



**Agenda Item 2: Report of activities of the GESEA and Subgroups**

**b) ATM implementation. Progress of the Subgroups**

**CAPACITY AND EFFICIENCY FOR AIR NAVIGATION**

(Prepared by the Secretariat)

**SUMMARY**

This working paper presents the progress made in the implementation of improvements in Capacity and Efficiency to Air Navigation, in the areas of ATM. The current priorities of the SAM Region in the context of the recovery of Aviation after the pandemic are emphasized.

The efficiency of services and airspaces contributes directly to the recovery of Aviation in the Region, in the context of the difficult global economic situation. Improvements in efficiency and capacity are crucial to drive the restoration of air connectivity in the Region, according to commitments of the Declaration of Fortaleza, Brazil.

**References:**

- Declaration to promote connectivity through the development and sustainability of air transport in the Pan-American Region – Vision 2020-2035 (Fortaleza, Brazil, 17 to 19 September 2018).
- Sixteenth Meeting of the Civil Aviation Authorities of the SAM Region (RAAC/16) (Lima, Peru, 6 to 7 December 2018).
- Report of GREPECAS/20 Meeting (Salvador, Bahía, Brazil, 15 to 18 November 2022).
- Report of the Seventeenth Meeting of Civil Aviation Authorities - RAAC/17 (Santiago, Chile, April 10-14, 2023)

**ICAO Strategic Objectives:**

- *Capacity and Efficiency*
- *Safety*
- *Economic development*
- *Environmental Protection*

**1. Introduction**

1.1 The Declaration of Fortaleza signed in September 2018 during the ICAO Fourth World Civil Aviation Forum (IWAF/4), outline a set of general objectives to promote connectivity in the Pan-American field, including; "to be a region where the growth of air operations is sustainable and remains stable and reduces the contribution of carbon emissions to the environment."

1.2 It is recognized that the development of ICAO's strategic objective on Air Navigation Capacity and Efficiency supports the sustainable recovery of the industry and connectivity of the Region in the post-pandemic period. The facilitation of optimized operations in airspace and airports, as well as Air Traffic Management (ATM) gifted with a reliable CNS platform, and supported by accurate aeronautical and meteorological information, generates savings in flight distances, fuel consumption and CO2 emissions, while mitigating the effects of possible capacity imbalances (delays in departures/arrivals, congestion, etc.) in airspace sectors and runways.

## 2. Analysis

2.1 During 2020 and part of 2021, activities inherent to the management of air navigation services (ANS), such as aeronautical publications, mapping and design of flight procedures, flight inspections, quality re-certifications, training of personnel with aeronautical licenses, CNS facilities/implementation, etc. were affected by the sanitary restrictions implemented. The implementation of improvements in the capacity and efficiency of air navigation in the Region had to be adapted to the context of the aforementioned restrictions and the temporary decrease in air operations.

2.2 SAM Region kept the implementation of ANS and Aerodromes within the framework of the Implementation Plan of the performance-based air navigation system – SAM PBIS. The various Working Groups for Planning and Implementation continued their activities assisted by the Regional Office and many technical support forums, based on virtual work, teleconferences and electronic communication.

2.3 At the same time, the Region deployed a pilot project to promote performance-based ANS planning within the framework of the GANP, developing Volume III of the Regional Plan – ANP CAR/SAM, in connection with Mexico Regional Office. Progress in the preparation of Volume III of the ANP is set out in a separate working paper.

2.4 In 2022, the activities of ANS service providers, aerodromes, as well as regulators have been restoring in the Region, sustaining the progressive recovery of air operations, which have reached the level of domestic demand of 2019, even though the challenges to recover international operations remain.

2.5 In this context, progress has been made in the implementation of improvements in air navigation capacity and efficiency, however, the Meeting should identify and propose actions to address the priorities of the execution of facilities, strengthening of services and allocation of resources to sustain the aforementioned implementation, as set out in the following paragraphs.

2.6 The efficiency of services and airspaces contributes directly to the recovery of aviation in the Region, facing the difficult global economic context. The extensive implementation of PBN and other on-route initiatives allow to generate this efficiency, and at the same time benefits to the environment. Airport and airspace capacity should be monitored and the demand-capacity imbalance managed through the ATFM service and ACDM. Consequently, improvements in efficiency and capacity are crucial to drive the restoration of air connectivity in the Region.

### *Air space Optimization*

2.7 The implementation of PBN in approach, departure/arrival and enroute segments has slowed down due to the departure or reassignment of personnel in charge and other limitations in the ANSPs. Some implementation projects in TMAs were postponed to this year 2023. The tasks of reviewing IFP procedures every 5 years are delayed in several States.

2.8 Between 2021 and 2022, improvements have been implemented in spaces in Argentina, Brazil, Chile, Colombia, Paraguay, Uruguay and Venezuela, continuing with the implementation of RNAV 5 on regional CAR/SAM routes. The implementation of APV/Baro-VNAV approximation procedures reached 92.8%. **Appendix A** shows the progress of GNP between 2019 and 2022.

2.9 Together with IATA, the strategic direct routing (EDE) initiative has been implemented and participates in the management of user's preferred routes (UPR) that are being implemented for the NAM-CAR-SAM Regions, having obtained estimates of savings in flight distance, fuels and CO2 emissions, in the latter case of the order of 1400 Tons in one year. See details of estimated benefits in **Appendix A** to this working paper.

2.10 Priorities for the air space optimization:

- a) Strengthen flight procedure design and airspace planning services by providing them with resources and qualified full-time personnel. Review of flight procedures as stipulated by ICAO should be addressed.
- b) See item a) of ATS priorities, below.

### ***Air Traffic Flow Management -ATFM***

2.11 Since 2021, the ATFM – OPSAM Operations Plan has been implemented, which aims to cover the 4 phases of the ATFM service (strategic-pretactic-tactical-post-operations) promoting weekly / monthly Teleconferences (BRISA), the management of a regional dashboard to analyze demand growth and, therefore, identify possible demand-capacity imbalances.

2.12 The ATFM Implementation Guide approved for the Region (based on CONOPS ATFM CAR/SAM) allows to guide the implementation by phases in the States that require it. In this way, in the medium term, the implementation of the cross-border ATFM service is aimed, that is, the evolution from an ATFM service with national-domestic scope to an integrated service between several States, with intra-regional and then inter-regional scope.

2.13 ATFM Priorities:

- a) Provide for the development of the ATFM service in the national air navigation plans, oriented on the concepts of the ATFM Regional Implementation Guide and the available technical documentation.
- b) Facilitate the sharing of projected demand data for operations for the purposes of the ATFM Regional dashboard. It is essential that the information is delivered by the last Thursday of each month.
- c) Allocate resources and permanent staff to ATFM services, as needed, covering the 24-hour ACC. Staff training should be strengthened, as well as their participation in the activities of implantation groups.
- d) Verify the validity of the data of runway capacity and ATC sectors in the main headquarters / dependencies of the State and, if applicable, immediately arrange a program for the review of said capacity calculations.

### ***Air Traffic Services – ATS***

2.14 Activities have been carried out to update the ATS letters of agreement (LOA) after the pandemic, however, some administrations need to complete the technical work carried out, through the signing of the agreements.

2.15 Through the LOA ATS, the application of the minimum longitudinal separation of aircraft of 40 NM in continental airspaces has been consolidated. This minimum separation affects aircraft transfer procedures between adjacent ACCs and thus the allocation of optimal and efficient flight levels. This allows capacity to be expanded in the on-route operation segment.

2.16 Agreements for the application of longitudinal separations of 20 NM are still limited by gaps in VHF communications and radar coverage in the adjacent airspace sectors between ACCs. It should be noted that in these sectors the subject of operational safety is also presented; large altitude deviations (LHD) events, caused by defects in the ATS coordination cycle.

2.17 In the pandemic period, there were contingencies with ATC ZERO degradations in ACCs of the Region. SAM States have harmonized their ATS contingency plans, adopting the SAM Regional Framework Plan, and are being published in the AIPs (or supplements) in English language for user availability.

2.18 ATS priorities:

- a) Evaluate the gaps in ATS communications and surveillance coverage in FIR boundary sectors and transfer points between adjacent ACCs, in order to renew or install VHF extended range equipment and SSR or ADS B facilities, if applicable. It aims to facilitate longitudinal separations of 20 NM and mitigate LHD events, as well as ensure the provision of ATS service for EDE flight plans or user-preferred routes – UPR.
- b) Strengthen the State's ATS contingency plans, through training for the operational staff involved, officials and decision-making levels. Provide for the publication in English language and periodic reviews of said Plans. Arrange for periodic drills to be carried out in the ATS.

### **3. Suggested Action**

3.1 The Meeting is invited to:

- a) Take note of the information presented; and
- b) propose actions to meet, at the level of the States, the priorities indicated on the execution of facilities, strengthening of services and allocation of resources to sustain the implementation of improvements for the capacity and efficiency of air navigation.

## APPENDIX A

### Advancing Airspace Optimization

*\*Note 1. - The GNP statistic presented by iSTARS considers 13 SAM States; does not include French Guyana.*

*\*\*Note 2.- In 2022, there are 224 international runway thresholds in the Region, compared to 215 in 2019.*

Table 1.- Progress in PBN implementation in SAM Regional routes.

Year	Total SAM Regional routes - Upper	Conventional routes	PBN routes	% Implemented PBN routes
2019	163	25	138	84.66
2020	163	25	138	84.66
2021	160	22	138	86.25
2022	160	20	140	87.50

*Elaborated by RO SAM*

Table 2.- Advances in the implementation of PBN in departures / arrivals.

Date iSTARS	*SAM States	THR PBN	**TOTAL THR Intl.	% SID PBN	% STAR PBN
2019	13	189	215	66	50.7
2020	13	192	217	67.7	52.5
2021	13	201	222	68.9	51.8
2022	13	205	221	68.8	54.8

*Source iSTARS*

Table 3.- Advances in PBN implementation in Approximation

Date iSTARS	*SAM States	THR PBN	**TOTAL THR Intl.	% Approaches PBN implemented
2019	13	189	215	87.9
2020	13	192	217	88.5
2021	13	201	222	90.5
2022	13	205	221	92.8

*Source iSTARS*

Table 4.- Estimated benefits of the implementation of the EDE, for the FIRs of Brasilia, Curitiba, Bogota, Barranquilla, Guayaquil, Maiquetia, Lima and Panama.

ESTIMATION OF 1 YEAR SAVINGS BASED ON 1 WEEK DATA		
SAVINGS	1 WEEK	1 YEAR
FLIGHT DIST.	1,926 NM	100,177 NM
FUEL	8.6 Tons.	447.3 Tons.
CO 2	27.2 Tons.	<b>1,413.5 Tons.</b>

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