



**Agenda Item 1: Review of the ATS Route Optimisation Programme of the South American Region and of PBN implementation improvements**

**EN ROUTE PBN PLANNING AND ATSRO ACTION PLAN**

(Presented by the Secretariat)

**SUMMARY**

This working paper presents PBN implementation plans for the en-route segment and the strategies set forth in the SAM/IG/22 and SAM/IG/23 meetings.

It also notes that the ATS Route Network Optimisation Programme is to be enhanced through the airspace optimisation concept, through the activities of the study group and the implementation of the SAM – GESEA airspace.

**References:**

- ATS/RO meeting reports
- SAM/IG meeting reports
- SAM PBN CONOPS for the period 2018-2020

**ICAO strategic objectives:**

*A - Safety*  
*D – Economic development of air transport*  
*E – Environmental protection*

**1 Background**

1.1 The SAM/IG/22 meeting (Lima, 19-23 November 2018), through WP/01 presented by the Secretariat, analysed a proposal of improvement of the SAM PBN Implementation Group through the SAM Airspace Study and Implementation Group (GESEA).

1.2 It was noted that, during the last 10 years, the PBN Group had developed the necessary guides for harmonised implementation of PBN in the en-route, TMA and approach segments.

1.3 However, airspace planning has evolved in the last few years, with the publication of various ICAO documents related to the development of airspace concepts (Doc 9931, Doc 9992, Doc 9993), in which it has been shown that PBN is a tool for achieving safe and efficient airspace concepts.

**2 Discussion**

2.1 The SAMIG/22 meeting noted that the PBN group (PBN/SAM/IG) needed to improve its work models in order to:

- a) deal with procedure design issues that were mainly addressed at PANS/OPS workshops;
- b) facilitate a more detailed work on specific and complex issues;
- c) create the best conditions for working between meetings through teleconferencing;

- d) encourage the participation of new professionals in **SAM Airspace Planning**, and in the activities related to the PANS-OPS.

2.2 The main objectives of GESEA would be the following:

- a) Coordinate the implementation of SAM route versions.
- b) Harmonise PBN implementation in the main SAM TMAs, applying international best practices.
- c) Support SAM States in the implementation of STARs, SIDs and PBN-based approaches.
- d) Coordinate the ICAO RNAV-to-RNP nomenclature migration process.
- e) Develop a harmonised methodology for post-implementation assessment, applying key performance indicators.
- f) Support the implementation of a regulatory framework for the instrument flight procedure design service.
- g) Share best practices in the design and publication of instrument flight procedures, with a view to enhancing flight safety and efficiency.

2.3 The SAM/IG/22 meeting examined a proposal of terms of reference to increase the efficiency of the work promoted by the SAM/IG, without generating bureaucratic burdens or additional costs. Therefore, GESEA will work *via* teleconferences and email and, where applicable, face-to-face activities under the RLA/06/901 programme.

2.4 In view of the above, the SAM/IG/22 meeting formulated the following conclusion:

<b>CONCLUSION</b>	
<b>SAM/IG/22-01 SAM Airspace Study and Implementation Group (GESEA)</b>	
<b>That:</b> The SAM Airspace Study and Implementation Group (GESEA) be constituted, in accordance with the terms of reference approved by the SAM/IG meeting.	<b>Expected impact:</b> <input type="checkbox"/> Political / Global <input type="checkbox"/> Interregional <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational
<b>Why:</b> Whereas the PBN/SAM/IG needs to improve its working models to: <ul style="list-style-type: none"> <li>a) cover the topics related to the design of procedure that are mostly treated in the at PANS/OPS workshops;</li> <li>b) facilitate more in-depth work on specific and complex issues;</li> <li>c) provide the best conditions for work between meetings, via teleconferencing; and</li> <li>d) encourage the participation of new professionals in the work carried out in the planning of SAM Airspace, as well as in the activities related to the PANS-OPS.</li> </ul>	
<b>When:</b> In SAM/IG/23	<b>Status:</b> Adopted by SAM/IG/22

**Who:** Coordinators States ICAO Secretariat ICAO HQ Other: Users/Industry

2.5 Details of the discussions held at the SAMIG/22 meeting can be found in the final report of the meeting, at:

<https://www.icao.int/SAM/Pages/MeetingsDocumentation.aspx?m=2018-SAMIG22>

2.6 The SAM/IG/23 meeting (Lima, 20-24 May 2019) ratified the creation of the GESEA group to increase the efficiency of the work promoted by the SAM/IG. GESEA will work *via* teleconferences and email and, if applicable, through face-to-face activities under the RLA/06/901 programme.

2.7 The meeting agreed on a list of State and IATA experts to be part of the GESEA General Coordination (GC) and the Coordination of the two subgroups (CSG). The experts for the work teams were also presented. The meeting highlighted that GESEA was open and, in due time, would call upon all the experts who wished to cooperate and support the initiative. See the list of experts in Table 1, and the priority issues for work teams in Table 2.

Table 1 – GESEA experts

General Coordinator	CSG-1	CSG-2
Fernandes Jr-BRAZIL	Julio Pereira-IATA	Tomás Macedo-PERU
STATE	SG1 (AIRSPACE)	SG2 (PANS-OPS)
ARGENTINA	Adrián Malizia, Ana Toloza, Marcelo Castronuevo	Diego Gamboa, Hernán Ibarra, Gustavo Guardia, Mariana Luna
BOLIVIA	Luis Rojas	Jenny Choque
BRAZIL	Marcos Peçanha	Cristian Smidt
CHILE	Hector Ibarra	Manuel Álvarez
COLOMBIA	Harlen Mejía, Fredy Celis, Mauricio Corredor	Oscar Angarita, Medardo Figueroa, Carlos Torres
ECUADOR	Christian Ramos	Alis Villavicencio
PANAMA	Gilda Espinosa	Ana Teresa Montenegro
PARAGUAY	Tomas Yentzch, Liz Portillo	Robin Dacak, Eleno Centurión
PERU	Dante Samaniego, Sady Beaumont	Marcos Vargas, Eloy Tafur
URUGUAY	Gabriel Falco, Gustavo Turcatti, Rosanna Baru	Miguel Miraballes, Bruno Gómez, Daniel Burgos
VENEZUELA	Carlos Castañeda	Omar Linares
IATA		Mariela Valdés, Raymundo Hurtado

Table 2.- GESEA work teams

<b>GESEA – LIST OF WORK TEAMS</b>	
<b>WORK TEAM</b>	<b>Assigned to Subgroup</b>
GESEA/WG	N/A
SAM AIRSPACE CONCEPT	SG1
AIRSPACE PLANNING STANDARDS	SG1
TRAINING – AIRSPACE PLANNER	SG1
CONT PLAN	SG1
CIRCULAR 353	SG2
RNAV VISUAL	SG2
QUALITY ASSURANCE - IFPDS	SG2

2.8 Top priority was assigned to the work of a GESEA-WG, which would be responsible for completing the terms of reference and the organisation. The specific composition of the work teams is to be defined once the tasks have been planned.

2.9 Therefore, the SAMIG/23 meeting agreed to request the Project RLA/06/901 to explore the possibility of supporting two GESEA activities in 2020, based on the activities currently being supported (two SAMIG, one ATSRO and one PANS OPS workshop), as follows:

- a) Workshop/meeting of the GESEA WG and the SG1-GESEA (5 days) in March; and
- b) Workshop/meeting of the SG2-GESEA (5 days) in July.

2.10 In order to review ATS/RO activities since October 2016, the Appendix to this working paper contains the action plan. It is expected that the GESEA Airspace Subgroup (SG1) will address planning, beginning on the second half of 2019.

2.11 The SG1 will adopt a collaborative interregional planning and implementation approach to improve CAR/SAM airspace and interfaces, as already done by the PBN III meeting of the NACC Regional Office (Mexico City, July 2018) and highlighted when preparing Version 5 of the route network that is presented to this Meeting.

### 3 **Suggested action**

3.1 The Meeting is invited to:

- a) take note of the information presented herein on the new SG1 subgroup of GESEA; and
- b) review the ATSRO action plan contained in the Appendix, and consider the transition to the GESEA SG1 activities.

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## APPENDIX

## ATSRO ACTION PLAN

Activity	Start	End	Responsible party	Remarks
<b>1. SAM route network</b>				
<b>1.1. Version 4 of the Route Network – RNAV-5</b>				
<p>1.1.1. Perform detailed study of the SAM ATS Route Network, with a view to developing Version 04 of the Route Network (TMA - Arrival/Departure/RNAV-5 route segment interface), including:</p> <ul style="list-style-type: none"> <li>• Prepare work plan for the participation of hired/seconded experts from States/international organisations who would support the preparation of the preliminary draft.</li> <li>• Determine tools required to conduct the study (aeronautical charts, specific software).</li> <li>• Analyse traffic data in order to understand traffic flows.</li> <li>• Analyse fleet navigation capacity.</li> <li>• Prepare the preliminary draft of Version 04 of the SAM route network, including control sectors, TMA interface, etc.</li> <li>• Study the feasibility/need to assess the preliminary design using “<i>airspace modelling</i>” tools and fast-time ATC simulation.</li> <li>• Propose the initial draft of the Proposal of Amendment to the CAR/SAM ANP.</li> </ul>	SAM/IG/18 (October 2016)	June 2017	SAM/PBN/IG (Project RLA/06/901) States IATA IFALPA ATM RO	<ul style="list-style-type: none"> <li>• Hiring/“secondment” of 2 experts for 3 weeks in order to prepare a preliminary draft.</li> </ul> <p>NOTE: PBN implementation in SAM TMAs progressed during 2016 and 2017. Examples: Argentina (Baires in process), Brazil, Colombia and Paraguay.</p> <p style="text-align: center;"><i>FINALISED</i></p>

Activity	Start	End	Responsible party	Remarks
<ul style="list-style-type: none"> <li>• Prepare the Plan for the Optimisation of Restricted, Prohibited, Danger and Reserved Use Zones of the SAM Region.</li> <li>• Calculate fuel/CO<sub>2</sub> savings using IFSET to validate the preliminary design of the SAM airspace structure, covering routes/SIDs/STARs.</li> <li>• Prepare “SAM Route Network, Version 04” document.</li> <li>• Prepare working paper for the ATSRO/8 meeting.</li> </ul>				
<p>1.1.2. Hold the Eighth Workshop/Meeting on SAM ATS Routes Optimisation, with the purpose of reviewing Version 04 of the Route Network.</p> <p>Includes:</p> <ul style="list-style-type: none"> <li>• Review draft Version 04 of the ATS Route Network. Define implementation process.</li> </ul>	SAM/IG/18 (October 2016)	ATSRO/8 (September 2017)	Project RLA/06/901 States ATM RO	<i>FINALISED</i>
<p>1.1.3. Joint work with States for the conduction of the risk analysis of the SAM Route Network, Version 04.</p>	ATSRO/8 (September 2017)	ATSRO/9 (July 2018)	Project RLA/06/901 States ATM RO	<ul style="list-style-type: none"> <li>• Will be done through teleconferences and distribution of guidance documents, as required.</li> </ul> <p><i>FINALISED</i></p>

Activity	Start	End	Responsible party	Remarks
1.1.4. Analysis and incorporation in SAM implementation activities of route optimisation initiatives originated in the CAR Region and coordinated with NACC Office.	III NACC PBN (September 2017)	ATSRO/9 (July 2018)	Project RLA/06/901 States ATM RO	<ul style="list-style-type: none"> <li>Will be done through teleconferences. Will include coordination at the SAM/IG/21 meeting (May 2018). <i>FINALISED</i></li> </ul>
1.1.5. Conduct the Ninth Workshop/Meeting on SAM ATS Route Network Optimisation, with the purpose of monitoring the implementation of Version 04 of the Route Network and adjusting the publication and implementation programme. Initiatives coordinated with NACC Office will be included.	ATSRO/8 (September 2017)	ATSRO/9 (July 2018)	Project RLA/06/901 States ATM RO	<i>FINALISED</i>
1.1.6. NAM-CAR-SAM inter-regional coordination to define implementation of exclusionary RNAV-5 airspace above FL245.	TBD	TBD	SAM Regional Office NACC Regional Office	<i>ANI/WG/PBN/TF (Mexico April, 2019) reviewed the CAR SAM routes interfaces initiatives IN PROGRESS</i>
<b>1.2. Version 05 of Route Network</b> <ul style="list-style-type: none"> <li>o <b>RNAV-5 Regional and Inter-regional upper airspace</b></li> <li>o <b>RNAV-5 for airspace below FL245</b></li> <li>o <b>RNP2 for Continental and Oceanic airspaces</b></li> </ul>				
1.2.1. Perform study to develop Version 05 of Route Network, considering implementation of RNAV-5 and RNP2 navigation specifications in selected airspaces. It includes:	ATSRO/8 (September 2017)	SAMIG/22 (2018)	Project RLA/06/901	2 experts will be hired for 3 weeks.  Tentative date: September 2018

Activity	Start	End	Responsible party	Remarks
<ul style="list-style-type: none"> <li>• Prepare work plan for the participation of hired/seconded experts and experts from the States/International Organisations to support the preparation of the preliminary draft.</li> <li>• Define the tools required to conduct the study (aeronautical charts, specific software).</li> <li>• Analyse traffic data. Study of regional and inter-regional upper airspace route network, optimisation and replacement of conventional routes.</li> <li>• Analyse interfaces to TMAs or aerodromes involved. Select airspaces for RNAV-5 application in regional route.</li> <li>• Analyse traffic data for airspace involving regional routes below FL245. Analyse fleet navigation capacity, with emphasis on general aviation.</li> <li>• Analyse traffic data for RNP2 oceanic airspace. Analyse fleet navigation capacity.</li> <li>• Prepare the Plan for Optimisation of Restricted, Prohibited, Danger and Reserved Use Zones of the SAM Region.</li> <li>• Calculate fuel/CO<sub>2</sub> savings using IFSET to validate the preliminary design of the SAM airspace structure, covering routes/SIDs/STARs.</li> <li>• Develop deliverable “Version 05 of SAM Route Network”, including harmonised implementation plan.</li> <li>• Prepare working paper for SAM/IG/23.</li> </ul>				<p style="text-align: center;"><i>FINALISED</i> 22 February 2019</p>

Activity	Start	End	Responsible party	Remarks
1.2.2. Review preliminary deliverable of Version 05 of Route Network. Analyse and propose changes to harmonised implementation plan, as required.	SAM/IG/23 (2019)	SAM/IG/23 (2019)	Project RLA/06/901 States ATM RO	<i>FINALISED</i>
1.2.3. Hold the Tenth Workshop/Meeting on SAM ATS Routes Network Optimisation, to review Version 05 of the Route Network. It includes:  • Review draft Version 05 of the ATS Route Network. Define process according to harmonised implementation plan for RNP2 and selected airspace below FL245, respectively.	SAM/IG/23 (2019)	ATSRO/10 (2019)	Project RLA/06/901 States ATM RO	
1.2.4. Perform risk analysis of Version 05 of the SAM ATS Route Network, coordinating such activities with the States involved.	ATSRO/10 (2019)	TBD	Project RLA/06/901 States ATM RO	1 expert will be hired for 2 weeks.
1.2.5. Hold the Eleventh Workshop/Meeting on SAM ATS Route Network Optimisation, with the purpose of monitoring implementation of Version 05 of the Route Network and adjusting the publication and implementation programme.	TBD	TBD	Project RLA/06/901 States ATM RO	