Departamento
de Controle do Espaço Aéreo
Department of Airspace Control

ADS-B OUT Implementation in Brazil

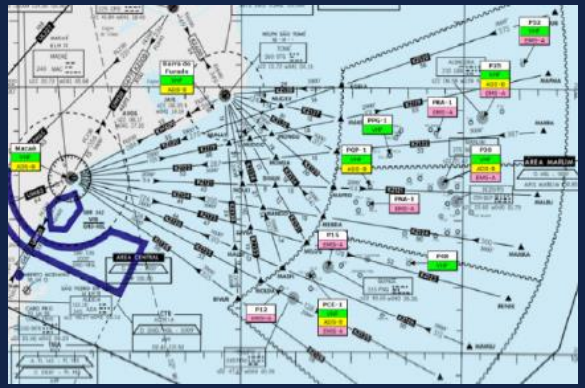
First NAM/CAR/SAM Meeting/Workshop on Planning the Implementation of Automatic Dependent Surveillance - Broadcasting (ADS-B) (ADS-B ANP/1)

ADS-B OUT in Brazil

SIRIUS BRASIL

- Operational demand
- Technological solution
- Main Challenges

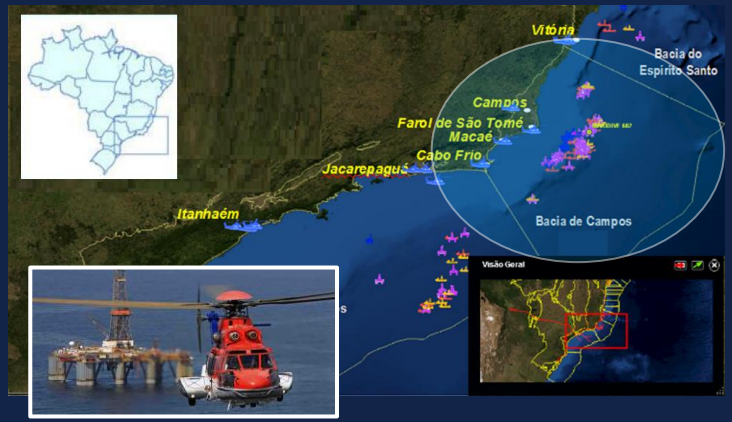
Campos Basin – TMA Macaé



ADS-B OUT in Brazil

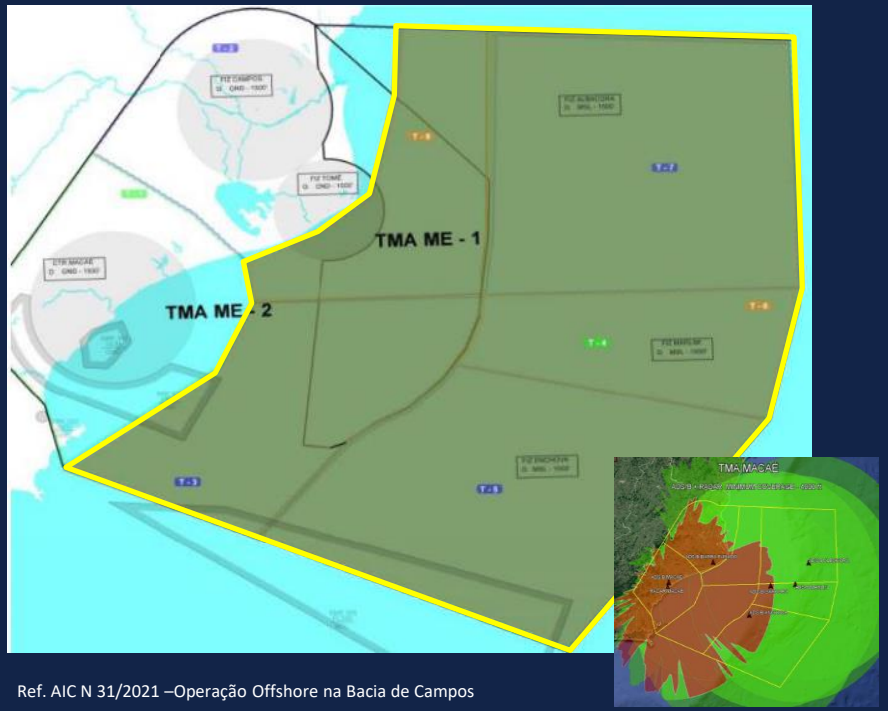
Campos Basin – TMA Macaé

- 6 ADS-B stations + 1 Central Processor
- ADS-B Out 1090 ES Mandate
- 500 ft MSL to FL145



- Benefits Identification

November 8, 2018



Ref. AIC N 31/2021 –Operação Offshore na Bacia de Campos

ADS-B OUT in Brazil - Planning

Domestic Airspace - Priorities

Priority 1 (2022/23)

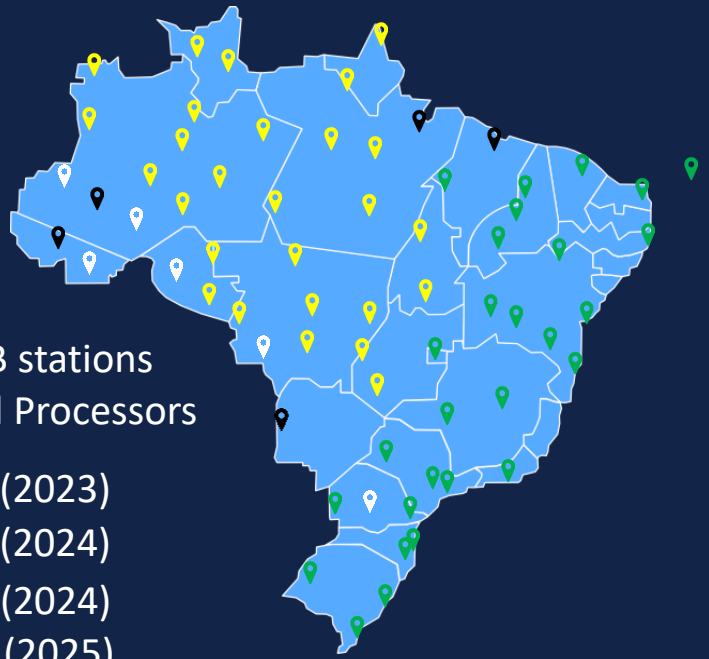
Priority 2 (2023)

Priority 3 (2024)

Priority 4 (2025)

- Coverage: FL245 and Main TMAs

Implementation Phases

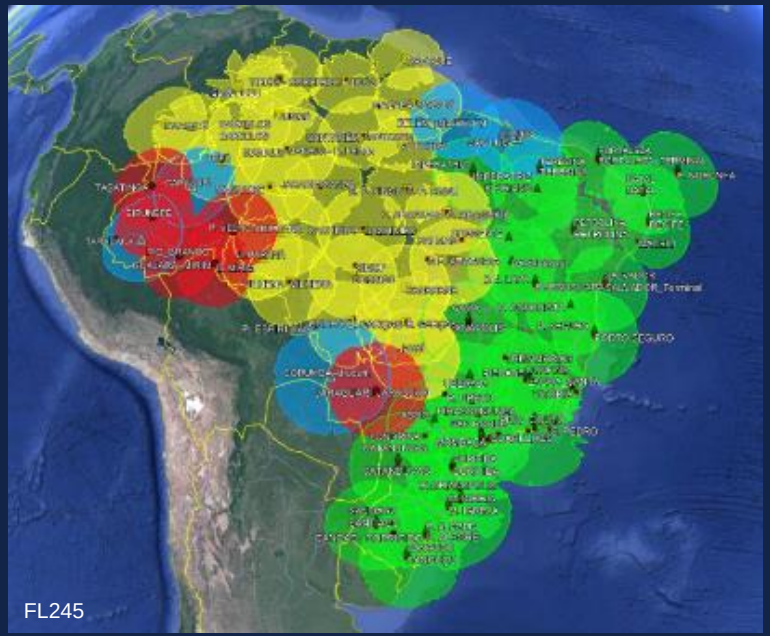


- 66 ADS-B stations
- 5 Central Processors

Phase 1 (2023)
Phase 2 (2024)
Phase 3 (2024)
Phase 4 (2025)

ADS-B OUT in Brazil - Planning

Full Coverage Above FL 245 (2025)



Domestic Airspace

Much more complex, comprehensive approach

- DECEA has initiated studies to identify the need to establish a mandate for ADS-B in continental brazilian airspace.
- There is still no provision for the establishment of a mandate, at least for the next 5 years.
- Any definition of a mandate should include the aeronautical community.

What are the Main Project Challenges?

Project Challenges for the full operationalization of Continental ADS-B

Non-exhaustive groups:

1. Operational Challenges
2. Technical Challenges
3. Management Challenges

Project Challenges for the full operationalization of Continental ADS-B

1. Operational Challenges (ATM)

a) Detail the objectives/actual benefits for the ATM and for aviation;

b) Define the Airspace for operationalization and its complexity – phased operationalization? Best Equipped Best Served?;

c) Define the minimum separation between aircrafts to be applied;

d) Evaluate the standards in force, identify those that will be impacted, edit new publications (eg: AIP, AIC...);

e) Evaluate the impact of the use of ADS-B on the Operational Doctrine for the ATC;

f) Assess the need for an Operational Training for ATCO and Simulations;

g) Define the version of ADS-B to be adopted – the version to be adopted must be aligned with the desired operation and with regional/global interoperability strategies;

Project Challenges for the full operationalization of Continental ADS-B

1. Operational Challenges (ATM)

h) Assess of which RNP and ADS-B requirements with GNSS will enable the required operations;

i) Develop ATC doctrine for handling GNSS unavailability occurrences (NOTAM?);

j) Assess how will the GNSS availability prediction information be presented and handled by ATCO;

k) Define the airspace access strategy: Mandate x airspace access priority for aircraft with operational ADS-B equipment?;

l) If there is ADS-B-OUT Mandate: delimit the Airspace, define the start date, inform what requirements for ADS-B avionics are necessary to fly in the designated airspace;

m) ADS-B Risk Assessment;

2. Technical Challenges

a) Defines the technical and logistical requirements for the infrastructure that meet the operational demand;

b) Recognize the standards to be adopted: ref. MOPS, TSO, AC, RTCA, Doc;

c) Define acceptable NIC, NACp, NuC, SiL requirements – in line with desired operation;

d) Define the required RNP (NACp, NiC, SiL values for GNSS support the definition of RNP);

e) Define how requirements monitoring will take place;

f) Definition of valid thresholds (to be accepted) for the airspace of interest (in Route and/or in Terminal;

g) ADS-B Spectrum security – assessment of spectrum security and congestion in the medium and long term;

Project Challenges for the full operationalization of Continental ADS-B

2. Technical Challenges

h) Develop cybersecurity actions for the ADS-B network;

i) Integration - How will the ADS-B position validation ?;

j) Define how GNSS availability monitoring will occur;

k) GNSS Navigation System Requirements - (ADS-B relies on data obtained from a navigation system (typically GNSS) to enable its functions and performance). Therefore, the navigation infrastructure must meet the corresponding requirements of the ADS-B application, in terms of: a) Data items; and b) Performance (eg accuracy, completeness, availability, etc.). - but does not preclude the use of another navigation source method;

l) Recognize the quality of ADS-B performance systems vs MSSR system;

n) Integrate ADS-B surveillance data into the ATFM center;

2. Technical Challenges

n) Define training for technical maintenance teams;

o) Define routine for recording, maintenance and local analysis of ADS-B data;

p) Define the correlations accepted by the ATC System (Flight ID and/or ICAO Address of the aircraft) – to support correct orientation of filling in the ACID and Item 18 CODE/keyword fields of the flight plan);

q) ATC System: Identify the necessary improvements (new requirements) to the ATC system in consideration of the expected ATM operation;

r) Define the ASTERIX Cat.21 protocol version to be used;

s) Define which groups (group 1 - mandatory, group 2-desirable, group 3-optional) of the ASTERIX protocol will be available (depending on operational demands/ATM objectives).

Project Challenges for the full operationalization of Continental ADS-B

3. Management Challenges

All Planning, Technical and Operational Challenges + ...

a) Develop a Project Implementation Plan;
b) Structure a Project Team/Implementation Team;
c) Encourage a collaborative decision-making process with all stakeholders;
d) Monitor the fleet ADS-B qualification status (survey/follow-up);
e) Encourage the disclosure of the project status and its benefits (expectations management);
f) Guide/Support the aeronautical community;

3. Management Challenges

g) Coordinate reviews (as necessary) of avionics certification processes and crew operational approval,

h) Planning for a technical-operational TRIAL under appropriate conditions;

i) Develop appropriate post-implementation monitoring and review processes;

j) Establish a methodology for continuous reporting of monitoring results of incidents, events, observations on ADS-B operations.

And more…

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