewed working paper WP/13, whereby the Meeting and, subsequently, the task force, were informed of the progress made and the deliverables still pending under this project.

7.10 Likewise, through working paper WP/25 “Guide for the preparation of SIGMETs in graphical format”, the Meeting and the task force were presented with this guide, which was reviewed and endorsed by the “Meeting on OPMET exchange”, for use by the countries of the Region that wished to do so.

7.11 The task force reviewed the Action Plan for ADS-B implementation in the SAM Region, shown in **Appendix C** to this agenda item, which consisted of three phases: Phase I for ADS-B trials; Phase II for operational implementation; and Phase III for monitoring the whole ADS-B implementation process. In this regard, the Meeting considered that Phase I (trials) had been completed at the regional level. Accordingly, the project would proceed with Phase II, which required the hiring of a CNS expert and an ATM expert for a period of 15 days to define the operational use of ADS-B, based on airspace requirements and coverage of existing surveillance systems.

7.12 Taking into account that several States of the Region have recently purchased surveillance systems and are planning to use ADS-B, FASID Table CNS 4 must be updated, since such information is required for the activity described in the previous paragraph. Accordingly, the following conclusion was formulated:

Conclusion SAM/IG/14-17 Updating of FASID Table CNS4

That SAM States send to the Secretariat at the ICAO SAM Office the updated FASID Table CNS4 by 15 December 2014.

7.13 As to the development of the “Technical guide to support ATFM implementation”, the plenary was informed that the “Manual on collaborative ATFM” (Doc 9971) was already available. This manual will be used as operational information for the drafting of the Guide, which will be presented at the SAMIG/15 meeting.

7.14 Regarding the “Technical/operational guide for MLAT implementation” still pending development, the Brazilian Administration is still to designate the expert, who will have the support of the experts from Bolivia and Peru.

7.15 The drafting of these guides will require a mission by two experts to Lima, Peru, for one week. In this regard, the Meeting considered that the Eighth Coordination Meeting of Project RLA/06/901, to be held in Lima, Peru, on 25-27 February 2015, should analyse the request for approval of the drafting of these guides. The guides will be presented at the SAM/IG/16 meeting.

7.16 Based on these changes to the tasks of the Situational Awareness Project, project deliverables have been updated. The updated table is shown in **Appendix D** to this agenda item.

APPENDIX A

NATIONAL FOCAL POINTS
IMPLEMENTATION OF INTERCONNEXION OF AUTOMATIZATION SYSTEMS

STATE	ADMINISTRATION	NAME	POST	TELEFHONE NUMBER	E-MAIL ADDRESS
ARGENTINA	DGSTA	Rubén Siva	Especialista ATM sistemas automatizados		ruben@assistcomp.com.ar
		Mario Correa	Jefe sistemas automatizados ATS	(54 11) 4317-6015	mario_correa@yahoo.com.ar
	ANAC	Javier Vittor	Especialista CNS	(54 11) 4480-2362 (54 911) 6894-0692	javiervittor@gmail.com
BOLIVIA					
BRASIL	DECEA	Alexander Santoro	Especialista CNS		santoroaas@decea.gov.br
		Murilo Loureiro	Asesor sistemas automatizados		murilo.loureiro@gmail.com
COLOMBIA	UAEAC	Mauricio Ferrer	Especialista ATM sistemas automatizados		mauricio.ferrer@aerocivil.gov.co
		Mario Rosas	Jefe sección radar	(57 31) 7656-7203	mario.rosas@aerocivil.gov.co
CHILE	DGAC	Pedro Pastrian	Especialista radar y sistemas automatizados	(56 2) 836-4005 (56 2) 644-8345	ppastrian@dgac.gob.cl
		Christian Vergara	Especialista comunicaciones	(56 2) 836-4005 (56 2) 644-8345	cvergara@dgac.gob.cl
ECUADOR	DAC	Raul Avellan	Especialista CNS coordinador sistema AMHS	(593 4) 269-2829 (593 9) 9530-2735	raul.avellan@aviacioncivil.gob.ec
		Juan Poalasin	(Programación FDP y coordinaciones)		juan.poalasin@aviacioncivil.gob.ec
GUYANA					
GUYANA FR.					
PANAMA	Autoridad Aeronáutica Civil (AAC)	Mario Antonio Facey Howard	Especialista radar y sistemas automatizados	(507) 501-9865	mfacey@aeronautica.gob.pa

STATE	ADMINISTRATION	NAME	POST	TELEFHONE NUMBER	E-MAIL ADDRESS
PARAGUAY	DINAC	David Torres	Jefe de Sección, Encargado del Sistema ATM ARCON2100	(595) 9812-31575	dr.torres33@gmail.com
		Diego Ramón Aldana Fernández	Supervisor ACC/APP	(595) 21 645-707	diegoaldana@gmail.com
		Enrique Alfredo Sánchez	Supervisor ATS	(595) 9948-80924	esanchez69@gmail.com
PERÚ	CORPAC	Johnny Ávila	Jefe sección radar y sistemas automatizados		javila@corpac.gob.pe
		Jorge Eduardo Merino Rodríguez	Especialista ATM Controlador de Tránsito Aéreo	(51 1) 414-1000	jmerino@corpac.gob.pe jemr69@yahoo.com
		Carlos Infante	Especialista ATM Controlador de Tránsito Aéreo		cinfante@corpac.gob.pe
SURINAM					
URUGUAY	DINACIA	Antonio Lupacchino	Especialista CNS sistemas automatizados		alupacch@yahoo.com.ar

APPENDIX B

2015 PLAN OF ACTIVITIES FOR AIDC IMPLEMENTATION

	Start	End	Responsible party	Remarks
1. **Establishment of activities to complete the technical implementation of AIDC**	**10/10**	**16/10**	**ICAO**	
1.1 Based on the results of AIDC trials conducted between February 2014 and June 2014; the technical documentation of automated systems installed in the Region; and the AIDC implementation guide developed in the SAM Region, draft: 1.1.1 Plan of activities to complete the technical feasibility trials for AIDC interconnection between: Santiago ACC and Lima ACC Guayaquil ACC and Lima ACC Bogota ACC and Guayaquil ACC 1.1.2 Syllabus of AIDC course for ATS controllers and AIDC database programmers, to be conducted in Chile, Colombia, Ecuador, and Peru.	10/10	16/10	ICAO	
2. Review of SAM/IG/14 meeting activities	**09/10**	**13/11**	**ICAO and SAM/IG**	
2.1 Presentation of plan of activities and AIDC course syllabus at the SAM/IG/14 meeting	09/10	13/11	ICAO	
2.2 Review and approval for submission to the Eighth Coordination Meeting of Project RLA	09/10	13/11	SAM/IG	
3. Approval of RCC/8 meeting activities	**25/02/15**	**27/02/15**	**RLA/06/901 member States**	
3.1 Presentation of activities for approval, with their respective cost	25/02/15	27/02/15	RLA/06/901 member States	

	Start	End	Responsible party	Remarks
4. Search for, and selection of, experts	**24/11/14**	**28/01/15**	**ICAO**	
4.1 Search for, and selection of, 4 experts from Project RLA/06/901 member States of the SAM Region, with experience in AIDC installation, operation, and database programming, to be responsible for the activities described in item 1.	24/11/14	30/01/15	ICAO	
5. Missions to complete AIDC interconnection between States that begun trials during the first half of 2014	**09/03/15**		**4 automation experts**	Missions proposed based on the results of AIDC trials conducted between February and June 2014 **Santiago ACC-Lima ACC** **Guayaquil ACC–Lima ACC** **Bogota ACC-Lima ACC**
5.1 ***Mission to Santiago, Chile, by two automation experts, to***:	**16/03/15**	**27/03/15**	**2 automation experts from the SAM Region**	**AIDC implementation Santiago ACC-Lima ACC**
5.1.1 Complete technical implementation of AIDC between the Santiago ACC and the Lima ACC	16/03/15	20/03/15	2 automation experts from the SAM Region	
5.1.2 Conduct AIDC course for ATS personnel of the Santiago ACC	23/03/15	27/03/15		
5.2 ***Mission to Lima by two automation experts, to***:	**09/03/15**	**13/03/15**	**2 automation experts from the SAM Region**	**AIDC implementation Santiago ACC–Lima ACC**
5.2.1 Conduct AIDC course for ATS personnel of the Lima ACC	09/03/15	13/03/15	2 automation experts	
5.3 ***Mission to Guayaquil by two automation experts, to:***	**06/04/15**	**17/04/15**	2 **automation experts from the SAM Region**	**AIDC implementation Guayaquil ACC–Lima ACC**
5.3.1 Complete technical implementation of AIDC between the Guayaquil ACC and the Lima ACC	06/04/15	10/04/15	2 automation experts from the SAM Region	
5.3.2 Conduct AIDC course for ATS personnel of the Guayaquil ACC	13/04/15	17/04/15		

	Start	End	Responsible party	Remarks
5.4 **Mission to Lima by two automation experts, to:**	**09/03/15**	**13/03/15**	**2 automation experts from the SAM Region**	**AIDC implementation Guayaquil ACC–Lima ACC**
5.4.1 Conduct AIDC course for ATS personnel of the Lima ACC (same as 5.2.1)	09/03/15	13/03/15	2 automation experts	
5.5 ***Mission to Bogota by two automation experts, to:***	**20/04/15**	**30/04/15**	**2 automation experts from Peru**	**AIDC implementation Bogota ACC–Guayaquil ACC**
5.5.1 Complete technical implementation of AIDC between the Bogota ACC and the Guayaquil ACC	20/04/15	24/04/15	2 automation experts from the SAM Region	
5.5.2 Conduct AIDC course for ATS personnel of the Bogota ACC	27/04/15	30/04/15		
5.6 ***Mission to Guayaquil by two automation experts, to:***	**20/04/15**	**24/04/15**	2 automation experts from the SAM Region	**AIDC implementation Bogota ACC–Guayaquil ACC**
5.6.1 Complete technical implementation of AIDC between the Guayaquil ACC and the Bogota ACC	20/04/15	24/04/15	2 automation experts from the SAM Region	
5.6.2 Conduct AIDC course for ATS personnel of the Guayaquil ACC (same as 5.3.2)	13/04/15	17/04/15		
6. First meeting of the AIDC operational implementation working group during the SAMIG/15 meeting	**11/05/15**	**15/05/15**	**RLA/06/90 member States**	
6.1 It is proposed that, as a matter of priority, AIDC implementation be monitored and reported to the SAM/IG/15 meeting; accordingly, the first meeting of the AIDC operational implementation working group will be held	11/05/15	15/05/15	RLA/06/901 member States	Based on the technical implementation of AIDC, the Meeting will develop a regional AIDC operational implementation plan, defining mode of operation and messages to be used, in accordance with the AIDC

	Start	End	Responsible party	Remarks
				guide drafted in the SAM Region. One fellowship is required per State, for personnel in charge of AIDC operational implementation in the States
7- Operational implementation of AIDC	**18/05/15**	**31/12/15**	States involved	
7.1 Start operational implementation of AIDC Lima ACC-Santiago ACC Guayaquil ACC-Lima ACC Bogota ACC-Guayaquil ACC Other operational implementations Resistencia ACC-Asunción ACC Ezeiza ACC-Santiago ACC Ezeiza ACC-Montevideo ACC	18/05/15	31/12/15	**States involved**	
8**. Workshop for the implementation of ATM automation, ADS B, and multilateration**	**21/09/15**	**26/09/15**	ICAO	CAR/SAM workshop to review the implementation of inter-regional AIDC interconnections (one fellowship is required per State)
9**. Second meeting of the AIDC operational implementation working group during the SAMIG/16 meeting**	**19/10/15**	**23/10/15**	**ICAO**	
9.1 It is proposed that, as a matter of priority, AIDC implementation be monitored and reported to the SAM/IG/16 meeting; accordingly, the second meeting of the AIDC operational implementation working group will be held.	**19/10/15**	**23/10/15**	**ICAO**	Follow-up to operational implementation as foreseen, and programming of activities for operational implementation in 2016

APPENDIX C

ACTION PLAN FOR THE CONDUCTION OF ADS-B TRIALS IN THE SAM REGION

IMPLEMENTATION PHASE	TASK	ACTIVITY	RESPONSIBLE PARTY	DELIVERABLE	STATUS
PHASE I **Conduction of ADS-B trials, collection and processing of data, submission of results**	1	Define trial objectives, aiming at studying the possibility for States to benefit from ADS-B as surveillance system in the Region.	CNS Task Force	Trial objectives	**Finalised**
	2	Review and describe in detail the activities to be considered for ADS-B trials designed by the GREPECAS mechanism.	Secretariat	Revised regional plan of activities for ADS-B trials	**Finalised**
	3	Define the equipment and configuration needed to begin trials. Define trial costs.	Rapporteur Project C2	Definition of equipment and its configuration for the trial	**Finalised** A Thales ADS-B station was used for the trial at no cost.
	4	Define the geographical area where trials will be conducted	Rapporteur Project C2	Geographical area defined (operational concept)	**Finalised** The terminal area of the Jorge Chavez international airport of Lima, Peru, was selected
	5	Consult States and users about their participation in the trials	Secretariat	Confirmation of participation by States	**Finalised**
	6	Select the entity, organisation or State in charge of conducting the trials	States	Selection of the entity, organisation or State	**Finalised** CORPAC, the air navigation service provider of Peru, was selected
	7	Installation of the ADS-B equipment required for the trial in the defined	Selected entity, organisation or State	Equipment installed	**Finalised** It was installed at the Jorge Chavez

IMPLEMENTATION PHASE	TASK	ACTIVITY	RESPONSIBLE PARTY	DELIVERABLE	STATUS
		geographical area			international airport of Lima, Peru.
	8	Conduction of trials (data collection).	State (Peru), manufacturer (Thales), Secretariat	Start-up of trials	**Finalised** Trials were conducted for a period of six months
	9	Processing of collected data	State (Peru), manufacturer /Thales), Secretariat	Processing of data	**Finalised** Processing of the data collected was done by the air navigation service provider (CORPAC)
	10	Presentation of results obtained	State (Peru), Secretariat	Presentation of results	**Finalised** Results were presented at the ADS-B workshop (Lima, Peru) and SAM/IG meeting.
PHASE II OPERATIONAL IMPLEMENTATION OF ADS-B	11	Define operational use of ADS-B, based on the airspace concept defined at national level	States	Presentation of results	**Valid**
	12	Safety assessment based on the defined operational use(s)	States	Presentation of results	**Valid** In this task, it is important to analyse the behaviour of global positioning satellites in these latitudes.
	13	Drafting of model documents for operational implementation of ADS-B • Drafting of model advisory circulars for	Regional projects RLA/99/901 RLA/06/901 States	Publications in support of ADS-B implementation	**Valid** December 2016 All model publications on operational use of ADS-B

IMPLEMENTATION PHASE	TASK	ACTIVITY	RESPONSIBLE PARTY	DELIVERABLE	STATUS
		airworthiness approval and operation with ADS-B • Drafting of model AIC to report ADS-B implementation plans • Develop model AIP supplement containing standards and procedures applicable to ADS-B, in accordance with the operational use defined • Review the procedural handbooks of ATS units, in accordance with the operational use defined for ADS-B			
	14	Publication of documents in support of ADS-B operational implementation	States	Publication of documents	**Valid** December 2017
	15	Training programme: • Establishment of a training programme for ATS personnel on the operational implementation of ADS-B, in accordance with the operational use defined	Regional projects RLA/99/901 RLA706/901 States	Training programme	**Valid** December 2016

IMPLEMENTATION PHASE	TASK	ACTIVITY	RESPONSIBLE PARTY	DELIVERABLE	STATUS
		• Establishment of a training programme for airworthiness and operation inspectors on the operational implementation of ADS-B, in accordance with the operational use defined • Establishment of a training programme for pilots on the operational implementation of ADS-B, in accordance with the operational use defined			
PHASE III **ADS-B IMPLEMENTATION MONITORING**	16	ADS-B implementation monitoring	SAM/IG Secretariat	ADS-B implementation monitoring	**Valid** 2018

APPENDIX D

<table>
<tr><th>SAM Region</th><th>PROJECT DESCRIPTION (PD)</th><th colspan="2">PD N° C2</th></tr>
<tr><th>Programme</th><th>Project Title</th><th>Starting Date</th><th>Ending Date</th></tr>
<tr><td>ATM Automation and Situational Awareness
(Programme Coordinator:
Onofrio Smarrelli)</td><td>Improve ATM Situational Awareness in the SAM Region

Project Coordinator: Paulo Vila (Peru)
Contributing experts: José Rubira, Marcos Vidal and Jorge Otiniano (Peru); Javier Vittor (Argentina), André Jansen (Brazil)</td><td>October 2011</td><td>May 2015</td></tr>
<tr><td>Objective</td><td colspan="3">Develop guidelines supporting the implementation of improvements in the situational awareness of ATS units in the South American Region</td></tr>
<tr><td>Scope</td><td colspan="3">Guidelines supporting the implementation of various applications, such as common traffic visualization, common meteorological conditions visualization and communications in general
• Analysis of the current surveillance infrastructure and identification of necessary improvements to support en route and terminal airspaces, airspace classification, PBN and ATFM
• Implementation of ADS-B, ADS-c and/or MLAT surveillance systems at selected airspaces
• Minimum common electronic information and data bases required in support of decision-making process and alert systems towards an interoperable situational awareness among centralized ATFM units
• Implement flight plan data process systems (new FPL format) and data communications tools among ACC´s
• Implement advanced automation support tools to contribute towards the sharing of aeronautical information</td></tr>
<tr><td>Metrics</td><td colspan="3">Drafting of following documents:
• Regional surveillance strategy for the implementation of systems in support of improvement of situational awareness – revised
• Evaluation of the surveillance systems coverage in the SAM Region - completed
• Guideline on technical/operational considerations for ADS-B implementation – completed
• Guideline on technical/operational considerations for MLAT implementation - completed
• Guideline on technical considerations in support of ATFM implementation – completed
• Guideline for the presentation of MET products in graphic fomat - completed</td></tr>
<tr><td>Strategy</td><td colspan="3">• All tasks will be conducted by experts nominated by States and organizations of the SAM Region members of the Project Improve ATM situational awareness in the SAM Region, under management of the project coordinator. Communications among project members, as well as between the project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet.
• Once studies are completed, the results will be submitted to the ICAO programme coordinator as a final consolidated document for its analysis, review, approval and presentation at the GREPECAS PPRC</td></tr>
</table>

Goals	• Regional surveillance strategy for the implementation of systems in support to situational awareness improvement for July 2012 (completed) • Evaluation of SAM surveillance systems coverage for October 2012 (completed) • Guideline on technical/operational considerations for ADS-B implementation for June 2012 (completed) • Guideline for the drafting of SIGMET in graphic format (March 2013) (completed) • Guideline for technical/operational considerations for MLAT implementation for March 2015 • Guideline for technical considerations in support of ATFM implementation • Action plan for ADS-B implementation in the SAM Region (November 2014)
Justification	• Improve situational awareness has been identified as a great support for ATM, contributing in the increase of safety and in flight efficiency • In addition, a close relationship with the other programmes and their respective projects is necessary, with the aim of collecting the operational requirements demanded by the mentioned applications and their respective tentative implementation dates • This project contributes to the implementation of modules B0 ASUR, B0 SURV, B0 NOPS and B0 AMET of the *Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)*
Related Projects	• Air Navigation Systems in Support of PBN • Automation • ATFM • ATN Ground-ground and Air-ground Applications

Project Deliverables	Relationship with Performance Based Regional Plan aligned with ASBU	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Evaluation of surveillance infrastructure and identification of surveillance systems improvements					
Evaluation of current surveillance systems coverage in the SAM Region	PFF SAM CNS 04 B0 ASUR	Paulo Vila (Peru)		October 2012	Presented as Appendix to the Guideline on technical/operational considerations for ADS-B implementation.
Drafting of regional plan for ADS-B and MLAT implementation					
Guideline on technical/ operational considerations for ADS-B implementation	PFF SAM CNS 04 B0 SURF B0 ASUR	José Rubira (Peru) Marco Vidal (Peru)		October 2012	The Guideline includes comments from Brazil, Chile and Guyana, presented through SAM/IG/11-WP/06. The Meeting approved the Guide. Peru will later include considerations to determine the values recommended for NIC, SIL and NAC for operational application.
Guideline on technical/ operational considerations for MLAT implementation	PFF SAM CNS 04 B0 SURF B0 ASUR	(Brazil)		March 2015	The Guideline has not been started, as MLAT installation in Brazil is being awaited for.

1 ***Gray**: Activity has not started*
***Green**: Activity has or will deliver planned milestone as scheduled*
***Yellow**: Activity is behind schedule on milestone, but still within acceptable parameters to deliver milestone on time*
***Red**: Activity has failed to deliver milestone on time, mitigation measures need to be identified and implemented*

Project Deliverables	Relationship with Performance Based Regional Plan aligned with ASBU	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Guideline on technical considerations in support of ATFM implementation	PFF SAM ATM 05 B0 NOPS	Pending designation		March 2015	The guideline will base itself on the CAR/SAM ATFM Manual approved through GREPECAS Conclusion 16/35. The ATFM Guide is being awaited for in order to define the operational requirements enabling the drafting of this Guideline.
Guideline for the presentation of MET products in graphical format	PFF SAM MET 03 B0 AMET	Jorge Otiniano (Peru)		2013	The document was delivered to the Secretariat (MET) for its review by the corresponding meteorology specialists.
Action plan for regional ADS-B implementation	BO 84	Paulo Vila (Peru)		October 2014	The action plan will be drafted by experts from Brazil and Peru.
Resources necessary	Experts in the carrying out of the deliverables				

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Agenda Item 8 Other matters

8.1 Under this agenda item, the following papers were analysed:

a) WP/14 – *Amendment 6 ATM-Air Traffic Management – Doc 4444* (presented by the Secretariat);
b) WP/28 – *Letter of operational agreement between the radio communication stations of Ponta Pora (Brazil) and Pedro Juan Caballero* (presented by Paraguay);
c) IP/04 – *Follow-up to missing flight plans, review and analysis of causes and proposal of corrective measures to resolve this problem* (presented by Argentina);
d) IP/14 – *Exception to the insertion of the alternate aerodrome* (presented by IATA);
e) IP/15 – *Strategic lateral offset procedures (SLOP);*
f) IP/16 – *FPL errors* (presented by IATA); and
g) IP/18 – National Air Navigation Plan of Argentina (presented by Argentina).

Loss of flight plans

8.2 The Meeting took note of the information presented by Argentina and Brazil regarding lost FPLs, especially for Aerolíneas Argentinas flights to Barcelona. Since FPLs arrived to destination, except for Casablanca, and it was shown that traffic originating in Argentina had been relayed by Brazil to Dakar and Madrid, the Regional Office was requested to inform the corresponding Office in Nairobi about this situation. Likewise, Brazil would contact the aforementioned switching centres in order to collect similar information to that presented at this meeting.

Exception in the insertion of alternate aerodromes

8.3 The Meeting reviewed IP/14, presented by IATA, concerning exceptions to the selection and insertion of the alternate aerodrome in the flight plan, pursuant to ICAO Doc 4444 and Annex 6, for flights specifically operating to the United States. In this regard, the Meeting agreed that the following procedure should be included in the respective AIPs so that the different configurations of FPL automated centres would not prevent airlines from benefitting from this exception.

"Airlines operating to the United States that will apply exceptions to the insertion of the alternate aerodrome shall insert "ZZZZ" in box 16 of the FPL and specify ALTN//NIL in box 18."

8.4 Accordingly, the Meeting formulated the following conclusion:

Conclusion SAM IG/14-18 Exception in the insertion of alternate aerodromes

That:

a) Airlines operating to the United States that will apply exceptions to the insertion of the alternate aerodrome, insert "ZZZZ" in box 16 of the FPL and specify ALTN//NIL in box 18.

b) States include such procedures in the respective AIPs.

Errors in flight plans

8.5 The Meeting took note that FPL errors and duplications continued to occur. Accordingly, States were urged to ensure reception of FPLs in electronic format via AFTN, AMHS or INTERNET.

8.6 According to IATA, a series of reports were submitted by States and airlines providing information on different types of ATS incidents resulting from FPL errors, rejections, lost FPLs, etc.

8.7 The analysis conducted in coordination with some States and airlines revealed that the initial cause of lost and duplicated FLPs, or FPL errors was the human factor, especially the AIM officer.

8.8 In order to reduce these and other possible subsequent events, IATA is encouraging airlines and States to use the latest technology available on both sides to delegate to duly equipped airlines the transmission of FPLs and, where applicable, message updates to report delays (DLA), changes (CHG), and cancellations (CNL), directly from the airline operations or dispatch control centre, thus reducing the possibility of human error.

8.9 The Meeting analysed the situation and proposed that States sign operational agreements with the airlines to define responsibilities and tasks concerning the completion of flight plan forms directly by said airlines.

Amendment 6 to the Procedures for Air Navigation Services – Air traffic Management (Doc 4444)

8.10 The Meeting noted that, on 29 April 2014, the Air Navigation Commission, acting by delegation of powers, approved Amendment 6 to the 15th Edition of the *Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444*), effective 13 November 2014. The President of the Council, on behalf of said body and in accordance with the established procedure, approved the amendment on 20 June 2014. The ICAO-NET website (http://portal.icao.int) contains the text of the amendment, which is attached to the electronic version of State Letter AN 13/2.1-14/48, and all other relevant documentation. Amendment 6 to the PANS-ATM - Doc 4444 is shown in **Appendix A** to this part of the report.

8.11 Amendment 6 originated from proposals of the Separation and airspace safety panel (SASP), the Operational data link panel (OPLINKP), the Special international volcanic ash task force (IVATF), and the Aerodrome Panel (AP). The nature and scope of the proposed amendment are related to:

a) Controller-pilot data link communications (CPDLC) and "in trail" procedures (ITP) to facilitate en-route climb and descent in oceanic and remote continental airspace, where lack of air traffic service (ATS) surveillance coverage is a limiting factor;

b) Automatic dependent surveillance – Contract (ADS-C) and CPDLC to improve surveillance, flight tracking, and communications of aircraft operating in oceanic and remote areas, including timely and appropriate provision of search and rescue services;

c) Volcanic ash clouds, to improve coordination and operations related to pilot and controller procedures when the presence of volcanic ash clouds is notified or forecast;

d) Strategic lateral offset procedures (SLOP), to improve current offset capabilities so as to include micro-offsets, and introduce new procedures that will use modern aircraft capabilities to achieve offsets of tenths of nautical miles;

e) Terminal separation of 9.3 km (5NM) based on the required navigation performance (RNP), lateral separation with performance-based navigation (PBN), and VOR/GNSS lateral separation; and

f) The subsequent amendment of PANS-ATM provisions derived from Amendment 11 to Annex 14 – *Aerodromes*, Volume I – *Aerodrome design and operations*, concerning air traffic control (ATC) phraseology related to runway surface condition and aircraft braking action.

8.12 The Meeting felt that the main sections of the approved Amendment 6 to the 15th edition of the *Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444*) that might have some impact in the SAM region were as follows:

a) Data link communications initiation procedures (item 4.15).
b) Lateral separation using flyover waypoint (5.4.1.1.4).
c) Lateral separation using GNSS (5.4.1.2.1.2).
d) Lateral separation of aircraft on parallel or non-intersecting tracks or ATS routes, where RNAV 10 (RNP 10), RNP 4, RNP 2 are applied, or GNSS (5.4.1.2.1.6) is used.
e) Lateral separation of aircraft on intersecting tracks or ATS routes, where RNAV 10 (RNP 10), RNP 4, RNP 2 (5.4.1.2.1.7) are applied.
f) Lateral separation of departing and/or arriving aircraft, using instrument flight procedures – 5NM separation minima (5.4.1.2.1.4.1).
g) Longitudinal separation minima based on distance using ADS-B in-trail procedure (ITP) (5.4.2.7).
h) ATC phraseology related to GNSS operating condition and separation instructions (12.3.1.14 and 12.3.2.8).
i) ADS contracts in airspace where procedural separation is being applied (13.4.3.4.3.2).
j) Use of pre-formatted free-text CPDLC messages (14.3.4).
k) Strategic lateral offset procedures (SLOP) (16.5).
l) Use of letter G in box 10 of the flight plan (Appendix 2 to Doc 4444).
m) Use of letter G in box 10 of air traffic service messages (Appendix 3 to Doc 4444).
n) Series of CPDLC ITP messages (Appendix 5 to Doc 4444).

8.13 Taking into account the scope of Amendment 6 to the 15th edition of the *Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444*), the regulators, ANSPs and aircraft operators should take action as needed to implement the new procedures set forth in the aforementioned amendment. Accordingly, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-19 Implementation of Amendment 6 to the 15th edition of the *Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444*)

That SAM States take the following action to implement the new procedures foreseen in Amendment 6 to the 15th edition of the Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444):

a) Amend national standards and procedures, including compliance with the flight plan and

associated messages.
b) Amend aeronautical information publications.
c) Amend ATS unit procedures.
d) Amend crew procedures.
e) Amend ANS safety protocols.
f) Train crews, air traffic controllers, and aeronautical information operators.
g) Assess and, if necessary, modify ATC systems.

Strategic lateral offset procedures (SLOP)

8.14 The Meeting recalled that SLOP had been designed to mitigate the effects of wake turbulence of preceding aircraft, and to reduce the risk of mid-air collision. Previously, this type of strategic lateral deviations were limited to 1 and 2 miles to the right of the heading, in airspace with parallel route systems with 30 NM separation minima. In general, this referred to oceanic airspaces where a parallel route system was used.

8.15 The Meeting took note that Amendment 6 to the 15th edition of the Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444), based on the current capability of some of the most modern FMS to apply strategic lateral offsets in tenths of NM, defines the new offset values, where authorised, as:

- where the lateral separation minima or spacing between route centre lines is 55,5 km (30NM) or more: offsets to the right of the centre line relative to the direction of flight in tenths of a nautical mile up to a maximum of 3,7 km (2 NM); and
- where the lateral separation minima or spacing between route centre lines is 11,1 km (6 NM) or more and less than 55,5 km (30 NM): offsets to the right of the centreline relative to the direction of flight in tenths of a nautical mile up to a maximum of 0,9 km (0,5 NM).
- All deviations will be flown to the right of the route centre line.

8.16 With these changes in procedure, strategic lateral offsets will be significantly available in the airspace, specifically over land, thus the term 'Continental SLOP' used on some occasions.

8.17 According to amendment 6 to the PANS ATM, paragraph 16.5.1, the implementation of offsets in any particular airspace shall be coordinated among the States involved. In this sense, and in order to apply harmonised procedures in the Region, it is recommended that the application of these procedures be included in the regional agreement.

8.18 The Meeting felt that extensive adoption of SLOP in all airspace where applicable, in accordance with the procedures established in the PANS-ATM, should be a priority in SAM States, taking into account that it is an effective tool for operational mitigation of possible errors of controllers and pilots, mainly in bidirectional routes.

8.19 The Meeting noted that each State should assess the regional and national route network in its airspace in order to verify in what route segments SLOP could be applied, in accordance with the procedures established in the PANS-ATM.

8.20 Likewise, the Meeting discussed the feasibility of implementing SLOP under the new procedures, from the point of view of the pilot, taking into account a possible increase in workload resulting from the application of SLOP by route segment.

8.21 In view of the above, the Meeting formulated the following conclusion:

Conclusion SAM/IG/14-20 Implementation of the new SLOP foreseen in Amendment 6 to the 15th edition of the *Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444*)

That:

a) SAM States study the feasibility of applying the new SLOP foreseen in Amendment 6 to the 15th edition of the Procedures for air navigation services – Air traffic management (PANS-ATM, Doc 4444) and present their results to the SAM/IG/15 meeting;

b) IATA and SAM users study the feasibility of the aforementioned SLOP, from the point of view of the associated workload for pilots, and present their results to the SAM/IG/15 meeting.

Letter of operational agreement between radio communication stations of Ponta Pora (Brazil) and Pedro Juan Caballero (Paraguay)

8.22 The Meeting took note of the presentation made by Paraguay concerning a proposal to update the letter of operational agreement between the radio communication stations of Ponta Pora (Brazil) and Pedro Juan Caballero (Paraguay), with a view to improving coordination procedures between adjacent aerodromes, and as a contingency measure in case of failure of communication systems.

8.23 The delegations of Brazil and Paraguay coordinated as necessary to prepare the final version of the aforementioned letter of agreement, and to establish mechanisms for its entry into force.

National Air Navigation Plan of Argentina

8.24 The Meeting took note that Argentina, through the National Civil Aviation Administration (*Administración Nacional de Aviación Civil* - ANAC) as the designated aeronautical authority, and in compliance with ICAO guidelines, drafted the National Air Navigation Plan (PNNA) for Argentina. The document has been drafted with the intention of becoming the State policy on air navigation at national and international level. That is why it refers to airspace and airport operational requirements for the 2014-2025 period. Its purpose is to improve safety levels, as well as regularity, efficacy, and efficiency levels in the use of airspace and airport operations, thus increasing the availability of flight schedules and profiles.

8.25 The document is supplemented with the Action Plan for the Improvement of Communication, Navigation, and Surveillance Systems to meet short- and medium-term operational requirements for en-route and terminal area operations. It covers technological strategies to support operational requirements, and CNS facilities and services and the CNS strategy to support the new technologies applicable in Argentina, in accordance with the SAM Regional Air Navigation Plan, with a view to achieving the required regional and national integration.

8.26 Furthermore, this document contains airport development strategies related to aerodrome operational planning (AOP) and airport facilitation.

8.27 The Meeting was informed that ANAC, the ANSP, and the users had expressed the opinion that it would be very important for this document to be considered as the State air navigation policy. Consequently, this is a “draft” that will be submitted as soon as possible to the Head of the Cabinet, the Ministry of the Interior and Transportation, the Ministry of the Defence, so that their authorities may sign a joint resolution prioritising the improvements set forth in the document at the required government level.

8.28 The Meeting took note that the decision had been made to develop the system under the *Collaborative Decision-Making* (CDM) concept. Accordingly, air navigation service providers and the industry are currently the main partners in the development of any plan around the world. An example that illustrates the importance of the concept is the implementation of PBN (RNAV) in domestic airspace. Only collaboration ensures effective information sharing in the system, leading to the adoption of flexible and dynamic decisions at all times. Strategic and tactical teamwork among community members helps define service types and levels.

8.29 The PNNA contains the strategic guidelines for the development of air navigation in Argentina, and elaborates on the global ATM operational concept (Doc 9854) and on the recommendations of the International Civil Aviation Organization (ICAO) on this topic. It also provides short- (2014-2018), medium- (2018-2025) and long-term (beyond 2025) guidance to the various bodies and the aeronautical community for the formulation of action plans and projects under the responsibility of each stakeholder, aimed at the attainment of common objectives. This document impacts, and receives inputs from, the following areas: ATS, procedures, mapping, flight inspection, operating procedures, aeronautical information, international projects, certification of ground equipment and avionics, aircraft operator facilities, communications, navigation, surveillance, aeronautical meteorology, search and rescue, aeronautical infrastructure of ANAC, aeronautical and airport service providers, and users of the navigation system.

APPENDIX A

AMENDMENT No. 6

TO THE

PROCEDURES
FOR
AIR NAVIGATION SERVICES

AIR TRAFFIC MANAGEMENT

(Doc 4444)

INTERIM EDITION

The text of Amendment No. 6 to the PANS-ATM (Doc 4444) was approved by the President of the Council of ICAO on behalf of the Council on **20 June 2014** for applicability on **13 November 2014**. This interim edition is distributed to facilitate implementation of the amendment by States. Replacement pages incorporating Amendment No. 6 are expected to be distributed in October 2014. (State letter AN 13/2.1-14/48 refers.)

JUNE 2014

INTERNATIONAL CIVIL AVIATION ORGANIZATION

NOTES ON THE EDITORIAL PRESENTATION
OF THE AMENDMENT TO THE PANS-ATM

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1. ~~Text to be deleted is shown with a line through it.~~	text to be deleted
2. New text to be inserted is highlighted with grey shading.	new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.	new text to replace existing text

TEXT OF AMENDMENT 6 TO THE

PROCEDURES FOR AIR NAVIGATION SERVICES

AIR TRAFFIC MANAGEMENT

. . .

Chapter 1

DEFINITIONS

. . .

Insert new text as follows:

Free text message element. A message element used to convey information not conforming to any standardized message element in the CPDLC message set.

ITP aircraft. An aircraft approved by the State of the Operator to conduct in-trail procedure (ITP).

ITP distance. The distance between the ITP aircraft and a reference aircraft as defined by:

a) for aircraft on the same track, the difference in distance to an aircraft calculated common point along a projection of each other's track; or

b) for aircraft on parallel tracks, the distance measured along the track of one of the aircraft using its calculated position and the point abeam the calculated position of the other aircraft.

Note.— Reference aircraft refers to one or two aircraft with ADS-B data that meet the ITP criteria described in paragraph 5.4.2.7 and are indicated to ATC by the ITP aircraft as part of the ITP clearance request.

Pre-formatted free text message element. A free text message element that is stored within the aircraft system or ground system for selection.

Standardized free text message element. A message element that uses a defined free text message format, using specific words in a specific order.

Note.— Standardized free text message elements may be manually entered by the user or pre-formatted.

. . .

End of new text.

Chapter 4

GENERAL PROVISIONS FOR AIR TRAFFIC SERVICES

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4.15 DATA LINK COMMUNICATIONS INITIATION PROCEDURES

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4.15.4 Failure

~~In the case of an initiation failure, the originator of the data link initiation process shall be informed.~~

4.15.4.1 In the case of an initiation failure, the data link system shall provide an indication of the failure to the ATS unit and the flight crew.

4.15.4.2 The ATS unit shall establish procedures to resolve, as soon as practicable, data link initiation failures. Procedures should include, as a minimum, the following:

a) when a flight plan is available, verify that the aircraft identification, aircraft registration, and other details contained in the data link initiation request correspond with details in the flight plan, and where differences are detected make the necessary changes; or

b) when a flight plan is not available, create a flight plan with sufficient information in the flight data processing system, to achieve a successful data link initiation; then

c) arrange for the re-initiation of the data link.

4.15.4.3 The aircraft operator shall establish procedures to resolve, as soon as practicable, initiation failures. Procedures should include, as a minimum, that the pilot:

a) verify the correctness and consistency of the flight plan available in the FMS or equipment from which the CPDLC communication is initiated, and where differences are detected make the necessary changes;

b) verify the correct ATSU address; and

c) re-initiate data link.

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Chapter 5

SEPARATION METHODS AND MINIMA

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5.4 HORIZONTAL SEPARATION

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5.4.1 Lateral separation

5.4.1.1 LATERAL SEPARATION APPLICATION

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5.4.1.1.4 When an aircraft turns onto an ATS route via a flyover waypoint, a separation other than the normally prescribed lateral separation shall be applied for that portion of the flight between the flyover waypoint where the turn is executed and the next waypoint (see Figures 5-1 and 5-2).

Note 1.— For flyover waypoints aircraft are required to first fly over the waypoint before executing the turn. After the turn the aircraft may either navigate to join the route immediately after the turn or navigate to the next defined waypoint before re-joining the route. This will require additional lateral separation on the overflown side of the turn.

Note 2.— This does not apply to ATS routes that have turns using fly-by waypoints.

Note 3.— An example of a prescribed lateral separation minima based on a specific navigation performance can be found in 5.4.1.2.1.6.

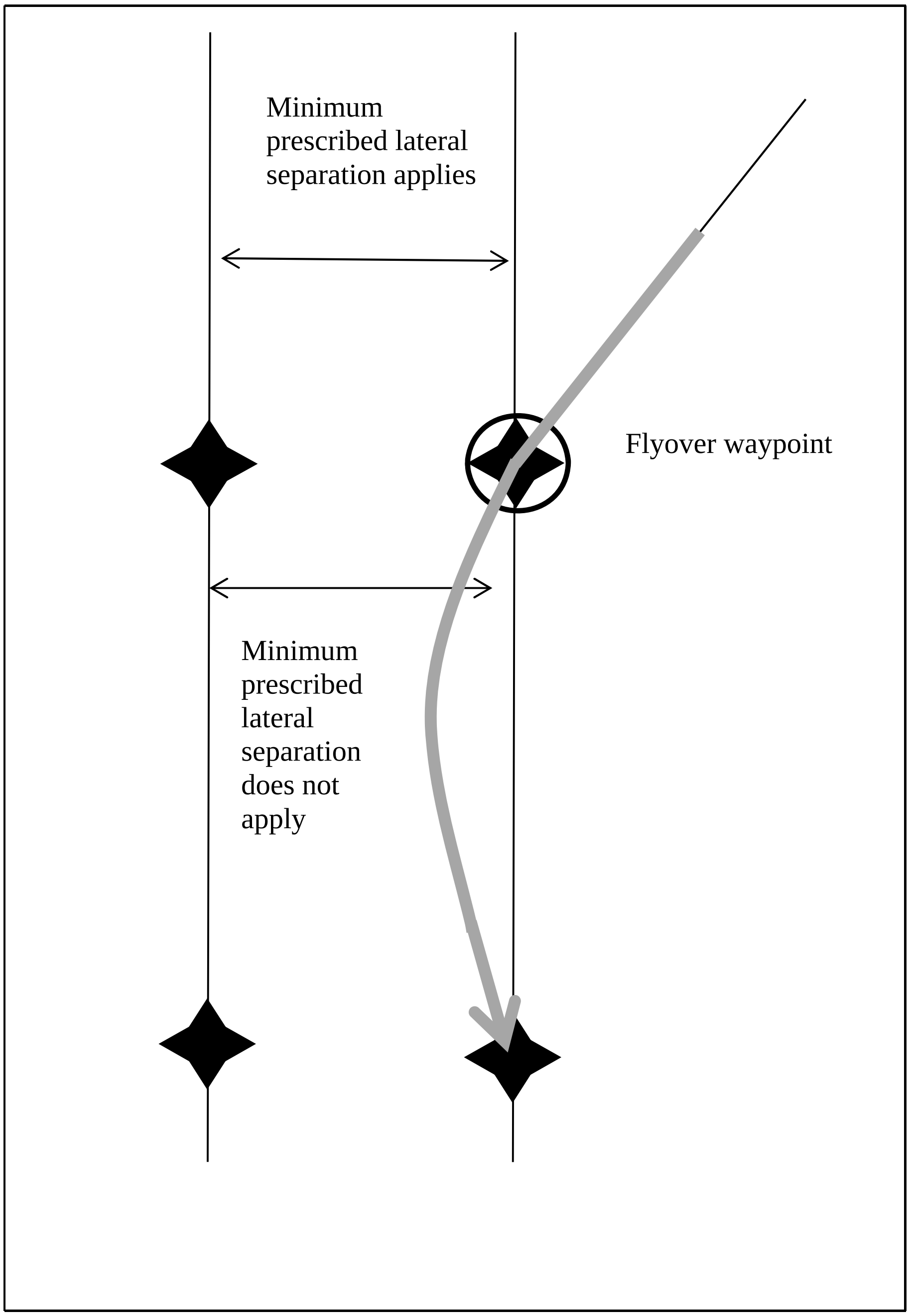

Figure 5-1: Turn over flyover waypoint (See 5.4.1.1.4)

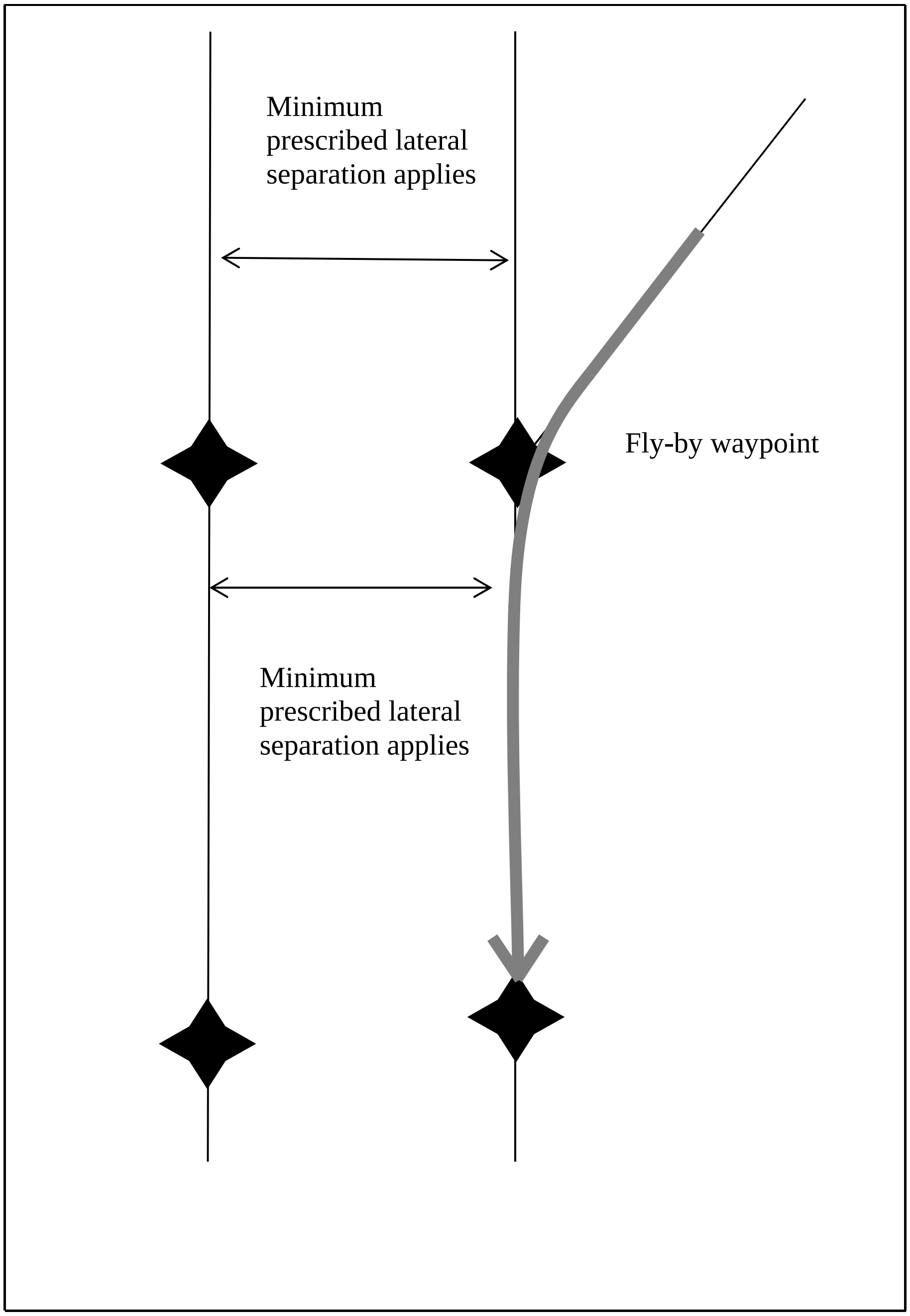

Figure 5-2: Turn at fly-by waypoint (See 5.4.1.1.4)

Renumber subsequent figures.

5.4.1.2 LATERAL SEPARATION CRITERIA AND MINIMA

5.4.1.2.1 Means by which lateral separation may be applied include the following:

5.4.1.2.1.1 *By reference to the same or different geographic locations.* By position reports which positively indicate the aircraft are over different geographic locations as determined visually or by reference to a navigation aid (see Figure 5-~~1~~3).

5.4.1.2.1.2 *By use of ~~the same navigation aid or method~~NDB, VOR or GNSS on intersecting tracks or ATS routes*. By requiring aircraft to fly on specified tracks which are separated by a minimum amount appropriate to the navigation aid ~~or method~~ employed. Lateral separation between two aircraft exists when:

a) *VOR:* both aircraft are established on radials diverging by at least 15 degrees and at least one aircraft is at a distance of 28 km (15 NM) or more from the facility (see Figure 5-~~2~~4);

b) *NDB:* both aircraft are established on tracks to or from the NDB which are diverging by at least 30 degrees and at least one aircraft is at a distance of 28 km (15 NM) or more from the facility (see Figure 5-~~3~~5);

c) ~~*dead reckoning (DR)*~~*GNSS/GNSS:* ~~both~~each aircraft ~~are~~is confirmed to be established on ~~tracks diverging by at least 45 degrees and at least one aircraft is at a distance of 28 km (15 NM) or more from the point of intersection of the tracks, this point being determined either visually or by reference to a navigation aid and both aircraft are established outbound from the intersection (see Figure 5-4)~~ a track with zero offset between two waypoints and at least one aircraft is at a minimum distance from a common point as specified in Table 5-1; or

d) ~~*RNAV operations*~~*VOR/GNSS:* ~~both~~ the aircraft ~~are~~using VOR is established on ~~tracks which diverge by at least 15 degrees and the protected airspace associated with the track of one aircraft does not overlap with the protected airspace associated with the track of the other aircraft. This is determined by applying the angular difference between two tracks and the appropriate protected airspace value. The derived value is expressed as a distance from the intersection of the two tracks at which lateral separation exists~~ a radial to or from the VOR and the other aircraft using GNSS is confirmed to be established on a track with zero offset between two waypoints and at least one aircraft is at a minimum distance from a common point as specified in Table 5-1.

	Aircraft 1: VOR or GNSS Aircraft 2: GNSS	
Angular difference between tracks measured at the common point (degrees)	FL010 – FL190 Distance from a common point	FL200 – FL600 Distance from a common point
15 – 135	27.8 km (15 NM)	43 km (23 NM)
The distances in the table are ground distances. States must take into account the distance (slant range) from the source of a DME signal to the receiving antenna when DME is being utilized to provide range information.		

Table 5-1

Note 1.— The values in the table above are from a larger table of values derived by collision risk analysis. The source table for separation of aircraft navigating by means of GNSS and VOR is contained in Circular 322, Guidelines for the Implementation of GNSS Lateral Separation Minima Based on VOR Separation Minima. *States may refer to Circular 322 for greater detail and other angular differences and separation distances.*

Note 2.— The values in the table above have accounted for distances from the common point encompassed by the theoretical turn area for fly-by turns as specified in the Minimum Aviation System Performance Standard: Required Navigation Performance For Air Navigation *(ED-75B/DO-236B), section 3.2.5.4 and fixed radius transition turns as defined in the* Performance-based Navigation (PBN) Manual *(Doc 9613).*

Note 3.— Guidance material for the implementation of GNSS lateral separation is contained in Circular 322, Guidelines for the Implementation of GNSS Lateral Separation Minima Based on VOR Separation Minima.

5.4.1.2.1.2.1 When aircraft are operating on tracks which are separated by considerably more than the ~~foregoing~~ minimum ~~figures~~in 5.4.1.2.1.2 a) and b), States may reduce the distance at which lateral separation is achieved.

5.4.1.2.1.2.2 Before applying GNSS-based track separation the controller shall confirm the following:

a) ensure that the aircraft is navigating using GNSS; and

b) in airspace where strategic lateral offsets are authorized, that a lateral offset is not being applied.

5.4.1.2.1.2.3 In order to minimize the possibility of operational errors, waypoints contained in the navigation database or uplinked to the aircraft flight management system should be used in lieu of manually entered waypoints, when applying GNSS-based track separation. In the event that it is operationally restrictive to use waypoints contained in the navigation database, the use of waypoints that require manual entry by pilots should be limited to half or whole degree of latitude and longitude.

5.4.1.2.1.2.4 GNSS-based track separation shall not be applied in cases of pilot reported receiver autonomous integrity monitoring (RAIM) outages.

Note.– For the purpose of applying GNSS-based lateral separation minima, distance and track information derived from an integrated navigation system incorporating GNSS input is regarded as equivalent to GNSS distance and track.

5.4.1.2.1.2.5 GNSS receivers used for applying separation shall meet the requirements in Annex 10, Volume I and be indicated in the flight plan.

Delete Figure 5-4.

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5.4.1.2.1.4 *Lateral separation of aircraft on published ~~adjacent~~ instrument flight procedures for arrivals and departures*.

5.4.1.2.1.4.1 Lateral separation of departing and/or arriving aircraft, using instrument flight procedures, will exist:

a) where the distance between any combination of RNAV 1 with RNAV 1 or, ~~Basic~~ RNP 1, RNP APCH ~~and/~~or RNP AR APCH tracks is not less than 13 km (7 NM); or

b) where the distance between any combination of RNP 1, RNP APCH or RNP AR APCH tracks is not less than 9.3 km (5 NM); or

~~b~~c) where the protected areas of tracks designed using obstacle clearance criteria do not overlap and provided operational error is considered.

Note 1.— ~~The 13 km (7 NM)~~distance values contained in a) and b) above ~~was~~were determined by collision risk analysis using multiple navigation specifications. Information on this analysis is contained in Circular 324, Guidelines for Lateral Separation of Arriving and Departing Aircraft on Published Adjacent Instrument Flight Procedures.

Note 2.— Circular 324 also contains information on separation of arrival and departure tracks using non-overlapping protected areas based on obstacle clearance criteria, as provided for in the Procedures for Air Navigation Services — Aircraft Operations, *Volume II* — Construction of Visual and Instrument Flight Procedures *(PANS-OPS, Doc 8168).*

Note 3.— Provisions concerning reductions in separation minima are contained in Chapter 2, ATS Safety Management, and Chapter 5, Separation Methods and Minima, Section 5.11.

Note 4.— Guidance concerning the navigation specifications is contained in the Performance-based Navigation (PBN) Manual *(Doc 9613).*

5.4.1.2.1.6 *Lateral separation of aircraft on parallel or non-intersecting tracks or ATS routes.* Within designated airspace or on designated routes, lateral separation between aircraft operating on parallel or non-intersecting tracks or ATS routes shall be established in accordance with the following:

a) for a minimum spacing between tracks of 93 km (50 NM) a navigational performance of RNAV 10 (RNP 10), RNP 4 or RNP ~~4~~2 shall be prescribed;~~ and~~

b) for a minimum spacing between tracks of 55.5 km (30 NM) a navigational performance of RNP 4 or RNP 2 shall be prescribed~~.~~;

c) for a minimum spacing between tracks of 27.8 km (15 NM) a navigational performance of RNP 2 or a GNSS equipage shall be prescribed. Direct controller-pilot VHF voice communication shall be maintained while such separation is applied;

d) for a minimum spacing between tracks of 13 km (7 NM), applied while one aircraft climbs/descends through the level of another aircraft, a navigational performance of RNP 2 or a GNSS equipage shall be prescribed. Direct controller-pilot VHF voice communication shall be maintained while such separation is applied; and

e) for a minimum spacing between tracks of 37 km (20 NM), applied while one aircraft climbs/descends through the level of another aircraft whilst using other types of communication than specified in d) above, a navigational performance of RNP 2 or a GNSS equipage shall be prescribed.

Note 1.— Guidance material for the implementation of the navigation capability supporting 93 km (50 NM), ~~and~~ 55.5 km (30 NM), 37 km (20 NM), 27.8 km (15 NM)~~,~~ and 13 km (7 NM) lateral separation is contained in the Performance-based Navigation (PBN) Manual *(Doc 9613)* and *Circular 334*, Guidelines for the Implementation of Lateral Separation Minima.

Note 2.— Guidance material for implementation of communication capability supporting 93 km (50 NM) and 55.5 km (30 NM) lateral separation is contained in the Manual on Required Communication Performance (RCP) *(Doc 9869). Information regarding RCP allocations for these capabilities is contained in RTCA DO-306/EUROCAE ED-122* Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard).

Note 3.— Existing implementations of the 55.5 km (30 NM) lateral separation minimum require a communication capability of direct controller-pilot voice communications or CPDLC and a surveillance capability by an ADS-C system in which a periodic contract and waypoint change and lateral deviation event contracts are applied.

Note 4.— See Appendix 2, ITEM 10: EQUIPMENT AND CAPABILITIES in relation to the GNSS prescribed in c), d) and e) above.

5.4.1.2.1.7 ~~*RNAV operations (where RNP is specified) on intersecting tracks or ATS routes*. The use of this separation is limited to intersecting tracks that converge to or diverge from a common point at angles between 15 and 135 degrees.~~*Lateral separation of aircraft on intersecting tracks or ATS routes.* Lateral separation between aircraft operating on intersecting tracks or ATS routes shall be established in accordance with the following:

a) an aircraft converging with the track of another aircraft is laterally separated until it reaches a lateral separation point that is located a specified distance measured perpendicularly from the track of the other aircraft (see Figure 5-6); and

b) an aircraft diverging from the track of another aircraft is laterally separated after passing a lateral separation point that is located a specified distance measured perpendicularly from the track of the other aircraft (see Figure 5-6).

This type of separation may be used for tracks that intersect at any angles using the values for lateral separation points specified in the table below:

Navigation	**Separation**
RNAV 10 (RNP 10)	93 km (50 NM)
RNP 4	55.5 km (30 NM)
RNP 2	27.8 km (15 NM)

5.4.1.2.1.8 When applying the 27.8 km (15 NM) separation minima specified in the table above, a GNSS, as indicated in the flight plan by the letter G meets the specified navigation performance.

Note 1.— Guidance material for the implementation of the navigation capability supporting 93 km (50 NM), 55.5 km (30 NM), and 27.8 km (15 NM) lateral separation is contained in the Performance-based Navigation (PBN) Manual *(Doc 9613) and Circular 334,* Guidelines for the Implementation of Lateral Separation Minima.

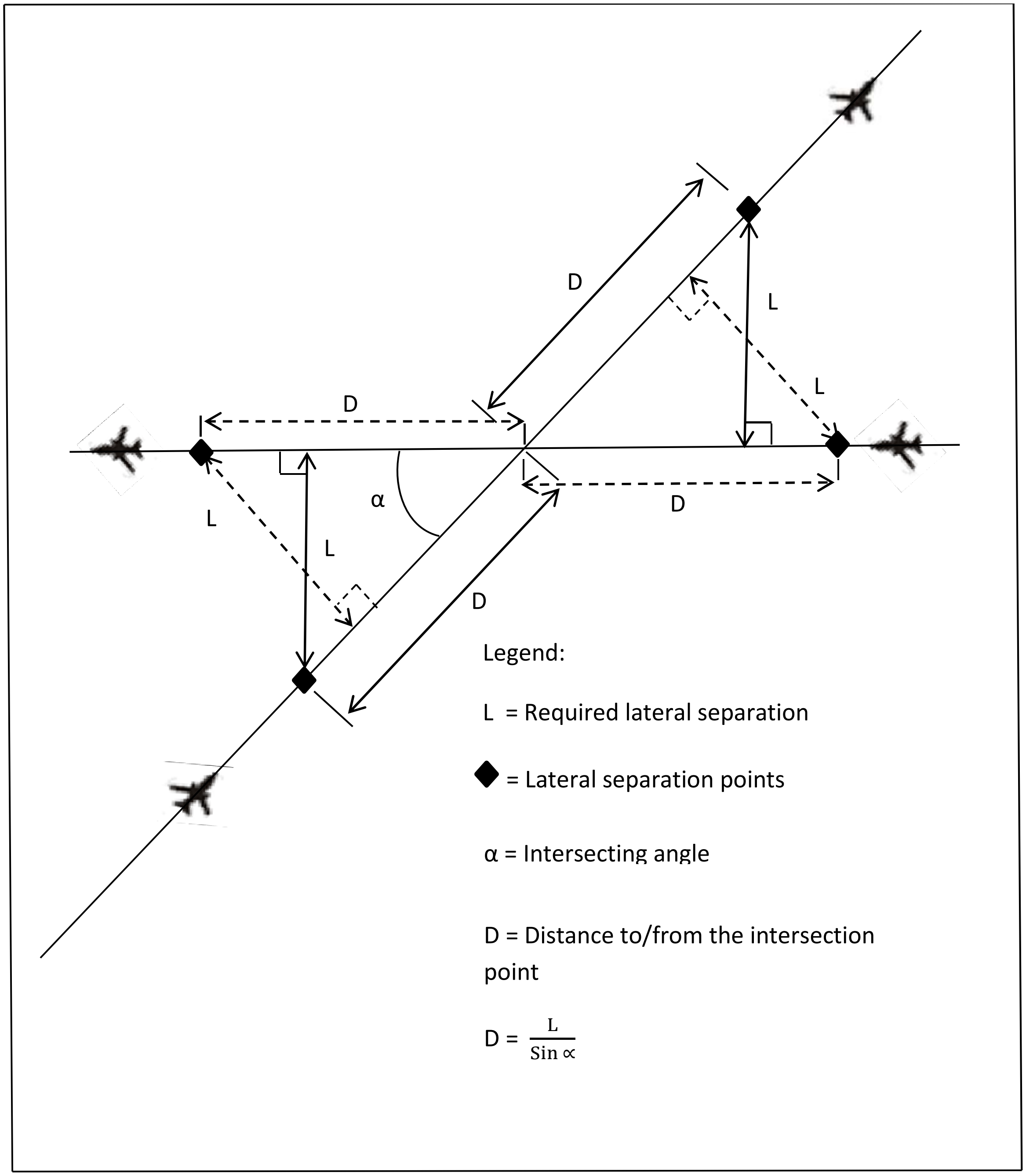

Figure 5-~~5~~6. Lateral separation points ~~and the area of conflict~~ (see 5.4.1.2.1.7~~.1~~)

Renumber subsequent figures.

~~5.4.1.2.1.7.1 For intersecting tracks, the entry points to and the exit points from the area in which lateral distance between the tracks is less than the required minimum are termed lateral separation points. The area bound by the lateral separation points is termed the area of conflict (see Figure 5-5).~~

~~5.4.1.2.1.7.2 The distance of the lateral separation points from the track intersection shall be determined by collision risk analysis and will depend on complex factors such as the navigation accuracy of the aircraft, traffic density, and occupancy.~~

~~*Note.— Information on the establishment of lateral separation points and collision risk analyses are contained in the* Manual on Airspace Planning Methodology for the Determination of Separation Minima *(Doc 9689).*~~

~~5.4.1.2.1.7.3 Lateral separation exists between two aircraft when at least one of the aircraft is outside the area of conflict.~~

5.4.1.2.1.~~8~~9 *Transitioning into airspace where a greater lateral separation minimum applies*. Lateral separation will exist when aircraft are established on specified tracks which:

a) are separated by an appropriate minimum; and

b) diverge by at least 15 degrees until the applicable lateral separation minimum is established;

providing that it is possible to ensure, by means approved by the appropriate ATS authority, that aircraft have the navigation capability necessary to ensure accurate track guidance.

. . .

5.4 HORIZONTAL SEPARATION

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5.4.2 Longitudinal separation

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Insert new text as follows:

5.4.2.7 LONGITUDINAL SEPARATION MINIMA BASED ON DISTANCE USING ADS-B IN-TRAIL PROCEDURE (ITP)

Note 1.— Attention is drawn to Circular 325, In-Trail Procedure (ITP) using Automatic Dependant Surveillance – Broadcast (ADS-B).

Note 2.— Guidance material on ITP equipment can be found in RTCA DO-312/EUROCAE ED-159 Safety Performance and Interoperability Requirements Document for the In-Trail Procedure in Oceanic Airspace (ATSA-ITP) Application *and Supplement and RTCA DO-317A/EUROCAE ED-194, Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Application (ASA) System*.

5.4.2.7.1 The routes or airspace where application of the in-trail procedure is authorized, and the procedures to be followed by pilots in accordance with the provisions of this Section (5.4.2.7), shall be promulgated in aeronautical information publications (AIPs).

5.4.2.7.2 ITP requests and clearances shall be communicated via a CPDLC message exchange only and in accordance with the appropriate message elements in Appendix 5.

5.4.2.7.3 Longitudinal separation between a climbing or descending ITP aircraft and reference aircraft shall be applied in accordance with 5.4.2.7.3.1, 5.4.2.7.3.2 and 5.4.2.7.3.3. An ITP aircraft shall not be separated simultaneously from more than two reference aircraft using the ITP separation minimum.

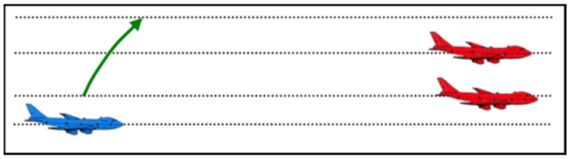
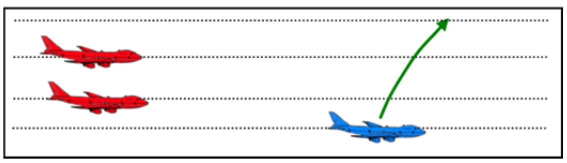
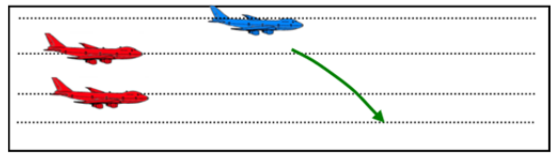
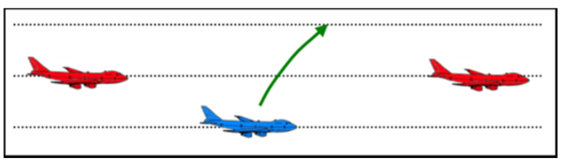
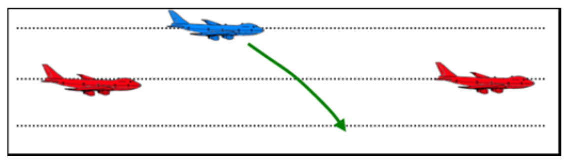
ITP "BEHIND" CLIMB (1 or 2 reference aircraft) 	ITP "BEHIND" DESCENT (1 or 2 reference aircraft) 
ITP "AHEAD OF" CLIMB (1 or 2 reference aircraft) 	ITP "AHEAD OF" DESCENT (1 or 2 reference aircraft) 
ITP COMBINED "BEHIND AND AHEAD OF" CLIMB 	ITP COMBINED "BEHIND AND AHEAD OF" DESCENT 
Note.– *In the diagrams above, the "ITP aircraft" is the aircraft to which the arrow indicating climb or descent is attached. Other aircraft in the diagrams are the "reference aircraft".*	

Figure 5-34. ITP flight level change scenarios (see 5.4.2.7.3)

Renumber subsequent figures accordingly.

5.4.2.7.3.1 An ITP climb or descent may be requested by the pilot provided the following ITP criteria are satisfied:

a) the ITP distance between the ITP aircraft and the reference aircraft shall be:

1) not less than 28 km (15 NM) with a maximum closing ground speed of 37 km/h (20 kt); or

2) not less than 37 km (20 NM) with a maximum closing ground speed of 56 km/h (30 kt);

b) the ITP on-board equipment shall indicate that the angle between the current tracks of the ITP aircraft and reference aircraft is less than 45 degrees;

c) the altitude difference between the ITP aircraft and any reference aircraft shall be 600 m (2 000 ft) or less;

d) the climb or descent shall be conducted at a rate of not less than 1.5 m/s (300 ft/min), or any higher rate when specified by the controller; and

e) the climb or descent shall be performed at the assigned Mach number. If no Mach number has been assigned by ATC, the ITP aircraft shall maintain the current cruise Mach number throughout the ITP manoeuvre.

Note.— These criteria are designed to ensure a minimum separation of 19 km (10 NM) between the ITP aircraft and the reference aircraft during the climb or descent.

5.4.2.7.3.2 A controller may clear an aircraft for an ITP climb or descent provided the following conditions are satisfied:

a) the ITP climb or descent has been requested by the pilot;

b) the aircraft identification of each reference aircraft in the ITP request exactly matches the Item 7 - aircraft identification of the corresponding aircraft's filed flight plan;

c) the reported ITP distance between the ITP aircraft and any reference aircraft is 28 km (15 NM) or more;

d) both the ITP aircraft and reference aircraft are either on;

1) same identical tracks and any turn at a waypoint shall be limited to less than 45 degrees; or

2) parallel tracks or same tracks with no turns permitted during the manoeuvre.

Note.— Same identical tracks are a special case of same track defined in 5.4.2.1.5 a) where the angular difference is zero degrees.

e) no speed or route change clearance shall be issued to the ITP aircraft until the ITP climb or descent is completed;

f) the altitude difference between the ITP aircraft and any reference aircraft shall be 600 m (2 000 ft) or less;

g) no instruction to amend speed, altitude or route shall be issued to any reference aircraft until the ITP climb or descent is completed;

h) the maximum closing speed between the ITP aircraft and each reference aircraft shall be Mach 0.06; and

i) the ITP aircraft shall not be a reference aircraft in another ITP clearance.

5.4.2.7.3.3 Following receipt of an ITP climb or descent clearance and before initiating the procedure, the pilot of the ITP aircraft shall determine that the ITP criteria referred to in 5.4.2.7.3.1 a) and b) are still being met with respect to the reference aircraft identified in the clearance and:

a) if the ITP criteria are satisfied, the pilot shall accept the clearance and commence the climb or descent immediately; or

b) if the ITP criteria are no longer satisfied, the pilot shall notify the controller and maintain the previously cleared level.

End of new text.

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Chapter 11

AIR TRAFFIC SERVICES MESSAGES

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11.4.3.4 MESSAGES CONTAINING INFORMATION ON AERODROME CONDITIONS

Note.— Provisions regarding the issuance of information on aerodrome conditions are contained in Chapter 7, 7.5.

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11.4.3.4.2 Information that water is present on a runway shall be transmitted to each aircraft concerned, on the initiative of the controller, using the following terms:

DAMP — the surface shows a change of colour due to moisture.

WET — the surface is soaked but there is no standing water.

~~WATER PATCHES — patches of standing water are visible.~~

~~FLOODED — extensive standing water is visible.~~

STANDING WATER — for aeroplane performance purposes, a runway where more than 25 per cent of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by water more than 3 mm deep.

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Chapter 12

PHRASEOLOGIES

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12.3 ATC PHRASEOLOGIES

12.3.1 General

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12.3.1.11 AERODROME INFORMATION	a) [*(location)*] RUNWAY SURFACE CONDITION RUNWAY *(number) (condition)*; b) [*(location)*] RUNWAY SURFACE CONDITION RUNWAY *(number)* NOT CURRENT; c) LANDING SURFACE *(condition)*;

d) CAUTION CONSTRUCTION WORK *(location)*;

e) CAUTION *(specify reasons)* RIGHT (*or* LEFT), (*or* BOTH SIDES) OF RUNWAY *[number]*;

f) CAUTION WORK IN PROGRESS (*or* OBSTRUCTION) *(position and any necessary advice)*;

g) RUNWAY REPORT AT *(observation time)* RUNWAY *(number) (type of precipitant)* UP TO *(depth of deposit)* MILLIMETRES. ~~BRAKING ACTION~~ ESTIMATED SURFACE FRICTION GOOD (*or* MEDIUM TO GOOD, *or* MEDIUM, *or* MEDIUM TO POOR, *or* POOR ~~*or* UNRELIABLE) [*and/or* BRAKING COEFFICIENT *(equipment and number)*~~];

h) BRAKING ACTION REPORTED BY *(aircraft type)* AT *(time)* GOOD (*or* MEDIUM to GOOD, *or* MEDIUM, *or* MEDIUM to POOR, *or* POOR);

~~i) BRAKING ACTION [*(location)*] *(measuring equipment used)*, RUNWAY *(number)*, TEMPERATURE [MINUS] *(number)*, WAS *(reading)* AT *(time)*;~~

~~j~~i) RUNWAY (*or* TAXIWAY) *(number)* WET [*or* ~~DAMP, WATER PATCHES, FLOODED *(depth)*~~ STANDING WATER, *or* SNOW REMOVED *(length and width as applicable)*, *or* TREATED, *or* COVERED WITH PATCHES OF DRY SNOW (*or* WET SNOW, *or* COMPACTED SNOW, *or* SLUSH, *or* FROZEN SLUSH, *or* ICE, *or* WET ICE, *or* ICE UNDERNEATH, *or* ICE AND SNOW, *or* SNOWDRIFTS, *or* FROZEN RUTS AND RIDGES)];

~~k~~j) TOWER OBSERVES *(weather information)*;

~~l~~k) PILOT REPORTS *(weather information)*.

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Circumstances	*Phraseologies*
12.3.1.14 GNSS SERVICE STATUS	a) GNSS REPORTED UNRELIABLE (*or* GNSS MAY NOT BE AVAILABLE [DUE TO INTERFERENCE]); 1) IN THE VICINITY OF *(location)* *(radius)* [BETWEEN *(levels)*]; or 2) IN THE AREA OF *(description)* (*or* IN *(name)* FIR) [BETWEEN *(levels)*]; b) BASIC GNSS (*or* SBAS, *or* GBAS) UNAVAILABLE FOR *(specify operation)* [FROM *(time)* TO *(time)* (*or* UNTIL FURTHER NOTICE)]; *c) BASIC GNSS UNAVAILABLE [DUE TO (*reason, e.g.* LOSS OF RAIM *or* RAIM ALERT)]; *d) GBAS (*or* SBAS) UNAVAILABLE; e) CONFIRM GNSS NAVIGATION; and *f) AFFIRM GNSS NAVIGATION. * Denotes pilot transmission.

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12.3.2 Area control services

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12.3.2.8 SEPARATION INSTRUCTIONS	a) CROSS *(significant point)* AT *(time)* [OR LATER (*or* OR BEFORE)]; b) ADVISE IF ABLE TO CROSS *(significant point)* AT *(time or level)*; c) MAINTAIN MACH *(number)* [OR GREATER (*or* OR LESS)] [UNTIL *(significant point)*];

d) DO NOT EXCEED MACH *(number)*;

e) CONFIRM ESTABLISHED ON THE TRACK BETWEEN *(significant point)* AND *(significant point)* [WITH ZERO OFFSET];

*f) ESTABLISHED ON THE TRACK BETWEEN *(significant point)* AND *(significant point)* [WITH ZERO OFFSET];

g) MAINTAIN TRACK BETWEEN *(significant point)* AND *(significant point)*. REPORT ESTABLISHED ON THE TRACK;

*h) ESTABLISHED ON THE TRACK;

i) CONFIRM ZERO OFFSET;

*j) AFFIRM ZERO OFFSET.

* Denotes pilot transmission.

Note.– When used to apply a lateral VOR/GNSS separation confirmation of zero offset is required. (see 5.4.1.2)

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Chapter 13

AUTOMATIC DEPENDENT SURVEILLANCE — CONTRACT (ADS-C) SERVICES

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13.4 USE OF ADS-C IN THE PROVISION OF AIR TRAFFIC CONTROL SERVICE

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13.4.3 Provision of ADS-C services

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13.4.3.4 GENERAL ADS PROCEDURES

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13.4.3.4.3 *ADS-C AGREEMENTS*

13.4.3.4.3.1 Except as provided for in 13.4.3.4.3.2, ~~I~~initial ADS-C agreements shall be determined by the ATS authority. Subsequent modifications to individual contracts may be made at the discretion of the~~controller based on prevailing traffic conditions and airspace complexity~~ ATS unit.

13.4.3.4.3.2 In airspace where procedural separation is being applied, ADS-C agreements shall, as a minimum, contain the following ADS contracts:

a) a periodic contract at an interval appropriate to the airspace requirements;

b) a waypoint change event contract;

c) a lateral deviation event contract;

d) a level range deviation event contract; and

e) a vertical rate change event contract for climb or descent, using a 27 m/s (5 000 ft/min) threshold.

Note 1.— Circumstances may dictate that periodic contract reporting rate might be increased on receipt of a lateral deviation or level range deviation event report.

Note 2.— A vertical rate change event specified at, for example, a negative vertical rate (i.e. a descent) exceeding 27 m/s (5 000 ft/min), may provide additional indication of an abnormal situation.

13.4.3.4.3.~~2~~3 When the application of specified separation minima is dependent on the reporting interval of periodic position reports, the ATC unit shall not establish periodic contracts with a reporting interval greater than the required reporting interval.

13.4.3.4.3.~~3~~4 Where an expected position report is not received within a prescribed time parameter, action shall be taken, as appropriate, to ascertain the position of the aircraft. ~~This may be achieved by the use of an ADS demand contract, CPDLC or voice communications, or receipt of a subsequent periodic report.~~

Note 1.— This may be achieved by the use of an ADS demand contract, CPDLC or voice communications, or receipt of a subsequent periodic report.

Note 2.— Requirements concerning the provision of an alerting service are contained in Chapter 9.

13.4.3.4.3.~~4~~5 An ADS-C aircraft observed to deviate significantly from its cleared flight profile shall be advised accordingly. Action shall be taken, as appropriate, to ascertain the position and intentions of the aircraft. Appropriate action shall also be taken if, in the opinion of the controller, such deviation is likely to affect the air traffic service being provided.

Note.— This may be achieved by the use of an ADS demand contract, CPDLC or voice communications.

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Chapter 14

CONTROLLER-PILOT DATA LINK COMMUNICATIONS (CPDLC)

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14.3 EXCHANGE OF OPERATIONAL CPDLC MESSAGES

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14.3.4 Free text messages

The use of free text messages by controllers or pilots, other than ~~pre-formatted~~standardized free text message~~s~~ elements, should be avoided. Standardized free text message elements should be pre-formatted and made available to controllers and pilots to facilitate their use.

Note 1.— While it is recognized that non-routine and emergency situations may necessitate use of free text, particularly when voice communications have failed, the avoidance of utilizing free text messages is intended to reduce the possibility of misinterpretation and ambiguity.

Note 2.— Provisions concerning the use of ~~pre-formatted~~standardized free text message~~s~~ elements are contained in Annex 10, Volume II, Chapter 8.

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Chapter 15

PROCEDURES RELATED TO EMERGENCIES, COMMUNICATION FALURE AND CONTINGENCIES

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15.8 PROCEDURES FOR ~~AN ATC~~ATS UNITS WHEN A VOLCANIC ASH CLOUD IS REPORTED OR FORECAST

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15.8.1 If a volcanic ash cloud is reported or forecast in the ~~FIR~~airspace for which the ~~ACC~~ATS unit is responsible, the ~~controller~~following actions should be taken:

a) relay ~~all~~pertinent information ~~available~~immediately to ~~pilots~~flight crews whose aircraft could be affected to ensure that they are aware of the ash cloud's current and forecast position and the flight levels affected;

b) accommodate requests for re-routing or level changes to the extent practicable;

~~b~~c) suggest ~~appropriate~~ re-routing ~~to the flight crew~~ to avoid ~~an~~or exit areas of ~~known~~reported or forecast ash clouds when requested by the pilot or deemed necessary by the controller; and

~~c~~d) ~~inform pilots that volcanic ash clouds are not detected by relevant ATS surveillance systems;~~when practicable, request a special air-report when the route of flight takes the aircraft into or near the forecast ash cloud and provide such special air-report to the appropriate agencies.

~~d) if the ACC has been advised by an aircraft that it has entered a volcanic ash cloud the controller should:~~

~~1) consider the aircraft to be in an emergency situation;~~

~~2) not initiate any climb clearances to turbine-powered aircraft until the aircraft has exited the ash cloud; and~~

~~3) not initiate vectoring without pilot concurrence.~~

Note 1.— Experience has shown that the recommended escape manoeuvre for an aircraft which has encountered an ash cloud is to reverse its course and begin a descent if terrain permits. The final responsibility for this decision, however, rests with the pilot-in-command as specified in the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds *(Doc 9691), 5.2.4.1.*

Note 2.— The final authority as to the disposition of the aircraft, whether to avoid or proceed through a reported or forecast ash cloud, rests with the pilot-in-command, as prescribed in Annex 2, 2.4.

15.8.2 ~~Each State should develop appropriate procedures and contingency routings for avoidance of volcanic ash clouds that meet the circumstances of the State and fulfill its obligations to ensure safety of aircraft.~~When the flight crew advises the ATS unit that the aircraft has inadvertently entered a volcanic ash cloud, the ATS unit should:

a) take such action applicable to an aircraft in an emergency situation; and

b) initiate modifications of route or level assigned only when requested by the pilot or necessitated by airspace requirements or traffic conditions.

Note 1.— General procedures to be applied when a pilot reports an emergency situation are contained in Chapter 15, 15.1.1 and 15.1.2.

Note 2.— Guidance material concerning the effect of volcanic ash and the impact of volcanic ash on aviation operational and support services is provided in Chapters 4 and 5 of Doc 9691.

~~15.8.3 Controllers should be trained in procedures for avoidance of volcanic ash clouds and be made aware that turbine-engine aircraft encountering an ash cloud may suffer a complete loss of power. Controllers should take extreme caution to ensure that aircraft do not enter volcanic ash clouds.~~

~~*Note 1.— There are no means to detect the density of a volcanic ash cloud or the size distribution of its particles and their subsequent impact on engine performance and the integrity of the aircraft.*~~

~~*Note 2.— Guidance material is provided in Chapters 4 and 5 of the* Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds *(Doc 9691).*~~

Chapter 16

MISCELLANEOUS PROCEDURES

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16.5 STRATEGIC LATERAL OFFSET PROCEDURES (SLOP) ~~IN OCEANIC AND REMOTE CONTINENTAL AIRSPACE~~

~~16.5.1~~*Note 1.— SLOP are approved procedures that allow aircraft to fly on a parallel track to the right of the centre line relative to the direction of flight~~.~~ to mitigate the lateral overlap probability due to increased navigation accuracy, and wake turbulence encounters. Unless specified in the separation* *standard, a~~A~~n aircraft's use of these procedures does not affect the application of prescribed separation standards.*

~~*Note 1.— The use of highly accurate navigation systems (such as the global navigation satellite system (GNSS)) by an increasing proportion of the aircraft population has had the effect of reducing the magnitude of lateral deviations from the route centre line and, consequently, increasing the probability of a collision, should a loss of vertical separation between aircraft on the same route occur.*~~

~~*Note 2.— The following incorporates lateral offset procedures for both the mitigation of the increasing lateral overlap probability due to increased navigation accuracy, and wake turbulence encounters.*~~

Note ~~3~~2.— Annex 2, 3.6.2.1.1, requires authorization for the application of strategic lateral offsets from the appropriate ATS authority responsible for the airspace concerned.

16.5.1 Implementation of strategic lateral offset procedures shall be coordinated among the States involved.

Note.— Information concerning the implementation of strategic lateral offset procedures is contained in the Implementation of Strategic Lateral Offset Procedures *(Circ 331).*

~~16.5.2 The following shall be taken into account by the appropriate ATS authority when authorizing the use of strategic lateral offsets in a particular airspace:~~

~~a) strategic lateral offsets shall only be authorized in en-route oceanic or remote continental airspace. Where part of the airspace in question is provided with an ATS surveillance service, transiting aircraft should normally be allowed to initiate or continue offset tracking;~~

~~b) strategic lateral offsets do not affect lateral separation minima and may be authorized for the following types of routes (including where routes or route systems intersect):~~

~~1) uni-directional and bi-directional routes; and~~

~~2) parallel route systems where the spacing between route centre lines is not less than 55.5 km (30 NM);~~

~~c) in some instances it may be necessary to impose restrictions on the use of strategic lateral offsets, e.g. where their application may be inappropriate for reasons related to obstacle clearance;~~

~~d) strategic lateral offset procedures should be implemented on a regional basis after coordination between all States involved;~~

~~e) the routes or airspace where application of strategic lateral offsets is authorized, and the procedures to be followed by pilots, shall be promulgated in aeronautical information publications (AIPs); and~~

~~f) air traffic controllers shall be made aware of the airspace within which strategic lateral offsets are authorized.~~

16.5.2 Strategic lateral offsets shall be authorized only in en-route airspace as follows:

a) where the lateral separation minima or spacing between route centre lines is 55.5 km (30 NM) or more, offsets to the right of the centre line relative to the direction of flight in tenths of a nautical mile up to a maximum of 3.7 km (2 NM); and

b) where the lateral separation minima or spacing between route centre lines is 11.1 km (6 NM) or more and less than 55.5 km (30 NM), offsets to the right of the centre line relative to the direction of flight in tenths of a nautical mile up to a maximum of 0.9 km (0.5 NM).

16.5.3 The routes or airspace where application of strategic lateral offsets is authorized, and the procedures to be followed by pilots, shall be promulgated in aeronautical information publications (AIPs). In some instances, it may be necessary to impose restrictions on the use of strategic lateral offsets, e.g. where their application may be inappropriate for reasons related to obstacle clearance. Route conformance monitoring systems shall account for the application of SLOP.

16.5.~~3~~4 The decision to apply a strategic lateral offset shall be the responsibility of the flight crew. The flight crew shall only apply strategic lateral offsets in airspace where such offsets have been authorized by the appropriate ATS authority and when the aircraft is equipped with automatic offset tracking capability.

~~16.5.4 The strategic lateral offset shall be established at a distance of 1.85 km (1 NM) or 3.7 km (2 NM) to the right of the centre line relative to the direction of flight.~~

Note 1.— Pilots may contact other aircraft on the inter-pilot air-to-air frequency 123.45 MHz to coordinate offsets.

Note 2.— The strategic lateral offset procedure has been designed to include offsets to mitigate the effects of wake turbulence of preceding aircraft. If wake turbulence needs to be avoided, ~~one of the three available options (centre line, 1.85 km (1 NM) or 3.7 km (2 NM) right offset) may be used~~an offset to the right and within the limits specified in 16.5.2 may be used.

Note 3.— Pilots are not required to inform ATC that a strategic lateral offset is being applied.

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Appendix 2

FLIGHT PLAN

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2. Instructions for the completion of the flight plan form

ITEM 10: EQUIPMENT AND CAPABILITIES

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A	GBAS landing system	J6	CPDLC FANS 1/A SATCOM (MTSAT)
B	LPV (APV with SBAS)	J7	CPDLC FANS 1/A SATCOM (Iridium)
C	LORAN C	K	MLS
D	DME	L	ILS
E1	FMC WPR ACARS	M1	ATC RTF SATCOM (INMARSAT)
E2	D-FIS ACARS	M2	ATC RTF (MTSAT)
E3	PDC ACARS	M3	ATC RTF (Iridium)
F	ADF	O	VOR
G	GNSS. If any portion of the flight is planned to be conducted under IFR it refers to GNSS receivers that comply with the requirements of Annex 10, Volume I *(See Note 2)*	P1–P9	Reserved for RCP
H	HF RTF	R	PBN approved *(See Note 4)*
I	Inertial Navigation	T	TACAN
J1	CPDLC ATN VDL Mode 2 *(See Note 3)*	U	UHF RTF
J2	CPDLC FANS 1/A HFDL	V	VHF RTF
J3	CPDLC FANS 1/A VDL Mode 4	W	RVSM approved
J4	CPDLC FANS 1/A VDL Mode 2	X	MNPS approved
J5	CPDLC FANS 1/A SATCOM (INMARSAT)	Y	VHF with 8.33 kHz channel spacing capability
		Z	Other equipment carried or other capabilities *(See Note 5)*

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Appendix 3

AIR TRAFFIC SERVICES MESSAGES

1. Message contents, formats and data convention

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Field Type 10 – Equipment and capabilities

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SINGLE HYPHEN

(a) *Radiocommunication, navigation and approach aid equipment and capabilities*

1 LETTER as follows:

N no COM/NAV/approach aid equipment for the route to be flown is carried, or the equipment is unserviceable

OR S Standard COM/NAV/approach aid equipment for the route to be flown is carried and serviceable (*see Note 1*)

AND/OR ONE OR MORE OF THE FOLLOWING LETTERS to indicate the serviceable COM/NAV/approach aid equipment and capabilities

A	GBAS landing system
B	LPV (APV with SBAS)
C	LORAN C
D	DME
E1	FMC WPR ACARS
E2	D-FIS ACARS
E3	PDC ACARS
F	ADF
G	GNSS. If any portion of the flight is planned to be conducted under IFR it refers to GNSS receivers that comply with the requirements of Annex 10, Volume I *(See Note 2)*
H	HF RTF
I	Inertial navigation
J1	CPDLC ATN VDL Mode 2 *(see Note 3)*
J2	CPDLC FANS 1/A HFDL
J3	CPDLC FANS 1/A VDL Mode A
J4	CPDLC FANS 1/A VDL Mode 2
J5	CPDLC FANS 1/A SATCOM (INMARSAT)
J6	CPDLC FANS 1/A SATCOM (MTSAT)
J7	CPDLC FANS 1/A SATCOM (Iridium)
K	MLS
L	ILS
M1	ATC RTF SATCOM (INMARSAT)
M2	ATC RTF (MTSAT)
M3	ATC RTF (Iridium)
O	VOR
P1–P9	Reserved for RCP
R	PBN approved *(see Note 4)*
T	TACAN
U	UHF RTF
V	VHF RTF
W	RVSM approved
X	MNPS approved
Y	VHF with 8.33 kHz channel spacing capability
Z	Other equipment carried or other capabilities *(see Note 5)*

Note 1.— If the letter S is used, standard equipment is considered to be VHF RTF, VOR and ILS, unless another combination is prescribed by the appropriate ATS authority.

Note 2.— If the letter G is used, the types of external GNSS augmentation, if any, are specified in Item 18 following the indicator NAV/ separated by a space.

Note 3.— See RTCA/EUROCAE Interoperability Requirements Standard for ATN Baseline 1 (ATN B1 INTEROP Standard – DO-280B/ED-110B) for data link services air traffic control clearance and information/air traffic control communications management/air traffic control microphone check.

Note 4.— If the letter R is used, the performance-based navigation levels that can be met are specified in Item 18 following the indicator PBN/ . Guidance material on the application of performance-based navigation to a specific route segment, route or area is contained in the Performance-based Navigation (PBN) Manual *(Doc 9613).*

Note 5.— If the letter Z is used, specify in Item 18 the other equipment carried or other capabilities, preceded by COM/ , NAV/ and/or DAT, as appropriate.

Note 6.— Information on navigation capability is provided to ATC for clearance and routing purposes.

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APPENDIX 5. CONTROLLER-PILOT DATA LINK COMMUNICATIONS (CPDLC) MESSAGE SET

1. Uplink messages

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Insert new table as follows:

Table A5-12. Spacing messages (uplink)

Number	*Message intent/use*	*Message element*	*URG*	*ALRT*	*RESP*
*	ATS acknowledgement for the pilot use of the in-trail procedure when the ITP aircraft is behind the reference aircraft. This message element is always concatenated with a vertical clearance.	ITP BEHIND *(aircraft identification of reference aircraft)*	N	L	R
*	ATS acknowledgement for the pilot use of the in-trail procedure when the ITP aircraft is ahead of the reference aircraft. This message element is always concatenated with a vertical clearance.	ITP AHEAD OF *(aircraft identification of reference aircraft)*	N	L	R
*	ATS acknowledgement for the pilot use of the in-trail procedure when the ITP aircraft is behind both reference aircraft. This message element is always concatenated with a vertical	ITP BEHIND *(aircraft identification of reference aircraft)* AND BEHIND *(aircraft identification of reference aircraft)*	N	L	R

	clearance.				
*	ATS acknowledgement for the pilot use of the in-trail procedure when the ITP aircraft is ahead of both reference aircraft. This message element is always concatenated with a vertical clearance.	ITP AHEAD OF *(aircraft identification of reference aircraft)* AND AHEAD OF *(aircraft identification of reference aircraft)*	N	L	R
*	ATS acknowledgement for the pilot use of the in-trail procedure when the ITP aircraft is behind one reference aircraft and ahead of one reference aircraft. This message element is always concatenated with a vertical clearance.	ITP BEHIND *(aircraft identification of reference aircraft)* AND AHEAD OF *(aircraft identification of reference aircraft)*	N	L	R
* Use UM169 when sending these messages as free text.					

Renumber subsequent tables accordingly.

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2. Downlink messages

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Insert new table as follows:

Table A5-24. Spacing messages (downlink)

Number	*Message intent/use*	*Message element*	*URG*	*ALRT*	*RESP*
*	Advisory indicating that the pilot has the ITP equipment, and provides the distance to the reference aircraft, including aircraft identification. This message element is always concatenated with a vertical request.	ITP (distance) BEHIND *(aircraft identification of reference aircraft)*	N	L	N
*	Advisory indicating that the pilot has the ITP equipment, and provides the distance from the reference aircraft, including aircraft identification. This message element is always concatenated with a vertical request.	ITP *(distance)* AHEAD OF *(aircraft identification of reference aircraft)*	N	L	N
*	Advisory indicating that the pilot has the ITP equipment, and provides the distance to both reference aircraft, including aircraft identification. This message	ITP *(distance)* BEHIND *(aircraft identification of reference aircraft)* AND *(distance)* BEHIND *(aircraft identification of*	N	L	N

	element is always concatenated with a vertical request.	*reference aircraft)*			
*	Advisory indicating that the pilot has the ITP equipment, and provides the distance from both reference aircraft, including aircraft identification. This message element is always concatenated with a vertical request.	ITP *(distance)* AHEAD OF *(aircraft identification of reference aircraft)* AND *(distance)* AHEAD OF *(aircraft identification of reference aircraft)*	N	L	N
*	Advisory indicating that the pilot has the ITP equipment, and provides the distance to one reference aircraft and distance from another reference aircraft, including aircraft identification. This message element is always concatenated with a vertical request.	ITP *(distance)* BEHIND *(aircraft identification of reference aircraft)* AND *(distance)* AHEAD OF *(aircraft identification of reference aircraft)*	N	L	N
* Use DM67 when sending these messages as free text.					

Renumber subsequent tables accordingly.

. . .

— END —

International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

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Ref.: AN 13/2.1-14/48 30 June 2014

Subject: Approval of Amendment 6 to the PANS-ATM

Action Required: a) Implementation of the amendment on 13 November 2014; b) Publication of any differences as of 13 November 2014

CORRIGENDUM OF 3 NOVEMBER 2014

After the approval of Amendment 6 to the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), editorial inconsistencies were identified relating to the controller-pilot data link communications (CPDLC) and automatic dependent surveillance — contract (ADS-C) procedures. Accordingly, the amended paragraphs that were approved by the Council on 20 June 2014 were rectified with the agreement of the Council on 8 October 2014, to read as follows:

paragraph 4.15.4.3 a) and b)	4.15.4.3 The aircraft operator shall establish procedures to resolve, as soon as practicable, initiation failures. Procedures should include, as a minimum, that the pilot: a) verify the correctness and consistency of the flight plan information available in the FMS or equipment from which the CPDLC communication is initiated, and where differences are detected make the necessary changes; b) verify the correct ~~ATSU~~ address of the ATS unit ~~address~~; ~~and~~then . . . ”
Paragraph 13.4.3.4.3.2 c), d) and e)	13.4.3.4.3.2 In airspace where procedural separation is being applied, ADS-C agreements shall, as a minimum, contain the following ADS contracts: . . . c) a lateral deviation event contract; and d) a level range deviation event contract~~;~~. ~~e) a vertical rate change event contract for climb or descent, using a 27 m/s (5 000 ft/min) threshold.~~”

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paragraph 14.3.4

14.3.4 Free text messages

The use of free text message~~s~~ elements by controllers or pilots, other than standardized free text message~~s~~ elements, should be avoided. Standardized free text message elements should be pre-formatted and made available to controllers and pilots to facilitate their use.

The above rectification has been included in the replacement pages incorporating Amendment 6 which will be forwarded to you.

— END —