



**Agenda Item 3: Analysis of Version 04 of the SAM ATS routes network and SAM-CAR inter-regional ATS routes**

**SAM REGION ROUTES NETWORK OPTIMISATION**

(Presented by the Secretariat)

<b>SUMMARY</b>	
This working paper presents the deliverable of Version 04 of the SAM Region Routes Optimisation Programme, to be evaluated and completed by the experts in order to prepare the concerning implementation plan, based on the needs of users and feasibility of States, taking into consideration PBN capacity of aircrafts.	
<b>References:</b>	
<ul style="list-style-type: none"><li>• ATS/RO meetings reports</li><li>• SAM/IG meetings reports</li><li>• SAM Region CONOPS PBN - Period 2018-2020</li></ul>	
<b>ICAO Strategic Objectives:</b>	<i>A - Safety</i> <i>D - Economic Development of Air Transport</i> <i>E - Environmental protection</i>

**1 Introduction**

1.1 The objective of the Declaration of Bogota for the reduction of CO<sub>2</sub> emissions in the SAM Region is based on the implementation of PBN flight procedures and, in parallel, on the establishment of a more efficient RNAV routes network, with more direct and better aligned flight paths. It has been estimated that during the period of January 2014 to June 2017, the set of improvements reached in the SAM Region airspace have accumulated CO<sub>2</sub> savings in the order of 93.516 TN.

1.2 Taking into account the need to deepen PBN implementation in the SAM Region, SAM/IG/16 meeting concluded that Project RLA/06/901 should be requested to develop activities to formulate a new version of the SAM optimised routes network.

1.3 Among other activities for year 2017 to support South American airspace optimization, the Tenth Meeting of the Coordination Committee of Project RLA/06/901 (RCC/10) approved to hire two experts for a three-week period, with a view to develop Version 04 of the SAM Routes Network according to SAM PBN Concept of Operations - Period 2018-2020.

**2 Analysis**

2.1 Experts Messrs. Luiz Antonio dos Santos and Tomas Macedo Cisneros, under the auspices of Regional Project RLA/06/901, prepared a preliminary report for the SAM ATS Routes Network Optimisation, which result is included under **Appendix A “MASTER V04 OF ROUTES NETWORK”** to this working paper and in Excel table “*SAMATSRO8\_Asu3\_APNa\_MASTER\_V04*”, to be delivered during the meeting. This report covers 91 proposals, which involve realigning and eliminating routes, as well as implementing new RNAV routes.

2.2 In view of the number of routes involved, it is proposed that the implementation of Version 04 should be carried out in three stages, with implementation dates in the AIRAC cycles of February, June and October 2018, looking forward to publish AIP amendments or supplements of the first stage in December 2017. Proposals to be included in each stage will be determined during ATSRO/8 meeting, taking into consideration priorities of users and plans of each State.

2.3 Experts considered following general and planning principles for the restructuring of SAM airspace:

- Ensure connectivity among ATS Routes Network to/from known entry/exit points of TMA where PBN implementation has been completed.
- Replace conventional regional routes by regional RNAV routes, taking into account an excluding RNAV 5 upper airspace by 2020.
- Most direct routes should consider the IAF or TMA entry/exit points, instead of aligning them to ARP.
- Parallel RNAV routes should be implemented when operational benefits exist (e.g. large air traffic movement, flow separation for airports of the same TMA, etc.). Assess implementation of RNP2 and RNP4 specifications.
- Allow integration with States domestic routes network.
- Eliminate or reduce congestion points where possible.
- Maintain the number of ATS routes at the least possible, avoiding redundant ATS routes, always taking into account the traffic demand in relation to the ATC capacity and the possibility of direct routes application.
- Maintain the least number of crossings as far as possible and if such crossings are necessary, same should be planned avoiding sectors of major congestion.
- Consider those routes that were planned in previous stages in Version 03, which for various reasons could not be implemented.
- Consider restricted airspaces as flexible use.
- Identify and analyze routes optimisation proposals that extend to the Caribbean and North American Regions, incorporating them in Version 04 to be subject of due coordination with NACC Office and States/Territories concerned.

2.4 Experts reviewed the Excel table including routes proposed used in Version 03, in order to make it easier to interpret and at the same time, to allow monitoring the evolution of each proposal. This improved Excel table (*SAMATSRO8\_Asu3\_APNa\_MASTER\_V04*), was shared with Mr. Eddian Méndez, ICAO NACC Office ATM/SAR Officer (CAR Region), on a preliminary basis, looking forward to use in the future one single model of planning template in the joint coordination meetings. The master table was also delivered to Messrs. Marco Vidal and Julio Pereira, from the IATA Security and Operations Areas, in order to receive feedback.

2.5 In summary, the preliminary report on Version 04 of the Routes Network includes 91 proposals, which are aimed at:

- Suppress 57 conventional regional routes;
- Suppress 6 regional RNAV routes by optimisation and harmonization;
- Implement 33 new RNAV routes;
- Modify 62 RNAV routes that contemplate realigning, extending or cutting existing RNAV routes; and
- Reduce flight distance for 52 proposals; obtaining a total reduction of 682 NM of flight should all of them be implemented.

2.6 For a better follow-up and analysis by the Meeting, proposals are summarized in **Appendix B “INDEX OF ROUTES V04”** included in the Excel table “*SAMATSRO8\_Asu3\_APNb*”, which offers a catalogue of proposals by their numbering, by States involved and by optimisation objective, which can be used as a quick reference to the aforementioned Appendix A.

### 3 **Suggested action**

3.1 In accordance with the commitment made by States in the Declaration of Bogota, the Meeting is invited to review Appendices A and B to this working paper, which contain the analysis on the SAM Region Route Network Optimisation, Version 04, as well as to formulate recommendations and coordinate corresponding implementation activities.

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**APPENDIX A**

**SAM REGION ATS ROUTES**

**NETWORK OPTIMISATION**

**VERSION 04**

**MASTER V04 OF ROUTES NETWORK**

*(SAMATSRO8\_Asu3\_APNa\_MASTER\_V04)*

**APPENDIX B**

**SAM REGION ATS ROUTE  
NETWORK OPTIMISATION  
VERSIÓN 04**

**INDEX OF ROUTES V04**

*(SAMATSRO8\_Asu3\_APNb)*