



Agenda Item 2: Optimisation of SAM airspace

- a) **Progress made in regional PBN implementation**
- b) **Actions to standardise longitudinal separation of en-route aircraft**
- c) **Post-implementation analysis of the SAM route network – Version 4**

FOLLOW-UP TO PBN IMPLEMENTATION

(Presented by the Secretariat)

SUMMARY	
This working paper presents the evolution of PBN implementation activities and other implementations related to SAM airspace optimisation, so that States may identify those activities on which efforts should be focused in order to meet the established goals.	
References:	
– SAM/IG meetings – ATSRO meetings – PANS-OPS workshops – GREPECAS/18 meeting	
ICAO strategic objectives:	<i>A - Safety E – Environmental protection</i>

1. Introduction

1.1 As a follow-up to GREPECAS Decisions 16/45 and 16/47, the “*Performance-based navigation (PBN)*” Programme was structured with the following associated projects:

- a) Project A1: PBN operational implementation; and
- b) Project A2: Air navigation systems in support of PBN.

1.2 The GREPECAS/18 meeting (Dominican Republic, 9-14 April 2018) conducted a detailed analysis of the status of implementation of the PBN programme in the CAR and SAM Regions, highlighting that a key to the success of projects was compliance with State commitments within the context of actions defined by the working groups, and the participation of decision-makers.

1.3 GREPECAS/18 noted that the commitments assumed under the Declarations of Bogota and Port-of-Spain had been an effective element of integration and commitment towards air navigation implementation in the two Regions, without forgetting that these Declaration had to be seen as a political guide agreed by States in consensus.

1.4 In this regard, GREPECAS/18 urged States to strengthen interregional coordination and enhance State processes for publication and implementation of new routes or optimised routes within the agreed timelines, which should be in accordance with the amendment to the regional e-ANP.

1.5 Likewise, it underlined the benefits obtained when PBN implementation activities integrated cooperation initiatives and collaborative decision making among States and between States, ANSPs, users, and airlines.

2. Discussion

2.1 The GREPECAS/18 meeting underlined the need for better coordination of efforts and projects between the CAR and SAM Regions. Accordingly, based on the recommendation of the Secretariat for both groups (RASG-PA and GREPECAS) to implement a common project management approach, it was agreed that project management techniques should be applied to all CAR and SAM Projects, based on GREPECAS/18 guidelines.

2.2 In this regard, the SAM/IG/21 meeting (Lima, 2-18 May 2018) was presented with a proposal to update the SAM PBN project, in order to apply such management techniques and incorporate performance indicators. Furthermore, the aforementioned meeting approved the following conclusion:

CONCLUSION SAM/IG/21-01		REGIONAL HARMONISED PBN	AND IMPLEMENTATION	INTERREGIONAL GOALS
That: SAM States, organisations, users, and stakeholders double efforts to meet regional and interregional performance-based air navigation implementation goals, based on GREPECAS projects, and contemplating the strengthening of national PBN implementation plans so that they include performance indicators and the use of recognised project management tools and methods.		Expected impact: <input type="checkbox"/> Political / Global <input checked="" type="checkbox"/> Interregional <input checked="" type="checkbox"/> Financial <input checked="" type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational		
Why: To complete the implementation of the GANP PBN components selected for the SAM Region, taking into account interoperability in the boundaries with the CAR Region.				
When: Before 2021		Status: Adopted by SAM/IG/21		
Who: <input checked="" type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Other: Users/Industry				

2.3 The draft of the new project is based on the previous project, which had three main axes: the national PBN implementation plans, the implementation of route network versions, and PBN implementation at the main SAM TMAs, including SID/STAR routes as needed, based on the projects/action plans established by SAM States, and the lessons learned at PBN workshops delivered under the auspices of Project RLA 06/901. See details of the draft in Appendix A to this paper.

2.4 In addition to the three aforementioned axes, the proposed project included the following enhancing elements (initiatives): Coordination between CAR and SAM projects, performance indicators, and longitudinal separation optimisation.

2.5 Regarding national PBN implementation plans, the SAM/IG/21 meeting deemed it advisable to consider the model plan contained in Appendix B to this paper. The new model should be used for submitting PBN implementation plans to the Secretariat, including initial proposals for performance indicators, in accordance with the material posted on the ICAO GANP website (see separate working paper).

2.6 In this regard, the SAM/IG/21 meeting agreed that national PBN plans should be aimed at identifying and addressing the actual needs of States, based on collaborative decisions with the users, and at defining implementation priorities. It also highlighted the value of these plans, taking into account that several SAM States had not yet completed or updated their national air navigation plan (ANP), where the national PBN plan could constitute the PBN chapter of the national ANP.

2.7 There have been difficulties in the conduction of the five teleconferences agreed at the SAM/IG/21 meeting to foster the updating of State PBN plans. Accordingly, it is advisable to define a new, more specific timetable that allows the Secretariat to coordinate with SAM States.

2.8 As of June 2018, the status of PBN operational implementation was as follows:

PBN en-route

2.9 Implementation of PBN en route is addressed at ATS route network optimisation (ATSRO) meetings, based on route network versions, to ensure the best possible airspace structure at all times within an integrated development concept.

2.10 Version 04 initiatives were consolidated at the ATSRO/9 meeting and became effective on 11 October 2018 with the implementation of 25 improvements involving realignment, flight distance reductions, and extension of RNAV-5 route segments. Furthermore, the optimisation includes 6 new RNAV-5 routes for the SAM Region and the elimination of 8 conventional routes, as a result of flow improvements derived from more efficient RNAV-5 routes.

2.11 Likewise, 5 interregional initiatives of ATSRO Version 04 were coordinated with CAR States at the Third PBN meeting held at the Mexico Office early this month. Accordingly, 29 ATSRO initiatives will have been implemented by 31 January 2019.

PBN in TMAs

2.12 SAM States continue to work to meet the implementation dates for PBN-based TMA redesign. Current planning is shown in the following table:

Redesign of selected TMA airspaces based on PBN plans			
State		Implementation	
Argentina	BAIRES	Phase 1.- October 2017. Optimisation of available resources. Completed. Phase 2.- 2017-2020. Introduction of the PBN concept. (See SAM/IG/20-IP/04) Phase 3. Total PBN redesign. Implementation expected by 2022	
Bolivia	Cochabamba	Phase 1.- July 2018. LA PAZ TMA PBN.	
	La Paz	Phase 2.- August 2019. Final PBN designs at the LA PAZ FIR with ATS surveillance.	
	Santa Cruz		
Brazil	Brasilia	12 Nov 2015 (implemented)	
	Belo Horizonte	12 Nov 2015 (implemented)	
	Sao Paulo (partial modifications)	12 Nov 2015 (implemented)	
	Salvador	27 Apr 2017 (implemented)	
	Manaus	17 Aug 2017 (implemented)	
	(PBN SUR)	Curitiba	12 Oct 2017 (implemented)
		Florianópolis	
		Joinville	
		Navegantes	
		Porto Alegre	
		São Paulo (modifications)	
	CW FIR route network		
	Vitória	November 2018	
	Fortaleza, Natal, João Pessoa, Recife	November 2019	
Sao Paulo (restructuring)	September 2020		
Belém, Campo Grande and Sao Luis	October 2021		
Cuiabá, Boa Vista, Porto Velho and Rio Branco	October 2023		
Chile	Santiago (South)	8 Dec 2016 (implemented)	
	Santiago FIR route network		
Colombia	Bogota	12 Oct 2017 (implemented)	
Ecuador	Guayaquil	21 Jul 2016 (implemented)	
Panama	Panama	Project starting in 2018. (See SAM/IG/20-IP/10)	
Paraguay	Asunción	17 Aug 2017 (implemented)	

Redesign of selected TMA airspaces based on PBN plans		
State		Implementation
Peru	Arequipa	First semester 2019
	Cusco	First semester 2019
	Juliaca	First semester 2019
	Puerto Maldonado	First semester 2019
Uruguay	Carrasco and Laguna del Sauce	First semester 2018 * The Carrasco TMA will be optimised, in accordance with Phase 2 of the Baires TMA.
Venezuela	Maiquetia	December 2017
	Isla Margarita	Foreseen 6 December 2018

Implementation of SIDs, STARs, and PBN approach procedures

2.13 The Declaration of Bogota binds States to implement PBN SID and STAR routes at international aerodromes, using CDO and CCO methods, in order to meet the established goals. The Declaration also urges States to implement APV approach procedures, with a view to complying with ICAO Assembly Resolution A37-11.

2.14 PBN SID/STAR implementation in the Region amounts to 72.9%. The 60% goal set in the Declaration of Bogota has already been met. Associated to the design of arrival and departure procedures is the application of CDO and CCO methods, which have reached the following levels of implementation: CDO 34% and CCO 26%.

2.15 Regarding the implementation of PBN approaches pursuant to Resolution A37-11, the ICAO iSTARS 3.0 website shows the status of implementation in 13 SAM States. To date, out of a total of 209 runway thresholds (international airports), 175 already have approach procedures with APV vertical guidance and/or LNAV-only minima, *i.e.* 83.7% implementation. See details in the following ICAO website link:

<https://portal.icao.int/space/Pages/PBN-Status.aspx>

2.16 On 8 November 2018, RNP APCH procedures were published for runways 11 and 29 of the Johan Pengel International Airport of Paramaribo, Suriname, with will be effective on 3 January 2019.

PANS-OPS workshops

2.17 PBN and PANS-OPS workshops are aimed at improving the skills of flight procedure designers applying ICAO criteria and other international methods, as well as strengthening collaborative ties with experts and airline pilots in order to receive valuable feedback on user requirements.

2.18 On the week of 24 September 2018, the SAM PANS-OPS/3 workshop addressed the initial planning of these activities, highlighting the publication of Circular 353, ‘Transition Planning for Change to Instrument Flight Procedure Approach Chart Identification from RNAV to RNP’, containing revised guidelines to support the implementation of the new PBN approach chart identification. The guidelines are aimed at providing for an effective management of the transition to the new chart identification, and highlight the need for coordinated transition planning at a global, regional and State level. Note was taken of the need to draft a regional plan for the transition to the identification of RNP instrument approach charts, and communicate it to ICAO Headquarters.

2.19 Brazil presented its national planning activities on this subject. The workshop started planning the transition from RNAV to RNP nomenclature in approach procedures. It was noted that Brazil had a significant number of charts that need to be updated (approximately 300), recognising the need to refine an action plan consistent with the Regional Plan. Other States need to modify a number of PBN charts, in the order of 80 to 100. However, for all States, the transition will require resources and great effort, especially since most are addressing the task of implementing PNB in TMAs and airports, a tasks that cannot be interrupted.

2.20 Circ. 353 defines ICAO Regions as the basis for transition planning. A CAR and SAM joint implementation scenario was analysed, where no requirement for synchronising dates between the two Regions was identified. It is necessary to continue analysing this transition within the framework of the SAM/IG.

Actions for the optimisation of longitudinal separation of aircraft en route

2.21 With the support of regional project RLA/06/901, a 4-day workshop was held in November 2017 at the SAM Regional Office, where an action plan was proposed to promote a reduction from 40NM to 20NM, and the signing and effective implementation of letters of agreement between States to consolidate the 40NM separation were coordinated. In this regard, Brazil has started standard implementation of the 20NM separation for aircraft entering its FIRs. The summary of the results of this workshop appears in the following link:

https://www.icao.int/SAM/Pages/ES/MeetingsDocumentation_ES.aspx?m=2017-OPTSEPLONG

2.22 In this regard, each State must report the status of implementation of the longitudinal separation minima between ACCs, with a view to updating the implementation follow-up table and revising the respective 2018-2019 action plan shown in Appendix C to this paper.

Project A2 – Air navigation systems in support of PBN

2.23 At this Meeting, Brazil is presenting information on the activities under this project.

Activities and resources required for the implementation of the South American Airspace Optimisation Action Plan, with the support of Project RLA/06/901

Activities and resources approved with the support of Project RLA/06/901 for 2019

1.1 The Twelfth Meeting of the Coordination Committee of Project RLA/06/901 (RCC/12) approved activities to be carried out in 2019 in support of SAM airspace optimisation, which have been scheduled/executed as follows:

- Development of draft Version 05 of the SAM Route Network – Deliverable: SAM Route Network Version 05 document. (February 2019)
- Seminar on the organisation of flight procedure design services (IFPD). – to address the implementation of the IFPD service in accordance with ICAO Annex 11 and LAR 211. Aimed at strengthening the capacity of the region to sustain PBN implementation over time. (April 2019)
- Development of a catalogue for planning and monitoring the implementation of regional ATS routes and flight procedures. - Catalogue of ATS routes and RNAV/RNP flight procedures at international airports of the SAM Region. Support for the first updating phase of the ICARD route designator database. (April-May 2019)
- ATSRO/10 – Follow-up to the implementation of Version 05 of the SAM Route Network. (June 2019)
- Fourth workshop on PANS-OPS implementation. - Continue harmonising and coordinating PBN instrument procedures in the SAM Region, improving the PANS OPS design capacity of States (October 2019)
- SAM/IG/23 and SAM/IG/24 – All air navigation implementation priorities in order to continue with implementation activities and the execution of action plans. (May and November 2019, respectively).

Strategy for PBN implementation in the SAM Region

1.2 SAM/IG meetings promote a strategy for PBN implementation in TMA and en-route airspace, with the approval of various activities. These activities, such as aircraft separation and PANS-OPS workshops, were included in the airspace optimisation work plan.

1.3 Taking into account that SAM/IG annual meetings would not be enough for such follow-up, it is advisable to participate in the monthly teleconferences. In summary, PBN implementation would be based on the following activities/events.

- a) Development of draft Version 5 of the ATS route network.
- b) ATSRO/10 meeting, with activities for the follow-up and adjustment of the implementation of the ATS route network – Version 5.
- c) PBN implementation in TMAs - SAM/IG meetings and teleconferences.
- d) Seminar on the organisation of flight procedure design services (IFPD)
- e) Transition from RNAV to RNP charting and harmonisation and coordination of PBN instrument procedures in the SAM Region - PANS-OPS workshops.
- f) Optimisation of longitudinal separation – multilateral and bilateral meetings.
- g) Meetings to update ATS contingency plans and letters of agreement in such a way as to ensure safety and consolidate PBN implementations and improvements, and to guarantee their benefits.
- h) Coordination and harmonisation of the route network and longitudinal separation between the CAR/SAM Regions - NAM/CAR/SAM interregional implementation meetings and teleconferences.

3. **Conclusion**

3.1 Under the sponsorship of Project RLA/06/901, direct assistance has continued to be provided to SAM States for PBN implementation in selected airspaces. The tools used by the SAM Regional Office for this purpose have been the PBN workshops and implementation meetings (SAM/IG). Through this strategy, guidance has been provided to States for PBN implementation and airspace design improvements.

3.2 Regarding PANS OPS design activities required for airspace and route optimisation in the Region, a collaborative process has been established among experts and mutual assistance among States has been strengthened in order to achieve bilateral and/or multilateral implementations; for example, among Argentina, Brazil, Paraguay, and Uruguay.





















3.3 Likewise, the following factors have been identified as hindering compliance with the objectives of the SAM Region:

- a) Lack of specialised PANS OPS design software in 40% of States; and
- b) Overlapping of activities for improving ATS, airspace, and airports, which, in some States, affects the completion of PBN implementation within the established time limits.




















4. **Suggested action**

4.1 The States participating in the Meeting are invited to:

- a) take note of the information provided in this working paper;
- b) analyse and propose improvements for the development of the SAM PBN action plan and the action to be taken by States, in accordance with Appendices A and B;
- c) update the tentative redesign implementation dates, based on PBN planning for selected TMA airspaces;
- d) review and propose changes or improvements, and approve the SAM PBN implementation strategy;
- e) update the information contained in Appendix C on the status of implementation of longitudinal separation optimisation in the SAM Region and the respective action plan;
- f) review the information provided in Appendix D regarding focal points for PBN implementation;
- g) review, propose, and approve the RNAV-to-RNP chart nomenclature transition implementation strategy; and
- h) coordinate with the Secretariat in case States need to update or sign LOAs or MOUs on longitudinal separation.

ID	 Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Text1
1		National PBN implementation plans	134 days	Tue 5/22/18	Fri 11/23/18			
2			134 days	Tue 5/22/18	Fri 11/23/18			
3	 	Develop new SAM PBN implementation plan model	1 day	Tue 5/22/18	Tue 5/22/18		SAM/PBN/ G	SAM G21
4	 	Discuss and approve new PBN implementation plan model	1 day	Wed 5/23/18	Wed 5/23/18	3	SAM/PBN/ G	SAM G21
5		Development and delivery of the new PBN implementation plans	132 days	Thu 5/24/18	Fri 11/23/18	4	States	SAM G22
6		SAM route network optimisation	52 days?	Thu 5/10/18	Fri 7/20/18			
7		Version 4	44 days	Tue 5/22/18	Fri 7/20/18			
8		Package 1 (30 routes agreed at ATSR0/8)	2 days	Tue 5/22/18	Wed 5/23/18			
9	 	Verify status of implementation	1 day	Tue 5/22/18	Tue 5/22/18		SAM/PBN/ G	SAM G21
10	 	Define implementation dates for routes not yet implemented	1 day	Wed 5/23/18	Wed 5/23/18		SAM/PBN/ G	SAM G21
11		Package 2 (52 routes pending from ATSR0/8)	43 days	Wed 5/23/18	Fri 7/20/18			
12	 	Preliminary assessment in SAMIG21	1 day	Wed 5/23/18	Wed 5/23/18		SAM/PBN/ G	SAM G21
13	 	Teleconference 1	0.5 days	Tue 6/5/18	Tue 6/5/18		States; coordinator	

Project: Project PBN_2018_pri
Date: Thu 5/10/18

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

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Text1
14		Teleconference 2	0.5 days	Tue 7/10/18	Tue 7/10/18			
15		Final assessment and definition of implementation date	43 days	Wed 5/23/18	Fri 7/20/18		States; coordinator	
16		Version 5	1 day?	Thu 5/10/18	Thu 5/10/18			
17		Airspace concept	1 day?	Thu 5/10/18	Thu 5/10/18			
18		Air traffic data	1 day	Thu 5/10/18	Thu 5/10/18			
19		Obtain CARSAMMA data 1						
20		Determine main flows 1						
21		Obtain CARSAMMA data 2						
22		Determine main flows 2						
23		Fleet capacity	1 day	Thu 5/10/18	Thu 5/10/18			
24		Investigate navigation capacity database						
25		Final report						
26		CNS means	1 day	Thu 5/10/18	Thu 5/10/18			

Project: Project PBN_2018_pri
Date: Thu 5/10/18

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

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Text1
27		Identify material required for CNS analysis						
28		Final report						
29		Design Version 5	1 day?	Thu 5/10/18	Thu 5/10/18			
30		Determine tools required						
31		Determine additional tools required						
32		Identify TMA gateways 1						
33		Identify final TMA gateways						
34		CAR/SAM interface 1						
35		CAR/SAM interface 2						
36		Final CAR/SAM interface						
37		Assessment of RNP 2 implementation						
38		Preliminary RNAV-5 exclusionary airspace volume						
39		Final RNAV-5 exclusionary airspace volume						

Project: Project PBN_2018_pri Date: Thu 5/10/18	Task		Inactive Summary		External Tasks	
	Split		Manual Task		External Milestone	
	Milestone		Duration-only		Deadline	
	Summary		Manual Summary Rollup		Progress	
	Project Summary		Manual Summary		Manual Progress	
	Inactive Task		Start-only			
	Inactive Milestone		Finish-only			

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Text1
40		Preliminary design 1						
41		Preliminary design 2						
42		Final design						
43		Validation	1 day	Thu 5/10/18	Thu 5/10/18			
44		FTS need / feasibility						
45		Strategy for using the FSET tool						
46		Safety assessment	1 day	Thu 5/10/18	Thu 5/10/18			
47		Workshop on risk analysis						
48		Drafting of final document						
49		Aircraft and operator approval	1 day	Thu 5/10/18	Thu 5/10/18			
50		Verify status of implementation of RNP 2						
51		Standards and procedures	1 day	Thu 5/10/18	Thu 5/10/18			
52		Initial dissemination of AIC						

Project: Project PBN_2018_pri
Date: Thu 5/10/18

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

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Text1
53		Database provider coordination system						
54		Amendment to the AIP						
55		Model letter of operational agreement						
56		Amendment to the ANP						
57		Implementation decision	1 day	Thu 5/10/18	Thu 5/10/18			
58		Verify ATS documentation						
59		Verify validation						
60		Verify status of operational approval						
61		Verify safety validation						
62		Post-implementation monitoring	1 day	Thu 5/10/18	Thu 5/10/18			
63		Define tools						
64		Establish methodology						
65		Hiring of consultants	1 day?	Thu 5/10/18	Thu 5/10/18			




















Project: Project PBN_2018_pri
Date: Thu 5/10/18

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




















ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Text1
66		Start hiring process 1						
67		Hiring of consultants 1						
68		Start hiring process 2						
69		Hiring of consultants 2						
70		Documentation	1 day	Thu 5/10/18	Thu 5/10/18			
71		Preliminary Version 5 document 1						
72		Preliminary Version 5 document 2						
73		Final Version 5 document						
74		Publication	1 day	Thu 5/10/18	Thu 5/10/18			
75		Publication of amendment to AIP						
76		Publication of trigger NOTAM						
77		Entry into force						
78		TMA	1 day	Thu 5/10/18	Thu 5/10/18			

Project: Project PBN_2018_pri
Date: Thu 5/10/18

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

ID		Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Text1
79			Argentina	1 day	Thu 5/10/18	Thu 5/10/18			
80			Bolivia						
81			Brazil						
82			Chile						
83			Colombia						
84			Ecuador	1 day	Thu 5/10/18	Thu 5/10/18			
85			Guyana						
86			French Guiana						
87			Panama	1 day	Thu 5/10/18	Thu 5/10/18			
88			Paraguay						
89			Peru						
90			Suriname						
91			Uruguay						
92			Venezuela						
93			Performance indicators	391 days	Mon 5/14/18	Mon 11/11/19			
94			Preliminary analysis of performance indicators	1 day	Tue 5/22/18	Tue 5/22/18		SAM/PBN/ G	
95			Drafting of proposal on PBN performance indicators	120 days	Mon 5/28/18	Fri 11/9/18		Regional Office	

Project: Project PBN_2018_pri
Date: Thu 5/10/18

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

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Text1
96		Incorporation of performance indicators in national PBN implementation plans	121 days	Mon 11/26/18	Mon 5/13/19		SAM G23	
97		Presentation of preliminary results of performance indicators	126 days	Mon 5/20/19	Mon 11/11/19		SAM G24	
98		CAR/SAM coordination	144.5 days	Mon 5/14/18	Tue 12/4/18			
99		Third ICAO/IATA/CANSO meeting on harmonisation, modernisation and implementation of performance-based navigation (PBN) for the North American, Caribbean and South American (NAM/CAR/SAM) Regions	5 days	Mon 7/2/18	Fri 7/6/18			
100		1 st coordination teleconference	0.5 days	Mon 5/14/18	Mon 5/14/18			
101		2 nd coordination teleconference	0.5 days	Tue 6/5/18	Tue 6/5/18			
102		3 rd coordination teleconference	0.5 days	Tue 8/7/18	Tue 8/7/18			
103		4 th coordination teleconference	0.5 days	Tue 9/4/18	Tue 9/4/18			
104		5 th coordination teleconference	0.5 days	Tue 10/2/18	Tue 10/2/18			
105		6 th coordination teleconference	0.5 days	Tue 11/6/18	Tue 11/6/18			

Project: Project PBN_2018_pri
Date: Thu 5/10/18

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

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names	Text1
106		7 th coordination teleconference	0.5 days	Tue 12/4/18	Tue 12/4/18			
107		Longitudinal separation optimisation	252 days	Fri 5/25/18	Mon 5/13/19			
108		Updating of status of implementation	1 day	Fri 5/25/18	Fri 5/25/18		SAM/PBN/ G	SAM G21
109		1 st coordination teleconference	0.5 days	Wed 6/6/18	Wed 6/6/18			
110		2 nd coordination teleconference	0.5 days	Wed 8/8/18	Wed 8/8/18			
111		3 rd coordination teleconference	0.5 days	Wed 10/3/18	Wed 10/3/18			
112		Updating of status of implementation	1 day	Fri 11/23/18	Fri 11/23/18		SAM/PBN/ G	SAM G22
113		4th coordination teleconference	0.5 days	Wed 12/5/18	Wed 12/5/18			
114		5th coordination teleconference	0.5 days	Wed 2/6/19	Wed 2/6/19			
115		6th coordination teleconference	0.5 days	Wed 4/3/19	Wed 4/3/19			
116		Updating of status of implementation	1 day	Mon 5/13/19	Mon 5/13/19		SAM/PBN/ G	SAM G23

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Project: Project PBN_2018_pri
Date: Thu 5/10/18

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

APÉNDICE B / APPENDIX B

PBN Implementation Plan
State XX

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 - 5.4 Approach (APV)
 - 5.5 Fuel savings and reduction of CO2

1. Objective

This PBN implementation plan has the following objectives:

- a) Provide a high-level strategy for PBN implementation in (indicate STATE and/or ANSP). This strategy is based on PBN concepts, area navigation (RNAV) and required navigation performance (RNP), which will be applied to aircraft operations in all flight phases: en-route (oceanic and continental), TMA (SIDs and STARs) and IFR approach, in accordance with the implementation objectives set forth in resolution A37-11 of the 37th ICAO Assembly and based on the Declaration of Bogota, established at the Thirteenth Meeting of Civil Aviation Authorities of the SAM Region.
- b) Avoid unnecessarily imposing the mandate for multiple equipment on board or multiple systems on the ground.
- c) Avoid the need for multiple aircraft and operator approvals for intra- and inter-regional navigation.

2. Background

Resolution A37-11: Global performance-based navigation goals, requires States to complete a PBN implementation plan as a matter of urgency, for purposes of:

- a) implementation of RNAV and RNP operations (where required) for en-route and terminal areas in accordance with the established target dates and intermediate milestones;
- b) implementation by 2016 of approach procedures with vertical guidance (APV) (Baro-VNAV and/or augmented GNSS), including minima for LNAV alone, for all instrument flight runway ends, whether main approach or as support to precision approaches, with the following intermediate milestones: 30% by 2010 and 70% by 2014; and
- c) implementation of LNAV-alone direct procedures, as an exception to b) above, for instrument flight runways at aerodromes that lack available local altimeter facilities and where aircraft are not duly equipped for APV operations with a maximum certified take-off mass of 5 700 kg or more.

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

Indirect relation

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

Direct relation

- Performance-based navigation (PBN) in terminal area – Achievement of the goals set forth in Resolution A37-11 of the ICAO Assembly concerning approach procedures with vertical guidance (APV).
- PBN en route
 - 60% of international aerodromes with standard instrument departure (SID) / standard instrument arrival (STAR) PBN.
 - 60% of routes/airspace with PBN.

- CDO - 40% of international aerodromes/terminal control areas (TMAs) with continuous descent operations (CDO).
- CCO - 40% of international aerodromes/TMAs with continuous climb operations (CCO).
- Fuel saving / CO₂ emission reduction estimates, based on the ICAO fuel savings estimation tool (IFSET) – Attain a regional level of 40,000 tonnes of annual reduction of CO₂ emissions in en-route PBN implementation.

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

3. Introduction

(AT THE DISCRETION OF THE STATE)

PBN implementation success will depend on effective participation by the ATM community, to make sure that the operational requirements of the various airspace users and of service providers are met.

4. Strategic objectives

4.1 En-route operations

PBN implementation for en-route operations in continental airspace under the jurisdiction of (indicate STATE) will take place in accordance with the SAM regional strategy and in compliance with the following strategic objectives:

- a) Safety – The implementation of RNAV-5 has permitted the formalisation and harmonisation of the use of RNAV in the new and existing RNAV routes, and of the conditions required for full restructuring of the route network. Thus, it will be possible to develop a less complex route network, reducing controller workload and, consequently, increasing safety.
- b) Capacity – Taking into account reduced airspace complexity and the subsequent reduction in controller workload, there will be an increase in ATC sector capacity, allowing for more aircraft in flight.
- c) Efficiency – The implementation of RNAV-5 will improve operational efficiency, since it will allow for:
 - Improved airspace management, through relocation of intersections.
 - Better use of available airspace, through a route network that allow for the establishment of:
 - More direct routes (double and parallel, if necessary) to accommodate more air traffic flow.
 - “Bypass” routes for aircraft overflying high-traffic-density TMAs.
 - Alternate or contingency routes.
 - Optimum in-flight holding positions.
 - Optimised feeder routes.
 - Reduction of distance flown, resulting in fuel savings.
 - Reduction in the number of Navaids.
- d) Environmental protection – As a result of increased efficiency and fuel savings, there will be a reduction in the emissions of harmful gases into the atmosphere.

4.2 Terminal and approach control areas (SIDs and STAR)

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

- a) Safety – The implementation of RNP1 and/or RNAV-1 at TMAs will permit separation between arrival and departure paths, thus avoiding conflicts between aircraft. The use of RNP APCH with APV/Baro-VNAV and/or RNP AR ACPH will reduce the risk of “*Controlled Flight into Terrain*” (CFIT).
- b) Capacity – The use of SID/STAR RNAV-1 and/or RNP1 will reduce the use of radar vectors and, thus, reduce airspace complexity and allow for the distribution of controller workload, increasing ATC sector capacity and allowing for more aircraft in flight.
- c) Efficiency – The implementation of RNP1 and/or RNAV-1 will result in enhanced operational efficiency, taking into account that the establishment of well-defined gateways will permit the restructuring of the TMA incoming and outgoing route network, thus reducing flight time. The interaction between STAR-approach interaction will permit the establishment of optimum arrival paths from the en-route phase to the final approach. Furthermore, RNP1 and RNAV-1 navigation precision will make aircraft paths more foreseeable, reducing the need for air traffic controller intervention in case of aircraft deviations from the expected paths. Likewise, predictability will increase as a result of STAR-approach integration.
- d) Environmental protection – Because of increased efficiency and fuel savings, harmful gas emissions into the atmosphere will be reduced. Likewise, the implementation of CDO/CCO will help reduce aeronautical noise.
- e) Access – The implementation of RNAV (GNSS) approach procedure with Baro-VNAV and/or RNP AR APCH at airports lacking ILS or where the terrain/obstacles lead to high operational meteorological minima, will help improve aerodrome access under adverse meteorological conditions.

5. Implementation

5.1 En-route operations

The implementation of PBN en-route is addressed at regional level, taking into account that the main air traffic flows encompass two or more States.

The regional PBN implementation strategy for en-route operations is based on the route network version concept, taking into account that the airspace structure changes based on the growth of air traffic movement, the shifting of air traffic demand from one Region or airport to another, and available technology, amongst other aspects. The use of route network versions reflects the need for periodic integrated reviews to make sure that the best possible airspace structure is always available, within an integrated development concept. Route network versions are the result of a broader analysis of the route network, based on statistical data on air traffic movement and fleet navigation capabilities, seeking to eliminate unused routes, and the exclusion or reduced use of “conventional” routes from a given airspace volume, where most users are RNAV-5 capable.

Furthermore, SAM route network versions must seek a full restructuring of the route network through a complete integration of ATS routes, control sectors, TMAs, etc., applying the flexible use of airspace concept. Use of specific “*airspace modelling*” and fast-time ATC simulation tools should be further analysed.

5.2 Complete redesign of terminal areas

5.2.1 TMA XX

5.2.1.1 Preliminary operational requirements

5.2.1.2 Tentative date of implementation

5.2.2 TMA YY

5.2.2.1 Preliminary operational requirements

5.2.2.2 Tentative date of implementation

5.2.3 TMA ZZ

5.2.3.1 Preliminary operational requirements

5.2.3.2 Tentative date of implementation

5.3 Implementation of arrivals and departures applying CDO and CCO

The objective of the PBN SID and STAR implementation programme is to publish these instrument procedures for all IFR thresholds, applying CDO and CCO techniques.

The status of planning and implementation of PBN arrivals and departures, with and without the application of CDO and CCO techniques, is shown in Appendix A (example: BOLIVIA) to this plan, and will be updated and delivered to the SAM Regional Office on a semi-annual basis, on 30 June and 31 December of each year.

5.4 PBN approach

The objective of the Aerodrome Approach Implementation Programme is to publish RNAV (GNSS) approach procedures for all IFR thresholds, with the possibility of applying vertical navigation (LNAV/VNAV) using Baro-VNAV. Likewise, RNAV/ILS approach procedures will be published for airport equipped with ILS, in order to facilitate the arrival-approach interface.

The status of planning and implementation of PBN approach procedures is shown in **Appendix A (example: BOLIVIA)** to this plan, and will be updated and delivered to the SAM Regional Office on a semi-annual basis, on 30 June and 31 December each year.

5.5 Fuel savings and reduction of CO₂ emissions

Fuel savings and CO₂ emission reduction derived from PBN implementation will be calculated using the IFSET tool, in order to determine the efficiency of such implementation. The aforementioned calculation will be applied to the full redesign of the main TMAs, and to the implementation of SIDs, STARs, and APV approach procedures. These estimates of fuel savings and CO₂ emission reductions will be sent to the SAM Regional Office, on a semi-annual basis, on 30 June and 31 December each year.

During the post-implementation phase, estimates of actual fuel savings and of CO₂ emission reduction will be prepared based on tools that retrieve data from the “*Flight Operations Quality Assurance*” and/or other means that might provide real information on fuel consumption. This data, when available will be sent to the SAM Regional Office.

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

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

Note: The aforementioned AIRAC dates are tentative, based on instrument procedure publication capacity.

- (1) Insert the orientation of thresholds capable of supporting IFR operations
- (2) Insert the orientation of thresholds with **only** VFR operations or are **not** in a position to support IFR operations.
- (3) Insert “yes” if the threshold of that airport already has the instrument procedure listed in the column title (APV IAP, LNAV IAP, RNAV AR IAP, PBN SID or PBN STAR). Insert the tentative AIRAC date of implementation of the procedure type, if not yet implemented.
- (4) Insert the relevant remarks. If appropriate, insert summarised information on the reason why the threshold does not support IFR operations.

APPENDIX C

Status of implementation of optimised longitudinal separation

ARGENTINA						
*Updated SAMIG20, Oct 2017						
ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/DME	Date of implementation	20 NM GNSS/DME	Date of implementation	
CORDOBA	IQUIQUE	OG				
	LA PAZ	YES	01/01/17			
	EZEIZA			YES	13/10/2016	
	MENDOZA			YES	13/10/2016	
	RESISTENCIA			YES	13/10/2016	There are some issues with VHF Com
RESISTENCIA	ASUNCION	YES	01/01/17			
	LA PAZ	YES	01/01/17			
	CORDOBA			YES	13/10/2016	
	CURITIBA	YES	01/01/17			
	EZEIZA			YES	13/10/2016	
EZEIZA	MONTEVIDEO	YES	01/01/17			
	COMODORO RIVADAVIA			YES	13/10/2016	
	MENDOZA			YES	13/10/2016	
	PUERTO MONTT	OG				
	CORDOBA			YES	13/10/2016	
	RESISTENCIA			YES	13/10/2016	
MENDOZA	MONTEVIDEO	YES	01/01/17	YES	2010	PAPIX, KUKEN and DORBO 20 NM
	EZEIZA			YES	13/10/2016	
	SANTIAGO	OG				
COMODORO RIVADAVIA	CORDOBA			YES	13/10/2016	
	EZEIZA			YES	13/10/2016	
	PUERTO MONTT	OG				

BOLIVIA						
*Updated OSL workshop, Nov. 2017						
ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/DME	Date of implementation	20 NM GNSS/DME	Date of implementation	
LA PAZ	AMAZÓNICO	YES	01/01/17			Not being applied
	ASUNCION	YES	01/01/17			Not being applied
	CURITIBA	YES	01/01/17			Not being applied
	CORDOBA	YES	01/01/17			Not being applied
	LIMA	OG				No agreement
	IQUIQUE	OG				Agreements being negotiated
	RESISTENCIA	YES	01/01/17			Not being applied

BRAZIL						
*Updated OSL workshop, Nov. 2017						
ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/ DME	Date of implementation	20 NM GNSS/ DME	Date of implementation	
AMAZÓNICO	BRASILIA	---	---	---	---	10 NM
	BOGOTÁ	YES	13/10/16			
	CAYENNE	---	---	---	---	10 minutes
	CURITIBA	---	---	---	---	10 NM
	GEORGETOWN	YES	07/01/16			
	LA PAZ	YES	01/01/17			
	LIMA	YES	31/03/16			
	MAIQUETIA	YES	23/10/16			
	PARAMARIBO	YES	13/10/16			
	RECIFE	---	---	---	---	10 NM

CHILE							*Updated OSL workshop, Nov. 2017
ACC	ADJ ACC	Longitudinal separation				Comments	
		40 NM GNSS/ DME	Date of implementation	20 NM GNSS/ DME	Date of implementation		
CURITIBA SANTIAGO	IQUIQUE	NA	YES	01/01/17	----	5 NM	
	LA PAZ	NA	YES	01/01/17	----		
	MONTEVIDEO	OG	---	---	---	5 NM	
SANTIAGO	RECIFE	OG	---	---	---	5 NM	
	PUEBLO MONTE	NA	YES	01/01/17	----	5 NM	
IQUIQUE RECIFE	RESISTENCIA	OG	---	---	---	10 Minutes	
	ATLANTICO	OG	---	---	---	10 NM	
IQUIQUE RECIFE	CORDOBA	OG	---	---	---	10 NM	
	AMAZONICO	OG	---	---	---	5 NM	
	LA PAZ	OG	---	---	---	Agreements being NM	
	CURITIBA	OG	---	---	---	5 NM	
	ATLANTICO	---	---	---	---	10 Minutes	
ATLANTICO	AMAZONICO	---	---	---	---	10 Minutes	
	CURITIBA	---	---	---	---	VHF Com issues	
	RECIFE	---	---	---	---		
	CAYENNE	---	---	---	---		

NOTE.- Prior to SAMIG21, 20 NM will be applied to traffic entering the Brazil FIR.

COLOMBIA						
*Updated OSL workshop, Nov. 2017						
ACC	ACC ADJ	Longitudinal separation				Comments
		40 NM GNSS/DME	Date of implementation	20 NM GNSS/DME	Date of implementation	
PUERTO BOGOTÁ MONTT	EZEIZA AMAZÓNICO	OG	30/09/16			
	COMODORO RIVADAVIA	OG				
PUNTA ARENAS	PUERTO MONTT	NA	---	---	---	5 NM
	COMODORO RIVADAVIA	OG				

	CENAMER	NO				MoU was not prepared because it did not guarantee efficient communications in the boundary
	GUAYAQUIL	YES	13/10/16			
	LIMA	YES	10/11/16			
	MAIQUETIA	YES	21/03/17			
	PANAMA	YES	13/10/16			
	BARRANQUILLA	YES	05/10/16			
BARRANQUILLA	MAIQUETIA	YES	21/03/17			
	PANAMA	YES	13/10/16			
	BOGOTA	YES	05/10/16			
	KINGSTON	YES	15/06/13			
	CURAÇAO	NO				MoU was not prepared because it did not guarantee efficient communications at the boundary

ECUADOR							*Updated OSL workshop, Nov. 2017
ACC	ADJ ACC	Longitudinal separation				Comments	
		40 NM	Date of	20 NM	Date of		

PANAMA

		GNSS/ DME	implementation	GNSS/ DME	implementation	
GUAYAQUIL	BOGOTÁ	YES	13/10/16			40 NM reduced separation applied. MoU among ATC service providers signed.
	LIMA	YES	10/11/16			Implemented
	CENAMER	NA	---	---	---	Oceanic separation

FRENCH GUIANA *Updated SAMIG20, Oct 2017

ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/ DME	Date of implementation	20 NM GNSS/ DME	Date of implementation	
CAYENNE	AMAZÓNICO	---	---	---	---	10 Minutes
	PARAMARIBO	---	---	---	---	10 Minutes
	PIARCO					No information available

GUYANA *Updated SAMIG20, Oct 2017

ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/ DME	Date of implementation	20 NM GNSS/ DME	Date of implementation	
GEORGETOWN	AMAZONICO	YES				
	PIARCO					No information available
	MAIQUETIA	OG				
	PARAMARIBO	YES				

*Updated OSL workshop, Nov. 2017						
ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/DME	Date of implementation	20 NM GNSS/DME	Date of implementation	
PANAMÁ	BOGOTÁ	YES	Oct/16			
	BARRANQUILLA	YES	Oct/16			
	CENAMER	YES	15/11/16			
	KINGSTON	YES	10/12/16			
PARAGUAY						
*Updated OSL workshop, Nov. 2017						
ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/DME	Date of implementation	20 NM GNSS/DME	Date of implementation	
ASUNCION	CURITIBA	YES	Mar/16 date SAMIG 16			
	LA PAZ	YES	01/01/17			
	RESISTÊNCIA	YES	01/01/17			Not being applied. Coordination with Argentina required

PERU						
*Updated OSL workshop, Nov. 2017						
ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/DME	Date of implementation	20 NM GNSS/DME	Date of implementation	
LIMA	AMAZONICO	YES	31/03/16			Full implementation agreed at OSL workshop
	BOGOTA	YES	31/03/16			Implanted
	OCEANICO	NA	---	---	---	Oceanic separation
	IQUIQUE	OG				Agreements being negotiated
	GUAYAQUIL	YES	10/11/16			Implemented
	LA PAZ	OG				No agreement

SURINAME						
*Updated SAMIG20, Oct 2017						
ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/DME	Date of implementation	20 NM GNSS/DME	Date of implementation	
PARAMARIBO	AMAZÓNICO	YES	13/10/16			OG
	GEORGETOWN	YES	29/03/16			Signed
	PIARCO	N/A	---	---	---	Oceanic separation
	CAYENNE	N/A	---	---	---	Oceanic separation

URUGUAY						
*Updated SAMIG20, Oct 2017						
ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/DME	Date of implementation	20 NM GNSS/DME	Date of implementation	
MONTEVIDEO	CURITIBA	YES	01/01/17			
	EZEIZA	YES	01/01/17	YES	2010	PAPIX, KUKEN, DORBO 20NM
	RESISTENCIA	YES	01/01/17			

VENEZUELA						
*Updated OSL workshop, Nov. 2017						
ACC	ADJ ACC	Longitudinal separation				Comments
		40 NM GNSS/DME	Date of implementation	20 NM GNSS/DME	Date of implementation	
MAIQUETIA	AMAZONICO	YES	12/12/15			
	BOGOTA	YES	21/03/17			
	BARRANQUILLA	YES	21/03/17			
	PIARCO	OG				Negotiating
	CURAZAO	NO				Curacao does not accept
	SAN JUAN	NO				San Juan not in a position to implement
	GEORGETOWN	OG				

2018 – 2019 Action Plan

“Improvement and standardisation of en-route longitudinal separation minima”

Phase 1: Consolidation of 40 NM LSM and initial steps to implement 20 NM LSM

- Define agreements to apply 40 NM LSM with CAR States (April 2018)
- Define application of 40 NM LSM in La Paz FIR (SAMIG/21)
- Feedback from Brazil on implementation of 20 NM LSM (SAMIG/21)
- Feedback from COL, PER, ECU, VEN, PAN on use of 20 NM LSM (SAMIG/21)
- Full implementation of 40 NM LSM in SAM continental airspace (SAMIG/21)

Phase 2: Implementation of 20 NM LSM

- Post-implementation analysis - 40NM LSM (SAMIG/22)
- Analysis of results of unilateral implementation of 20 NM in Brazil (SAMIG/22)
- Analysis of the results of 20 NM LSM trials by States (SAMIG/22)
- Analysis of limitations and gaps (SAMIG/22)
 - a. ATS sectoring, ATS capacity measurement
 - b. Flow management, proper implementation of initiatives
 - c. Direct VHF
 - d. ATS route network
 - e. Implementation of AIDC, FPL management
- Risk assessment
- Define agreements to apply 20 NM with CAR States (SAMIG/22)
 - a. Stage 1: Aircraft landing in the FIR
 - b. Stage 2: All aircraft entering the FIR
- Define agreements and effective date 20 NM LSM between SAM States (SAMIG/22)
 - a. Stage 1: Aircraft landing in the FIR
 - b. Stage 2: All aircraft entering the FIR
- Complete application of 20NM LSO in continental SAM airspace (SAMIG/23 - 2019)
- Post-implementation analysis 20 NM LSM (SAMIG/23 - 2019)

Phase 3: Implementation of 10 NM LSM, with ATS surveillance (TBD)

APPENDIX D / APÉNDICE D

LIST OF CONTACTS FOR OPERATIONAL PBN FOCAL POINTS

LISTA DE CONTACTOS PARA PUNTOS FOCALES PBN

State/ Estado	PBN FOCAL POINTS PUNTOS FOCALES PBN
ARGENTINA*	<p>Mariana Fernandez Administración Nacional de Aeronáutica Civil (ANAC) A/C Departamento Programación Técnica Tel: +54 11 5941 3000, Ext. 69193 E-mail: mafernandez@anac.gov.ar</p> <p>Rodrigo Devesa Diseño de Espacio Aereo (EANA) Tel: +54 11 4320 2010 Cel: +54911 4088 6542 E-mail: rdevesa@eana.com.ar</p> <p>Maria Estela Leban Directora de Regulaciones Normas y Procedimientos tel 541159413000 int 69728 e-mail meleban@anac.gob.ar</p>
BOLIVIA* (Plurinational State of) / BOLIVIA (Estado Plurinacional de)	<p>Luis Benjamín Rojas Santa Cruz Dirección General de Aeronáutica Civil (DGAC-BOLIVIA) Especialista Planificación de Espacios Aéreos y Procedimientos de Vuelo Tel.: +591 4 422 1696 Cel.: +591 7203 5429 E-mail: lrojas@dgac.gob.bo</p>

State/ Estado	PBN FOCAL POINTS PUNTOS FOCALES PBN
BRAZIL / BRASIL*	<p>Luiz Antonio dos Santos Jefe ATM Departamento de Control del Espacio Aéreo (DECEA) Av. General Justo, 160 – Centro Rio de Janeiro 20.021-130, Brasil Tel: +55 21 2101 6088 E-mail: luizantoniolas@decea.gov.br</p> <p>Rochelly de Miranda Corrêa Auxiliar ATM Departamento de Control del Espacio Aéreo (DECEA) Av. General Justo, 160 – Centro Rio de Janeiro 20.021-130, Brasil Tel: +55 21 2101 6197 E-mail: rochellyrmc@decea.gov.br</p>

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