



SAM/IG/17

INTERNATIONAL CIVIL AVIATION ORGANIZATION
South American Office

Regional Project RLA/06/901

**SEVENTEENTH WORKSHOP/MEETING OF THE SAM
IMPLEMENTATION GROUP**

(SAM/IG/17)

FINAL REPORT

Lima, Peru, 9 to 13 May 2016

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HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Seventeenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/17) was held at the premises of the ICAO South American Regional Office in Lima, Peru, from 9 to 13 May 2016, 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 15:00 hours, with appropriate breaks. The work was done with the Meeting as a Single Committee, Working Groups and *ad-hoc* Groups.

Mr. Fernando Hermoza, delegate from Peru, was unanimously elected as Chairman of the Meeting. Also, Francisco Almeida da Silva, delegate from Brazil, was elected as Vice-Chairman.

Mr. Onofrio Smarrelli, RO/CNS SAM Office, Lima, acted as Secretary assisted by Messrs. Roberto Arca, ATM/SAR Adviser and Mr. Roberto Sosa RO/ANS/SFTY.

In addition the Secretariat counted with the support of Messrs. Julio Pereira, Rapporteur of the PBN/AFTN Group; Omar Gouarnalusse, Rapporteur of the CNS Group; and Jorge Merino in the automation *ad-hoc* 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 and tasks for the States regarding the new Electronic Air Navigation Plan (eANP).

Agenda Item 2: Optimization of the SAM airspace.
a) PBN en-route.
b) PBN in Terminal Areas.
c) PBN proceedings.
d) Other business related to PBN

- Agenda Item 3: Implementation of Air Traffic Flow Management (ATFM).
- Agenda Item 4: Assessment of operational requirements to determine the implementation of improvements in communications, navigation and surveillance (CNS) capabilities for operations in route and terminal area.
- Agenda Item 5: Operational implementation of new ATM automated systems and integration of the existing systems.
- Agenda Item 6: Other business.

ii-6 ATTENDANCE

The Meeting was attended by 51 participants from 11 States of the SAM Region (Argentina, Brazil, Chile, Colombia, Ecuador, French Guyana, Panama, Paraguay, Peru, Uruguay and Venezuela), and as Observers 1 State from CAR Region (United States), 1 International Organization (IATA) and 2 Observers from the aeronautical industry (SITA and THALES). The list of participants is shown in page iii-1.

ii.7 LIST OF CONCLUSIONS

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Agenda Item 1: Follow-up to conclusions and decisions adopted by SAM/IG meetings and tasks for the States regarding the new Electronic Air Navigation Plan (eANP)

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

- a) WP/02 – *Follow-up to valid conclusions formulated by SAM/IG meetings and pending activities* (presented by the Secretariat); and
- b) WP/03 - *Progress in the development of the new electronic Air Navigation Plan (eANP) for the CAR/SAM Regions* (presented by the Secretariat).

Conclusions and decisions adopted by SAM/IG meetings

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

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

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

Progress in the development of the new electronic Air Navigation Plan (eANP) for the CAR/SAM Regions

1.4 Regarding this Agenda Item, the Meeting noted that On April 4 2016, the President of the ICAO Council approved the proposal for amendment to the new electronic Air Navigation Plan (eANP) for the CAR/SAM Regions.

1.5 Volume II of eANP has been submitted for comments of ANB and is expected to be approved before July 2016.

1.6 With reference to eANP Volume III, both Regional Offices are integrating the required information concerning performance based implementation regional plans of CAR (RPBANIP) and SAM (SAM IP) Regions, for the implementation planning of air navigation systems and their modernization, taking into consideration emerging programmes such as the ASBUs and associated technology roadmaps described in the GANP.

Agenda Item 2: Optimisation of the SAM airspace

- a) PBN en-route**
- b) PBN in terminal areas**
- c) PBN proceedings**
- d) Other business related to PBN**

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

- a) WP/04 - *ICAO/IATA/CANSO Performance-Based Navigation (PBN) Harmonization, Modernization and Implementation Meeting for the Caribbean (CAR) Region* (presented by the Secretariat);
- b) WP/05 - *Follow-up to the PBN implementation related to the goals of the Bogota Declaration* (presented by the Secretariat);
- c) WP/12 - *Status of optimization and harmonization of the Longitudinal Separation Minima in the SAM FIRs boundaries* (presented by IATA);
- d) WP/14 - *ADS-B data as a source for analytical solutions of traffic behaviour in terminal airspace* (presented by the Secretariat);
- e) WP/16 - *ATFM Project (ASBU: B0-SEQ, B0-FRTO, B0-NOPS and B0-ACDM)* (presented by Bolivia and Venezuela);
- f) WP/19 - *Aprobación operacional y de aeronavegabilidad para aeronaves militares* (presented by Venezuela) (Spanish only); and
- g) WP/20 - *Verification protocol to airspace design implementation based on PBN* - (presented by Uruguay).

Follow-up to the PBN implementation related to the goals of the Bogota Declaration

2.2 The Meeting recalled that the Second Meeting of Air Navigation and Flight Safety Directors of the SAM Region (Lima, Peru, 14 to 16 October 2015) discussed the status of PBN implementation in terms of the optimisation of routes, terminal areas (SIDs, STARs, CCO and CDO), PBN approach procedures, as well as the reduction on CO₂ emissions, among other issues, as part of the goals approved by RAAC/13 Meeting (Bogota, Colombia, 4 to 6 December 2013) through the Bogota Declaration (Conclusion RAAC/13-8 - *Implementation of air navigation and safety priorities*).

TMA PBN implementation strategy

2.3 The Meeting reviewed the TMA PBN implementation strategy for 2016 approved by the SAM/IG/16 meeting. These activities, such as the PBN workshops and the PANS/OPS workshop, were as follows:

- ✓ Monthly teleconferences (last Thursday of each month);
- ✓ 2 PBN implementation workshops in 2016;
- ✓ 1 PANS/OPS workshop;
- ✓ Bilateral and/or multilateral meetings, as needed.

2.4 In this regard, and taking into account the implementation dates foreseen for the main TMAs, the Secretariat conducted on 7 April 2016 a TELECON in preparation to PBN/IMP/1 workshop. The report on the TELECON was sent to PBN focal points. The First Workshop on PBN Implementation (PBN/IMP/1) was held in Lima, Peru, from 25 to 29 April 2016. The results of the workshop are shown

in **Appendix A** to this part of the report and the updated status of implementation is shown in **Appendix B** to this part of the report.

Updating of National PBN Plans and Action Plans

2.5 The activities associated to the implementation goals include the National PBN Implementation Plans, in accordance with Conclusion SAM/IG/14-5. Accordingly, SAM States must submit their updated National PBN Plans at SAM/IG meetings. The status of presentation of the updated national PBN plans is shown in **Table 1** below. Headquarters is requesting these plans in order to update those submitted in 2007. The Meeting took note of the importance of updating national plans to incorporate the modified dates. Five States of the Region have not yet updated their national plans. The Secretariat will circulate a State letter in response to the request of ICAO Headquarters in this regard.

2015 63%	ARG	BOL	BRA	CHI	COL	FGI	ECU	GUY	PAN	PAR	PER	SUR	URU	VEN
	YES	NO	YES	YES	NO	YES	YES	NO	NO	YES	YES	NO	YES	YES

Table 1 - States that have presented their updated national PBN plans

2.6 The Meeting took note that, as a supplement to PBN plans, SAM States should present their Action Plan for the application of PBN to the redesign of selected airspaces, using the model Action Plan approved to that end. The status of updating of Action Plans is shown in **Table 2**. During the PBN/IMP/1 Workshop it was noted that several States had changed the implementation dates. States that had not changed them yet should present them to the Secretariat during the Meeting.

2015 78%	ARG	BOL	BRA	CHI	COL	FGI	ECU	GUY	PAN	PAR	PER	SUR	URU	VEN
	YES	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	NO	YES	YES

Table 2 – States that have presented their updated Action Plans on PBN redesign of selected airspaces

2.7 The Meeting took note that, for different reasons, **Bolivia, Panama** and **Paraguay** were delayed in the implementation of their action plans, and that Colombia had not yet submitted the updated action plan as reported *via* teleconference at the PBN/1 Implementation Workshop.

En-route PBN

2.8 En-route PBN implementation is discussed at ATS/RO meetings, based on the route network version concept. The use of route network versions reflects the need for a periodic, integrated review to ensure that the best possible airspace structure is always in place within an integrated development concept.

2.9 The Secretariat conducted two TELECON on routes to advance on the results scheduled for Version 03 of the Routes Optimisation. The progress made in the implementation of RNAV routes in

the upper airspace has been 65%, thus attaining the 60% goal set in the Bogota Declaration. In order to have a more clear view, **Table 3** below shows the number of regional conventional and PBN upper airspace routes, as well as the percentage of PBN routes.

Total ATS routes in the upper airspace	Conventional routes	PBN routes	% of PBN routes implemented	Bogota Declaration indicator: % PBN routes
172	60	112	65%	60%

Table 3 - (Conventional and PBN) ATS routes in the upper airspace

2.10 As a result of the teleconferences, the following routes were implemented in the SAM Region:

ROUTE Implementation	IMPLEMENTATION DATE
UL667, G446, UL203, UL318, UM328, UM659, UM657 and UM775.	21/07/2016
UL404, UL542, UM414, UM424, UM542, UM776, UN420, UN525, UP528 and UP790.	18/08/2016
UN420, UN525, UP528 and UP790.	13/10/2016
ROUTES or segments	DELETION DATE
UB696, UG427, UG436, UG439, UG445 and UR551.	21/07/2016
UA320	18/08/2016
UA301, UA305, UA312, UA321, UA558, UB510, UB554, UM538, UR550, and UR559.	13/10/2016

PBN in TMA

2.11 The PBN/IMP/1 Workshop was held with the participation of one or more leading operators and IATA, which contributed to the collaborative decision-making process and to the improvement of projects in the Planning, Design, and Validation phases.

PBN implementation in Iguazu airport

2.12 Delegations of Argentina and Brazil agreed on the PBN implementation in the Iguazu airport, under following considerations:

- a) Argentina will implement APV procedures in both thresholds at the airport by October 2016. There will be no need for changes in the Letter of Agreement currently valid at Foz do Iguazu TMA.
- b) Argentina provided the Brazilian delegation with drafts on SID and STAR of Iguazu airport, with a view to harmonize procedures valid for Foz do Iguazu and Guarani airports.
- c) Brazil, who is responsible for the provision of ATC at Foz do Iguazu TMA, will examine the proposed drafts and provide their analysis to the Argentinean delegation.

- d) After analysis and agreement between both delegations, required changes will be made in the corresponding Letters of Agreement, establishing the date of publication and entry into force of SID and STAR at the Iguazu airport, as well as any changes in the Foz do Iguazu and Guarani procedures.

Implementation of SID, STAR and PBN approach procedures

2.13 The monitoring and control template for the implementation of SID, STAR, and PBN procedures was sent by the Secretariat to the PBN focal points of the States. Argentina, Bolivia, Brazil, Chile, Ecuador, French Guiana, Panama, Paraguay, Peru, Suriname, Uruguay and Venezuela updated status of implementation of arrival, departure and approach procedures, according to Conclusion SAM/IG/14-4 - *Follow-up of the PBN goals established in the Bogota Declaration*.

2.14 No significant progress was observed in this update that would achieve the commitment made in the General Assembly according to Resolution A37-11, so States should intensify efforts to reach that goal. The following table shows the current status of implementation.

Total of International Airports	Total thresholds	Total IAP APV or RNP AR or LNAV	ICAO A37-11 indicator % APV per IFR runway	
			Current regional	GOAL 2016
99	175	120	69%	100%

Table 4 – Compliance with resolution A37-11

2.15 The status of implementation of regional PBN SIDs/STARs achieved is shown in the following table, which shows that this goal of the Bogota Declaration has been exceeded.

Total Airports	Total SID/STAR	Total SID/STAR PBN	ICAO indicator: % of SID/STAR PBN in international airports	ICAO indicator: % of SID/STAR PBN in International airports
			April 2016	GOAL 2016
99	1680	1159	70,7 %	60%

Table 5 – Implementation of SID/STAR in international airports

Public PBN instrument procedures

2.16 Upon discussing the implementation of the RNP AR procedure at the Chapelco/Neuquén airport, the Meeting considered that the policy of SAM States should establish, as a general rule, the

publication of RNP AR procedures in the AIP, so that all users who had equipped aircraft and approved operations could use these procedures, which had proven to be more efficient and safe.

2.17 Besides, the publication of procedures in the AIP encourages a better situational awareness by air traffic controllers, taking into account that this allows knowing details of procedures applied by airspace users.

2.18 The Meeting also defined the scope of the public use of the procedure through its insertion in the AIP, using public formulation criteria that, in the case of RNP AR procedures, were foreseen in Doc 9905.

2.19 When the public criteria of said document are not used, civil aviation authorities should be capable of approving aircraft and operators by applying other formulation criteria (“*tailored*” procedure).

2.20 Furthermore, the CAAs should have safety oversight capabilities, with a view to ensuring that only approved aircraft and operators are authorised to fly “*tailored*” procedures.

2.21 The Meeting considered that this matter should be analysed in more detail during the PANS/OPS workshop with a view to harmonising the criteria applied by SAM States.

Application of RNAV 1 and RNP 1 specifications in SID, STAR and RNAV/ILS approaches

2.22 The Meeting considered that RNAV 1 and RNP 1 specifications should be applied in SID and STAR, in order to enable aircraft and operators trained for one or the other air navigation specification, to be capable of performing such procedures. Although RNAV 1 specification with GNSS required is similar to RNP 1 specification, there are aircraft that still not count with RNP 1 in its operating specifications.

2.23 Likewise, the Meeting recommended the application of RNAV 1 or RNP 1 specifications in RNAV/ILS approach procedures, considering that such specifications may be used up to FAF and that some operators still not have RNP APCH specification in its operating specifications.

Reduction of CO₂ emissions as a result of PBN implementation in TMAs

2.24 A reduction of **23,351 tonnes of CO₂** was obtained in 2015. It is expected that during 2016 more annual CO₂ savings will be achieved, if the implementation plans foreseen for this year are complied with. In such sense, several States have done a good job at calculating savings resulting from the optimisation of selected airspaces. Most States have used the ICAO IFSET tool; others have calculated such savings in collaboration with operators.

Activities and resources needed for the implementation of the Action Plan for the optimisation of the SAM airspace, with the support of Project RLA/06/901

2.25 The Ninth Meeting of the Project RLA/06/901 Coordination Committee approved the following activities to support the optimisation of the South American airspace:

Activity	Tentative date	Fellow-ships	Objective	Remarks
1) First Workshop on PBN implementation in TMAs	April 2016	1 per State	Contribute to, verify, and monitor PBN implementation activities in the TMAs of Argentina (COR; MDZ, BRC, FTE, NQN, IGR, CRD, SLA, TUC, MVD, RGL and USH), Brazil (Brasilia, Belo Horizonte and changes in Sao Paulo), Chile (Santiago - PAMPA SUR), Ecuador (Guayaquil), Peru (Arequipa, Cuzco, Juliaca and Puerto Maldonado), and Venezuela (Maiquetia).	CONCLUDED
2) Second Workshop on PBN implementation in TMAs	September 2016	1 per State	Contribute, verify, and monitor PBN implementation activities in the TMAs of Argentina (Baires), Bolivia (Cochabamba, La Paz, Santa Cruz), Brazil (PBN Sur), Chile (Santiago - PAMPA SUR), Panama (Panama), Paraguay (Asuncion), and Uruguay (Carrasco and Laguna del Sauce).	
3) Version 04 of the SAM Route Network	October 2016	----	Give continuity to the detailed study of the SAM ATS route network, with a view to developing Version 04 of the Route Network.	Hiring / "secondment" of 2 experts for a period of 3 weeks to develop the preliminary draft. Invitation to experts from States and users to participate in the study.
4) ATSRO/8	November 2016	1 per State	Preliminary review of Version 04 of the SAM Route Network (final version).	

2.26 The Meeting reviewed the activities approved by the Ninth meeting of the Coordination Committee of Project RLA 06/901, and analysed the impact of not approving the support to the PANS-OPS workshop that had been requested at the SAM/IG/16 meeting.

2.27 In this regard, the Meeting noted that, due to delays in the implementation of PBN design in several terminal areas, the activity involving the continuation of the detailed study of the SAM ATS route network for the development of Version 04 of the Route Network would be affected, as well as the holding of the ATSRO/8 meeting.

2.28 The Meeting also considered that the activities to be conducted under the projects defined for the period 2017-2019 should be considered within an operational concept and the PBIP, and that a study was required to proceed with the planned implementation.

2.29 Based on the foregoing, the Secretariat was requested to ask the Project Management to circulate a letter to the States requesting approval to modify the activities, without changing the approved budget. A modification is requested to activity 2 in terms of its objective and allocation of fellowships, and the replacement of activities 3 and 4 in the table above with activity 3 of the following table:

Activity	Tentative date	Fellowships	Objective	Remarks
2) Second Workshop on PBN implementation in TMAs and related PANS-OPS activities	September 2016	2 per State	<ul style="list-style-type: none"> • Analysis for PBN impementation in the TMAs of Argentina (Baires), Bolivia (Cochabamba, La Paz, Santa Cruz), Brazil (PBN Sur), Chile (Santiago - PAMPA SUR), Panama (Panama), Paraguay (Asuncion), and Uruguay (Carrasco and Laguna del Sauce). • PANS-OPS activities 	2 fellowships are requested per State
3) PBN route structure operational concept (ATS routes, SIDs and STARs) for the period 2017-2019)	October 2016	----	<p>Development of the PBN route structure operational concept (ATS routes, SIDs and STARs) for the period 2017-2019, including:</p> <ul style="list-style-type: none"> – Implementation strategy – Navigation specification to be applied en route and in TMAs – Metrics and indicators 	<p>Hiring / "secondment" of 2 experts for a period of 3 weeks to develop the operational concept.</p> <p>Invitation to experts of States and users to participate in the study, based on the profile designed by the Secretariat.</p>

2.30 To conclude this programming, it was decided that the SAM/IG/18 meeting would be forum to validate the operational concept for the implementation planned for the period 2017-2019.

ICAO/IATA/CANSO CAR PBN harmonisation, modernisation, and implementation meeting

2.31 The Meeting took note of the results obtained regarding PBN harmonization, modernization and implementation at the ICAO/IATA/CANSO meeting for the CAR Region, which was attended by 98 participants from CAR/SAM States, CANSO, IATA, IFALPA, Jeppesen, and ICAO NACC and SAM Regional Offices.

2.32 The main results of the meeting were as follows:

- a) Under a collaborative decision-making (CDM) process, in plenary and *ad-hoc* group sessions, ATCOs, procedure designers, airspace planners, regulatory bodies, as well as line pilots, general aviation, and military authorities reviewed the proposed PBN routes with a view to developing a new PBN route network for the CAR Region. The agreed PBN routes will be included in the final report of the meeting.
- b) States and ANSPs of the CAR and SAM Regions agreed to revise the Letters of Operational Agreement (LOAs) by 30 November 2016 in order to introduce the applicable longitudinal separation minimum of 40 NM or 20 NM between transferred air traffic operating in the CAR FIRs and the adjacent SAM FIRs. The status of the Letters of Agreement in the NAM/CAR Regions is shown in **Appendix C** to this part of the report. A figure illustrating the status of the agreements reached in the NAM/CAR//SAM Regions is shown in **Appendix D** to this this part of the report.
- c) The CAR States and the ANSPs also agreed to review the availability of restricted areas to aircraft operators for prompt implementation of the flexible use of airspace (FUA).
- d) All CAR States are committed to achieving the PBN implementation goals, as established in ICAO Assembly Resolution A37-11 and the Port of Spain Declaration.
- e) States will give special consideration to enhancing as much as possible the implementation of the Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) criteria in all SIDs and STARs linked to the upper airspace in order to maximise operational benefits.
- f) IATA proposed the implementation of Random Routing in Continental Airspace, taking into consideration that Advanced Flight Planning systems are able to plan from Wpt to Wpt, taking into account various factors as wind, costs, fuel. The random routing will allow the use of the Least Cost track for that day/flight. The following States accepted to host the trials: Trinidad and Tobago, Surinam and Guyana. It was mentioned that Amazonica FIR would be a suitable airspace to participate on the aforementioned trials. Brazil stated that it would agree to participate in the trials and would draft an action plan for that purpose, including the best days and periods to conduct such trials.

Status of optimisation and harmonisation of longitudinal separation minima in the SAM FIR boundaries

2.33 The Meeting recalled that regional application of optimised longitudinal separation minima had been discussed at the SAM/IG/15 meeting and at the ICAO/IATA/CANSO CAR PBN

harmonisation, modernisation and implementation meeting held in Fort Lauderdale (28 March - 1 April 2016).

2.34 The SAM/IG/15 meeting also considered that, since the longitudinal optimization procedures were established in Doc 4444, PANS ATM, they could be implemented as the Letters of Operational Agreement between adjacent FIRs were reviewed.

2.35 The optimization of longitudinal separation, either in a conventional or radar operational environment, is expected to improve operational efficiency in the SAM Region and reduce the workload of ATCOs and pilots, taking into account that aircraft would be “naturally separated” and very little intervention of the ATCOs would be needed to change the flight level of aircraft. This reduction in workload would result in a safety improvement.

2.36 Taking into consideration that the optimization of longitudinal separation from 10 minutes or 80 NM directly to a separation of 20 NM in a conventional environment could represent a significant impact on the operational procedures currently applied, the SAM/IG/15 has established a strategy to apply a gradual optimization, through an action plan developed by the SAM/IG and the States involved, using initially 40 NM longitudinal separation, that is double the separation minimum required under Doc 4444.

2.37 The 20 NM longitudinal separation minima would be the next phase of implementation, taking into account that the 40 NM separation would be applied "only" for the ATCOs adaptation, in order to allow application of 20 NM separation minima in the near future, as contained in Doc. 4444. Thus, the transition from separation of 40 NM to 20 NM could be made within a period of 1 year and may be already established in the same Letter of Agreement signed for a change from 80 NM separation minima to 40 NM. Although it is not a specific requirement of Doc. 4444, taking into consideration that 20 NM is a conventional separation, it is important to observe that a significant portion of the separation of 20 NM will be held in airspace with radar coverage.

2.38 Taking into consideration the existing radar coverage in the SAM Region and the projects on expansion of this coverage, it is natural the evolution for the separation of 10 NM, with a view of a better use of existing CNS infrastructure.

2.39 The impact of the 80 NM separation minima currently applied in the SAM FIR boundaries is equivalent to the absence of radar coverage for international flights, with the only exception of the boundary between the Ezeiza and Montevideo FIRs.

2.40 Longitudinal separation minima normally have a domino effect on flight operations, due to the need for coordination between ACCs responsible for ATS in neighboring FIRs. So it is important to have close coordination with the CAR Region in order to avoid the mentioned domino effect. In this sense, the ICAO/IATA/CANSO CAR PBN Harmonization, Modernization and Implementation Meeting made significant progress in the optimization of longitudinal separation in both the CAR Region and in the SAM States that had an interface with the CAR Region.

2.41 Most SAM States have already agreed on the Longitudinal Separation Optimization, as reflected in the figure shown in the **Appendix E** to this part of the report. The longitudinal separation status and the expected scenario by the end of 2016 are also shown in Appendix E to this part of the report.

2.42 Based on the foregoing, Argentina, Brazil, Colombia, Ecuador, Panama, Paraguay, Peru, Uruguay and Venezuela agreed to reduce the longitudinal separation from 80 to 40 NM in the FIRs under their jurisdiction as of 13 October 2016. With this implementation, 63% of States would have reduced the longitudinal separation to 40 NM.

2.43 During this period of time until the implementation date, the States mentioned in the previous paragraph will coordinate with the adjacent FIRs to exchange the modifications to the existing Letters of Agreement.

2.44 The Secretariat will consult with the States that did not participate in the meeting: Bolivia, Guyana, and Suriname, as to their availability to participate in this major step towards airspace optimization. Chile and French Guiana stated that they were not in a position to make a decision on this matter at this Meeting, thus leaving their airspaces with a longitudinal separation of 80 NM.

2.45 The Secretariat recalled that this reduction was applicable between GNSS-equipped aircraft. In case one of the aircraft or the two aircraft involved in the longitudinal separation lacked GNSS capabilities, then the reduction would not apply, and they would maintain a separation of 80 NM.

	ARG	BOL	BRA	CHI	COL	FGI	ECU	GUY	PAN	PAR	PER	SUR	URU	VEN
2016 63%	YES	NO	YES	NO	YES	NO	YES	NO	YES	YES	YES	NO	YES	YES

Table 6 - Reduction of longitudinal separation to 40NM

2.46 As a follow-up to the agreements made in such sense, the Secretariat, through the PBN teleconferences, will monitor on the LOAs update for the implementation of the separation of 40 NM for aircraft equipped with GNSS.

Other business related to PBN

ADS-B data as a source for analytical solutions of traffic behavior in terminal airspace

2.47 The Meeting welcomed Mr. Andreas Meyer, of the Integrated Aviation Analysis Section (IAA) at ICAO Headquarters, which provides constant cross-organizational support in the development of solutions and tools to analyze the effective, efficient, and safe use of airspace.

2.48 The Meeting noted that the IAA had identified the benefits of ADS-B data as a source for the analysis of traffic behaviour in terminal airspace. These solutions have already been successfully applied and implemented in areas with appropriate availability of ADS-B data but are limited in the SAM Region due to a relatively small number of ground-based receivers.

2.49 The Meeting took note that ADS-B is a system intended to broadcast the precise location of the aircraft via a digital link to other aircraft and air traffic control without the need for secondary radar. The system comprises GPS-equipped aircraft whose position can be determined through cross-validation of multiple on-board sources, and is capable of transmitting that position through a suitable ADS-B transmitter to a ground station (in the future, satellite-based receivers are perceived). The broadcast consists of information continually transmitted for monitoring by properly equipped aircraft or ground stations and is: automatic (requires no pilot inputs or external interrogation); dependent

(influenced by accurate position and velocity data from the airborne navigation system – e.g. GPS); and offers surveillance capabilities. ADS-B data is broadcast every half-second on a 1090 MHz datalink and may include:

- a) flight identification (flight number or call sign);
- b) ICAO 24-bit aircraft address (airframe code, that is unique);
- c) position (latitude/longitude);
- d) position integrity/accuracy (GPS horizontal protection limit);
- e) barometric and geometric altitudes;
- f) vertical rate (rate of climb/descent);
- g) track angle and ground speed (velocity);
- h) emergency indication (when emergency code selected); and
- i) special position identification (when IDENT selected).

2.50 The Meeting was also informed that, in addition to air navigation service providers, there were commercial companies collecting this type of data for various purposes, such as providing updates on scheduled flight progress to the public. FlightAware, based in Houston and founded in 2005, is a company providing flight tracking through a global solution integrating ADS-B data from over fifty air navigation service providers and their own worldwide network of ADS-B and Mode S receivers. FlightAware owns and operates this network at hundreds of airports, in conjunction with airport operators, and makes them available to professional users at no cost. The technical requirements to install the receivers are:

- a) an installation facility with a clear line of sight to the sky;
- b) a power source (110 – 240 V); and
- c) internet access (via Ethernet).

2.51 Furthermore, in addition to flight tracking using ADS-B data, information derived from radar data is added, where available, to enhance the position accuracy and updating frequency. This data is provided by air navigation service providers and governed through specific agreements with FlightAware. Increased sharing and exchange of such information is beneficial to the overall analysis of effective airspace usage.

2.52 The capability of ground stations to receive ADS-B signals from transmitting aircraft is limited to a 250 NM range, and is influenced by altitude and obstructing terrain. Availability and quality of ADS-B data depends on the number, placement, and availability of ground receivers. The FlightAware network covers most of Australia, Europe, the United States and Southern Canada but has limited availability in the South American Region (SAM), mostly around the lower part of the Brazilian Atlantic coast (detailed coverage information is available at <https://flightaware.com/adsb/coverage#data-coverage>).

2.53 It should be borne in mind that ADS-B data availability has additional limitations since not all aircraft are equipped with ADS-B transmitters, and if they are, equipped operators may elect not to make use of it. Air traffic in the SAM Region is a combination of commercial air traffic (as per ICAO Annex 6 - *Operation of Aircraft, Part I - International Commercial Air Transport - Aeroplanes, Part II - International General Aviation - Aeroplanes* and Part III - *International Operations - Helicopters*). Thus, the fleet composition is complex and not 100% ADS-B equipped.

Analytical solutions using ADS-B

2.54 The Meeting took note that the position of the aircraft that is broadcast through the ADS-B system enables the plotting of flight tracks relative to geographical position. An advantage of using a commercial provider of ADS-B data is the availability of historical data and the possibility to connect the live data at pre-determined intervals. Understandably, the amount of data is limited only by available funding to cover the applicable user fees.

2.55 The Meeting also took note that the IAA at ICAO Headquarters in Montreal had started using ADS-B data provided by FlightAware in 2014 for the initial purpose of analyzing traffic volumes at high density airports. Since then, IAA continued to develop and refine algorithms, creating applications based on such data and making them available to users on the integrated Safety Trend Analysis and Reporting System (iSTARS).

2.56 Most recent applications include the traffic analysis in conflict zones (and any other defined airspace) by providing information on the volume of re-routed traffic and the associated increase in flight sector distance and inferred fuel cost. The algorithms used in determining real time and approximated flight tracks are also used in the analysis related to the effective usage of navigation procedures around airports. Where appropriate coverage is available, the data supports calculation of traffic volume using a specific existing terminal navigation procedure and density distribution in the respective airspace. The same methodologies and concepts were successfully applied in another study to extend the radar based EUROCONTROL Arrival and Metering Area (ASMA) concept to an independent ADS-B based solution.

2.57 Presently, the development of solutions is limited to Europe, North America and parts of Asia for reasons of data availability, as mentioned in paragraphs 2.48 and 2.49. However, the applications developed by IAA can easily be applied to other regions when sufficient ADS-B coverage becomes available. Future satellite-based ADS-B receivers will greatly solve the limited coverage by ground-based receivers, but in the meantime, as their implementation timeline is not yet determined, the increased availability of ADS-B data requires increased installation of ground-based ADS-B receivers, and increased installation of ADS-B transmitters in aircraft.

2.58 It was clear to the SAM/IG/17 Meeting that, in order to analyse terminal airspace and procedure usage in the SAM Region, it was essential to increase the quantity and availability of ADS-B data. Currently, this can be achieved by increasing the number and coverage of ground-based receivers. Once the data is available, ICAO, through IAA, can apply the algorithms through their applications and thus, provide appropriate analysis of traffic analysis, density, and environmental to relevant stakeholders. The accuracy and details of such analysis can be greatly enhance by radar data provided through sharing mechanisms with the respective air navigation service providers.

2.59 During the presentation offered to the Meeting, ICAO Officer Andreas Meyer informed it would be possible to support interested States by installing some ADS-B receivers in airports, at no charge. At the same time, in order to supplement such analysis, it would be very beneficial that the State could supply ICAO with radar data. Thus, integrated data could be analysed using ICAO tools, and States could be provided with the result of such analysis for planning purposes.

2.60 States' requests to participate in such initiative will be made through the ICAO Regional Office, who will coordinate corresponding details with Headquarters after conducting a situational study. Required training for the State regarding the use of this tool will also be available.

2.61 The Meeting welcomed the presentation on this tool and made some inquiries on its mechanism and scope, understanding it was not for air traffic control purposes, but for planning.

Proposal for the creation of the SAM PANS-OPS Group

2.62 The Meeting was informed that, in recent years, technologies for optimising air operations have evolved significantly. This requires a review of the documented procedure design criteria to accommodate this evolution, as well as the incorporation of new navigation specifications that are consistent with on-board technology and that incorporate additional communication and surveillance requirements.

2.63 The Meeting recognised that the SAM Region had shown much determination, optimism, and human resource capacity, capable of assuming the commitments related to the technological developments required by global CNS/ATM. Likewise, the ICAO SAM Regional Office carries out regional projects and all their resulting activities to allow the South American Region to keep pace with global ATM developments.

2.64 The Meeting was aware that SAM States had a selected group of PANS-OPS experts with sufficient knowledge of the navigation specifications to be implemented, and capable of analysing both the relevant operational requirements and the reality of each State in order to adjust to such requirements.

2.65 In view of the foregoing, the Meeting agreed to propose to the Regional Office the creation of a regional group of PANS-OPS experts (or PANS-OPS panel), if so approved by the States, tasked, among other things, with:

- a) Analysing the proposals of amendment to ICAO documentation concerning PANS-OPS and related documents before they are individually submitted to the consideration of States;
- b) Analysing and proposing to ICAO the PANS-OPS training initiatives required in the Region;
- c) Creating a discussion forum on the feasibility of implementing new technologies in the Region;
- d) Facilitating the interpretation of navigation specification requirements for their adoption by the States;
- e) Identifying, interpreting, and assisting in the solution of queries concerning the interpretation of the technical concepts contained in the PANS-OPS;
- f) Encouraging technical cooperation among States in the PANS-OPS area;
- g) Any other activity derived from the terms of reference and the procedural handbook for the creation of the group or panel;
- h) Support the States of the Region on projects related to the designs contained in the PANS-OPS.

2.66 The Meeting acknowledged the initiative and considered that it would be very beneficial. Accordingly, it encouraged PANS-OPS designers of the States and airlines to establish a virtual discussion group, through teleconferences with the support of IATA and ICAO, to advance the discussion of the terms of reference and work programme, and to submit its results to the next PBN/IMP/2 Workshop. During this workshop, the convenience of including PANS-OPS Group under the terms of reference and work programme for SAM PBN Implementation Group should be analysed.

2.67 The Meeting expects that this group of PANS-OPS professionals will dispel any doubts and contribute to the technical discussions required in the Region, with a view to harmonize the application of Doc 8168 criteria and the publication of aeronautical charts, among other relevant subjects, as a result of the implementation of new specifications. In such sense, it would be essential to count with the perspective of the operators regarding flight profiles, FMS, CDO, CCO, navigation systems databases and other experience-based contributions not contemplated in the design theory, which could contribute towards bringing to a level of excellence the design of instrumental procedures in the SAM Region.

Operational and airworthiness approval of military aircraft

2.68 The Meeting was informed that the civil aviation authority of Venezuela had undertaken the task of sharing information with the military on the evolution of global aviation in terms of navigation. In turn, the latter have shown much interest on the subject and on the possibility of making the most of their last-generation aircraft, making it clear that they were not combat aircraft but aircraft used for other purposes. The military aviation in Venezuela has modern aircraft for both advanced training and transportation.

2.69 That is how the military aviation took the initiative to conduct RNAV approaches at civil airports that had procedures published. However, they expressed the concern regarding what was required for their aircraft to be duly approved to use PBN airspace together with civil aircraft, without causing any problem to either of them.

2.70 Upon reviewing this item, the Meeting agreed to request the participating States to assist in this request of Venezuela by providing information to the next SAM/IG meeting that would help to identify the safest way to handle these operations and what operational authorisation and/or approval mechanisms could be used for PBN-equipped military aircraft.

Verification protocol for PBN airspace design implementation

2.71 The Meeting took note that, according to Annex 19, Ap. 1 par. 6, States must implement documented processes and procedures to ensure that the personnel and organizations performing an aviation activity meet the established requirements before they are allowed to exercise the privileges of a licence, certificate, authorization and/or approval to conduct the relevant aviation activity.

2.72 Furthermore, the Meeting took note that the provisions of Doc. 4444 - PANS-ATM required an ATS safety management system to include, *inter alia*:

- Operational safety assessments concerning implementation of airspace reorganization, introduction of new equipment, systems or installations as well as new or modified ATS procedures.

2.73 Based on the foregoing, the Meeting deemed it advisable to analyse the protocol contained in **Appendix F** to this part of the report, and recommended that it be enriched with the contributions of other ANS inspectors of the Region.

2.74 In this regard, the ANS/Safety Secretariat will convene a group that, using electronic means and teleconferences, will submit to the SAM/IG/18 a PBN inspection protocol to assist ANS inspectors of the Administrations in PBN implementation audits in accordance with ICAO requirements.

APPENDIX A

(Spanish only)

RESULTS OF THE FIRST PBN

IMPLEMENTATION WORKSHOP

(PBN/IMP/1)

Lima, Peru, 25 to 29 April 2016

RESULTADOS DEL TALLER PBN/IMP/1

Lima, Perú, 25 al 29 de abril de 2016

El Primer Taller de Implantación PBN (PBN/IMP/1), se realizó con el apoyo del Proyecto RLA/06/901 con el objetivo de apoyar las tareas de implantación para el rediseño de los espacios aéreos seleccionados en base a la PBN en aquellos Estados que habían programado fechas de implantación cercanas a abril 2016. El Proyecto apoyó con una beca por Estado.

Los Estados participantes del Taller fueron: Argentina, Bolivia, Brasil, Chile, Ecuador, Panamá, Paraguay, Perú, Venezuela y Uruguay.

En general se observó que algunos Estados tienen problemas serios para evolucionar en sus proyectos y están retrasados en las expectativas de implantación. Argentina, Ecuador y Perú han invertido en capacitación del personal en diseño PANS-OPS.

Asimismo, se notó la falta de fecha en varios planes de acción, lo que plantea cierta incertidumbre sobretodo en un Plan de Acción.

Argentina/Brasil/Uruguay

La interdependencia de los proyectos de la terminal Baires-Carrasco y el espacio aéreo Sur de Brasil fue analizada encontrándose que ese proyecto no ha progresado en la medida esperada. Se han planificado procedimientos RNP APCH en Aeroparque y en Ezeiza la SID de la RWY 11 para el tráfico EZE-MELO.

Durante el Taller se acordó optimizar la conectividad Buenos Aires-Montevideo con SID y STAR conectadas.

Uruguay espera una propuesta de la Empresa MITRE para junio 2016, pero no ha habido un proceso CDM en el proyecto. Por otro lado se decidió mantener la trayectoria actual de la Ruta UB555 hasta que se obtengan datos suficientes para optimizar la Ruta y haya una respuesta de MITRE. **Argentina** informó que presentará una propuesta para la Ruta UB555 en la SAM/IG/17.

Uruguay informará su posición formal sobre el Proyecto TANGO en la terminal Baires y aceptó la propuesta de Brasil para la realineación de la Ruta 661 y UN857 que une Brasil y Argentina. En la reunión SAM/IG/17 se espera actualizar las LOAs correspondientes.

Brasil expresó que no hay inconveniente para la inversión de los flujos de tránsito entre la FIR Ezeiza y la FIR Curitiba que figuran en el Proyecto TANGO.

Argentina

Argentina ha implantado PBN en 5 TMAs, de los cuales 2 tienen fecha definida. Una de las TMAs depende de la firma de una LOA. Existen 5 Terminales en fase de proyecto y hay 3 en fase de diseño.

No hay fecha definida para la Terminal Baires. La muestra inicial de ahorros de CO₂ calculados indica que sumarían 20.500 toneladas con los ahorros de 4 aeropuertos y rutas.

Se ha librado un AIC (01/2016) informando la nueva denominación de las cartas PBN que puede ser usado como modelo por los demás Estados.

Se intentará hacer un acuerdo sobre Iguazú durante la SAM/IG/17. Se ha efectuado un análisis de riesgo de la terminal Iguazú.

Han planteado la necesidad de un Taller PANS-OPS para analizar la diferencia de las codificaciones, la elaboración de cartas electrónicas, la aplicación de la RNP avanzada y para analizar la publicación en AIP de los procedimientos RNP AR realizados por los usuarios

Bolivia

La implementación de PBN en Cochabamba, La Paz y Santa Cruz no tiene fecha definida. Asimismo se han agregado tres aeropuertos más al proyecto inicial que son Sucre, Oruro y Potosí.

Uno de los temas centrales es la integración de los terminales troncales de Cochabamba, Santa Cruz y La Paz.

Se informó de la próxima radarización del país, lo que en total demandará unos tres años.

La Secretaría observó que se debería analizar muy bien la conveniencia de ampliar las áreas terminales, ya que eso conllevaría un gasto exorbitante por la obligación de relevamiento de Obstáculos y Terreno de acuerdo al Anexo 15.

Se consideró que el mejor camino de avance sería comenzar por conectar SIDs-STARs entre las terminales troncales.

Brasil

Brasil ha indicado que la implantación de los espacios aéreos en base a PBN en el sur del país se completará el 22 de junio de 2017.

La entrada al sector NW de la TMA Sao Paulo se ha simulado en dos escenarios. El estado de este proyecto al momento es el de Validación y el STA está en proceso de análisis. Los ajustes se han planificado a partir de los análisis de las aerolíneas nacionales.

Se consideraron interesantes los cuestionarios efectuados a los ATCOs en los diferentes escenarios para analizar la complejidad de carga del ATCO y de los flujos, problemas de despegues independientes, métricas del FOQA.

Colombia

A través de la herramienta *Go-To-Meeting* se pudo contactar a Colombia para conocer el avance de la implantación PBN en el Aeropuerto El Dorado de Bogotá.

Este proyecto abarca además la evaluación del lado aire de las operaciones aeroportuarias, la actualización y adecuación de la reglamentación al nuevo concepto operacional, la performance del ATYS, así como la reducción de la separación en TMA a 3NM.

Asimismo, Colombia informó de la implantación para RWY 31 de la RNP AR y que se está estudiando la cancelación de la RNAV visual para vuelos internacionales. En ese sentido se ha solicitado a Colombia la posibilidad de mantener esta aproximación visual para aeronaves que no puedan volar RNP AR.

La Secretaría destacó la importancia de que se envíe a la Oficina Regional el Plan de Acción actualizado, así como que se mantenga a la OACI informada de los avances que se están sucediendo en esta implantación. Es muy importante que acudan a las reuniones expertos relacionados con la implantación del proyecto para informar de los avances del mismo.

Chile

Chile ha hecho un muy buen trabajo actualizando sus planes y proyectando la implementación PAMPA SUR Fase 2 para la TMA Santiago y Rutas para el 8 de diciembre de 2016. Ha mantenido una red de rutas convencionales al Sur para flota no equipada, para solucionar conflictos de control y la mejor ruta para el usuario.

Se ha diseñado en base a RNP 2 asegurando una separación lateral de 15 NM y se ha adecuado el diseño para la optimización de uso de pistas en ambas direcciones.

El ahorro estimado de CO₂ anual es de 2.260 Tons.

Ecuador

Ecuador ha proyectado la implantación PBN del TMA Guayaquil para el 21 de julio de 2016. Se han conectado SIDs, STARs e IAF. Ha actualizado su Plan de Acción.

También ha concluido el proyecto de estructura de Rutas RNAV-5 para Galápagos y ha aplicado en esta implantación el concepto FUA al espacio aéreo restringido de la UT18.

Panamá

El diseño de Panamá ha sido validado por STA, pero no tiene fecha de implantación ya que la CAA plantea la contratación de un consultor externo para validar todo el proceso. Por lo tanto, el proyecto está en suspenso a la espera de esa definición.

Paralelamente Panamá informa al Taller que existe un problema de capacitación de los nuevos ATCOs que puede impactar el proyecto.

Paraguay

La implantación del proyecto de la TMA Asunción se ha pospuesto para el 22 de junio de 2017. El proyecto ya ha pasado la etapa de Validación. La actualización del sistema ATC está proyectada para diciembre de 2016, así como la implantación del Nuevo Centro Integral de Capacitación Aeronáutica y Respaldo Operativo (CICARO), previsto para diciembre de 2016.

Se implantará un simulador radar, un simulador de TWR de 180° y un simulador AIM.

Perú

Las TMA de Arequipa, Cusco, Juliaca y Puerto Maldonado no tienen fecha de implantación. El estado del proyecto está en fase de Diseño. Se ha mejorado la accesibilidad a Cusco haciendo público el procedimiento RNP AR desde el 5 de febrero de 2015.

Se ha implantado una SID RNP AR en Cusco el 15 de septiembre de 2015.

Se ha proyectado la conexión SIDs, STARs, IAF.

Venezuela

A la fecha del Taller la implantación del terminal Maiquetía estaba sin fecha prevista, aunque la fase de Validación ya está completada. La actual crisis energética ha afectado el avance del proyecto.

Uno de los puntos importantes que se podría gestionar para facilitar la continuidad del proyecto sería el acuerdo con Curazao para la realineación de la Ruta G446.

La TMA Margarita está en fase de Planificación.

Contribuciones LATAM

La contribución de la empresa Aérea LATAM fue muy significativa, además de muy ilustrativa, abordando asuntos muy interesantes sobre las especificaciones PBN, particularmente en lo que respecta a la RNP avanzada y RNP 2.

Otro de los temas abordados fue la necesidad de una encuesta para la capacidad de la flota para definir el escenario continental u oceánico en lo que respecta al equipamiento simple o dual del GNSS + RF.

Asimismo, se presentaron varios *tips* para el ATCO y el planificador de espacio aéreo en cuanto al perfil Vertical de Vuelo de una aeronave, que fueron muy apreciados por la audiencia.

Contribuciones IATA

El representante de IATA resaltó cuestiones muy importantes en relación con las métricas a aplicar, los Planes de Acción, la gestión del proyecto, la gestión de una reducción escalonada en la separación longitudinal de 40, 20 y 10 NM que ya se había planificado en la anterior reunión SAM/IG/16, así como la importancia de aprovechar la reunión SAM/IG/17 para sellar estos acuerdos entre los FIR adyacentes.

La Secretaría confirmó que no había seguridad de apoyo económico para el taller PANS OPS solicitado en la pasada reunión SAM/IG/16, pero que se podían buscar algunos Estados que quisieran auspiciar el evento.

Próximos pasos

Dentro de los temas abordados como prioritarios, se entendió que era necesario que los Estados completaran la capacitación de los ATCOs, en busca de una implantación efectiva y balanceada.

Se resaltó la necesidad del envío de la información actualizada donde el responsable es el punto focal del área en cuanto a los Planes Nacionales, Planes de Acción, Tabla de Procedimientos PBN, así como la información de los ahorros de CO₂ calculados con la optimización.

Se alentó a los Estados a estudiar la aplicación de RNP 2 en ruta, la RNP Avanzada para ruta, TMA y aproximación, así como la implantación de RNP AR donde sea posible obtener un buen balance costo/beneficio.

PBN – TMA Implementation			
State	TMA	Implementation date	
Argentina	BAIRES	?????????	
	Rio Gallegos (SAWG):	07/01/2016	
	Resistencia (SARE)	31/03/2016	
	Comodoro Rivadavia (SAVC)	15/04/ 2015	
	El Calafate (SAWC)	15/04/ 2015	
	Neuquen (SANZ)	23/06/2016	
	Salta (SASA)	13/10/2016	
	Tucuman (SANT)	13/10/2016	
	Iguazu (SARI)	LOA	
	Ushuaia (SAWH)	Design	
	Bahia Blanca (SAZB)	Project	
	Bariloche (SAZS)	Project	
	Cordoba (SACO)	Project	
	Mendoza (SAME)	Project	
	San Juan (SANU)	Project	
	San Luis (SAOU) – Domestic	Design revision	
San Rafael (SAMR) – Domestic	Design revision		
Bolivia	Cochabamba	?????????	
	La Paz	?????????	
	Santa Cruz	?????????	
	Sucre	?????????	
	Oruro	?????????	
	Potosi	?????????	
Brazil	Brasilia	12 Nov 2015	
	Belo Horizonte	12 Nov 2015	
	Sao Paulo (changes)	12 Nov 2015	
	(PBN SOUTH)	Curitiba	22 Jun 2017
		Florianopolis	
		Joinville	
		Navegantes	
		Porto Alegre	
São Paulo (changes)			
Curitiba FIR Route Network			
Chile	Santiago (South)	08 Dec 2016	
	Santiago FIR Route Network		
Colombia	Bogota	?????????	

Ecuador (Guayaquil)		21 Jul 2016
Panama (Panama)		??????????
Paraguay (Asuncion)		22 Jun 2017
Peru	Arequipa	??????????
	Cuzco	??????????
	Juliaca	??????????
	Puerto Maldonado	??????????
Uruguay (Carrasco and Laguna del Sauce)		??????????
Venezuela (Maiquetia)		??????????

STATE/ORGANIZATION	Adjacent State/Organization	40 NM GNSS/DME Longitudinal	Proposed implementation dates	20 NM GNSS/DME Longitudinal	Proposed implementation dates	Remarks
Trinidad & Tobago	United States (San Juan)	TBD	TBD	TBD	TBD	<p>Currently 10Mins MNT</p> <p>US has advised that there is a current issue regarding the US classification of their airspace that is preventing the use of this type of separation.</p> <p>US and Trinidad and Tobago will continue discussion on this issue bilaterally.</p> <p>TJSJ has possible VHF issues at FIR BDY. This is being investigated.</p>
	Guyana	Agreed (GNSS) LOA to be finalized and signed by April 8, 2016	31-May-16	TBD	TBD	<p>Currently 10 Mins MNT</p> <p>Analysis will be conducted over the first six months of use and a decision will be made by DEC 2016 as to the timeframe to reduce to 20 NM</p>
	Suriname	TBD	TBD	TBD	TBD	<p>Currently 10 Mins MNT</p> <p>Currently there is a VHF communication challenge for T&T at position TRAPP. Solutions to this challenge are being investigated.</p>
	Venezuela	TBD	TBD	TBD	TBD	<p>Currently 10 Mins MNT</p> <p>Confirmation required from Venezuela. T&T is ready to implement 40NM GNSS with Venezuela</p>

Curacao	San Juan	TBD	TBD	TBD	TBD	<p style="text-align: center;">Currently 10 Mins MNT</p> <p>US has advised that there is a current issue regarding the US classification of their airspace that is preventing the use of this type of separation.</p> <p>US and Curacao will continue discussion on this issue bilaterally.</p> <p>TJSJ has possible VHF issues at FIR BDY. This is being investigated.</p>
	DR	Agreed A319, remain at 80nm	TBD	TBD		Currently 10 Mins MNT
	Venezuela	Agreed via telcon to be	TBD	TBD	TBD	Currently 10 Mins MNT
	Jamaica	Agreed	TBD	TBD	TBD	Currently 10 Mins MNT
	Haiti	UG444 remain at 80nm based on Curacao's VHF situation	TBD	TBD	TBD	Discussions ongoing
	Colombia	Agreed A319, UG444 remain at 80nm	Dec-16	TBD		Currently 10 Mins MNT

COCESNA	Mexico	Implemented	In effect	TBD	TBD	Challenge to Reduction to 20 is due to required separation between Mexico and Houston
	Cuba	N/A	N/A	Implemented	implemented	Data sharing agreements in effect. 2017 proposed RADAR handoffs
	Jamaica	Implemented	In effect	Discussions		Limitation is VHF at BDY with Jamaica. Request has been made by Jamaica for solution. When this is accomplished, analysis for use of 20nm will be done by Jamaica
	Panama	Implemented	In effect	Reduce to 20NM in a certain area that include the FIX points. UM659 LESIR UM328 PAPIN UR773/UA502 POXON UL655 EGODI UG440 ISEBA UA317 BUFE0 UM796 PADUR UM419 ANSON UA322 AMUBI UR505 DURAM Maintain 40NM the next points: UA552 FALLA UA321 PELRA		
	Colombia	Agreed	TBD	TBD	TBD	LOA being revised.

Dominican Republic	Haiti	In discussion	TBD	TBD	TBD	Discussions Ongoing
	Curacao	Agreed A319, remain at 80nm	TBD	TBD	TBD	
	Miami	Discussion with Miami re procedural contingency				Currently 10 NM Surveillance in use Discussion if required
	San Juan	Willing to reduce. Procedural. Discussion with San Juan	TBD			Currently 10 Mins MNT US has advised that there is a current issue regarding the US classification of their airspace that is preventing the use of this type of separation. US and Curacao will continue discussion on this issue bilaterally. TJSJ has possible VHF issues at FIR BDY. This is being investigated.

Mexico	COCESNA	Already implemented (Surveillance) Discussion about procedural use of 40NM with GNSS				Northbound traffic from COCESNA Challenge to Reduction to 20 is due to required separation between Mexico and Houston
	Houston	N/A				Continental – 10 NM miles Surveillance The proposed separation standard is currently being reviewed by FAA HQs to determine applicability in ZHU offshore airspace.
		N/A				Oceanic 10 minutes (MNT) The proposed separation standard is currently being reviewed by FAA HQs to determine applicability in ZHU offshore airspace.
	Albuquerque	N/A				Currently Continental – 10NM miles Surveillance Bilateral Discussions required
	Los Angeles	N/A				Currently 10 nm Surveillance Bilateral Discussions required
	Cuba	TBD	TBD	TBD	TBD	TBD

Haiti	Kingston	TBD	TBD	TBD	TBD	10 Mins MNT Discussions Ongoing
	Cuba	TBD	TBD	TBD	TBD	10 Mins MNT Discussions Ongoing
	Dominican Republic	TBD	TBD	TBD	TBD	10 Mins MNT Discussions Ongoing
	Miami	TBD	TBD	TBD	TBD	10 MINS MNT
	Curacao	LOA agreement in place				
Guyana	Trinidad & Tobago	Agreed	May 31 2016	TBD	TBD	
	Suriname	Agreed	31-May-16	TBD	TBD	
	Brazil	Signed	Implemented	TBD	TBD	
	Venezuela	TBD	TBD	TBD	TBD	
Suriname	Guyana					10 Mins MNT
	Brazil	Suriname in favour	TBD	TBD	TBD	Sent draft to Brazil. TELCON on April 7 for discussion
	French Guiana	TBD	TBD	TBD	TBD	10 Mins MNT
	Trinidad and Tobago	Suriname willing, Trinidad and Tobago has challenges with	TBD	TBD	TBD	Currently 10 NM MNT Currently there is a VHF communication challenge for T&T at position TRAPP.
Antigua and Barbuda (with Trinidad)						
Bahamas	TBD				Discussions needed with US	
Barbados (with Trinidad)						
Belize (with COCESNA)						

Colombia	PANAMA	Agreed Air traffic flying between the FIRs maintain 20 nm separation	Dec-16	As agreed between FIRs	Dec-16	
	JAMAICA	Agreed				20nm will depend on establishing communication in the north of the Barranquilla FIR
	CURACAO	Agreed	Dec-16	TBD	TBD	
	VENEZUELA	TBD	TBD	TBD	TBD	
Costa Rica (with COCESNA)						
Cuba	COCESNA	N/A	N/A	Implemented	Implemented	Data sharing agreements in effect. 2017 proposed RADAR handoffs
	MEXICO	TBD	TBD	TBD	TBD	Currently 40 nm (surveillance) Discussion regarding use of 40NM procedural under a letter of agreement
	HAITI	TBD	TBD	TBD	TBD	10 Mins MNT Discussions Ongoing
	JAMAICA	TBD	TBD	TBD	TBD	Currently 40nm overflight based on surveillance, 20nm landing based on surveillance. Use of GNSS procedural minima to be discussed

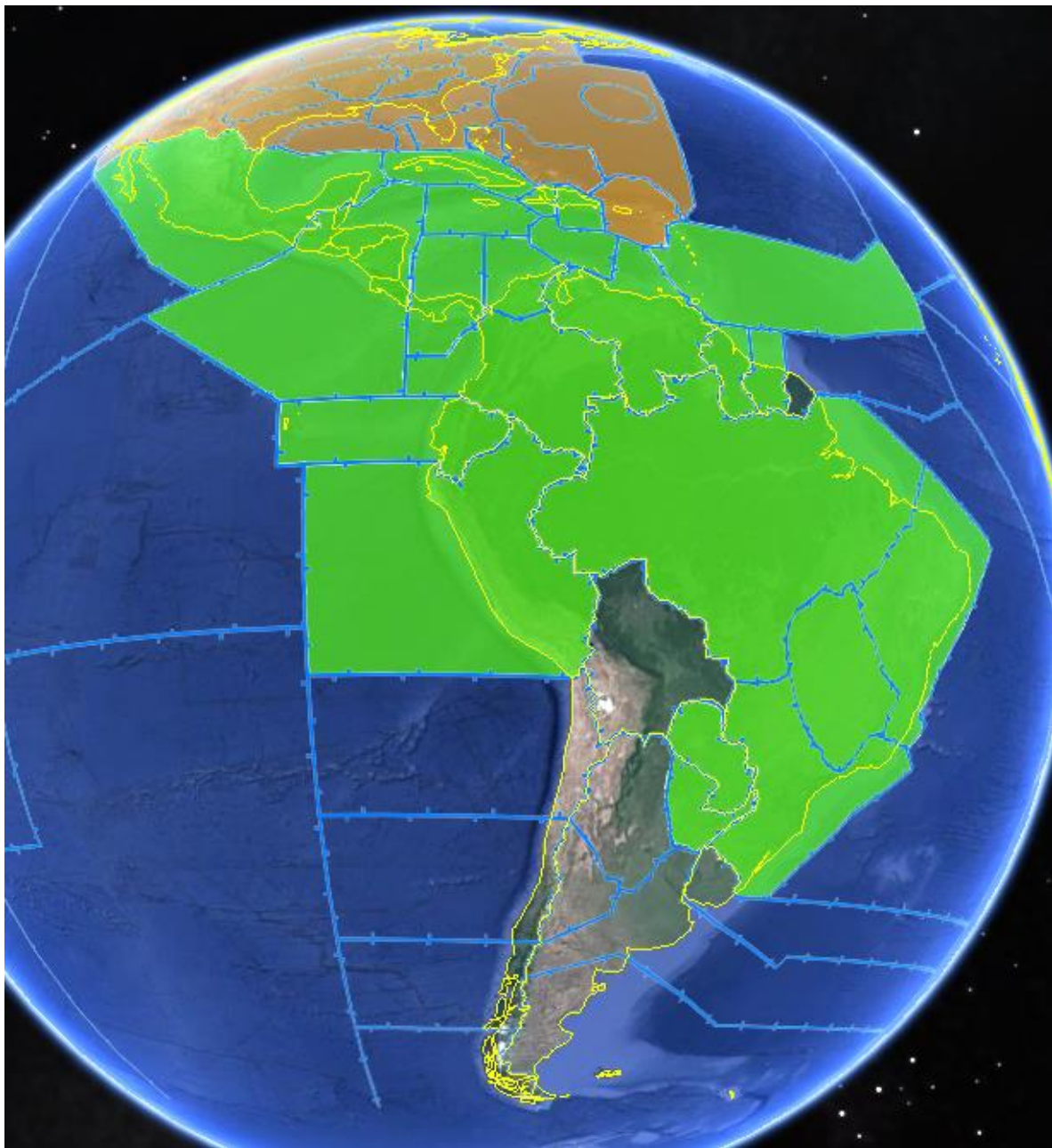
Honduras (with COCESNA)						
Panama	COCESNA	In effect	Implemented	<p>Reduce to 20NM in a certain area that include the FIX points.</p> <ul style="list-style-type: none"> • UM659 LESIR • UM328 PAPIN • UR773/UA502 POXON • UL655 EGODI • UG440 ISEBA • UA317 BUFEO <ul style="list-style-type: none"> • UM796 PADUR • UM419 ANSON • UA322 AMUBI <ul style="list-style-type: none"> • UR505 DURAM <p>Maintain 40NM the next points:</p> <ul style="list-style-type: none"> • UA552 FALLA • UA321 PELRA 		

	COLOMBIA	Agreed Air traffic flying between the FIRs maintain 20 nm separation	Dec-16	As agreed between FIRs	Dec-16	
	JAMAICA	Agreed	1-May-16	TBD	TBD	
United States	TRINIDAD AND TOBAGO	TBD	TBD	TBD	TBD	<p>Currently 10Mins MNT</p> <p>US has advised that there is a current issue regarding the US classification of their airspace that is preventing the use of this type of separation.</p> <p>US and Trinidad and Tobago will continue discussion on this issue bilaterally.</p> <p>TJSJ has possible VHF issues at FIR BDY. This is being investigated.</p>
	CURACAO	TBD	TBD	TBD	TBD	<p>Currently 10 Mins MNT</p> <p>US has advised that there is a current issue regarding the US classification of their airspace that is preventing the use of this type of separation.</p> <p>US and Curacao will continue discussion on this issue bilaterally.</p> <p>TJSJ has possible VHF issues at FIR BDY. This is being investigated.</p>

	DR	Willing to reduce Procedural Discussion with San Juan				<p>Currently 10 Mins MNT</p> <p>US has advised that there is a current issue regarding the US classification of their airspace that is preventing the use of this type of separation.</p> <p>US and RD will continue discussion on this issue bilaterally.</p> <p>TJSJ has possible VHF issues at FIR BDY. This is being investigated.</p>
	MEXICO (Reference Above)					
	HAITI	TBD	TBD	TBD	TBD	10 MNT
Jamaica	Curacao	Agreed	TBD	TBD	TBD	<p>Currently 10 Min MNT in use</p> <p>Discussions on ground to ground communications in progress and LOA revision to be signed soon.</p> <p>Automated coordination being investigated.</p>
	COCESNA	Implemented EXCEPTION: UM782 10 MIN MNT	In effect	Discussions	TBD	<p>Limitation is VHF at BDY with Jamaica. Request has been made by Jamaica for solution. When this is accomplished, analysis for use of 20nm will be done by Jamaica</p>
	PANAMA	agreed	1-May-16	TBD	TBD	
	COLOMBIA	Implemented	In use	TBD	TBD	

	HAITI	TBD	TBD	TBD	TBD	<p>Currently 40nm overflight based on surveillance, 20nm landing based on surveillance.</p> <p>Use of GNSS procedural minima to be discussed</p>
	CUBA	TBD	TBD	TBD	TBD	

NAM/CAR/SAM Agreement Status on Implementation 40/20 NM Longitudinal Separation Minima



Longitudinal Separation Status and expected Scenario by 2016



Green: States in charge of the UTA/FIR that have accepted the concept and that **have no problem** to implement the optimized procedural separation.

Brown: States in charge of the UTA/FIR that have accepted the concept and that **have a problem** to implement the optimized procedural separation.

Longitudinal Separation – Situation in 2015



Red:	80NM
Green:	10NM or less
Yellow:	40NM

Longitudinal Separation – Current Situation



Red: 80NM
Green: 10NM or less
Yellow: 40NM

**VERIFICATION PROTOCOL
TO AIRSPACE DESIGN IMPLEMENTATION BASED ON PBN**

References	Questions	Orientation	Impl State	Obs
Doc. 9613 Part B Navigation based on performance concept Chapter 1 Introducing the implementation process 1.2.1	1. On the PBN implementation project organization, were the phases fulfilled correspondingly?	Detail the process and phases developed.		
Doc. 9613 Part B Navigation based on performance concept Chapter 2 Process 1 2.2.1 Process 1 Information	2. Was the airspace concept defined with enough details to be able to identify and could the navigation functions be supported?	<ul style="list-style-type: none"> • Show the inputs supplies to Process 1 such as: <ol style="list-style-type: none"> 1.) Strategic objectives. 2.) The operational needs based on airspace users. 3.) The rules referred to environmental mitigation. 		
Doc. 9613 Cap.2 2.3.1 Doc.9992 2.2.2.2	3. Did you define the Team?	<ul style="list-style-type: none"> • Detail integration. • Detail the selection criteria. 		
Doc.9613 Chap.1 Step 1 Formulate airspace concept	4. Which were the factors that had been included to establish the airspace concept?	<ul style="list-style-type: none"> • Detail factors. 		
Doc. 9613 Chap.2 Process 1	5. What was considered by the Team to establish the airspace concept?	<ul style="list-style-type: none"> • Show the analysis and the determination about operative requirements, • Show the methods to communicate to airspace users the requirements and availability (contingency) about service • Show transition plan to the new air space concept 		

<p>Doc. 9613 Step 1 Formulate the concept</p> <p>Rec 2 Airspace requirements</p>	<p>6. How were airspace requirements identified?</p>	<ul style="list-style-type: none"> • Show the air traffic increase statistics. • Show the compilation data. • Flows and composition of same. • Surveillance evaluation, communications and navigation infrastructure available in airspace. 		
<p>Doc. 9613 Rec 3 – Approach requirements</p>	<p>7. Were there considered the existing capacity about regional aircrafts?</p>	<ul style="list-style-type: none"> • Show fleet analysis. • Evidence the approach type determinations required about the fleet. 		
<p>Doc. 9613 Rec 4 – Others requirements</p> <p>Doc.9992 2.2.1 Agreements operational requirements</p>	<p>8. Show what other requirements were considered</p>	<ul style="list-style-type: none"> • Show the environmental factors that could require considerations and adaptation. • Any impact foreseen about flight plan presentation or treatment. 		
<p>Doc. 9613 Step 2</p> <p>Fleet evaluation existing and capacity about navigation infrastructure aids available</p>	<p>9. How did you determinate the application type feasible to the users?</p>	<ul style="list-style-type: none"> • Airplanes fleet capacity evaluation. • Navigation infrastructure aids evaluation. 		
<p>Doc. 9613 Step 3</p> <p>Actual System Surveillance Evaluation and ATS communications and ATM System.</p>	<p>10. Considering that an air traffic system is the result of CNS/ATM, and the available capacities, did you elaborate an evaluation or its availability?</p>	<ul style="list-style-type: none"> • Show availability evaluation about communications between the aircraft and the air transit services provider • Show surveillance infrastructure evaluation about ATS that is available to support the operation. 		
<p>Doc. 9613 Chapter 2</p> <p>Specifications identification</p>	<p>11. Concerning the output of Process 1, what did the planners consider about the revision of one or more possible specifications?</p>	<ul style="list-style-type: none"> • Show the evidences about revisions if they were any. 		

Doc. 9992 2.3 Design Fase 2.3.1.8	12. Was there a close cooperation among all interested parties involved in the design process?	<ul style="list-style-type: none"> Show the interactive character in the different activities. Ex: CNS/ATM restrictions if any. 		
Doc. 9613 3.2 Process 2 Information	13. Was there a Safety Operational Plan to the Implementation Plan before beginning with the validation phase?	<ul style="list-style-type: none"> Show risk evaluation SMS Members Safety Documents 		
Doc. 9992 2.4 Validation Fase 2.4.2.3	14. Was the Validation Process complied?	<p>Show how:</p> <ul style="list-style-type: none"> a) air space modelling; b) reduced time simulation (FTS); c) real ATC trials; d) flight simulation. 		
Doc. 9613 3.3.1.1	15. In reference to the general airspace concept and design, did the project objectives were achieved?	<ul style="list-style-type: none"> Verify the ATM operations evidence on the new airspace If any weak points were identified, show mitigations measures. Show the control about every procedure in an independent form to guarantee the comply of design criteria. 		
Doc. 9992 2.3 Implementation Face 2.5.1.2	16. Which were the factors that had been considered to decide about the implementation?	Show the evidence of the selection of factors considered decisive.		
Doc. 9992 2.5.3 Becoming aware and instruction materials	17. What kind of training was done to ATCOs?	<ul style="list-style-type: none"> Show registered training evidence. Show if were considered the FFHH. 		
Doc.9613 3.3.3.3	18. Once validated and inspected the procedures, were there published on national AIP jointly with the changes made on routes, waiting areas or airspace structure	<ul style="list-style-type: none"> Evidence AIRAC or amendment AIP. 		

Doc. 9992 2. 2.5.4 Implementation	19. Did you elaborate a procedure on implementation planning?	• Show the PBN Implantation Plan.		
Doc.9992 2.5.5	20. Have you planned an evaluation about the operational safety system for the post-Implantation?			

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

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

- a) WP/06 - *ATFM Project (ASBU: B0-SEQ, B0-FRTO, B0-NOPS and B0-ACDM)* (presented by the Secretariat);
- b) IP/03 - *Capacitación AFTM al personal de las dependencias operativas involucradas* (presented by Argentina) (*Spanish only*);
- c) IP/04 - *Propuesta AIC A “Plan de Implantación del servicio ATFM en la República Argentina”* (presented by Argentina) (*Spanish only*);
- d) IP/07 - *Medidas adoptadas para su realización durante los Juegos Olímpicos Río 2016 en Brasil* (presented by Brazil) (*Spanish only*); and
- e) IP/08 - *Seguimiento del avance en la implantación de la ATFM en el Estado Peruano* (presented by Peru) (*Spanish only*).

ATFM Project (ASBU: B0-SEQ, B0-FRTO, B0-NOPS and B0-ACDM)

3.2 To analyse the achievement of ATFM goals, the Meeting reviewed the following indicators:

- Percentage of States that have conducted runway and ATC sector capacity calculations.
- Percentage of States that have implemented ATFM in Flow Management Units (FMUs) or Flow Management Positions (FMPs).

3.3 To date, 85% of the States of the Region have performed their ATC runway and ATC sector capacity calculations as pre-implementation tasks, as shown in the following table:

Percentage of States that have conducted their runway and ATC sector capacity calculations

May 2016	ARG	BOL	BRA	CHI	COL	ECU	FGI	GUY	PAN	PAR	PER	SUR	URU	VEN
85%	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES

3.4 Regarding this table, the delegate of French Guiana stated that runway capacities had been calculated, but ATC sector capacity calculations had not been done yet. He also stated that inadequate staffing directly affected progress in accordance with operational requirements and sector allocation. The Secretariat provided French Guiana with the Capacity Calculation Guide presented at the SAM/IG/5 meeting.

3.5 Two more States have implemented FMP in the SAM Region, increasing the regional average to 56% ATFM implementation, as shown in the following table:

**Percentage of States that have implemented ATFM Flow Management Units (FMU)
or Flow Management Positions (FMP)**

May 2016 56%	ARG	BOL	BRA	CHI	COL	FGY	ECU	GUY	PAN	PAR	PER	SUR	URU	VEN
	NO	NO	YES	YES	YES	NO	SI	NO	NO	YES	SI	NO	YES	YES

3.6 Argentina informed of its plans to implement ATFM in EZEIZA ACC and reported that they had installed an FMP at the Jorge Newbery airport for operations at Aeroparque.

3.7 Panama stated that ATFM implementation was delayed because of lack of personnel to carry out the implementation.

3.8 Ecuador reported that, as of 26 May 2016, the FMP of the Guayaquil ACC will be implemented.

3.9 The SAM/IG/16 meeting had developed a Strategic Planning Table that was updated by the Meeting as shown in **Appendix A** to this part of the report.

3.10 The Meeting updated the information contained in **Appendix B** to this part of the report, containing the list of ATFM focal points. In this regard, the Secretariat highlighted the need to include the delegate of IATA in the information circuit in order to allow ATFM information to be relayed to the airlines.

3.11 Regarding this matter, the Meeting also recommended that each State establish a 24h operational point of contact to be used in case of urgency/contingency, so as to guarantee the dissemination of information between States/ANSP, and to users through ICAO and IATA. Brazil requested that forms were sent in PDF format.

3.12 The Meeting agreed that both the ATFM Action Plan and the ATFM Work Programme shown in **Appendix C** to this part of the report should be completed by the States with updated information for the SAM/IG/18 meeting.

3.13 As a supplementary task to the follow-up, the ATFM survey data will be updated for SAM/IG/18, in terms of that specified in **Appendix D** to this part of the report.

Use of NOTAMs as an ATFM measure

3.14 Once again, the Meeting discussed the issue concerning the use of NOTAMs as an ATFM measure. In this regard, it was noted that ATFM measures were specified in ICAO Doc 9971, and that they did not include NOTAMs.

3.15 The NOTAM, by nature, is a static tool that must not be used as a tactical ATFM measure, since it depends on the specific operational scenario and must be flexible and be applied as needed. The tactical measures that should be implemented, if so required, are those specified in the ICAO ATFM Manual.

3.16 The NOTAM that establishes specific separations, especially those applied regardless of the flight level to overcome any CNS or personnel deficiencies, must be considered as a contingency measure and not as an ATFM measure.

Measures adopted for the Rio 2016 Olympic and Paralympic Games of Brazil

3.17 Regarding ATFM measures applicable in Brazil with a view to the Rio 2016 Olympic and Paralympic Games in Brazil, the corresponding aeronautical publication was presented with a view to disseminating all the relevant information and expediting planning and operations during the event for operators and other users of the Brazilian airspace, and SAM States. Details of the AIC of Brazil appear in the Appendix to information paper SAM/IG/17-NI/07 on the Meeting website and in the following Internet link: <http://publicacoes.decea.gov.br/?i=publicacao&id=4339>. To supplement this information, Brazil made a very detailed presentation of the ATFM concept to be applied during the event.

ATFM training in Argentina

3.18 The Meeting took note that the DGCTA, the air navigation service provider of Argentina, had scheduled, organised, and conducted training in the ATFM and CDM concepts for ATS, AIS, and CNS personnel involved in the five FIRs. It had also been offered to the main domestic airlines.

3.19 The ATFM and CDM Introduction Manual, shown as Appendix 1 to information paper SAM/IG/17-NI/03 on the Meeting website was used for training purposes.

3.20 Training started in October 2015 and ended in early May 2016. It was addressed to experts from different services that would be subsequently considered for the provision of ATFM services.

3.21 The experts that had been trained at ATFM courses sponsored by Project RLA/06/901 were the ones that trained a total of 167 experts from the ATC, AIS, and CNS areas and from Aerolíneas Argentinas and LAN Argentina.

3.22 Argentina informed that, since this is a new service that requires experts for its operation, and since the trained staff is currently working in other units, the implementation process contemplates the gradual incorporation of human resources into the new ATFM service, based on their availability.

Plan for the implementation of the ATFM service in Argentina

3.23 The air navigation service provider, DGCTA, through Directive 01/15, formalized the **Plan for the implementation of the ATFM service in Argentina** to supplement ATFM training. It was proposed to the aeronautical authority that the Plan be published as an AIC to allow the aeronautical community to get acquainted with it. It is attached as Appendix 1 to information paper SAM/IG/17-NI/04 on the Meeting website.

3.24 The Meeting noted that the Plan for the implementation of the ATFM service in Argentina describes the phased implementation of the new ATFM service.

ATFM implementation in Peru

3.25 The Meeting took note that, following ICAO recommendations and in accordance with the Action plan for ATFM implementation in the Lima FIR, capacity studies were conducted at the main airports that suffered congestion and saturation at peak hours (Lima and Cusco). All the information concerning this implementation is contained in information paper SAM/IG/17-NI/08 and in the Action plan for ATFM implementation, in its corresponding Appendix.

3.26 The Meeting acknowledged the excellent presentation made by Peru on the implementation process and its strategic application, and recommended that the States analyse it because of its highly didactic content.

3.27 The Meeting considered that the ATFM implementation process in Peru could be considered as a model of implementation of strategic ATFM, to be used by those States that had not yet implemented ATFM or that needed to improve the ATFM procedures being applied.

3.28 The Meeting requested the delegates of Peru to submit at the next SAM/IG/18 meeting more detailed information on ATFM implementation and operation, including, *inter alia*:

- a) Process for establishing and organising itineraries.
- b) Lessons learned in the process of increasing ATC, runway, and airport infrastructure capacity.
- c) Use of CTOT, ATFM flow basic tool of INDRA AIRCON 2100 system.
- d) Process for eliminating flow control NOTAMs.
- e) Benefits and difficulties resulting from applying 95% runway capacity.
- f) Use of indicators to verify ATFM performance.
- g) Use of Excel table for itinerary planning to identify potential congestion schedules.

3.29 Both the Secretariat and IATA congratulated Peru for this achievement and recommended all States that had already implemented ATFM to make a brief presentation at the SAM/IG/18 meeting of the benefits obtained from the implementation of ATFM.

STRATEGIC PLANNING TABLE FOR THE DEVELOPMENT OF ATFM														
CONC. PPRC/3-5 action of compliance	ARG	BOL	BRA	CHI	COL	ECU	FGI	GUY	PAN	PAR	PER	SUR	URU	VEN
	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year	Month/ Year
1- Replica of ATFM courses to speccialized personnel	09/2015 to 11/2015	10/2015	Imp.	09/2015 07/2016	Imp.	1st Quarter 2015	2016		04/2015 02/2016	11/2015	02/2016		02/2015	07/2016
2- Bilateral Letters of Agreement with appropriate ATFM procedures without impacting on safety	04/2016	02/2014	Imp.	05/2016	Imp.	2nd Sem/2016	2016		2nd. Sem/2016	Feb/2014	05/2016		15/08/2016	SAM/IG/18
3- Implementation of Flow Control Positions or Units (FMPs/FMUs)	Sep/2016 SAEZ	1st Sem/ 2016	Imp.	Imp. FMP ACC/ 2016	Imp. unified ACC	May/2016	2016		Nov/2016	Imp.	Imp.		Imp.	Imp.

APPENDIX B / APÉNDICE B**LIST OF CONTACTS FOR OPERATIONAL ATFM FOCAL POINTS AND
ESTABLISHED ATFM UNITS****LISTA DE CONTACTOS PARA PUNTOS FOCALES ATFM OPERACIONALES Y
UNIDADES ATFM ESTABLECIDAS**

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
ARGENTINA*	<p>Héctor Luis Sánchez Jefe de Departamento Registro y Estadísticas Dirección Proyectos de Navegación Aérea Administración Nacional de Aviación Civil (ANAC) Tel: +54 11 5941-3000, Ext. 69773 E-mail: hsanchez@anac.gob.ar</p>	<p>Víctor Marcelo de Virgilio Jefe del Departamento Servicios de Tránsito Aéreo Tel.: +5411 5789 8400, Ext 68454 E-mail: dsna@faa.mil.ar</p>
<p>BOLIVIA (Plurinational State of) /</p> <p>BOLIVIA (Estado Plurinacional de)*</p>	<p>ATCO Jesús I. Villca Jiménez Inspector ATM/SAR Dirección General de Aeronáutica Civil (DGAC) Teléfono: +591 2 211-4465 Cel.: +591 72023263 E-mail: jvillca@dgac.gob.bo</p>	<p>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@asana.bo masebarbar@hotmail.com</p>

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
BRAZIL / BRASIL*	<p>James Souza Short Jefe de Operaciones del CGNA Centro de Gerenciamento e Navegação Aérea - CGNA Chefe Geral Tel.: +55 21 2101-6531 Cel.: +55 21 99499-1658 E-mail: dcc@cgna.gov.br;</p> <p>Cap José Airton Patricio Centro de Gerenciamento e Navegação Aérea - CGNA Oficial ATM Tel.: +55 21 2101-6448 Cel.: +55 21 98554-4425 E-mail: mosu@cgna.gov.br</p> <p>CARSAMMA carsamma@cgna.gov.br;</p>	<p>Gerente Nacional - GNAC Tel.: +55 21 2101-6409 E-mail: gnac@cgna.gov.br</p> <p>Gerente Nacional de Fluxo - GNAF Tel.: +55 21 2101-6546 E-mail: grt@cgna.gov.br</p> <p>Gerencias Regionais - GER Tel.: +55 21 9949-6492 / +55 21 2101 98554 3598 E-mail: gr1@cgna.gov.br / gr2@cgna.gov.br</p>

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
CHILE*	<p>Jorge Caro Gálvez Dirección General de Aeronáutica Civil Dirección de Aeródromos y Servicios Aeronáuticos (DASA) Sub Departamento de Servicios de Tránsito Oficina ATFM (FMU) Tel.: +56 2 2836-4022 E-mail: jcarog@dgac.gob.cl</p>	<p>Supervisor ATC de turno FMP ACC Santiago Tel.: +56 2 22836-4017 ACC Santiago Cel.: +56 9158-1865 E-mail: sup.accu@dgac.gob.cl</p>
COLOMBIA*	<p>Mauricio José Corredor Monroy Unidad Administrativa Especial de Aeronáutica Civil (UAEAC) Jefe Grupo ATFCM Tel.: + 57 1 296-2628 E-mail: mauricio.corredor@aerocivil.gov.co Skype: mauricio.jose.corredor.monroy</p>	<p>Unidad de Gestión de Afluencia de Tránsito Aéreo y Capacidad – FCMU COL (DE 1100 A 0500 UTC)</p> <p>E-mail: cfmu.dsna@aerocivil.gov.co</p> <p>Please copy to / Favor copiar a: E-mail: cns.fmu@aerocivil.gov.co aga.fmu@aerocivil.gov.co</p> <p>Telefonos:</p> <p>MANAGER: +57 1 296-2656 CNS: +57 1 296-2100 AGA: +57 1 296-2200 DEPARTURE FLOW MANAGEMENT: +571 296-24 06 Celular:</p> <p>MANAGER: +57 317 517-10 46 AGA: +57 317 363- 88 11 CNS: +57 318 330-73 74</p>

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
ECUADOR	Marcelo Valencia Taco Responsable ATM Nacional Tel.Ofc: +593 2 2947400 Ext. 4520 Móvil: +593 979097292 E-mail: marcelo_valencia@aviacioncivil.gob.ec marcelovalencia_qa@gmail.com	Supervisores Centro de Control DDI: +593 4 2924219 REDDIG: 5060 / 5051 / 5052 / 5053 Clemente Pinargote Móvil : +593 994035543 E-mail: clemente.pinargote@aviacioncivil.gob.ec fmp-accgye@aviacioncivil.gob.ec
FR. GUIANA / GUYANA FRANCESA	Jean Michel Pubillier French West Indies and French Guiana Air Navigation Services Office: +596 596 42 24 88 GSM: +596 696 93 60 72 Email: jean-michel.pubillier@aviation-civile.gouv.fr	Herve Thomas Head of ATC Services Cayenne Office: +596 594 35 93 04 GSM: +594 694 91 63 63 Email: herve.thomas@aviation-civile.gouv.fr
GUYANA		

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
PANAMA*	Flor Silvera Directora de Navegación Aérea Tel.: +50 7 6982-1215/ 315-9846 E-mail: fsilvera@ aeronautica.gob.pa	Gabriel Bernard Administración de Aeronáutica Civil Tel.: +50 7 6511-0730 +50 7 315-9871 E-mail: gabibernard24@hotmail.com cerap@aeronautica.gob.pa
PARAGUAY*	ATCO. Sindulfo Ibarrola Dirección Nacional de Aeronáutica Civil (DINAC) Gerencia de Tránsito Aéreo Aeropuerto Internacional Silvio Pettrossi Tel./Fax: +595 21 645-598 Cel.: +595 983 350-815 E-mail: gtadinac@gmail.com	1-Unidad de Flujo (SGAS) – FMU SGAS (Unidad Operativa). Current responsible / Responsable actual de dicha Unidad: ATCO Alejandro Amarilla Tel./Fax: +595 21 758-5292 Tel.: +595 971 180-665 E-mail: fm.asu@gmail.com Centro de Control de Área Unificado ACC-U Mariano Roque Alonso-Paraguay 2-Unidad de Flujo (SGES) – FMU SGES (Unidad Operativa). Current responsible / Responsable actual de dicha Unidad: Lic. ATCO David Gavilán Tel./Fax: +595 64 420-842 Cel.: +595 983 830-404 E-mail: daga_978@hotmail.com Aeropuerto Internacional Guaraní

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
PERU*	Martha Soto Ansaldi Dirección General de Aeronáutica Civil (DGAC) Inspector de Navegación Aérea Tel.: +51 1 615-7881 Cel.: +51 997367352 E-mail: msoto@mtc.gob.pe	Dante Samaniego Bilbao Coordinador del FMP LIMA - ACC Corporación Peruana de Aeropuertos y Aviación Comercial (CORPAC S.A) Tel.: +51 1 630-1000 Ext. 2482 / 2483 E-mail: dsamaniego@corpac.gob.pe
SURINAME	Mr. Soeknandan Andre Chief Air Traffic Services Tel.: +59 7 530-433 Cel.: +59 7 7 216-108 Fax: +59 7 491-743 E-mail : atmcnslvd@yahoo.com	Mr. Gaddum R Coordinator ATS Supervisor ATS unit Zanderij Phone Operations : +597 032-5208 Cel: +597 853-1681 E-mail: g.rperez@hotmail.com
URUGUAY*	Dirección Nacional de Aeronáutica Civil (DINACIA) Tte Cnel. (Nav.) Gabriel Falco Sub- Director de Circulación Aérea Tel: +598 2 604 0408 Ext 5101 Cel: +598 9 804 6848 FAX +598 2 604 0408 E-mail: gfalco@dinacia.gub.uy	Dirección Nacional de Aeronáutica Civil (DINACIA) C.T.A. Luis A. Otheguy Director de Tránsito Aéreo (ATM) Tel.: +598 2 604-0408, Int. 5105 Cel: +598 99592113 E-mail: atfmuruguay@dinacia.gub.uy Email: dta@dinacia.gub.uy ACC Montevideo Tel.: +598 260-00619 REDDIG

State/ Estado	STATE ATFM FOCAL POINTS PUNTOS FOCALES ATFM DEL ESTADO	OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS
<p>VENEZUELA (Bolivarian Republic of) /</p> <p>VENEZUELA (República Bolivariana de)*</p>	<p>Maribel Mayora Vallenilla Responsable ATFM Tel: +58 212 303-4532 (13:00 – 21:00 UTC) Cel: +58 416 611-0607 (H24) E-mail: atfm@inac.gob.ve m.mayora@inac.gob.ve</p>	<p>Harrynson Salazar Jefe ACC-Maiquetía Tel: +58 212 355-2912 (13:00 – 21:00 UTC) Cel: +58 416 632-6204 (H24) E-mail: Ha.Salazar@inac.gob.ve</p> <p>ACC-Maiquetía Tel: +58 212 355-2216 (H24) Cel: +58 416 632-6204 (H24)</p>
OTHERS	Organizaciones Internacionales /International Organizations	OACI/ ICAO
	<p>Julio de Souza Pereira Assistant Director, Safety Flight Operations IATA Avda. Ibirapuera, 2332, cj22 Torre I Sao Paulo, Brasil Tel: +55 11 21874236 Mob: +55 11 993800953 pereiraj@iata.org</p>	<p>Roberto Sosa RO / ANS & SFTY Tel. +511 611 86 86 Ext 104 Email: rsosa@icao.int</p>

*Updated SAM/IG/17 / Actualizados en la SAM/IG/17

APPENDIX C

ACTION PLAN FOR THE IMPLEMENTATION OF ATFM AT SAM AIRPORTS

A: AIRPORT				
Task description	Start	End	Responsible party (designate individual or organisation in charge)	Remarks
1. Airport demand/capacity (runway capacity) analysis				The ATFM survey provides information on this subject
1.1 Carry out Calculation of Airport and Airspace Capacity of main airports by States. <ol style="list-style-type: none"> 1. Identify personnel available in each State to carry out calculation of runway capacity. 2. Identify which airports already have calculation of runway capacity. 3. Identify, prioritize and report what airports require calculation of runway capacity. 4. Carry out calculation of runway capacity. 5. Update calculation of runway capacity as necessary. 6. Identify airports exceeding runway capacity. 	Sep 2009	SAM/IG/16	States	States that have yet to submit information: Suriname and Guyana
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. <ol style="list-style-type: none"> 1. Consider the implementation of a CDM process in main airports. 2. States will notify airports with this process. 	SAM/IG/11	2016*	States	<p style="text-align: center;">VALID</p> ATFM operational concept, ATFM manual and ATFM roadmap will be taken into account. Chile signed a MoU with the Airport Community.
3. Infrastructure and database				
3.2 Establish a data base format to be used for automation.	SAM/IG/11	SAM/IG/17	States	VALID

A: AIRPORT				
Task description	Start	End	Responsible party (designate individual or organisation in charge)	Remarks
4. Policy, standards, and procedures				
4.7 Provide AIP/AIC published information on ATFM to SAM/IG meetings.	SAM/IG/11	2016*	States	PERMANENT Information will be presented in each SAM/IG The format of the publication is in Doc 8126
5. Training				
5.1 Establish courses on: a) FMP/FMU training b) Airport CDM training	SAM/IG/13	2016*	States	A-CMD course carried out at ICAO Lima, under the support of RLA/06/901 Project. States must replicate the course.
5.2 Draft ATFM training plans.	SAM/IG/11	2016*	States	VALID
5.3 Train FMP/FMU/ATC personnel for the application of ATFM measures in airports.	SAM/IG/11	2016*	States	VALID
5.4 Monitor the training of the ATM community.	SAM/IG/11	2016*	States	VALID
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				

A: AIRPORT				
Task description	Start	End	Responsible party (designate individual or organisation in charge)	Remarks
7.1 Develop performance indicators according to CDM manual.	SAM/IG/11	Oct/2017	States	VALID States which have implemented ATFM will present an information paper concerning the performance indicators.
7.2 Develop a performance indicators follow-up programme	SAM/IG/11	Oct/2017	States	VALID
7.3 Develop and implement an ATFM post-implementation follow-up programme at airports.	SAM/IG/13	Oct/2017	States	VALID

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION

B- AIRSPACE (ATC Sector)				
Task description	Start	End	Responsible party (designate individual or office in charge)	Remarks
1. Airspace demand and capacity analysis				ATFM survey has information on this subject
1.1 Carry out ATC sectors calculation. 1. Identify and train personnel available in each State to carry out calculation of air space capacity. 2. Identify which sectors already count with calculation of capacity. 3. Identify, prioritize and report what sectors require calculation of capacity. 4. Identify sectors exceeding capacity.	SAM/IG/11	SAM/IG/15	States	VALID Suriname and Guyana have not yet submitted information.
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 Suriname and Guyana have not yet submitted information.

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. Evaluate improvement of traffic flow by sequencing (B0-RSEQ) in order to allow an optimal application of new airspace concepts based on PBN, mainly using CDO and CCO	SAM/IG/14	SAM/IG/17	SAM/ATFM/IG States	VALID
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	2016*	States	VALID
4. Infrastructure and database				
4.2 Coordinate implementation activities with the Automation Group.	SAM/IG/13	SAM/IG/17	ATFM/IG	VALID Depends on States' requirements.
5. Policy, standards, and procedures				
5.2 Develop template/contents for operational agreements between centralized ATFM units for interregional demand/capacity balancing.	2008	2017	Project RLA/06/901	VALID
6. Training				
6.2 Prepare plans and ATFM training material	Dec 2014	2016*	States	VALID Argentina presented ATFM training Manual
7. Final implementation decision				
7.1 Analyse factors affecting the implementation decision.	N/A	2016	States	VALID
7.2 Declare pre-operational implementation in the area defined.	N/A	2016*	States	VALID

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	Start	End	Responsible party (designate individual or office in charge)	Remarks
7.3 Declare definitive operational implementation in the area defined.	N/A	2016*	States	VALID
8. Monitor system performance				
8.1 Draft performance indicators	2010	Oct/2017	Project RLA/06/901	VALID
8.2 Develop an indicators follow-up programme.	TBD	Oct/2017	States	VALID

NOTE: *Indicates that the date is related to the Bogota Declaration

ATFM SURVEY

ATFM SURVEY	ARG	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	YES	YES	YES	NO			NO	YES	NO		NO	YES	
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	YES	YES	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES	Pending Guyana and Suriname.

ATFM SURVEY	ARG	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	1	0	0	0	1		0	1	2		0	0	<p>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).</p> <p>Chile: We believe that SCEL, SCIE, and Loa de Calama require this calculation.</p> <p>Colombia: None. It is required for several airports since airport capacity is not being managed to address growing demand.</p> <p>Ecuador: None of the airports in the country has apron capacity calculations. However, it is estimated that the airports of Quito, Guayaquil, Nueva Loja, Coca, Shell Mera, Cuenca, and Manta require these calculations.</p> <p>Panama: Will request data from Tocumen S.A.</p> <p>Paraguay: These calculations have not been performed due to lack of experts (specialists) duly trained for this purpose. Calculations are required for the two international airports mentioned above: “Silvio Pettirossi” in Asuncion and “Guarani” in Minga Guazú.</p> <p>Peru: Cusco 7 C/D and 4 A/B positions.</p> <p>Uruguay: SUMU and SULS.</p> <p>Venezuela: None. We still do not have personnel duly trained to conduct these calculations, which would be required for the international airport of Maiquetía.</p>
6. Number of operations per hour at the airport considered to be the most important one:															<p>Chile: SCEL</p> <p>Peru: SPIM.</p>
Runway capacity			SBGR 52	SCEL 40	70 SKBO	29	6		MPTO 44	SGAS 23	SPJC 32		SUMU 25 SULS 18	SVMI 34	
Apron capacity	NO	NO	SBGR 90	NO	NO	NO	NO	NO	NO	NO	SPJC	NO	NO	NO	

ATFM SURVEY	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	REMARKS
7. For the airport considered to be the most important one, number of trained personnel capable of providing, in terms of operations per hour, calculations for:															
Runway capacity	20	12	18	15	4	1	3		2	1	8		5	2	
Apron capacity	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	3	NO	NO	NO	
ATS sector capacity	5	10	18	4	4	1	3		2	1	8		5	2	

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

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

- a) WP/07 - *Follow up to REDDIG II performance* (presented by the Secretariat);
- b) WP/08 - *Follow-up to activities under the SAM ground-ground and ground-air applications project (Project D2)* (presented by the Secretariat);
- c) WP/09 - *ICAO WRC 2015 results* (presented by the Secretariat);
- d) WP/13 - *Consideraciones sobre análisis de seguridad para proteger a la REDDIG II* (presented by Argentina) (Spanish only);
- e) WP/15 - *Plantear la necesidad de formular un documento sobre los requerimientos que se deben cumplir para los servicios de voz para la aviación civil* (presented by Argentina) (Spanish only);
- f) WP/21 - *Follow-up of Chile ANSP test implementation to access the SITA ACARS service through the REDDIG II network* (presented by SITA); and
- g) IP/11 – *Publicación AIC en el uso de SATDIS en Brasil* (presented by Brazil).

4.2 The aforementioned working papers covered the following issues:

- Activities carried out under project D1, *SAM ATN architecture*
- Activities carried out under project D2, *ATN ground-ground and air-ground applications*
- Frequency spectrum
- Follow-up to the use of the RAIM availability prediction application in the SAM Region (SATDIS)

ACTIVITIES CARRIED OUT UNDER PROJECT D1 – ATN ARCHITECTURE

Progress made in the implementation of REDDIG II

4.3 Effective implementation of REDDIG II started on 15 January 2015 and was completed on 31 January 2016. The following aspects enabled an effective follow-up of activities:

REDDIG II performance

4.4 Once the network was enabled, there were still some issues pending resolution (failure to operate of some AFTN, AMHS, ATS speech circuits, etc.). At present, the network has a stable and highly reliable behaviour leaving only one aspect to solve, which is the random freezing of some satellite modems.

4.5 In this sense, LNB (low noise block) devices are being replaced, initially at six (6) locations (Manaus, Recife, Ezeiza, Lima, Guayaquil, and Cayenne). Once this process has been completed, a detailed analysis will be conducted to ensure that the problem has been minimised, so as to proceed to the replacement of LNBs in the remaining locations. If the results of this analysis are negative, the manufacturer of the satellite modems, NDSatcom, shall conduct a more in-depth investigation to solve the issue.

4.6 Once the fault has been corrected, the final acceptance of the system will take place.

Activities carried out since the SAMIG/16 meeting

4.7 Implementation of a new node in Brasilia: Installation work started in December 2015. The satellite sub-network started operating in January 2016 while the ground sub-network did so last April, so the node is now fully integrated with the rest of the network. The enabled services are: one (1) AFTN circuit with Guyana and eleven (11) AMHS circuits with all neighbouring countries, as well as three (3) administrative speech channels and four (4) switched ATS channels with Atlanta through MEVA III.

4.8 Training courses: In accordance with that approved by the RCC/8, the first part of a basic course on Cisco routers and switches (“Interconnecting Cisco Network Devices part 1”) was provided on 9-13 November last year. Its purpose was to provide basic training to the personnel in charge of managing each node of the network and that lacked a sound background in IP networks and related equipment. This first part had an approximate cost of eight thousand dollars (USD 8.000), for a maximum of 16 participants, with the allocation of one fellowship per State. The second part of the course (“Interconnecting Cisco Network Devices part 2”) was conducted in April 2016. For REDDIG members that were unable to attend the aforementioned courses, two operation and maintenance courses will be given, one in Buenos Aires - Argentina (in Spanish) and the other in Georgetown – Guyana (in English), both scheduled for next September.

4.9 Furthermore, based on the task given to the Secretariat by the Nineteenth Meeting of the REDDIG Coordination Committee (RCC/19), the former was analysing the costs associated to the conduction of a satellite modem operation, programming, and maintenance course in 2017, either for twenty (20) personas, or for three (3) who would then convey the knowledge received to the rest of the required personnel.

Fifth technical-operational meeting

4.10 The RCC/19 initially agreed to hold the 5th technical-operational meeting of REDDIG on the week of 18 July 2016, in Manaus, Brazil, although confirmation by Brazil is still pending. The delegate of Brazil stated that he would be informing ICAO Secretariat as soon as possible.

Implementation of services

- ✓ *LEVEL 3 ground services*: the contract for the provision of services for 54 months was signed between said company and ICAO, on behalf of all the States.
- ✓ *Our services*: new AMHS circuits will be implemented this year. Colombia informed that, due to the transfer to the new control centre, AMHS implementations would be delayed.
- ✓ *New node in Córdoba, Argentina*: due to the construction of a new control centre in Ezeiza, a new node will have to be installed on that location. Once it has been enabled (first quarter of 2018), the current node will be transferred to the Cordoba ACC. Accordingly, the RCC/19 tasked the Secretariat with requesting the corresponding budget to INEO.

- ✓ *Transfer of the Bogotá node, Colombia*: since the control centre is scheduled to be moved mid this year, initial coordination has taken place between the network provider and the Special Civil Aviation Unit of Colombia.

Safety analysis

4.11 The RCC/19 felt the need to conduct a safety analysis of the network in order to protect it from external interference and to define a solution applicable to all nodes. Accordingly, an *ad-hoc* group was established, which allowed Argentina, as a result of the teleconferences conducted, to submit a working paper that was extensively discussed by the meeting, especially regarding the initial identification of hazards, risk assessment and control, as shown in the table contained in **Appendix A** to this agenda item.

Thus, the Meeting considered that:

- a) The information contained in the Appendices (A to F) to WP/13 will be included as appendices to the IP network security guide (April 2013). The guide is available at the following website:

<http://www.icao.int/SAM/eDocuments/GuiaOrientacionSeguridadImplantacionRedesIP.pdf>

- b) The REDDIG administrator and REDDIG members should review the implementation of initial action as described in Appendix A to this agenda item, in order to maintain the required security in REDDIG II, and submit it at the next meeting of the REDDIG coordination committee for approval and implementation. In this sense, the Meeting formulated the following conclusion:

Conclusion SAM/IG/17/01: Implementation of actions to maintain the security in REDDIG II

That REDDIG II member States and the REDDIG II Administration analyse the implementation of the initial actions described in Appendix A to this agenda item in order to maintain the required security in REDDIG II and submit the results of this analysis at the Twentieth meeting of the Coordination Committee of Project RLA/03/01 (RCC/20 March 2017) for approval.

Follow-up to the conduction of trials by the DGAC of Chile for accessing the SITA ACARS service through REDDIG

4.12 The RCC/19 considered that the trials conducted for the provision of SITA data link services at the ACC of Chile, entering the REDDIG node of Santiago and receiving them in Recife and from there to the SITA node, had been initially successful.

4.13 The meeting also felt the need to know the final results of the trials, as well as the cost/benefit ratio obtained by Chile and SITA. In this regard, taking into account that the tests will conclude by the end of the current month, during the course of the meeting the relevant presentations were made at the meeting that showed that:

- a) The extended trial period had been successful.
- b) The solution was cost-effective for the States requiring it.
- c) Availability can be further improved as compared to the initial scenario.

4.14 Regarding this last point, SITA presented the Meeting with a scenario where the company connects to REDDIG II at two different points (Recife and Brasilia), with the possibility of using one or the two available options (ground and/or satellite network) in each node (see configuration in Appendix B to this agenda item).

4.15 The possibility of having different connectivity (and thus availability) scenarios forced the Meeting to conduct a thorough analysis of each of them. The Meeting decided that:

- a) A first teleconference should be held on 21 June 2016 among REDDIG II member States that have implemented or are in the process of implementing the ground-air data link and the REDDIG II and SITA administration, to analyse the connectivity scenario shown in Appendix B to this agenda item.
- b) The results of the analysis of the REDDIG II data link connection configuration will be presented at the SAMIG/18 meeting.

In this regard, the Meeting formulated the following conclusion:

Conclusion SAM/IG/17/02: Analysis of the REDDIG II connection configuration for the transport of SITA data link services

That REDDIG II member States that have implemented or are in the process of implementing the ground-air data link service and the REDDIG II and SITA administration hold the necessary teleconferences to analyse the REDDIG II connection configuration shown in Appendix B to this agenda item, starting on 21 June 2016, and submit the results of the analysis at the SAM/IG/18 meeting.

4.16 DGAC Chile, at the end of his current contract with SITA (October 2016) will decide whether to continue with the current service delivery mode, or will select the option via REDDIG.

Voice service requirements

4.17 Upon discussing WP/15, the Meeting recognised that, when planning voice services, special attention had to be paid to the fact that what is initially more economical in a fully operational environment such as aviation, almost never turns out to be the most appropriate or beneficial or, that matter, the most economical.

4.18 Consequently, when making a decision, quality of service should prevail, without neglecting reliability and scalability.

4.19 In this regard, the Meeting recognised the need to draft a guiding document that contemplates all the aspects contained in the WP. Accordingly, it recommended the Secretariat to insert this requirement for its analysis and approval at the Tenth meeting of the coordination committee of project RLA/06/901 to be held in Lima, Peru, in late August 2016. For the drafting of the document, a communication expert on a mission for one week at the ICAO South American Office would be required.

FOLLOW UP TO ACTIVITIES UNDER PROJECT D2, GROUND-GROUND AND AIR-GROUND ATN APPLICATIONS

Ground-ground applications

Follow-up to the operational interconnection of AMHS systems

4.20 Since the PPRC/3 meeting, it was noted that the AMHS application was not being used to its full potential, and that it was operating like the AFTN, only with alphanumeric characters, without using annexes to messages, which may contain various information, such as tables and graphs.

4.21 In this sense, the PPRC/3 established a working group for the development and implementation of a strategy for effective use of AMHS, made up by Brazil, United States, Dominican Republic, and the coordinators of the D programmes of the CAR/SAM Regions. The working group considered that OPMET exchange in XML/GML digital format (recommended in Amendment 77 of Annex 3 – Meteorological service for international air navigation for OPMET exchange), to be implemented starting in November 2016, would constitute an effective use of AMHS, since the AFTN network does not meet the minimum requirements for the transmission of XML messages (limited to 2500 characters per message), which would cause errors in messages. Therefore, the effective implementation of XML/GML should expedite the implementation of AMHS interconnections.

4.22 Regarding the AMHS interconnection, the Meeting took note that, since mid December 2015, positive trials had been conducted and several connections had been achieved between various MTAs of the Region, which are ready to move to the operational phase. The interconnection between the Brasilia and the Lima MTAs became operational in mid December 2015.

4.23 The Meeting took note that operational trials would be conducted between the Ezeiza and the Brasilia MTAs on the eve of 23 May 2016, and that the ICAO Secretariat in Lima was offering the go-to-meeting teleconferencing application to coordinate as needed.

4.24 Finally, the Meeting took note of the activities carried out for the implementation of the AMHS interconnection, as shown in **Appendix C**, and proceeded to update the implementation dates of AMHS interconnections, as shown in **Appendix D** and the list of focal points for the AMHS interconnection, shown in **Appendix E**.

SITA AMHS connection

4.25 As a follow-up to SITA AMHS implementation in Brasilia, the Meeting took note that DECEA and SITA are coordinating the installation of the necessary connectivity elements for the AMHS interconnection (routers, etc.), and the drafting of the documents (technical memorandum) required for the conduction of initial trials that will allow SITA to send to the airlines all the ATS/AIS information of interest for them, especially to those that currently have no access to the AFTN/AMHS network.

Operational integration of international AIDC connections in the SAM Region

4.26 Regarding this activity, the Meeting took note of the progress made in AIDC interconnections. These activities are addressed in detail under Agenda Item 5.

Ground-air data link applications

4.27 The Meeting took note that, in order to support the States with data link planning, a NAM/CAR/SAM ATS data link implementation workshop was held in Saint Marteen, on 18-21 April this year. **Appendix F** to this agenda item contains copy of the preliminary summary of the workshop, with the respective conclusions and recommendations. All the presentations of the event are available at <http://www.icao.int/NACC/Pages/meetings.aspx?year=2016&cM=02&cY=2016>.

4.28 Similarly, the Meeting was informed that with the same purpose, and with the support of DECEA and SITA, a seminar on datalink implementation was held in Recife from 16 to 18 March 2016. All presentations are available at <http://especiais.decea.gov.br/jornada-datalink/>.

RESULTS OF THE WRC 2015

4.29 The Meeting took note that the ITU 2015 Radio Navigation Conference was held in Geneva, Switzerland, on 2 to 27 November 2015, with the participation of 3,800 delegates of 162 ITU member States and 130 other entities, including international organisations and the industry.

4.30 The position of ICAO was intended to protect the aeronautical spectrum for all radio communication and radio navigation systems that use the ground and airborne facilities, since the radio frequency spectrum is a limited resource with a finite capacity. Furthermore, its demand is constantly increasing, while the needs of civil aviation and those of the other spectrum users continue increasing at a fast pace, generating more pressure on this meagre resource.

4.31 The telecommunication industry was seeking 1 200 MHz of additional spectrum in the frequency range of 300 MHz to 6 GHz, for international mobile telecommunications (IMT). This frequency range includes a number of aeronautical frequency bands, several of which were analysed by the Conference for possible assignment to IMT, including:

- a) the 2 700 – 2 900 MHz band, used by the primary aeronautical surveillance radar (PSR),
- b) the C band (3.400 – 4.200 MHz, used for satellite links in the fixed satellite service (FSS) to support ground-ground communications, using very small aperture terminal equipment (VSAT), and
- c) the 4.400 – 4.500 GHz band, which is adjacent to the band for the 4.2-4.4 GHz aeronautical radio altimeter. The aeronautical radio altimeter is a critical piece of equipment of the ground proximity warning system (GPWS) of the aircraft, and is used during I/II/III landings.

4.32 Relatively early during the Conference, an agreement was reached to leave PSR bands out of the discussion. In contrast, the 4.4 – 4.5 GHz band, adjacent to the radio altimeter band, was left out of the discussion towards the final days of the Conference.

4.33 Meantime, a favourable result for the C band (3.4-4.2 GHz) was secured. Taking into account that the frequency band for receiving RF signals for REDDIG II is within the 3400 - 4200 Mhz band (the total receiving bandwidth occupancy of REDDIG II goes from frequency 3788.621 to frequency 3.792.9995).

4.34 Likewise, other VSAT networks for aeronautical use are operating in Argentina, Brazil, Colombia, Ecuador, Paraguay, Peru, and Venezuela in the 3400 - 4200 Mhz band. Of the States that informed of the operating frequency, Paraguay and Peru are within the protected band, while the

operating frequency of Venezuela is in the section of the band (3.4 - 3.7 Ghz) in which they allowed bandwidth assignments to IMT, provided this service does not interfere with the FSS service.

4.35 For that protection to exist, the FSS frequencies and equipment for aeronautical applications need to be registered before the national body in charge of managing the spectrum.

4.36 The Meeting took note that the RCC/19 meeting had followed up the implementation of Conclusion RCC18/1 – Process for the registration of REDDIG II equipment and frequencies before the national entities that manage the spectrum, whereby States that had not yet registered the frequencies and equipment before the national entities that managed the frequency spectrum, were requested to do so by 29 May 2015.

The Meeting took note that:

- a) Argentina and Chile had submitted the registration forms and the approvals by the entity in charge of managing the spectrum,
- b) Brazil informed that the registration process was being conducted together with the registration of all aeronautical equipment frequencies installed in the country,
- c) Colombia informed that it would begin the registration process once it completes the relocation of the REDDIG II node of Bogota and the installation of its new national VSAT network that is in the implementation phase,
- d) France will inform the ICAO SAM Office about the registration process as soon as possible,
- e) Paraguay informed that it had registered the frequencies and the equipment, just like Peru, Trinidad and Tobago, Uruguay, and Venezuela.

4.37 Finally, the Meeting took note that the RCC/19 had considered that, in order to ensure due protection of REDDIG II frequencies and of national satellite networks used for aeronautical applications, the States, through their respective national entities responsible for managing the frequency spectrum, should register the VSAT stations at the MIFR (Master International Frequency Register). In this regard, the Meeting formulated Conclusion *RCC19/3 – Registration of VSAT stations for fixed satellite service (FSS) for aeronautical use at MIFR (Master International Frequency Register)*. To date, no State has completed the registration at the MIFR.

FOLLOW-UP TO THE USE OF THE RAIM AVAILABILITY PREDICTION APPLICATION IN THE SAM REGION (SATDIS)

4.38 As a follow-up to the use of the RAIM availability prediction web-based application, the Meeting took note of the little use made of it. In this sense, it considered that, at the forthcoming SAM/IG/18 meeting, the Secretariat should present information on the use of the SATDIS application by project RLA/06/901 member States since the date of its implementation, to allow the SAM/IG/18 meeting to analyse the results and propose relevant recommendations.

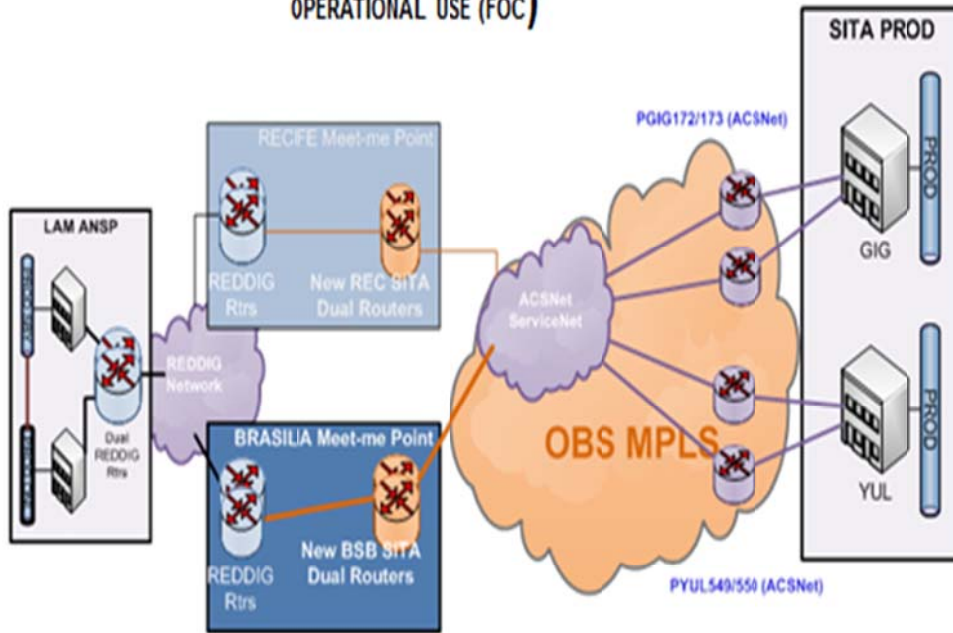
AMENAZAS	IDENTIFICADAS	CONSIDERACIONES	ACCIONES PROPLESTAS
<p>INTERNAS de la REDDIG (Sub red satelital y Subred terrestre)</p>	<p><i>Subred terrestre MPLS LEVEL 3</i></p>	<p>La red terrestre es sobre MPLS VPN, brindada por un proveedor, Level (3), en la cual, el administrador de la REDDIG II, al igual que cualquiera de sus usuarios, no tiene gestión sobre los dispositivos y mucho menos sobre esta red, supuestamente mallada, y, supuestamente, con QoS prevista para priorizar los paquetes pertinentes.</p>	<p>* Que el proveedor de servicio de la subred terrestre (LEVEL 3) debería informar si utiliza el estándar de seguridad RFC 592. * Que en la reunión de mediados de mayo de 2016 se trate con la empresa Level (3) el tema de seguridad. * Que se haga uso de NAT en los routers de frontera de los Estados ante el nodo de la REDDIG II y la subred terrestre de LEVEL 3, adicionalmente se podrían proceder a la encriptación de la información.</p>
	<p><i>Accesos remotos a través del internet pública en la REDDIG II por VPN</i></p>	<p>En la REDDIG II el consorcio INEO&LEVEL 3 ha considerado que cada nodo de la REDDIG II tenga instalada una interfaz VPN con el fin de poder acceder remotamente a los equipos de la red (Routers, MODENs amplificadores) en caso de falla o cambios de configuración. A la fecha se tiene VPN en operación en los nodos de Brasilia, Ezeiza y Manaus. Se han instalados VPN en Montevideo (Uruguay) y Guayaquil (Ecuador pero no están en operación) el consorcio INEO&LEVEL 3 está utilizando este acceso para corregir problemas en los equipos de los nodos o cambios de configuraciones y lo seguirá utilizando hasta que proceda la entrega de la red al proyecto (RLA/03/901) que ocurrirá una vez que se haya realizado la aceptación definitiva de la red, también este acceso será utilizado durante el periodo de garantía (dos años a partir de la aceptación final de la red).</p>	<p>* Cuando la red pase bajo el control de la OACI, el acceso VPN será manual bajo requerimiento del administrador de la REDDIG. De esta forma se reducirían los peligros que se presentan al tener siempre conectado a la REDDIG II redes públicas IP.</p>
	<p><i>Factores humanos</i></p>	<p>La intervención humana en los nodos de cada sitio, la carga de nuevas configuraciones de software, bajar información almacenada en los equipos, etc; debe hacerse con mucha precaución evitando introducir virus posiblemente instalados en CD o memorias USB.</p>	<p>* En vista que las manipulaciones ocurren a través del sistema de gestión (NMS) se debería actualizar constantemente el antivirus de la aplicación <i>Whats up red</i>. * Una vez que la red sea administrada completamente por la OACI, se procederá a cambiar todos los password de acceso. Tener en cuenta que en este momento todos los que operan la red conocen los password de todos los nodos de la REDDIG II. Solamente el administrador de la red y aquel personal de cada NCC que este autorizado el mismo con un login y password que lo identifique, tendrán el acceso a la red. La administración, configuración, y registro de actividades, estarán a cargo del Administrador de la Red. * Las personas a cargo del mantenimiento del nodo solamente tendrán acceso a su propio nodo con login y password personales y asignado por el Administrador. * Todas las actividades que se realicen en las configuraciones de los equipos de networking quedarán registradas en un servidor al cual tendrá acceso el Administrador y donde quedarán registrados todos los accesos y cambios que el personal autorizado haya realizado.</p>
		<p>En el caso de que usuarios realicen cambios en la configuración de equipos de networking de la REDDIG, y estos cambios resulten contrarios a los deseados o afecten servicios.</p>	<p>* Realizar tareas de Backup de todos los equipos de la red de manera automática y con tiempo predefinidos para contar, ante contingencias, con las configuraciones actualizadas.</p>
<p>EXTERNAS a la REDDIG II</p>	<p>EXTERNAS de la REDDIG es decir a nivel de los usuarios que acceden a la red</p>	<p>Esta parte se refiere al lado de los usuarios de la REDDIG II. A nivel de usuario los tipos de servicio entrante en la REDDIG son circuitos de voz y datos. Los circuitos de datos representan el factor más importante de vulnerabilidad en cuanto a seguridad de la red.</p>	<p>* Asimismo el grupo consideró la necesidad que el servidor del NMS este constantemente registrando las configuraciones de los diferentes equipos de forma tal de poder tener grabado versiones anteriores, de esta forma se garantizaría regresar a versiones anteriores en caso de problemas en las nuevas versiones. * A fin de poder identificar los potenciales peligros, se debería realizar un relevamiento de como están conectados los circuitos a las interfaces de entrada de la REDDIG II. Este relevamiento permitiría identificar si algunos de los circuitos o servicios que entran en la red tienen de alguna red pública. * Que los servicios y circuitos se interconecten a través de un router de frontera y no directamente a los router de la REDDIG. * Que los router de frontera deben tener los firewall adecuados * Realizar un estudio sobre un firewall estándar para aplicar a todos los router de frontera y estandarizar el nivel de seguridad en todas las entradas a los nodos REDDIG</p>
<p>OTRAS CONSIDERACIONES</p>	<p>Los aspectos a considerar tienen que ver con la protección de las frecuencias de la REDDIG II</p> <p>Los aspectos tendientes a implementar una adecuada política de seguridad</p>	<p>otros aspectos a considerar para evitar riesgos en la REDDIG II</p>	<p>* Hacer un inventario de equipamiento licenciado (frecuencia-espectro ambiental) por cada nodo. * Registro de los equipos de Estado ya licenciados nacionalmente y/o MFR, volcados en Base de datos (Software). * Monitoreo y Tracking constante del espectro radioeléctrico empleados por los nodos REDDIG, a fin de no ser interferidos y tampoco causar eventuales interferencias. * Con el apoyo o soporte de la UIT hacer control de las amenazas de interferencia invocando al Artículo 45 CS y 15.1 del RR de la UIT. * Grupo de Trabajo capacitado para realizar trabajos de control y mitigación de interferencias. * Implementar Políticas de Seguridad. * Tener actualizada y disponible la topología de la red. * Asignar login y password a los responsables de cada nodo, de forma tal de limitar y controlar las facilidades con que cada uno gestionará los dispositivos de networking pertenecientes a la red. * En principio determinar dos tipos: administradores con acceso a toda la red; y usuarios responsables desistiendo con acceso sólo a los equipos de su nodo. * Prevenir intentos de acceso por fuerza bruta estableciendo parámetros de tiempo para el ingreso de claves en el dispositivo.</p>

APPENDIX B

APENDICE B

SITAONAIRO

PROPUESTA DE CONECTIVIDAD PARA USO OPERACIONAL/ PROPOSED CONNECTIVITY FOR OPERATIONAL USE (FOC)



APPENDIX C

PROGRESS MADE IN THE IMPLEMENTATION OF AMHS INTERCONNECTION SINCE THE SAM/IG/16 MEETING

1.1 The progress made in the implementation of AMHS interconnection since the SAM/IG/16 meeting is reported below. In this regard, there has been a significant progress in the implementation of AMHS interconnection with respect to previous years.

Brasilia - Lima

1.2 On 14 December 2015, the AFTN circuit between the Brasilia MTA and the Lima MTA was migrated to an AMHS circuit using protocol P1. Thus, Peru has implemented its third operational AMHS, becoming the State with the largest number of AMHS interconnections.

1.3 In this sense, the Secretariat commended all the technical and operational personnel of Brazil and Peru that participated in the implementation of the new AMHS circuit between Brazil and Peru through the REDDIG II for the excellent job done. Initially, some errors have occurred in the messages through this new circuit, which are being analysed in order to find a prompt resolution.

Brasilia - Madrid

1.4 It was noted that all AMHS trials between Brazil and Spain (Brasilia MTA-Madrid MTA) through the CAFSAT satellite network had been successfully completed on 14 January 2016. In this regard, all the technical, operational, and managerial personnel of Brazil and Spain involved in the implementation of the interconnection and the trials was commended. It was also reported that Brazil and Spain were coordinating as necessary for the commissioning of this AMHS connection, which would be the first inter-regional AMHS interconnection of the SAM Region.

Brasilia - Ezeiza

1.5 It was noted that the final Argentina-Brazil interconnection trials, scheduled for 26 January 2016, would be conducted after completing the installation of the new REDDIG II node in Brasilia, which was completed in mid-April 2016.

Ezeiza - Montevideo

1.6 On 3 March 2016, Uruguay began initial coordination with Argentina for AMHS interconnection between Ezeiza and Montevideo. AMHS trials between the Ezeiza and Montevideo MTAs started on the week of 21 March 2016. The focal point of Argentina, Mr. Javier Vittor, reported on 22 March that P1 connectivity between Ezeiza and Montevideo had been achieved from Ezeiza to Montevideo, and that trials from Montevideo to Ezeiza were still pending.

Brasilia - Montevideo

1.7 In March 2016, the focal point of Uruguay started to coordinate the implementation of the AMHS interconnection with Brazil. The interconnection will be between the Brasilia and the Montevideo MTAs.

Ezeiza - Lima

1.8 Trials were resumed on the week of 21 March. In this regard, the focal point of Argentina reported that P1 connectivity between the Ezeiza and the Lima MTAs had been established. The person designated by Argentina to be in charge of the working group for the conduction of the trials is Mr. Antonio González (+54 11 4480 2362 / 2376).

1.9 In order to complete trials between Argentina and Peru, it was coordinated that they would be resumed on 31 March 2016.

Lima - Caracas

1.10 On 10 March 2016, AMHS trials between Peru and Venezuela were resumed, attaining P1 connectivity between the Maiquetía and Lima MTAs. P1 connectivity between Peru and Venezuela was achieved with the support of Brazil. Initial message exchange trials through the AMHS (P1) circuit were conducted on 15 March, without satisfactory results. In this regard, the focal point of Peru requested Venezuela to make the necessary corrections so that messages could be processed and delivered to the user without any problems. Trials were conducted on 20 and 21 March, in which some progress was noted, expecting a successful completion as soon as possible.

Lima - Santiago

1.13 Coordination started for the implementation of the AMHS interconnection between Chile and Peru. In this regard, the focal point of Peru sent to the focal point of Chile a copy of the Quito MTA configuration to be used by Chile as reference, taking into account that the Santiago AMHS is also from Thales. AMHS interconnection trials between Chile and Peru would be resumed on the week of 21 March 2016.

Brasilia – United States

1.14 On 13 January, the focal points of Brazil and United States started coordinating the implementation of the AMHS interconnection through the MEVAIII-REDDIG II interconnection. In this regard, Brazil reviewed a technical letter required by the United States (FAA) for interconnections with other countries. The technical letter covers administrative and operational aspects for the completion of the AMHS interconnection. At present, the technical letter is being reviewed by the United States. Once the technical letter has been finalised and signed, interconnection trials will start. Copy of the technical letter is contained in the **Attachment to this Appendix** to this working paper.

Remaining interconnections of Brazil

1.14 The remaining AMHS interconnection trials of Brazil would be conducted once the new Brasilia node is fully completed. The REDDIG II node of Brasilia is to be completed in mid 2016. From there on, Brazil would start final interoperability trials with the MTAs of the States with which it has AMHS requirements.

APPENDIX D

AMHS INTERCONNECTION REQUIREMENT AND DATE OF IMPLEMENTATION

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
Argentina	Bolivia	Dec 2016	
	Brazil	Jun 2016	Pending operational implementation
	Chile	Dec 2016	
	Paraguay	Mar 2012	Implemented
	Peru	Oct 2016	
	Uruguay	Dec 2016	
	Venezuela	Dec 2016	
Bolivia	Argentina	Dec 2016	
	Brazil	Dec 2016	
	Peru	Dec 2016	
Brazil	Argentina	Jun 2016	Pending operational implementation
	Bolivia	Dec 2016	
	Colombia	Jul 2016	
	Guyana	Jul 2016	
	French Guiana	TBD	AMHS pending implementation
	Paraguay	Jun 2016	
	Peru	Dec 2015	Implemented 14 December 2015
	Suriname	Dec 2016	
	Uruguay	Oct 2016	
Chile	Argentina	Dec 2016	
	Peru	Oct 2016	
Colombia	Brazil	Jul 2016	
	Ecuador	Jul 2016	
	Panama	Dec 2016	
	Peru	Sep 2010	Implemented
	Venezuela	Dec 2016	
Ecuador	Colombia	Jul 2016	
	Peru	Julio 2012	Implemented
	Venezuela	Dec 2016	
French Guiana (France)	Brazil	TBD	AMHS pending implementation
	Venezuela	TBD	AMHS pending implementation
Guyana	Brazil	Jul 2016	

STATES	AMHS INTERCONNECTION REQUIREMENTS	DATE OF IMPLEMENTATION	COMMENTS
	Suriname	Jun 2011	Implemented
	Venezuela	Dec 2016	
Panama	Colombia	Dec 2016	
	Argentina	Mar 2012	Implemented
Paraguay	Brazil	Jul 2016	
	Argentina	Oct 2016	
	Bolivia	Dec 2016	
	Brazil	Dec 2015	Implemented 14 December 2015
Peru	Chile	Oct 2016	
	Colombia	Sep 2010	Implemented
	Ecuador	Jul 2012	Implemented
	Venezuela	Oct 2016	
	Brazil	Dec 2016	
Surinamee	Guyana	Jun 2011	Implemented
	Venezuela	Dec 2016	
	Argentina	Dec 2016	
Uruguay	Brazil	Oct 2016	
	Argentina	Dec 2016	
	Brazil	Dec 2016	
	Colombia	Dec 2016	
	Ecuador	Dec 2016	
	Guyana	Dec 2016	
	French Guiana	TBD	AMHS pending implementation
	Peru	Oct 2016	
	Suriname	Dec 2016	

APÉNDICE E/APPENDIX E

**NATIONAL FOCAL POINTS/PUNTOS FOCALES NACIONALES
IMPLEMENTATION OF INTERCONNECTION OF AMHS SYSTEM /IMPLANTACIÓN INTERCONEXIÓN DE SISTEMAS AMHS**

STATE/ ESTADO	ADMINISTRATION/ ADMINISTRACIÓN	NAME/ NOMBRE	POST/ CARGO	TELEPHONE/ TELEFONO	E-MAIL
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BRAZIL/ BRASIL	DECEA	Francisco Almeida	Jefe de División de Coordinación técnica SDTE/DECEA	(55 21) 2101-6461 (55 21) 99499-6762 (5521) 98552-0829	franciscoalmeida@hotmail.com
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ECUADOR	DAC	Raul Avellan	Especialista CNS coordinador sistema AMHS	(593 4) 269-2829 (593 9) 9530-2735	raul.avellan@aviacioncivil.gob.ec
GUYANA	Guyana Civil Aviation	Mortimer Salisbury	Supervisor - AN & T	(592) 261-2569	mbsalisbury2000@yahoo.com
GUYANA FR.	Service de la Navigation Aérienne aux Antilles-Guyane (SNA-AG)	Michel Arenó	Head French Guiana ACC	(594) 694455617	michel.arenó@aviation-civile.gouv.fr

STATE/ ESTADO	ADMINISTRATION/ ADMINISTRACIÓN	NAME/ NOMBRE	POST/ CARGO	TELEPHONE/ TELEFONO	E-MAIL
PANAMA	Autoridad Aeronáutica Civil (AAC)	Daniel de Avila	Supervisor Dep. de COM	(507) 315 9877/78/77	ddavilah@hotmail.com
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		Alejandro Ibarrola	Jefe sección AMHS		aleiba40@gmail.com
PERÚ	CORPAC	Jorge Garcia	Jefe de Comunicaciones	(511) 2303131	jgarcia@corpac.gob.pe
		Raul Anastasio Granda	Supervisor Comunicaciones AMHS-AFTN Área de Comunicaciones Fijas Aeronáuticas	(511) 230-1018	ranastacio@corpac.gob.pe
SURINAM/ SURINAME	Ministry of Transport, Communication and Tourism, Civil Aviation Department	Mitchell Themen	CNS Technical Division	(597) 325-123 (597) 325-172 (597) 497-143	mickiano@live.com
URUGUAY	DINACIA	Wilson Pelayo	Jefe de Comunicaciones	(598) 26826224	wiledda@hotmail.com
VENEZUELA	INAC	Samuel Sánchez	Jefe coordinación AMHS		s.sanchez@inac.gob.ve
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Agenda Item 5: Operational implementation of new ATM automated systems and integration of the existing systems

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

- a) WP/10 – *Follow-up to the implementation of AIDC interconnection* (presented by the Secretariat);
- b) WP/11- *Follow-Up to the implementation activities under the project on Improved ATM Situational Awareness in the SAM Region* (presented by the Secretariat);
- c) WP/17 - *Implementation of AIDC Protocol in Brazil* (presented by Brazil);
- d) WP/18 - *Aceptación manual o automática de los mensajes EST del AIDC en los sistemas automatizados de control* (presented by Colombia and Panama); (Spanish only) and
- e) IP/09 - *Prueba Pre-operacional del tratamiento de automático de Planes de vuelo, sistemas LIDO y JEPPESEN* (presented by Argentina) (*Spanish only*).

Review of the Guidance for AIDC implementation through the interconnection of automated centres

5.2 The Meeting reviewed the *Guidance for AIDC implementation through the interconnection of automated centres*, with the insertion of the updated Chapter II *Technical Aspects for the AIDC implementation*, the also updated minimum set of AIDC messages, the standard document on AIDC operations and procedures for the AIDC tests, all documents developed according to what was agreed by the First Meeting on the AIDC Implementation, and included in Appendix A to WP/10 of this meeting.

5.3 The Meeting also reviewed in detail the status of the AIDC implementation in the SAM Region which will be added as part of the Guidance.

Analysis of the availability of flight plans in the SAM Region

5.4 The Meeting analyses and updated the implementation status of automated systems in the Region in correspondence with Amendment 1 of Document 4444 (FLP/12) presented as **Appendix A** to this Agenda Item.

5.5 Argentina explained the work made by two airlines (Aerolineas Argentinas and LAN Argentina) through Lido and Jeppesen services, which is in pre-operational phase, for the presentation of the direct flight plans via AFTN, via user interfaces that count with controlled templates to ensure the quality of the content and format of the flight plans.

5.6 The Meeting decided that the AIDC group continues evaluating actions intended to mitigate flight plans errors, as well as reducing the duality multiplicity, continuing with the analysis of feasibility to include automated presentation of FPL systems interconnected with the ATC automation systems in the regulatory framework of each State and present results in the second meeting of the AIDC implantation to be held in Lima, Peru, from 26 to 28 September 2016.

Follow-up to AIDC performance in the SAM Region and tests results of AIDC interconnections in SAM Region

5.7 The Meeting analyzed the status of the AIDC interconnections in the SAM Region and its level of performance. In **Appendix B** to this Agenda Item a chart with the AIDC implementation requirements in the SAM Region and the status of implementation to date is presented. The updated list of AIDC focal points is presented as **Appendix C**.

Lima - Guayaquil AIDC interconnection

5.8 Despite this interconnection begins operations on 31 March 2016 according to letter of agreement signed between Lima and Guayaquil, to date it is not being used at 100%.

5.9 The representative of Ecuador stated that the Lima ACC lacks of pattern in the use of the AIDC, reporting that during some turns it is used, but not in all, and that in additionally there are times with no AIDC coordination, since the Lima supervisor reports to the Guayaquil supervisor that it is not possible to use the AIDC due to technical problems and lack of personnel.

5.10 The meeting urged the Civil Aviation Administration of Peru to comply with the letter of operational agreement spreading the use of the AIDC and solving the technical and ergonomic problems regarding the ATC consoles of Lima ACC.

AIDC interconnection between ACC Bogota-Lima, Bogota-Guayaquil, Bogota-Panama y Panama-Cenamer

5.11 There is a pending letter of agreement between the Lima ACC and Bogota ACC, planned its entry into force May 30, 2016.

5.12 In this regard, the focal point of Peru reported that an agreement was signed to perform operational tests between the ACC of Lima and Bogota since April. However, these tests are not have been fulfilled satisfactorily, mainly due to the little initiative and lack of knowledge of Bogotá ATC staff regarding the correct use of the AIDC tool. It was observed lack of response to the coordination, or incorrect replies to AIDC messages from the ACC Lima to Bogota ACC, and the widespread use of the speech channel for transfers between the ACC in Bogota and Lima, without taking advantage of the AIDC.

5.13 The meeting noted that letters of agreement between Bogota-Guayaquil and Bogota-Panama are ready for signing. During the Meeting trials protocol between Bogota ACC and Guayaquil ACC was signed.

5.14 Panama has performed satisfactorily tests with the Bogota ACC and CENAMER, as well as successful exchange of AIDC messages with Barranquilla. We keep waiting for the signing agreements between the different ACC to formalize the AIDC use between the corresponding centres.

5.15 The meeting was informed that despite the fact that in Panama remains the same operating problems reported by other States, Panama is working together with THALES in the TOPSKY system improvements to minimize the system's technical errors for optimum performance of the AIDC.

AIDC interconnection between ACC Lima and Iquique

5.16 Successful tests of AIDC interconnection between the Lima ACC and Iquique were carried out. However, these tests have faced the difficulty that Iquique staff have not received training in the use of the AIDC as a coordination tool, and must be guided by the Lima ACC staff during testing.

5.17 Also, to date there is not a letter of agreement between Lima and Iquique, being pending its preparation. It is expected that this letter of agreement is presented during the second meeting of AIDC implantation.

Another AIDC interconnections

5.20 Argentina informed the progress of the AIDC interconnection tests between the Cordoba ACC and Iquique that cannot be concluded. From the initial tests, it was noted that the speed of transmission should be increase from 2400 bits/seg to 9600bit/seg.

5.21 Brazil reported the AIDC interconnection tests between Lima ACC and Amazonico (Amazonico through a simulator), which have been successful.

5.22 The focal point of Peru reported a limitation in the Sagitario system of Amazonian ACC, which has no ability to build segments of route unless specified transfer point and the adjacent point is explicitly indicated in box 15 (a limitation that does not exist in the software of other manufacturers). This generates additional manual work by the Lima ACC to ensure that AIDC coordination with the ACC Amazon will operate fluently.

AIDC training

5.23 The following AIDC courses are planned:

- ✓ Asuncion, Paraguay: 6 to 10 June 2016
- ✓ Curitiba, Brazil: 10 to 16 October 2016

5.24 In addition, the technical focal point of Chile expressed the need to deliver an AIDC course for ATC staff from ACC Iquique, since technically this ACC would be soon entering in operational phase with the Lima ACC, but its staff still does not know well the use of the tool. In this regard the Secretariat considered requesting to the next meeting of the Coordination Committee of project RLA/06/901 (RCC/10) a week AIDC practical course to be held probably in October 2016.

AIDC implementation in Brazil

5.25 Brazil explained the progress made in the AIDC implementation both at internal and adjacent ACC.

5.26 On this respect, informed about the status of the following AIDC interconnections:

ACC Date of AIDC implementation:

- ✓ Curitiba – Recife July 2016
- ✓ Recife – Brasilia July 2016
- ✓ Curitiba – Brasilia July 2016

- ✓ Curitiba – Amazonica July 2016
- ✓ Amazonica – Brasilia June 2016
- ✓ Amazonica – Recife 02/05/2016

Manual or automatic acceptance of AIDC EST messages in automated control systems

5.27 When automated ATC systems generate AIDC coordination messages, such as ABI, EST, PAC, LAM, and LRM automatically and they are answered by an ACP in the same way, the coordination runs fluidly, thus fulfilling the objectives of coordination processes automation. This fluidity is not accomplished when one of the automated systems require acceptance of automated coordination (ACP message) must be sent manually, which causes delays in response coordination, or stagnation of them due to lack of response. This in turn generates an overload of work in the ATCOs, who are forced to rely on alternate means, such as speech channels of coordination ATS not to obtain response to automated coordination.

5.28 On this respect, the Meeting recalled that according to PAN ICD regarding EST and PAC messages, the only valid reply to this messages is and ACP message.

5.29 Since this message is the only valid reply for these AIDC messages, does not make much sense requesting that the response be made manually. Moreover, taking into account the undue delays or low level of ACP registered during the tests of AIDC messages exchange.

5.30 For these reasons it is considered beneficial to take advantage of the capacity of Topsky systems of Thales, and recent versions of the 2100 Aircon/Icon of Indra, that allow configuration of the ACP response automatically, thus eliminating the need that EST and PAC messages must be answered manually through an ACP by ATCO of the ACC receiver.

5.31 The Meeting agreed to include aspects related to automatic reply to EST and PAC messages in the corresponding section of *Guidance for AIDC implementation through the interconnection of automated centres*

Follow-Up to the implementation activities under the project on Improved ATM Situational Awareness in the SAM Region

5.32 The Meeting noted that the activities corresponding to the project of Improved ATM Situational Awareness ATM (project C2) have been completed only pending the preparation of the *Guidance with technical considerations in support of the implementation of the ATFM*.

5.33 The meeting was informed that the *Guidance with technical considerations in support of the implementation of the ATFM*, still pending, was approved for elaboration by the Ninth meeting of the Committee of review of the project RLA/06/901, approval consisted of a week mission of an expert (for April 2016, in Lima, Peru). The mission is still pending, waiting that the guidance is presented in the SAM/IG/18.

5.34 Also the meeting was informed about the planning tables related to the surveillance area referred to in volume II of the eANP (see Appendix B of WP/11) such as CNS II 6 (aeronautical mobile services, AMSS), table CNS II 8 CNS II-8 (ASTERIX SAC code assignment plan for the CAR/SAM Regions) and table CNS II 9 on surveillance systems. In this regard Argentina, Chile, Ecuador, Paraguay,

and Peru amended some of the tables during the meeting. The secretariat will update the contents of the tables of the eANP.

5.35 Finally, the Meeting was informed that the Fourteenth Meeting of the Civil Aviation Authorities (RAAC/14) took note on the planning of implementation of air navigation activities in the CNS field for the period 2017-2019 (See Appendix C of WP/11) related with ASBU modules: related to ASBU modules B0 – SUR: Initial ground surveillance capability, B0-SURF: Safety and efficiency of surface operations (A-SMGCS Level 1-2) and B0 – TBO: Improved safety and efficiency through the initial application of data link in route, and identified indicators and goals for the period 2017-2019. On this respect, the Meeting considered that as follow-up to the implementation of the abovementioned activities shall be included in the project C2.

Other consideration on improvement of the situation awareness

5.36 A delegate from Brazil presented to the Group of CNS improvement and Automation, information related to the status of the ADS-B satellite and the way the service is provided and the associated cost. In this sense the Meeting considered the possibility that the Secretariat invited for the SAM/IG/18 representatives from ADS B satellite to give the group more information in this regard.

APPENDIX A / APÉNDICE A**STATUS OF THE AUTOMATION IMPLEMENTATION TO GIVE EFFECT TO THE AMENDMENT TO THE FLIGHT PLAN FORMAT/****ESTADO DE IMPLANTACION DE LA AUTOMATIZACIÓN PARA DAR CUMPLIMIENTO DE LA ENMIENDA EN EL FORMATO DEL PLAN DE VUELO**

STATE/ ESTADO	ACC	AFTN/AMHS	FDP
Argentina	Comodoro Rivadavia	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Manual Automated/Automatización Second Quarter/ Segundo semestre 2016
	Cordoba	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated / Automatizado
	Ezeiza	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated / Automatizado
	Mendoza	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated/Automatización Primera semana mayo 2016 First week of May 2016
	Resistencia	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated/Automatización Primera semana mayo 2016 First week of May 2016
Bolivia	La Paz	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Manual It is foreseen by third quarter 2016 an ATM automated system with AIDC in the La Paz ACC/ Se tiene previsto para finales del tercer trimestre de 2016 un sistema automatizado ATM en el ACC de La Paz con AIDC.
Brazil / Brasil	Amazónico	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated / Automatizado (use of converter) / (uso de convertidor centralizado)
	Atlántico	Implemented (AMHS terminal) / Implantado (terminal AMHS)	An update in Sagitario ATM automated system (from ATECH Brazil) which includes the new FPL/12 flight

STATE/ ESTADO	ACC	AFTN/AMHS	FDP
	Brasilia	Implemented (AMHS terminal) / Implantado (terminal AMHS)	plan format to deactivate the centralized inverter is scheduled for November 2016 in the AAC Amazonico, Atlantico, Brasilia, Curitiba and Recife./ Para noviembre 2016 está prevista una actualización en Sagitario (sistema automatizado ATM de Brasil de la empresa ATECH) que incluye el nuevo formato de plan de vuelo FPL/12 y desactivar el convertidor centralizado.
	Curitiba	Implemented (AMHS terminal) / Implantado (terminal AMHS)	
	Recife	Implemented (AMHS terminal) / Implantado (terminal AMHS)	
Chile	Iquique	Implemented (AFTN terminal) / Implantado (terminal AFTN)	Automated /Automatizado
	Punta Arena	Implemented (AFTN terminal) / Implantado (terminal AFTN)	Manual Junio 2016 Automatizado / June 2016 Automated
	Puerto Montt	Implemented (AMHS terminal) / Implantado (terminal AFTN)	Automated /Automatizado
	Santiago	Implemented (AFTN terminal) / Implantado (terminal AFTN)	Automated/Automatizado
Colombia	Barranquilla	Not implemented (AMHS terminal) No implantado (terminal AMHS)	Automated /Automatizado
	Bogotá	Not implemented (AMHS terminal) No implantado (terminal AMHS)	Automated /Automatizado
Ecuador	Guayaquil	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated /Automatizado
French Guiana (France) Guyana Francesa (Francia)	Cayenne	(AFTN terminal) / (terminal AFTN) Sistema AMHS previsto en operación a finales del 2016/ AMHS system foreseen at the end of 2016	Automated / Automatizado Nuevo sistema automatizado estará funcionando a finales del 2016/ New automation sistema in operation at the end of 2016

STATE/ ESTADO	ACC	AFTN/AMHS	FDP
Guyana	Timehri	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated / Automatizado
Panama	Panama	Implemented / implantado (AMHS terminal)	Automated /Automatizado
Paraguay	Asunción	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Manual Modernizacion sistema automatizado para el cuarto trimestre del 2016 Modernization of automation system at the fourth quarter of 2016
Peru	Lima	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated / Automatizado
Surinam	Paramaribo	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated (out of service, working manually) / Automatizado (fuera de servicio, trabajando manualmente)
Uruguay	Montevideo	Not implemented / No implantado	Automated / Automatizado
Venezuela	Maiquetia	Implemented (AMHS terminal) / Implantado (terminal AMHS)	Automated /Automatizado (use of converter) / (uso de convertidor) Proceso de adquisición de un nuevo centro automatizado y su operación para el 2017 Adquisition process of a new automation system operation for 2017

APPENDIX B**(AIDC) GROUND-GROUND DATA INTERCONNECTION LEVEL REQUIREMENTS IN THE SAM REGION**

ARGENTINA						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels *				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
CORDOBA (AUT. INDRA AIRCON2100) (2007)	IQUIQUE	XI			X	Positive AIDC trials - March 2016 As a result of the trials, the transmission speed has to be incremented from 2400 to 9600 bit/seg AIDC foreseen to be operational on second half of 2016
	LA PAZ	XI			X	AIDC foreseen for period 2017-2019
	EZEIZA	XI			XI	AIDC in pre-operational phase since December 2015. Operational phase foreseen in mid 2016
	MENDOZA	XI			X	AIDC pre-operational by the end of 2016
	RESISTENCIA	XI			X	AIDC pre-operational by the end of 2016
RESISTENCIA (AUT. INDRA AIRCON2100) (June 2016)	ASUNCION	XI			X	Positive AIDC trials were conducted in 2015 between Ezeiza and Asunción. Trials between Resistencia and Asunción will be conducted in mid 2016 AIDC foreseen to be operational on second half of 2016
	CORDOBA	XI			X	AIDC pre-operational by the end of 2016
	CURITIBA	XI			X	AIDC foreseen for second half of 2016
	EZEIZA	XI			X	AIDC pre-operational by the end of 2016
	MONTEVIDEO	XI			X	AIDC foreseen for second half of 2016
EZEIZA (AUT. INDRA AIRCON2100) (2007)	COMODORO RIVADAVIA	XI			X	AIDC pre-operational by the end of 2016
	MENDOZA	XI			X	AIDC pre-operational by the end of 2016

	PUERTO MONTT	XI			X	AIDC by end 2016
	CORDOBA	XI			XI	AIDC in pre-operational phase since December 2015. Operational phase foreseen for mid 2016
	RESISTENCIA	XI			X	AIDC pre-operational by the end of 2016
	JOHANNESBURG	XI			X	AIDC TBD
	MONTEVIDEO	XI			X	AIDC foreseen for second half of 2016
MENDOZA (AUT INDRA AIRCON2100) (June 2016)	EZEIZA	XI			X	AIDC pre-operational by the end of 2016
	SANTIAGO	XI			X	AIDC foreseen for period 2017-2019
	CORDOBA	XI			X	AIDC pre-operational by the end of 2016
COMODORO RIVADAVIA (AUT INDRA AIRCON2100) (June 2016)	EZEIZA	XI			X	AIDC pre-operational by the end of 2016
	PUNTA ARENAS	XI			X	AIDC by the end of 2016
	PUERTO MONTT	XI			X	AIDC by the end of 2016

BRAZIL						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
AMAZÓNICO (MANAUS) AUTO. SAGITARIO ATECH	BRASILIA	XI			X	AIDC
	BOGOTÁ	XI			X	AIDC foreseen for first semester 2019
	CAYENNE	XI			X	AIDC foreseen for period 2017-2019
	GEORGETOWN	XI			X	AIDC foreseen for period 2017-2019
	LA PAZ	XI			X	AIDC foreseen for period 2017-2019
	LIMA	XI			X	Positive trials have been conducted in March 2016 AIDC foreseen for second half of 2016
	MAIQUETIA	XI	X		X	AIDC foreseen for period 2017-2019
	PARAMARIBO	XI			X	AIDC foreseen for period 2017-2019
	RECIFE	XI			X	AIDC implemented since 2 May 2016
	CAYENNE	XI			X	AIDC foreseen for period 2017-2019
ATLÂNTICO	XI			X	AIDC TBD	

BRASILIA AUTO. SAGITARIO ATECH	AMAZÔNICO	XI			X	AIDC June 2016
	CURITIBA	XI			X	AIDC July 2016
	RECIFE	XI			X	AIDC June 2016
CURITIBA AUTO. SAGITARIO ATECH	ASUNCION	XI			X	AIDC foreseen for second half of 2016
	BRASÍLIA	XI			X	AIDC June 2016
	LA PAZ	XI			X	AIDC foreseen for period 2017-2019
	MONTEVIDEO	XI			X	AIDC foreseen for second half of 2016
	RESISTÊNCIA	XI			X	AIDC foreseen for second half of 2016
	ATLÂNTICO	XI			X	AIDC TBD
RECIFE AUTO. SAGITARIO ATECH	AMAZÔNICO	XI			X	AIDC Implemented on 2 May 2016
	BRASÍLIA	XI			X	AIDC June 2016
	ATLÂNTICO	XI			X	AIDC TBD
ATLÂNTICO AUTO. SAGITARIO ATECH	AMAZÔNICO	XI			X	AIDC TBD
	BRASÍLIA	XI			X	AIDC TBD
	CURITIBA	XI			X	AIDC TBD
	DAKAR	XI			X	AIDC TBD
	JOHANNESBURG	XI			X	AIDC TBD
	LUANDA	XI			X	AIDC TBD
	MONTEVIDEO	XI			X	AIDC foreseen for period 2017-2019
	RECIFE	XI			X	AIDC TBD
	CAYENNE	XI			X	AIDC foreseen for period 2017-2019

BOLIVIA						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
LA PAZ (MANUAL)	AMAZÔNICO	XI			X	AIDC foreseen for period 2017-2019
	ASUNCION	XI			X	AIDC foreseen for period 2017-2019
	CURITIBA	XI			X	AIDC foreseen for period 2017-2019
	CORDOBA	XI			X	AIDC foreseen for period 2017-2019
	LIMA	XI			X	AIDC foreseen for period 2017-2019
	IQUIQUE	XI			X	AIDC foreseen for period 2017-2019

CHILE						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
SANTIAGO (AUTO THALES TOPSKY)	IQUIQUE	XI			X	AIDC foreseen for period 2017-2019
	LIMA	XI			X	AIDC foreseen for period 2017-2019
	MENDOZA	XI			X	AIDC foreseen for period 2017-2019
	PUERTO MONTT	XI			X	AIDC foreseen for period 2017-2019
IQUIQUE (AUTO INDRA AIRCON 2100)	CORDOBA	XI			X	Positive AIDC trials - March 2016 AIDC foreseen to be operational on second half of 2016
	LA PAZ	XI			X	AIDC foreseen for period 2017-2019
	LIMA	XI			X	Positive AIDC trials conducted in February 2016 AIDC foreseen to be operational on second half of 2016
PUERTO MONTT (INDRA AUTOMATED)	SANTIAGO	XI			X	AIDC foreseen for period 2017-2019
	PUNTA ARENAS	XI			X	AIDC by the end of 2016
	EZEIZA	XI			X	AIDC by the end of 2016
	COMODORO RIVADAVIA	XI			X	AIDC by the end of 2016
PUNTA ARENAS (MANUAL)	PUERTO MONTT	XI			X	AIDC by the end of 2016
	COMODORO RIVADAVIA	XI			X	AIDC by the end of 2016

COLOMBIA						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
BOGOTÁ (AUTO INDRA AIRCON 2100)	AMAZÔNICO	XI			X	AIDC foreseen to be operational on second half of 2016
	CENAMER	XI			X	AIDC foreseen for period 2017-2019
	GUAYAQUIL	XI			XI	Positive AIDC trials conducted AIDC in pre-operational phase (August 2015)
	LIMA	XI			XI	Positive AIDC trials conducted AIDC operational since 30 May 2016 according to letter of operational agreement (August 2015)
	MAIQUETIA	XI			X	AIDC foreseen for period 2017-2019
	PANAMA	XI			X	Positive AIDC trials conducted AIDC foreseen to be operational by mid 2016
	BARRANQUILLA	XI			XI	AIDC pre-operational (March 2016)
BARRANQUILLA (AUTO INDRA AIRCON 2100)	MAIQUETIA	XI			X	AIDC foreseen for period 2017-2019
	PANAMA	XI			X	Positive AIDC trials conducted AIDC foreseen to be operational by mid 2016
	BOGOTA	XI			XI	AIDC pre-operational (March 2016)
	KINGSTON	XI			X	AIDC TBD
	CURAÇAO	XI			X	AIDC TBD

ECUADOR						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
GUAYAQUIL AUTO INDRA AIRCON 2100	BOGOTA	XI			XI	Positive AIDC trials conducted AIDC pre-operational (August 2015)
	LIMA				XI	AIDC operational implementation (31 March 2016)
	CENAMER	XI			X	Positive AIDC trials conducted AIDC foreseen for period 2017-2019

FRENCH GUIANA						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
CAYENNE AUTO ADACEL AIDC not installed	AMAZÔNICO	XI			X	AIDC foreseen by first semester 2017
	PARAMARIBO	XI			X	AIDC foreseen for period 2017-2019
	PIARCO	XI			X	AIDC foreseen for period 2017-2019
	DAKAR	XI			X	AIDC foreseen by end 2016
	ATLANTICO	XI			X	AIDC foreseen by first semester 2017

GUYANA						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
GEORGETOWN AUTO INTELCAN AIDC not installed	AMAZONICO	XI			X	AIDC foreseen for period 2017-2019
	PIARCO	XI			X	AIDC foreseen for period 2017-2019
	MAIQUETIA	XI			X	AIDC foreseen for period 2017-2019
	PARAMARIBO	XI			X	AIDC foreseen for period 2017-2019

PANAMA						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
PANAMA (AUTO THALES)	BOGOTA	XI			X	Positive AIDC trials conducted AIDC foreseen to be operational by mid 2016
	BARRANQUILLA	XI			X	Positive AIDC trials conducted AIDC foreseen to be operational by mid 2016
	CENAMER	XI			X	Positive AIDC trials conducted AIDC foreseen to be operational by the end of second half of 2016

PARAGUAY						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
ASUNCION AUTO AIRCON 2100 INDRA	CURITIBA	XI			X	AIDC foreseen by second half of 2016
	LA PAZ	XI			X	AIDC foreseen for period 2017-2019
	RESISTÊNCIA	XI			X	Positive AIDC trials conducted in 2015 between Ezeiza and Asunción. Trials between Resistencia and Asunción will be conducted in mid 2016 AIDC foreseen to be operational on second half of 2016

PERU						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
LIMA AUTO AIRCON 2100 INDRA	AMAZONICO	XI			X	Positive trials conducted in March 2016 AIDC foreseen to be operational on second half of 2016
	BOGOTA	XI			XI	Positive AIDC trials conducted AIDC pre-operational phase (August 2015) 30 May
	SANTIAGO	XI			X	AIDC foreseen for period 2017-2019
	IQUIQUE	XI			X	Positive AIDC trials conducted in February 2016 AIDC foreseen to be operational on second half of 2016
	GUAYAQUIL	XI			XI	AIDC operational (31 March 2016)
	LA PAZ	XI			X	AIDC foreseen for period 2017-2019

SURINAME						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
PARAMARIBO (AUTO INTELCAN) AIDC installed not	AMAZÓNICO	XI			X	AIDC foreseen for period 2017-2019
	GEORGETOWN	XI			X	AIDC foreseen for period 2017-2019
	PIARCO	XI			X	AIDC foreseen for period 2017-2019
	CAYENNE	XI			X	AIDC foreseen for period 2017-2019

URUGUAY						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
MONTEVIDEO (AUTO INDRA AIRCON2100)	CURITIBA	XI			X	AIDC foreseen by second half of 2016
	EZEIZA	XI			X	AIDC foreseen by second half of 2016
	RESISTENCIA	XI			X	AIDC foreseen by second half of 2016
	ATLANTICO	XI			X	AIDC foreseen for period 2017-2019
	JOHANNESBURG	X			X	AIDC TBD

VENEZUELA						
ACC	ACC ADJ	Flight plan				Comments
		Interconnection levels				
		1 4444 Manual	2 4444 Auto	3 (OLDI)	4 (AIDC)	
MAIQUETIA (AUTO ATECH X4000) AIDC not installed	AMAZONICO	XI	XI		X	AIDC foreseen for period 2017-2019
	BOGOTA	XI			X	AIDC foreseen for period 2017-2019
	BARRANQUILLA	XI			X	AIDC foreseen for period 2017-2019
	PIARCO	XI			X	AIDC TBD
	CAYENNE	XI			X	AIDC foreseen for period 2017-2019
	CURAZAO	XI			X	AIDC TBD
	SAN JUAN	XI			X	AIDC TBD

* X PLANNED

*XI IMPLEMENTED AND IN PRE-OPERATIONAL OR OPERATIONAL PHASE

APPENDIX C / APÉNDICE C

**NATIONAL FOCAL POINTS/PUNTOS FOCALES NACIONALES
IMPLEMENTATION OF INTERCONNECTION OF AUTOMATED SYSTEMS/IMPLANTACIÓN INTERCONEXIÓN SISTEMAS
AUTOMATIZADOS**

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Agenda Item 6: Other business

6.1 Under this agenda item the Meeting analysed the following papers:

- a) WP/22 - *Preparation for the 39th Session of the ICAO Assembly* (presented by the Secretariat);
- b) IP/05 - *DECEA's participation in Mini Global II* (presented by Brazil);
- c) IP/06 - *Sistema Integrado de Control Operacional (SICO)* (presented by Ecuador) and
- d) IP/10 - *Restablecimiento de servicios ANS en el aeropuerto de Manta* (Spanish only) (presented by Ecuador).

Preparation for the 39th Session of the ICAO Assembly

6.2 The Meeting noted that the Fourteenth Meeting of Civil Aviation Authorities of the SAM Region (RAAC/14) agreed to continue coordinating joint positions in ICAO global forums. In this sense, taking into account the 39th Session of the ICAO Assembly (Montreal, Canada, 27 September to 7 October 2016) the SAM Regional Office deemed appropriate to conduct a series of teleconferences initially addressed to the Air Navigation Directors, Safety and Aviation Security.

6.3 The first teleconference in preparation for the A39 regarding air navigation matters, was held on 15 April 2016, with the participation of 11 States from the SAM Region. As a result, it was agreed that the air navigation area would contribute with the Assembly in the preparation of three working papers.

6.4 The first paper will be on the positive support to the implementation of air navigation systems and the safety sustainability that could be used as reference by ICAO States from other regions. The second paper will state the necessity of the Region to have ICAO documentation in Spanish language and the difficulties faced at this moment for the lack of such version affecting the planning and implementation of services, proceedings and facilities for the air navigation and safety. The last paper will deal with the mechanism used by the SAM Region to identify the implementation priorities for the air navigation and safety areas for the period 2014-2016 (Declaration of Bogota).

6.5 The first draft of these working papers will be presented on 20 May 2016, date of the second teleconference in preparation for the A39.

DECEA's Participation in Mini Global II

6.6 DECEA presented an executive summary about the participation as observer during this first demonstration event of the Mini Global II, which is a collaborative effort between the FAA and the international aviation community to provide a global networked infrastructure environment for the research and validation of SWIM concepts, the global exchange models including Flight Information Exchange Model (FIXM), Weather Information Exchange Model (WXXM), and Aeronautical Information Exchange Model (AIXM) and the operational concepts outlined in Flight & Flow Information for a Collaborative Environment (FF-ICE).

Integrated System of Operational Control (SICO)

6.7 The Meeting noted the new system of monitoring the operational status of various integral components of the air navigation system, including all airports, radio-aids and ANS dependencies in Ecuador. The access can be made from any internet navigator, by entering following link: www.sico.aviacioncivil.gob.ec.

Restoration of ANS services in the airport of Manta

6.8 The Meeting took note the executive summary presented by Ecuador informing about the activities taken by its Air Navigation Direction towards the restoration of the provision of ANS services in the airport of Manta, as a consequence of the earthquake occurred on Saturday April 16, that caused, among other damage, the collapse of the control tower in the terminal building, involving mobile and fix aeronautical service telecommunications systems, meteorology, radar surveillance, AIS, radio-aid monitoring, runway illumination control, aerodrome beacon and AMHS, which were totally destroyed because of the structural failure and collapse of the ATS dependency.

6.9 The Meeting noted the importance of not concentrating all support equipment to ATS units in a single building, but install them in different locations, as possible. This would prevent the total loss of equipment in case of natural disasters.

6.10 By 17 April 2016, approach frequency in Manta (122.7 MHz), as well as communications among dependencies, was restored.

6.11 In the absence aerodrome control, AFIS treatment was given, allowing the immediate arrival of the first flight to facilitate medical evacuation and rescue actions.

6.12 The Meeting was presented a summary of activities taken for the restoring of air traffic services, including the arrival of a mobile control tower, provided by the United States' Armed Forces, which supported the provision of services at the airport. The operation of oral circuits (telephone and oral ATS with Guayaquil and Control Centre – ACC approach), AMHS terminals for meteorological service and AIS, could be restored by 23 April.