International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)

INFORMATION PAPER

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Virtual Phase (Asynchronous, 19 January to 17 February 2026)
In-Person Phase (Mexico City, Mexico, 4 to 6 March 2026)

Agenda Item 8: CAR/SAM Air Navigation Implementation

EVOLUTION OF BRAZILIAN AIRSPACE SURVEILLANCE: ADVANCES IN THE IMPLEMENTATION OF ADS-B AND MULTILATERATION TECHNOLOGIES

(Presented by Brazil)

EXECUTIVE SUMMARY

This paper provides a comprehensive overview of Brazil's strategy for modernizing air traffic surveillance systems, in alignment with the global guidelines of the International Civil Aviation Organization (ICAO). It details the evolution of the implementation of the Automatic Dependent Surveillance – Broadcast (ADS-B) system in offshore oil basins and continental airspace. Additionally, it addresses the strategic implementation of Multilateration (MLAT) in terminal areas, exemplified by the initiative in Porto Alegre. The advances, updated timelines, inherent challenges posed by Brazil's vast territorial dimension, and future plans are discussed, highlighting the country's commitment to operational safety and efficiency in air traffic management.

Strategic Objectives 2026-2050:	• Every flight is safe and secure • Aviation is environmentally sustainable • Aviation delivers seamless, accessible, and reliable mobility for all • No country left behind • The International Civil Aviation Convention and Other Treaties, Laws and Regulations Address All Challenges • The Economic Development of Air Transport Assures the Delivery of Economic Prosperity and Societal Well-Being for All •
References:	• ICAO Annex 10, Aeronautical Telecommunications Volume IV – Surveillance and Collision Avoidance Systems. • Twenty-Second Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/22 Final Report, November 20–22, 2024). • Technical and Operational Considerations Guide for ADS-B Implementation in the SAM Region.

1. Introduction

1.1 The continuous evolution of global air traffic demands increasingly sophisticated and efficient management systems, driven by technological advances that ensure safety and capacity of air navigation services. In this context, Brazil, aligned with ICAO's Global Air Navigation Plan (GANP), has undertaken significant efforts to modernize its airspace surveillance infrastructure.

1.2 Traditionally based on primary and secondary radars, Brazilian surveillance has been complemented and enhanced by the introduction of collaborative technologies such as ADS-C and, more recently and broadly, ADS-B and Multilateration (MLAT).

1.3 This paper aims to present recent developments and strategic plans of the Airspace Control Department (DECEA) in implementing these technologies, highlighting lessons learned, challenges faced, and the vision for a future integrated and robust surveillance system.

2. Discussion

2.1. Surveillance System in Oil Basins

2.1.1. Air traffic surveillance in Brazil's offshore oil basins has been a priority area due to high operational demand and the remote nature of the region. ATS surveillance based on ADS-B OUT was pioneered in the Campos Basin, Rio de Janeiro State, in November 2018. This successful initiative served as the foundation for expanding surveillance capacity in these critical areas.

2.1.2. Currently, DECEA is advancing expansion to other basins. For the Santos Basin, six new ADS-B stations are planned, with two land-based and four maritime. Additionally, four ADS-B stations will be installed in the South Campos and Espírito Santo basins. In parallel, and to maintain operational excellence, five existing ADS-B stations in the Campos Basin will be replaced. Contracts for these implementations and replacements are expected to be signed in December 2025, with completion and activation scheduled for October 2027.

2.1.3. These actions aim to ensure that ADS-B air traffic services are fully available throughout the offshore oil exploration and production region by the end of 2027. It is important to note that a mandate for ADS-B use in these oceanic basins is expected by 2030, although the specific ADS-B version has not yet been defined.

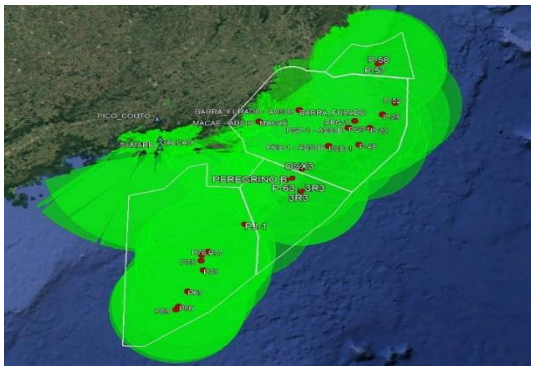

Figure 1 – ADS-B Coverage in Campos, Santos, and Espírito Santo Basins (FL 010)

2.2 Continental ADS-B

2.2.1. Considering the positive experience in the Campos Basin, DECEA launched an ambitious project in 2018 to extend ADS-B surveillance to Brazilian continental airspace. The fundamental premises of this project include providing coverage for aircraft en-route control above FL 245, maintaining primary and secondary radars as alternative surveillance means during the transition phase and for non-equipped aircraft. The mandate for continental ADS-B, version DO260B, is expected by 2030.

2.2.2. The activity schedule for continental ADS-B implementation has undergone adjustments, reflecting the complexity of such a large-scale project. However, it is noteworthy that deployments related to Phases 1, 2, and 3 have already been completed.

Table 1 – Phases of Continental ADS-B Implementation

Phase	FIR	Start	End	No. of Receivers	Status
1st	CINDACTA III	January/23	April/25	19	Completed
2nd	CINDACTA II	March/24	December/24	13	Completed
3rd	CINDACTA I	December/24	August/25	6	Completed
4th	CINDACTA IV	August/25	May/26	28	In progress
Total Acquisitions: 66 Receivers; 4 Processing Centers; 1 Monitoring Center (CGTEC)					

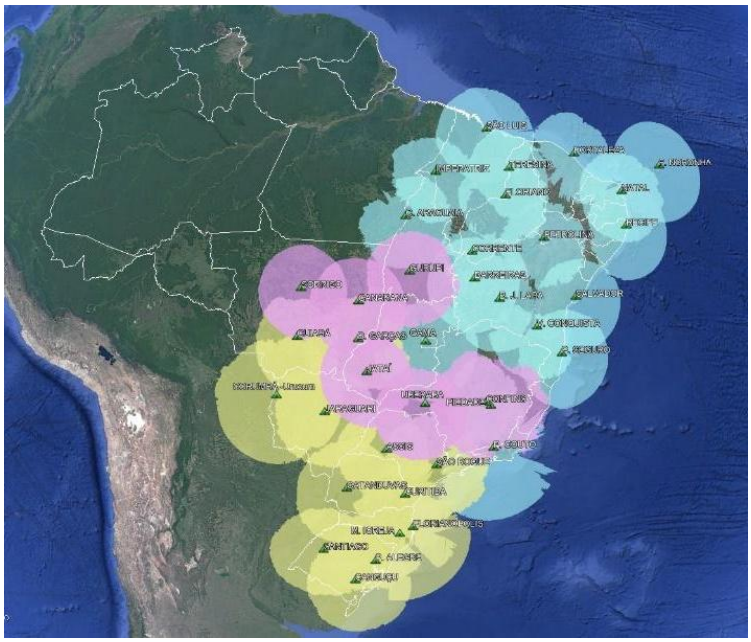

Figure 2 – ADS-B Systems implemented in Phases 1, 2, and 3 (completed) – FL 200

2.2.3. Field acceptance tests are currently being conducted, along with certification flights and engineering support flights at stations from Phases 2 and 3. One of the inherent challenges of deploying in a country with continental dimensions and vast remote areas has been optimizing data communication infrastructure and information flow. Ensuring robustness and quality of ADS-B data traffic to processing centers in isolated locations requires dedicated connectivity solutions, an aspect that is being carefully addressed and continuously improved to guarantee system integrity.

2.2.4. Lessons learned during these phases, such as the importance of analysing antenna visibility and verifying basic infrastructure—including grounding networks, telecommunications, stabilized power supply, and asset security—continue to guide subsequent phases, ensuring more effective planning for future deployments.

2.3. Terminal Area Multilateration

2.3.1 The ability to adapt and respond quickly to critical events is a fundamental pillar of air traffic management. In 2024, faced with the impacts of natural disasters in the state of Rio Grande do Sul, which compromised the surveillance infrastructure of Salgado Filho International Airport (SBPA) and its Terminal Area (TMA-PA), DECEA (Department of Airspace Control) decided on an innovative solution: the implementation of a Wide Area Multilateration (WAM) system.

2.3.2 Although the primary and secondary radars at SBPA were damaged, the choice of MLAT aims to complement ATS surveillance at lower flight levels in the TMA-PA, serving as technical and operational redundancy for the new radars being installed in Canoas (SBCO) and Caxias do Sul (SBCX).

2.3.3 The MLAT system for the TMA-PA, which benefits from the experience and existing contracts of the continental ADS-B system, will include the installation of four receivers to ensure complete coverage. The operational requirements that MLAT must meet include the ability to determine the target's instantaneous geographic position, monitor movement history (tracking), display speed and direction, and collaboratively provide aircraft identification and altitude.

2.3.4. The administrative process for MLAT implementation in TMA-PA is currently underway at the Airspace Control System Implementation Commission (CISCEA). The expectation is that the MLAT system will be implemented in TMA-PA by the 2029.

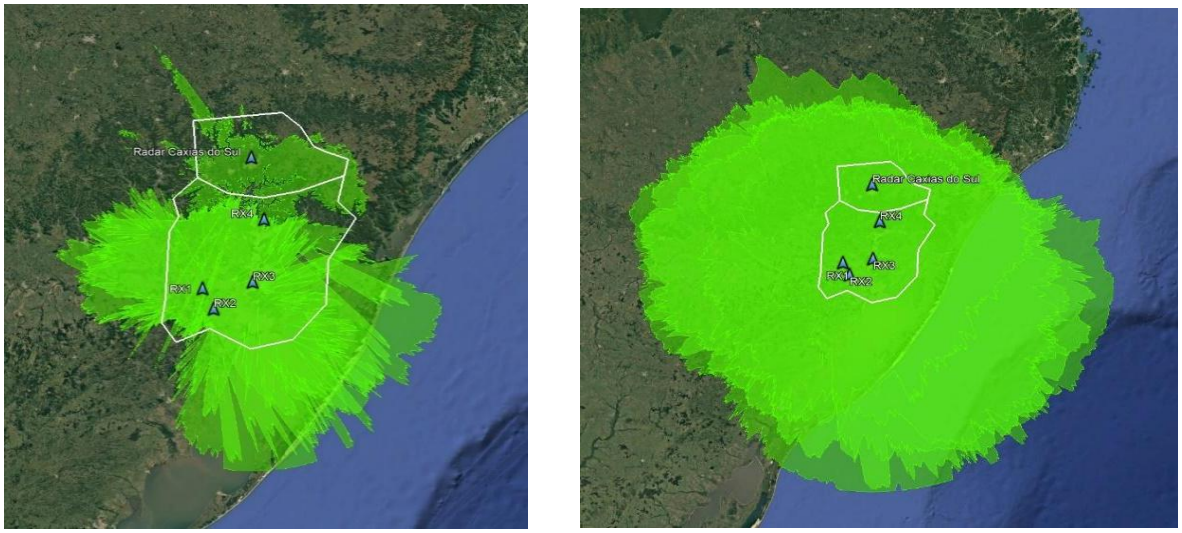

Figure 3 – Estimated ATS surveillance coverage in TMA-PA with MLAT - FL 010 (left) and FL 100 (right).

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