International Civil Aviation Organization
North American, Central American and Caribbean Office

WORKING PAPER

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Automatic Dependent Surveillance – Broadcast (ADS-B) Implementation and Regulation Meeting for the NAM/CAR/SAM Regions (ADS-B/LEG)

Mexico City, Mexico, 26 to 30 November 2018

Agenda Item 6: ADS-B regulation considerations

STATUS OF ADS-B IMPLEMENTATION IN BRAZIL

(Presented by Brazil)

EXECUTIVE SUMMARY	
This paper provides an update on the implementation of ADS-B in Brazil.	
Action:	Suggested action is presented in Section 3.
Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency
References:	• Workshop/Seminar for ADS-B implementation, Lima-Peru, November 13-16, 2017

1. Introduction

1.1 The 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 in order to meet the identified operational demands, while contributing to the evolution of future ATM concepts.

1.2 One of these projects aimed at improving air navigation services in the oil basins - ocean areas, in the southeastern region of Brazil.

1.3 The project was initiated by the Campos Basin, in 2009.

1.4 The Air Traffic structure and services at TMA-Macaé were implemented mainly to support the air operations of interest of the oil activity, which is characterized by the flow of helicopters between the mainland and the oil platforms or vessels anchored in that Basin, in the ocean area, for the transportation of persons and cargo.

1.5 The main operational units responsible for air traffic in the Campos Basin are:

a) APP-Macaé, responsible for the approach control service at TMA-Macaé, and CTR Macaé and for the provision of Air Traffic Services in the TMA-Macaé airspace, under FL 145, by delegation of ACC-CW;

b) Three Aeronautical Telecommunications Stations located on maritime platforms (Platform P-15 - RADIO Enchova, Platform P-20 - RADIO Marlim and Platform P-25 - RADIO Albacora), responsible for providing Flight Information Service and Alert Service for the surrounding areas in the middle of the ocean.

1.6 The TMA-Macaé surveillance service was based on the exclusive use of a STAR 2000 / RSM-970S PSR / SSR radar installed at Macaé. Due to the limitations of reach and coverage, the ATS (radar) surveillance service was provided by the APP-Macaé only in Sector 1. In Sector 2, which includes the platforms, located at more than 60NM from Macaé city, and where the helicopters operations are carried out at low levels/altitudes, conventional surveillance was applied. The increase in air operations and consequent increase in air traffic control demand, resulted in an increase of the workload of APP-Macaé air traffic controllers.

1.7 Additionally, the occurrence of low visibility due to meteorological phenomena raised concerns regarding maintaining operational safety at the required levels.

1.8 In these conditions, the need for restructuring and modernization of the air navigation services in the Campos Basin airspace was evident.

2. **Discussion**

2.1 The project comprised, among others:

a) the implementation of a new airspace structure based on RNAV Routes, as well as new operational procedures that envisage en-route and platform operations;

b) the construction of a new building for the APP-ME;

c) the expansion and modernization of the Air Traffic Control System used in the APP-Macaé;

d) the improvement of the Aeronautical Mobile Service, through the expansion of VHF coverage in the platforms area, using stations in climax;

e) the implementation of Automated Surface Weather Stations (EMS-A); and

2.2 The implementation of the improvement of the aeronautical surveillance service, through the use of Automatic Dependent Surveillance – Broadcast (ADS-B).

2.3 The activities were managed by DECEA and carried out in a collaborative way, with the participation of the entire aeronautical community, especially PETROBRAS, the Brazilian Airport Infrastructure Company - INFRAERO, all the offshore region helicopter operators and the National Civil Aviation Agency (ANAC).

2.4 To serve the Campos Basin, in the airspace corresponding to TMA-Macaé, 6 ADS-B stations were installed: four stations on maritime platforms and two on the mainland. This infrastructure, integrated with the current radar network that supports the air traffic control in that region, enables surveillance throughout the TMA airspace at 500 feet and above.

2.5 The ADS-B coverage at 500ft AMSL provided by these stations is shown below:

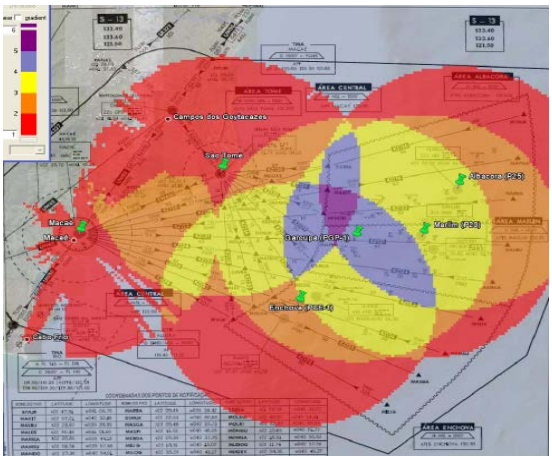

Figure 01 – Campos Basin ADS-B coverage – 500ft AMSL

2.6 Currently, 100% of the 122 helicopters flying in that region are already equipped with the avionics necessary to support ADS-B 1090 ES.

Company	Amount	Type	Ready	%	Status
Aeróleo	3	EC225	3	100	OK
	13	AW139	13	100	OK
	2	AW189	2	100	OK
CHC	3	AW139	3	100	OK
	8	S92	8	100	OK
	11	S76	11	100	OK
Líder	25	S76	25	100	OK
	11	S92	11	100	OK
Omni	11	S76	11	100	OK
	7	S92	7	100	OK
	13	AW139	13	100	OK
	3	EC255	3	100	OK
	3	EC155	3	100	OK
Helivia	3	S76	3	100	OK
Costa do Sol	1	SK76C	1	100	OK
EMAR	5	SK76C	5	100	OK
				100%	

Figure 02 – ADS-B 1090 ES helicopters capability

2.7 The exclusive ADS-B airspace is the portion belonging to the TMA-Macaé and its projections, where the use of the mode S transponder with ADS-B (aircraft) is mandatory for the receipt of the ATS Surveillance Service by APP-Macaé. This volume comprises the oceanic Macaé Terminal Control Area airspace, for the point of 500'MSL / FL145. It comprises, geographically, the T3, T4, T5, T6, T7 and T8 sectors of TMA-Macaé, shown in Figure 3.

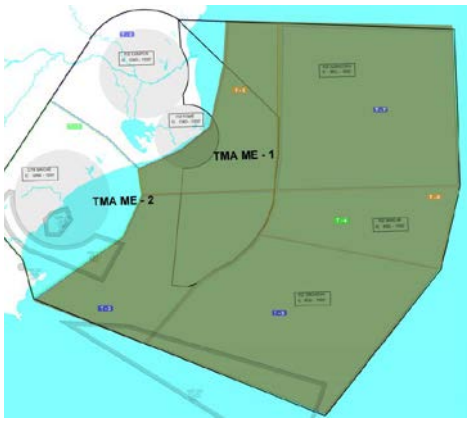

Figure 3 – Exclusive ADS-B airspace

2.8 The exclusive ADS-B operation in the TMA-Macaé started on November 8th, 2018 and, as of that date, only aircraft appropriately equipped with the ADS-B system may be allowed to enter such airspace. State aircraft, not equipped with ADS-B 1090 ES, may be allowed to enter such airspace, for specific missions. Likewise, aircraft not equipped with ADS-B involved in SAR missions, transport of patients or serious injuries will also be assisted.

2.9 The operational benefits of the ADS-B use in TMA-Macaé include the significant improvement of Air Traffic Services in the oceanic area, where helicopter traffic is predominant at low altitude, increasing controllers' situational awareness of evolving aircraft, enabling increased safety and efficiency in operations, as well as improved air traffic management.

2.10 The Alert Service is also being significantly enhanced by the availability of more accurate information of the aircraft's latest positions, enabling the efficient activation of SAR resources.

2.11 The ADS-B system, coupled with other ATS communications and automation capabilities, enables the APP-Macaé to provide a minimum separation of up to 5NM between aircraft flying at low altitudes.

2.12 AIC 40/17 was published with the purpose of disseminating information on the application of Automatic Dependent Surveillance by Broadcasting (ADS-B) in the ATS Surveillance Service of TMA-Macaé, as well as establishing the deadlines for the start of its operation.

2.13 AIC 47/18 was published with the purpose of publicizing the airspace restructuring at TMA-Macaé through the application of the ADS-B system in the provision of the ATS surveillance service and the concept of exclusive ADS-B airspace, in addition to the provisions of AIC N 40/17, the extension of VHF coverage and the provision of meteorological products from EMS-A.

2.14 Operational implementation of ADS-B OUT at TMA-Macaé marks the beginning of the evolution of ATS Surveillance Systems in non-radar airspace in Brazil, with a significant increase in aeronautical surveillance coverage in the offshore region, improvement in the provision of ATS services (ATC, Flight Information and Alert Services) and safety in low altitude operations.

3. **Suggested action**

3.1 The meeting is invited to:

a) Note the information contained in this paper; and
b) Discuss any relevant matters as appropriate.

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