



Agenda Item 4: Report on activities and deliverables for the GESEA and Subgroups

**PBN IMPLEMENTATION FOLLOW-UP AT TMA CARRASCO,
CCO, CDO AND RNP APCH AT SUEO FIR**

(Information Paper presented by Uruguay)

SUMMARY	
This Information paper presents PBN implementation follow-up at MONTEVIDEO FIR aligned with PBN Airspace optimization and organization under Global Air Navigation Plan (GANP) modules APTA-B0/1, B0/2, B0/4 y B0/5.	
<i>Strategic Objectives:</i>	<ul style="list-style-type: none">• Operational Safety• Air Navigation Capacity and Efficiency• Aviation Security and Facilitation• Economic Development of Air Transport• Environmental Protection
<i>References:</i>	<ul style="list-style-type: none">• Bogotá Declaration• Doc. 9750 Global Air Navigation Plan (GANP), 2022• ICAO Assembly Resolution A37-11• Thirty-Second Workshop/Meeting of SAM Implementation Group (SAM/IG/32), September 2024.

1. Introduction

1.1 In accordance with SAM/IG/14-4 Conclusion (follow-up of the PBN goals established in the Bogotá Declaration), the República Oriental del Uruguay is committed to achieve the objectives established by the States for Civil Aviation benefits.

1.2 The Thirty-Second Workshop/Meeting of the SAM Implementation Group (SAM/IG/32) final report includes Action S29/10 follow-up, which aims to resume State reports on the progress of PBN implementation.

1.3 Since 2024, Uruguay has completed the implementation of a 20NM longitudinal separation between aircraft with all adjacent FIRs, with the possibility of reducing this separation to 10NM under specific conditions. The upper airspace routes in Montevideo FIR have been implemented as RNAV 5, as well. The next step in airspace optimization is the implementation of PBN arrival, departure, and approach procedures.

1.4 In January 2023, bilateral work began between Uruguay and Brazil to define operational criteria and begin the design for SID and STAR procedures for Carrasco (SUMU) and Laguna del Sauce (SULS) airports.

1.5 Throughout 2024, SID and STAR procedures were verified, and RNP instrument approach procedures were designed for the remaining international aerodromes in the country.

2. Analysis

2.1 APTA-B0/1 states that the use of PBN in approach procedures design, provides more flexibility to airspace planners for managing airspace use and facilitating airport access. These procedures provide stabilized approaches for aircraft equipped with Baro-VNAV functionality.

2.2 APTA-B0/2 also states that the use of PBN capabilities enables arrival and departure procedures without the need for ground-based infrastructure. The flexibility of arrival design supports the ability to optimally connect route segments with approach, improving airspace management, reducing distances, and decreasing the noise footprint. It offers optimal descent planning, reducing ATC intervention. This flexibility also applies to optimizing departure trajectories from terminal areas. These capabilities are essential elements for the development of Continuous Climb/Descent Operations (CCO/CDO).

2.3 These CDO/CCO operations are included in APTA-B0/4 and APTA-B0/5, with the primary objective of reducing fuel consumption during descent and climb phases. By reducing fuel consumption through idle descent and avoiding level segments during climb, CO₂ emissions are decreased, enabling optimal climb/descent profiles. They also reduce ATC/Pilot interactions.

2.4 In line with the aforementioned premises, work was conducted jointly with DECEA for the design of SID/STAR procedures for the airports within Carrasco TMA with regular commercial operations, as well as for the design of RNP procedures for the international airports in the rest of the country.

2.5 Currently, out of ten thresholds of international airports within Carrasco TMA, nine have RNP approaches with Baro-VNAV. The two main airports, SUMU and SULS, have 100% of their thresholds with RNP approaches.

2.6 For the eight international airports outside Carrasco TMA, PBN approach procedures were designed for all thresholds (18), achieving 100% PBN approach coverage, of which seventeen have BARO-VNAV (94%).

2.7 Currently, the PBN approaches within Carrasco TMA are implemented and operational. The SID and STAR procedures, as well as the PBN instrument procedures, have been verified by the IFPDS (Instrument Flight Procedure Design Service), draft charts have been printed, and validation flights are still pending.

2.8 RNP procedures Implementation provides the following advantages:

- Improves operational safety by reducing navigation errors.
- Enhances obstacle clearance.
- Improves situational awareness with precise and standardized procedures.
- Optimizes airspace use with more direct and closer routes.
- Reduces radar instructions and vectoring.
- Reduces controller and pilot workload.
- Reduces voice channel congestion.
- Increases communication availability.
- Supports CDO and CCO operations.
- Reduces fuel consumption and CO₂ emissions.
- Enables operations at aerodromes without ground-based navigation aids.

- Enhances operational continuity during conventional navaid failures.
- Harmonizes criteria and equipment across regions, facilitating global interoperability.

2.9 This implementation aligns with the provision of basic services for the SAM Region airspace optimization, with a view towards Free Route Airspace (FRA) transitioning.

3. Conclusion

3.1 This information note is presented for the meeting's awareness regarding the progress of PBN implementation in Montevideo FIR, for the purpose of evaluating the possibility of obtaining support for the validation flights.

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