International Civil Aviation Organization
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INFORMATION PAPER

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Agenda Item 2: Global and Regional Developments

ADS-B IMPLEMENTATION IN THE SANTOS OIL BASIN

(Presented by Brazil)

EXECUTIVE SUMMARY	
This informative note aims to disseminate the project for the implementation of Air Navigation Services in the Santos Oil Basin and highlight Brazil's efforts to expand the employment of ADS-B in remote oceanic airspaces in the country.	
Strategic Objectives:	• Air Navigation Capacity and Efficiency
References:	• International Civil Aviation Organization (ICAO). Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM) – Doc 4444, 2016. • DCA 100-3 - Concepção Operacional para a Estruturação dos Serviços de Navegação Aérea na Bacia Petrolífera de Santos.

1. Introduction

1.1 Considering the vastness of flight information regions under its responsibility, Brazil has the huge challenge of providing surveillance, in order to comply with the existing ATS precepts, in accordance with ICAO guidelines.

1.2 The Department of Airspace Control (DECEA) strategic program for the evolution of Brazilian air traffic management, SIRIUS BRAZIL, harmonized with the recommendations contained in Doc. 9750 and aligned with the ASBU, considers the ADS-B implementation in some of its projects, to meet the identified operational demands, while contributing to the evolution of future ATM concepts.

1.3 One of these projects aimed at improving or implementing air navigation services in the oil basins – oceanic areas, in the Southeast region of Brazil.

1.4 The Pre-Salt area is considered an important oil reserve, located in the Brazilian Continental Platform, which extends from the state of Espirito Santo to the state of Santa Catarina, encompassing the Espirito Santos Basin, the Campos Basin and the Santos Basin.

1.5 Oil prospecting and exploration activities are carried out in maritime units located in oceanic areas, which are supported by infrastructure in the continental area.

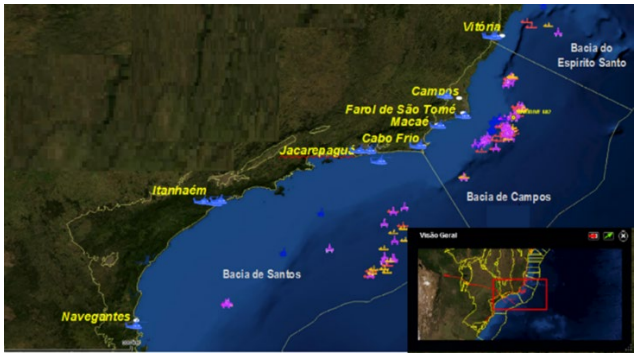

Figure 1: Santos, Campos and Espirito Santo oil basins

1.6 The first stage of the project, concerning the Campos Basin, was successfully completed in 2018. The improvement of air navigation services at TMA-ME was achieved through, among others, the implementation of Automatic Dependent Surveillance - Broadcast (ADS-B).

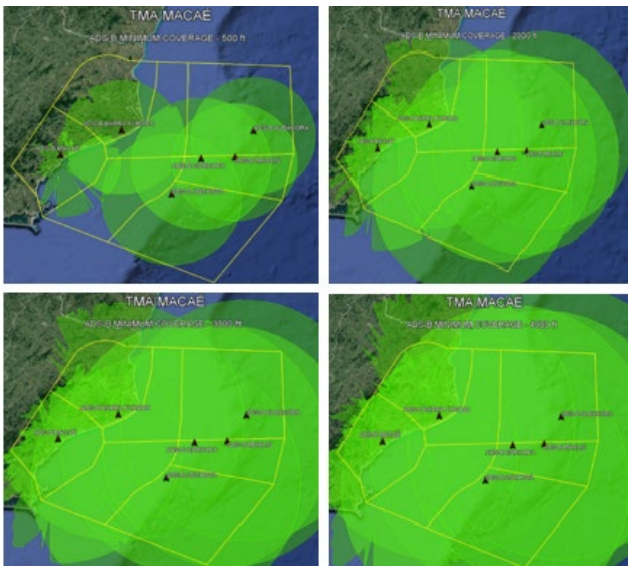

Figure 2: Campos Basin ADS-B System Coverage

1.7 An exclusive ADS-B airspace was created to ensure ATM homogeneity. This is the portion belonging to the TMA-Macaé and its projections, where the use of mode S transponder with ADS-B 1090 ES is mandatory for the receipt of the ATS Surveillance Service by APP-Macaé.

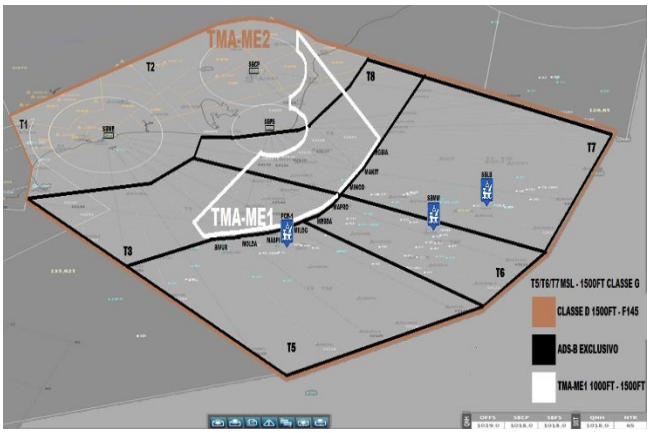

Figure 3 – TMA-Macae: Exclusive ADS-B airspace

1.8 State aircraft, not equipped with ADS-B 1090 ES, may be allowed to enter such airspace, for specific missions, with prior coordination with the APP. Likewise, aircraft not equipped with ADS-B involved in SAR missions, transport of patients or serious injuries will also be assisted, through prior coordination with the APP-Macaé.

1.9 The current phase of the project comprises the implementation of Air Navigation Services in the Santos Oil Basin (BPS). It is a region where there is a predominance of low-altitude helicopter traffic between the continent and the oil platforms, which are far from the continent, for the transport of people and cargo.

1.10 ADS-B OUT 1090 ES presents itself as the solution for the provision of the aeronautical surveillance service in this portion of remote airspace, contributing to the maintenance of safety and efficiency of operations.

2. Discussion

2.1 The project for the implementation of Air Navigation Services in the Santos Basin was divided into 2 distinct phases.

2.2 Phase 1, inaugurated in July 2021, aimed at structuring airspace, still without the provision of air traffic control service, increasing safety in the region more immediately.

2.3 The Santos Basin offshore airspace was established, from GND to FL100, in the region where most maritime units are concentrated. Five sectors, routes, levels of visual flights specific to the roundtrip routes in the platform-continent segment; and entrance gates were established. And self-coordination frequencies were established for the sectors.

Figure 4 - Santos Basin Offshore Airspace

2.1 Phase 2 is scheduled to start in October 2024 and is planned to have air traffic control service implemented by the Macae Approach Control Center (APP-ME).

2.2 There will be horizontal and vertical modification of the sector, in order to enable the dynamic use of airspace by the APP-Macae.

2.3 The aeronautical communication system to be implemented will ensure bilateral contact between the APP-ME and aircraft evolving in the region served, from 1000 feet to the FL100, including operational requirements and technical performance compatible with the provision of ATC service in Terminal areas.

2.4 Two VHF stations will be employed on the continent and seven antennas will be installed on oil drilling platforms.

2.5 As a solution to provide aeronautical meteorological information in the offshore region, the same model will be employed in the Gulf of Mexico region. The so-called Weather Blocks assist a region of 60 NM by 80 NM extension using a pair of Automated Weather Observing Stations (called AWOS).

2.5.1 For the composition of the meteorological system 5 EMS-A will be installed in maritime units.

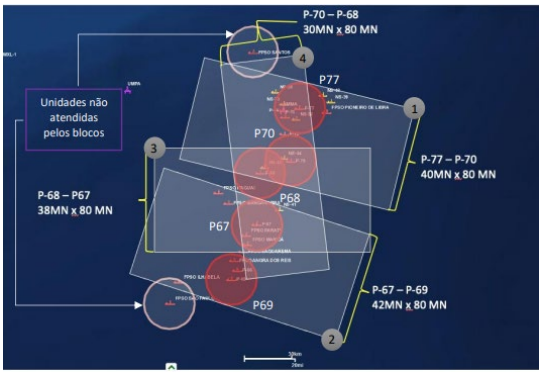

Figure 5: Meteorological Polygons

2.6 The ADS-B OUT surveillance technology will be used to provide the ATS surveillance service in the oceanic and coastal areas of the Santos Basin, focusing, in particular, on flight/altitude levels outside the coverage of PSR/SSR radars installed on the continent.

2.7 The coverage of the surveillance system will be able to serve aircraft flying above 1000 ft to the FL100 in the offshore region, at a distance of up to 200 NM from the continent.

2.8 The aeronautical surveillance service will be supported by the installation of 2 onshore ADS-B stations and 4 receivers on platforms.

2.9 A horizontal separation of 5NM will be applied and ADS-B data will be integrated into the APP-ME along with RADAR signals with partial coverage in the oceanic region of the Santos basin.

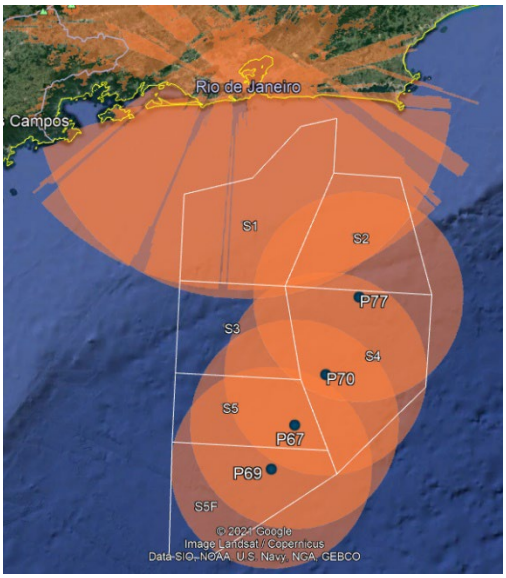

Figure 6: ADS-B coverage estimated at 1000 feet in the Santos Basin

2.10 All helicopters that evolve at BPS already have ADS-B onboard capability.

2.11 As the experience in the Campos Oil Basin, an ADS-B mandate will also be established for this region as of 2024.

2.12 Once the Santos Basin implementations are completed, the project will continue with the integration between the Basins, improving the conditions of navigation and ATC provision in all offshore oil exploration region in the Southeast of Brazil.

3. Conclusion

3.1 The operational use of ADS-B OUT at TMA-Macae in 2018 marked the beginning of the evolution of ATS Surveillance Systems in the Brazilian Airspace (NRA) and allowed the significant increase of aeronautical surveillance coverage in the offshore region, the improvement in the provision of ATS services (ATC, Flight Information and Alert), and greater safety in operations at low altitude.

3.2 The adoption of ADS-B 1090 Extended Squitter surveillance in the Santos Basin is part of Brazil's strategy to use this solution on a larger scale in the near future, also in continental airspace.

3.3 The use of ADS-B in the offshore airspace of the Santos basin will meet a clearly identified operational demand, support the implementation of ATC in the region, while harmonizing with ICAO recommendations for the evolution of the global ATM, especially regarding Safety, Accessibility, Capacity, Efficiency and Environment strategic objectives.

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