TEL: (501) 225-2014
(501) 225-2052
FAX: (501) 225-2533
AFS: MZBZYAYX
Email:belize.ais@civilaviation.gov.bz
WEB site: www.civilaviation.gov.bz
ADDRESS: P.O. BOX 367
BELIZE, C.A.

BELIZE
DEPARTMENT OF CIVIL AVIATION
AERONAUTICAL INFORMATION SERVICE

AIC
A003/25
18th February 2025

Automatic Dependent Surveillance – Broadcast (OUT) 1090 MHz ES

Table of Contents

1. Introduction

1.1 This Aeronautical information circular (AIC) serves to inform all license holders (pilots, air traffic controllers, engineers), of the implementation of the ADS-B OUT Surveillance system within Belize's airspace.

2. Purpose of AIC

2.1 The purpose of this AIC is to inform the aviation industry of the requirements and characteristics of the ADS-B OUT surveillance technology implementation within the Belizean airspace.

3. Background

3.1 This AIC is mandatory and is in compliance with the Belize Department of Civil Aviation Regulation for Aeronautical telecommunications 10 which has been developed through the guidance of the Standard & Recommended Practices (SARPs) of ICAO's annex 10 for Aeronautical Telecommunications to the convention of international Civil Aviation, which states the technical basis of operation for ADS-B onboard equipment as well as ground based.

4. Applicability

4.1 This AIC is applicable to all Airline Operators, Pilots, Engineers, Air Traffic Controllers and CNS providers as well as any other relevant bodies.

5. Definition for the purpose of this regulation:

ADS-B Out (Automatic Dependent Surveillance) - It is a function of avionics on board an aircraft that periodically transmits the aircraft's status vector (three-dimensional position and velocity) and other required information as described in this section.

***NAC_P, Navigation Accuracy Category for Position*) -**. Specifies the accuracy of a reported aircraft's position.

NAC_V, Navigation Accuracy Category for Velocity -. Specifies the accuracy of a reported aircraft's speed.

NIC, Navigation Integrity Category -. Specifies an integrity containment radius around an aircraft's reported position.

Position Source - It refers to equipment installed on board an aircraft that is used to process and provide information about the aircraft's position (e.g., latitude, longitude, and speed).

SIL, Source Integrity Level) - *Source Integrity Level* - indicates the probability that the reported horizontal position will exceed the NIC-defined containment radius per sample or per hour.

DA, System Design Assurance *- It*indicates the probability that a malfunction of the aircraft will cause the transmission of false or misleading information.

Total latency - is the total time between the time the position is measured and the time the aircraft transmits it.

Uncompensated latency - is the time during which the aircraft does not compensate for latency.

TSO - Technical Standing Order

RTCA - Radio Technical Commission for Aeronautics

TMA - Terminal Maneuvering Area

6. Mandatory use of ADS-B OUT 1090 MHZ Transponder on Aircrafts above 19,500 feet

6.1 Effective ***1st January 2025***, unless otherwise authorized by Air Traffic Control, no person may operate an aircraft, fixed or rotating wing, in Belize's airspace for ATS purposes above 19,500 feet Mean Sea Level, unless the aircraft has an ADS-B Out 1090 MHz transponder equipment installed that meets performance requirements in:

(1) TSO-c166c and section 2 RTCA DO-260B (as mentioned in TSO-C166b)
(2) TSO-166c and section 2 of RTCA DO-260c modified by DO-260c -change 1 (as mentioned in TSO-C166c
(3) Meets the requirements of this regulation

7. Mandatory use of ADS-B OUT 1090 MHZ Transponder on Aircrafts below 19,500 feet

7.1 Effective ***1st January 2026***, unless otherwise authorized by Air Traffic Control, no person may operate an aircraft, fixed or rotating wing, below 19,500 feet Mean Sea Level in Belize's airspace where ADS-B coverage exists, unless the aircraft has an ADS-B OUT 1090 MHz transponder installed that meets performance requirements in:

(1) TSO-c166c and section 2 RTCA DO-260B (as mentioned in TSO-C166b)
(2) TSO-166c and section 2 of RTCA DO-260c modified by DO-260c -change 1 (as mentioned in TSO-C166c
(3) Meets the requirements of this regulation

8. Criteria for Operation of ADS-B out 1090 MHz

8.1 Each person operating an ADS-B Out equipped aircraft must operate this equipment in transmission mode.

8.2 Requests for deviations authorized by ATC from the requirements of this section must be made to the ATC unit having jurisdiction over the airspace in question, within the time periods specified below:

(1) For the operation of an aircraft with an inoperative ADS-B Out, to the airport of final destination, including intermediate stopovers, or to proceed to a place where appropriate separations can be made, or both, the request may be made at any time.

(2) In any case, it will be the power of the ATC to authorize or deny these requests, according to the altitude of radar signal in the area within which it is intended to operate without ADS-B.

8.3 Contingency for failures of the ADS-B OUT systems

(1) If an aircraft experiences equipment failure shortly after departure and is unable to use the ABS-B OUT system, ATC clearance of requests to operate in airspace will depend on the tactical basis in air traffic flow management. The operation of these flights must be notified to the adjacent ATC unit or by the aircraft's own crew before entering the airspace.

(2) If an ADS-B OUT failure occurs while the flight is operating within space, the ATC unit must be notified immediately. Such flights will receive new authorizations to operate in airspace, but consideration will be given to allowing the flight to remain in airspace, based on tactical considerations.

9. 1090 MHz ES Transmission Link and Power Requirements:

Aircraft operating in Belize's airspace must have equipment installed that meets the antenna and power output requirements of Class A1S, A1, A2, A3, B1S, or B1 equipment as defined in **TSO–C166b** and Section 2 of RTCA DO–260B (as referred to in TSO–C166b), or **TSO–C166c and** Section 2 of RTCA DO–260C as amended by DO–260C–Change 1 (as referred to in TSO–C166c).

10. ADS–B output performance requirements for NACP, NACV, NIC, SDA, and SIL:

(a) For aircraft transmitting ADS–B Out, the data quality must meet the following minimum performance requirements:

(i) ADS-B version number ≥ 2;

(ii) The aircraft's NAC_P must be less than 0.1 nautical miles (NACp>= 7);

(iii) The aircraft's NAC_V must be less than 10 metres per second (NAC_V>=1);

(iv) The aircraft's NIC must be less than 1 nautical mile (NCI>=5);

(v) The aircraft's SDA must be less than or equal to 10^{-5} per flight hour (SDA >= 2); and

(vi) The aircraft's SIL must be less than or equal to 10^{-7} per flight hour or per sample (SIL >=3).

(vii) The barometric altitude is valid.

(b) Changes in NAC_P, NAC_V, SDA, and SIL must be transmitted within 10 seconds.

(c) Changes in the IAS must be transmitted within 12 seconds.

11. Minimum set of broadcast message elements for ADS–B OUT.

Each aircraft shall transmit the following information, as defined in TSO–C166b (including Section 2 of RTCA DO–260B, as referred to in TSO–C166b), TSO–C166c (including Section 2 of RTCA DO–260C as amended by DO–260C–Change 1, as referred to in TSO–C166c). The

pilot must enter information for the message elements listed in subparagraphs (8) through (11) of this section during the appropriate phase of the flight.

(1) The indication of the aircraft's position in latitude and longitude;

(2) The barometric pressure altitude of the aircraft.

(3) The indicated speed of the aircraft;

(4) An indication of whether an ACAS or ACAS II system is installed and operating in a mode that can generate Resolution Notice (RA) alerts;

(5) If you have an ACAS ll installed and operational and there is a Notice of Resolution (RA) indication;

(6) The indication of the Mode A transponder code specified by the ATC;

(7) The indication of the aircraft identification or call sign presented in the flight plan or the registration of the aircraft.

(8) An indication of whether the flight crew has identified an emergency, a failure of radio communications or unlawful interference;

(9)The aircraft's "IDENT" indication for ATC;

(10)The indication of the 24-bit ICAO code or address assigned to the aircraft.

(11)The indication of the category of aircraft emitters;

(12)Indication of whether an ADS-B with "IN" capability is installed

(13)The indication of the geometric altitude of the aircraft;

(14)The indication of the Navigation Accuracy Category for the Position (NACP);

(15)The indication of the Navigation Accuracy Category for Speed (NACV);

(16)The indication of the Navigation Integrity Category (NIC);

(17)The indication of the System Design Assurance (SDA); and

(18)The indication of the source integrity level (SIL).

12. ADS-B latency requirements

(1) The aircraft shall transmit its geometric position not later than 2.0 seconds from the time of position measurement to the time of transmission.

(2) Within the total latency allocation 2.0, a maximum of 0.6 seconds may be an uncompensated latency. The aircraft must compensate for any latency greater than 0.6 seconds up to the maximum of 2.0 seconds total by extrapolating the geometric position at the time of message transmission.

(3) The aircraft shall transmit its position and speed at least once per second while in the air or moving over the surface of the airport.

(4) The aircraft shall transmit its position at least once every 5 seconds while stationary on the surface of the airport.

13. GNSS Source of Position Information

The source of position information shall be a GNSS that meets the requirements of one of the following technical standards:

a. TSO-C129. GPS + ABAS

b. TSO-C145. GPS + satransponders

transponders multi-sensor

c. TSO-C146. GPS + SBAS stand alone.

d. TSO-C196. GPS + ABAS

14. Procedures for Obtaining ADS-B OUT Compliance Rating.

To install ADS-B Out equipment in your aircraft, you'll need to follow several steps to ensure compliance with aviation regulations and standards. Here's a general outline of the procedure:

1. *Determine Equipment Requirements*
    - Ensure your aircraft is equipped with a Version 2 ADS-B OUT transmitter and a compatible GPS position source
    - The type of ADS-B system required: 1090ES (Mode S transponder with Extended Squitter)
2. *Select Approved Equipment*
    - Choose equipment that meets the performance requirements of Technical Standard Orders as mentioned in section 7.1 and 8.1 of this requirement.
3. *Obtain Necessary Approvals*
    - Initial ADS-B OUT system pairings must be approved using the Type Certificates (TC), amended TC (ATC), or Supplemental Type Certificate (STC) process.
    - Consult the Belize Department of Civil Aviation to determine the appropriate approval process
4. *Installation*
    - Install the ADS-B OUT equipment according to the manufacturer's instructions and the guidance provided in this Advisory Circular.
    - Ensure the installation is performed by a certified avionics technician.
5. *Update Aircraft Documentation*
    - Include ADS-B OUT operating limitations, normal operating procedures, and system description in the airplane flight manual (AFM) or rotorcraft flight manual (RFM) supplements.
6. *Conduct System testing*
    - Perform ground and fight tests to verify the proper operation of the ADS-B OUT system.
    - Ensure the system meets the performance requirements specified in this requirement.
7. *Submit Compliance Reports*

- Submit the necessary compliance reports to the Belize Department of Civil Aviation (BDCA) to demonstrate that the installation meets all regulatory requirements along with completed Form 337.

16. **Conclusion:**

The Belize Department of Civil Aviation encourages all pertinent parties to become familiar with the requirements for the ADS-B mandate and undergo appropriate measures in preparation for the implementation of this surveillance technology for the dates specified in this requirement.

http://civilaviation.gov.bz

****END.****