



# ICAO

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

## Technical Meeting of the NACC/WG Surveillance Task Force on Automatic Dependent Surveillance – Broadcast (ADS-B) work plan

(ICAO NACC Regional Office, Mexico City, Mexico, 30 to 31 July 2024)

### Summary of Discussions

- Date** 30 July to 1 August 2024
- Location** Regional Office for North America, Central America and the Caribbean of the International Civil Aviation Organization
- Participants** The Meeting was attended by 8 representatives from Cuba, Mexico, United States, COCESNA, and IATA. The list of participants is shown in **Attachment A**.



### 1. References

1.1 As a result of the First Meeting of the Surveillance Task Force (SURV/TF/01) of the North American, Central American and Caribbean Working Group (NACC/WG) (May 24, 2024), after to analyze the work carried out to date for the implementation of Automatic Dependent Surveillance - Broadcasting (ADS-B), and taking into account the GREPECAS Conclusion/21, the NACC/WG/SURV/TF coordinated with the International Air Transport Association (IATA) a joint meeting between the States in the process of operational implementation of ADS-B.

## 2. Background

2.1 During the Third Meeting of the Airspace Optimization Task Force (AO/TF/3) of the North America, Central America and Caribbean Working Group (NACC/WG)<sup>1</sup>, NACC/WG/SUR/TF presented to the attending airlines the level of implementation of ADS-B in the region.

2.2 Conclusion GREPECAS/21 establishes to create a work plan for the implementation of ADS-B and present it at the GREPECAS/22 meeting, as follows:

CONCLUSION GREPECAS/21/21		DEVELOPMENT OF AN ACTION PLAN FOR THE ADS-B IMPLEMENTATION	
<b>What:</b>  That States/Territories, led by ICAO, a) review the existing Operational Concept for the ADS-B Implementation in the CAR and SAM Regions, including its operational objectives, b) support the development of model regulations for ADS-B; c) integrate all different stakeholders in the process; and d) develop an action plan incorporating activities, accountability, and milestone dates by 15 August 2024.		<b>Expected impact:</b>  <input type="checkbox"/> Political / Global <input checked="" type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Operational/Technical	
<b>Why:</b>  ADS-B is an enabler to several of the operational improvements foreseen in the GANP ASBUs, current many States have implemented ADS-B infrastructure as a surveillance mean. To obtain the benefits of ADS-B implementation regional agreements and priorities for the CAR and SAM States			
<b>When:</b> 15 August 2024		<b>Status:</b> <input checked="" type="checkbox"/> Valid / <input type="checkbox"/> Superseded / <input type="checkbox"/> Completed	
<b>Who:</b> <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> OACI <input checked="" type="checkbox"/> Others: IATA			

2.3 In this regard, to achieve the objectives requested in Conclusion GREPECAS/21/21, a teleconference was held in coordination with IATA on 2 April 2024, with IATA representatives covering Air Navigation Services (ANS) issues for the Caribbean (CAR) Region and the South American (SAM) Region, in which a work plan was agreed upon to work jointly on what was requested in this conclusion.

2.4 As part of the regional analysis, it was concluded that the CAR and SAM Regions cannot work together at this time because the level of implementation of ADS-B is different in each region, but it was indicated that as implementation proceeds in the different States, the benefits of ADS-B can be integrated in both regions.

<sup>1</sup> The AO/TF/3 meeting held at the ICAO NACC Regional Office, Mexico City, Mexico, 25-29 September 2023 included the Fifth Meeting of the NACC/WG Air Traffic Flow Management Implementation Task Force (ATFM/TF/5) and Seventh Meeting of the ICAO IATA CANSO Free Airspace Routes Team (CIIFRA/7) (AO/TF/3/ATFM/TF/5/CIIFRA/7).

2.5 During the LATAM/CAR RCG (Regional Coordination Group) meeting (Miami, Florida 22 April 2024), ICAO presented the level of regional CAR implementation in ADS-B and the safety benefits obtained with this implementation, as well as the regional impact to be achieved by taking advantage of its operational benefits.

2.6 Finally, the online meeting held between the NACC/WG Surveillance Task Force (NACC/WG/SURV) and IATA/LATAM on 2 April 2024 agreed on a series of activities and information exchange to facilitate knowledge between the parties and also agreed to hold a face-to-face meeting to jointly address the development of the action plan for the implementation of ADS-B in the CAR Region.

2.7 This face-to-face meeting between the States of the CAR Region ready for the implementation of ADS-B and IATA was held at the ICAO offices in Mexico City, Mexico from July 30 to 1 August 2024, and this report is presented as a result of this meeting.

### **3. Objective of NACC/WG Technical Meeting Surveillance Task Force**

3.1 The objective of this meeting (Ref.: NT-NE57-3 - E.OSG-NACC112116) was to socialize with IATA the operational implementation of ADS-B in the Central American Flight Information Region (FIR) integrated by all Central American States and COCESNA (Central American Corporation of Air Navigation Services) and Mexico to put ADS-B into operation in the upper airspace of the States involved and take advantage of the safety and efficiency benefits that this functionality provides.

### **4. Introduction**

4.1 The Secretariat explained the functioning and implementation objectives of the ADS-B in accordance with the Global Air Navigation Plan, GANP (ICAO Doc. 9750), which is on the following online platform:

<https://www4.icao.int/ganportal/>

4.2 ADS-B is an element of the Aviation System Block Upgrade (ASBU). The ICAO GANP ASBU methodology is a programmatic and flexible global approach that allows all Member States to enhance their air navigation capabilities based on their specific operational requirements. ADS-B belongs to Block 0 and is the first element of the surveillance area.

4.3 ADS-B supports the provision of air traffic services and operational applications with reduced cost and increased surveillance coverage. ADS-B provides accurate position/speed information throughout the airspace (accuracy is not range dependent as with radar). It also provides aircraft call sign and accurate position/velocity information to nearby aircraft with Automatic Dependent Surveillance – Broadcast (ADS-B-in) receivers.

4.4 ADS-B can also support airspace access for states aircraft, however, where possible, it should take advantage of the benefits of dual use of state aircraft capabilities to reduce cost and technical impact.

4.5 An important point indicated was that the ADS-B belongs to the GANP technology line and therefore it is an ASBU element that is an enabler, it enables the operational ASBU elements, with which the operational improvements and benefits are implemented.

4.6 It was emphasized that the main operational benefit of ADS-B implementation is safety by providing surveillance data coverage in places where it did not previously exist and where radar data coverage does not provide surveillance coverage. Without the implementation of ADS-B, the implementation of operational ASBU elements would not be possible.

## **5. Development of activities**

5.1 As part of Conclusion GREPECAS/21/21 "Development of an action plan for ADS-B implementation", the following activities were carried out:

### **Review of the Operational Concept document for ADS-B implementation**

5.2 This document, developed by the States of the CAR Region and reviewed by Brazil, was approved in 2019 during the Automatic Dependent Surveillance - Broadcast (ADS-B OUT) Implementation Meeting for the NAM/CAR Regions held in Ottawa, Canada.

5.3 Through Decision ADS-B/OUT/M/03 "CONCEPT OF NAM/CAR TRANSACTIONS, the document was approved and underwent a process of review and update according to regional needs and was again revised and updated in line with the comments provided by the States and the industry. The document was approved by the Meeting and it was recommended that the ICAO NACC Regional Office distribute the document by sending its final version to the NAM/CAR States, Brazil and French Guiana, since these States/Territories of the SAM Region participated in the last revision of the document. The document was subsequently approved for use by the NAM/CAR/SAM Regions.

<https://www.icao.int/NACC/Documents/Meetings/2019/ADSBOUT/ADS-B-OUT-M-InformeFinal.pdf>

5.4 The document has been reviewed and updated according to current needs and no further requests for updating the document have been received from the industry.

### **Development of an ADS-B regulatory model for operational implementation in the CAR Region**

5.5 The ADS-B as an ASBU element has a series of enablers that must be implemented prior to placing the ADS-B fully operational. These enablers are:

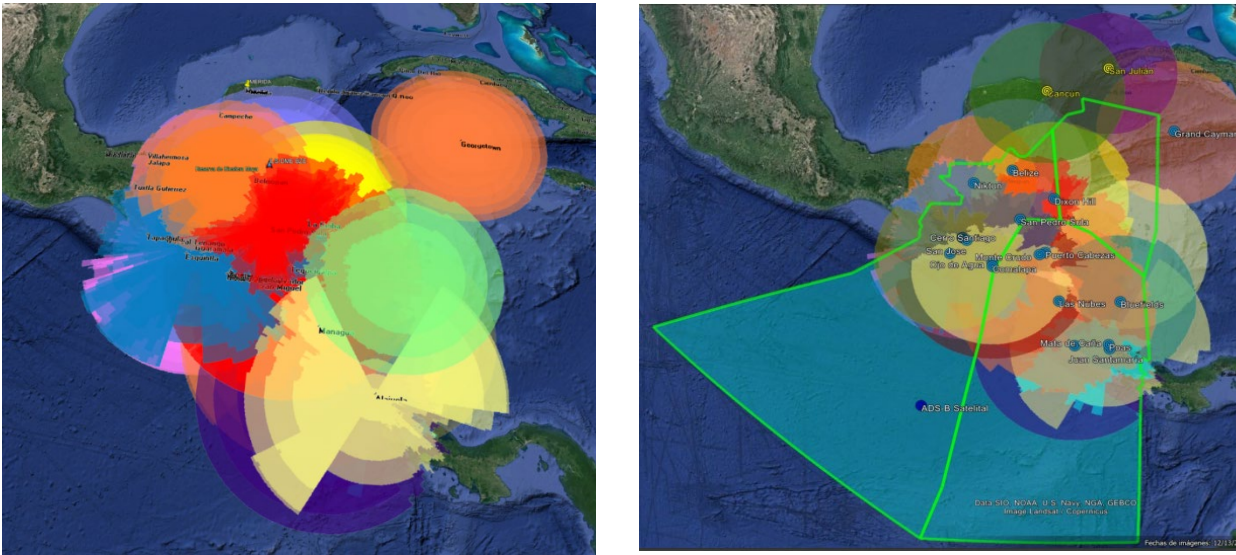
1. Ground System Infrastructure (ground antennas, communication systems, integration to the air traffic control center and enabling data at air traffic control positions, controller positions).
2. Avionics capability on board aircraft to be able to send and provide surveillance data.

3. Personnel training (all technical and operational personnel related to the start-up)
4. State regulation to enable the use of ADS-B (indicates the roles and responsibilities of each stakeholder).

5.6 The CAR Region, in the States that already have ADS-B, has already completed the implementation of the first three enablers and the implementation of the fourth enabler, which is the regulation for the implementation of ADS-B in each of the States, is missing. The Meeting analysed the proposed regulation of Central American States and the Central American Corporation of Air Navigation Services (COCESNA), as a sole one, and Mexico.

5.7 The Central American States and COCESNA, due to their operational structure, propose to establish a regulation per State based on their operations to cover tower and approach air traffic control operations. In a harmonized manner at the Central American subregion level to cover air traffic control service operations in the upper airspace provided by the COCESNA on behalf of the Central American States (Belize, Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua) and for the lower airspaces where ADS-B coverage exists.

5.8 Surveillance radar coverage of Central America is reflected in the following



Note: This graph reflects the coverage that Central American surveillance systems provide throughout the Central American FIR, in addition to the fact that COCESNA shares surveillance data with Cuba, Grand Cayman, Jamaica, Mexico, , and Panama to support regional redundancy of surveillance data and to support the automation process (Air Traffic Services Inter-Facility Data Communication –AIDC- and North American Interface Control Document -NAM/ICD) among the regional control centres.

5.9 **Appendix B** presents the draft regulation proposed by the Central American States and COCESNA, with a mandatory implementation date of ADS-B of 1 January 2025.

5.10 Mexico indicated that the process of final implementation of ADS-B in its control centres was underway, by the hardware/software update of them, and that it had published the Mexican Official Standard NOM-91/2-SCT3-2022, which establishes the specifications for the installation of ADS-B in aircraft. The document can be found in **Appendix C** of this report.

5.11 Mexico has a project to deploy ADS-B antennas around its border, with the objective of improving coverage, providing radar backup data and boosting operational improvement in areas where radars did not fully cover the Mexican geography.

5.12 The following graph shows the coverage areas that have been improved with the implementation of the ADS-B antennas installed to date:



5.13 **Appendix D** contains the Surveillance Coverage Charts for Central America and Mexico.

5.14 The following table contains a comparison of the regulations evaluated:

**ADS-B REGULATION CONTENT**

No	ÍTEM	Mexico	CENTRAL AMERICA
1	<b>PREFACE</b>	Mexican Official Standard NOM-91/2-SCT3-2022 Legal framework, context, background and participants of the ADS-B regulation.	To be defined by each country the type of regulation, AIC and subsequently incorporated in RAC 91 or RAC 10.
2	<b>INDEX</b>	Content of the standard	It will depend on the type of publication of the regulation.
2	<b>OBJECTIVE AND FIELD OF APPLICATION</b>	ADS-B OUT 1090 ES Installation Requirement, applicable to aircraft operators operating in the FIR	Requirement to install ADS-B Out 1090 ES equipment in the upper and lower space where ADS-B coverage exists, minimum DO-260B or higher. Equipment must remain in transmit mode.
3	<b>REFERENCES</b>	Reference to aircraft modification standards	References are included as part of the bibliography.
4	<b>DEFINITIONS AND ABBREVIATIONS</b>	Applicable to regulations, including ADS-B Avionics definitions and figures of merit.	Related to ADS-B avionics, including figures of merit.
5	<b>GENERAL PROVISIONS</b>	All aircraft must comply with the regulation and the conditions of exceptions Mandatory Circular “CO AFAC-01/21 R2	Deviations and contingencies due to failures must be authorized by ATC personnel and the exceptions will be those established in the regulations of each country according to its regulatory framework.
6	<b>REQUIREMENTS FOR USE AND INSTALLATION OF ADS-B OUT</b>	All aircraft must have ADS-B OUT installed, transmission mode, minimum equipment requirement.	Figures of merit have been established as a minimum to ensure 5 MN clearances for all applicable airspaces.
7	<b>ADS'B FUNCTIONALITY REQUIREMENTS</b>	Exclusively Version 2, RTCA-DO 260B, ES 1090MHZ, performance requirements equal to FAA, updated figures of merit and minimum elements to be transmitted, latency requirements.	Minimum Version 2, RTCA-DO 260B, ES 1090MHZ, performance requirements equal to FAA, updated figures of merit and minimum elements to be transmitted, latency requirements.
8	<b>PROCEDURES FOR ADS-B OUT INSTALLATION</b>	Aircraft modification and exceptions	To be defined by each country
9	<b>DEGREE OF COMPLIANCE WITH STANDARDS AND GUIDELINES</b>	Basic standards used	To be defined by each country
10	<b>BIBLIOGRAPHY</b>	Annexes and ICAO docs.	RTCA, FAA Regulations, and ICAO Annex Doc.
11	<b>COMPLIANCE WITH THIS STANDARD</b>	Who is responsible for compliance with the standard	To be defined by each country
12	<b>CONFORMITY ASSESSMENT</b>	Installation specifications and conformity assessment	To be defined by each country
13	<b>CURRENT</b>	80 days after publication. 28 August 2024 according to Mexican Official Standard NOM-91/2-SCT3-2022.	1/1/2025, although there are states such as Costa Rica whose regulations are in force as of January 2025.

5.15 Regarding the measurements made by Mexico and Central America of the avionics capacity of the aircraft that have operations in their respective FIRs, the following table shows this capacity:

Operations	MEXICO	Central America
Lower airspace	Percentage of compliance with the standard NOM-91/2-SCT3-2022 of the aircraft detected with ADS-B.1 sensors  Version            99.30% NIC                    99.10% NACp                99.00% NACv                99.60% SIL                    98.60%	No data
Upper airspace	Percentage of compliance with the standard NOM-91/2-SCT3-2022 of the aircraft detected with ADS-B.1 sensors  Version            99.30% NIC                    99.10% NACp                99.00% NACv                99.70% SIL                    99.20%	99.0%

5.16 IATA, on behalf of the airlines, shared a series of questions, which were answered by the States:

1. Effective date of implementation of Automatic Dependent Surveillance – Broadcast (ADS- B) OUT.
  - Mexico: 80 days after August 28, 2024, according to Mexican Official Standard NOM-91/2- SCT3-2022  
The regulation issued by Mexico last March is only for aircraft to be equipped and they are in the process of evaluating the data that will be obtained and will be fully operational until the four control centers in Mexico are up to date. The data will not be used for separation.
  - Central America and COCESNA: 1 January 2025.
2. The possibility of publishing an exemption equivalent to FAA 12555 for aircraft currently operating under that exemption.
  - Mexico: No, there are currently no plans to issue an exemption.
  - Central America: No, there are currently no plans to issue an exemption.
3. Indicate whether SBAS/WAAS is a mandatory requirement to meet mandated aircraft position source performance.



- Mexico: Not considered a requirement, as long as the parameters required by the standard are met.
  - Central America: Not considered a requirement, as long as they meet the parameters required by the regulation.
4. Whether SA-AWARE (GPS) equipped aircraft comply with the mandate.
- Mexico: If they obtain merit parameters equal to or higher than those required by the standard, they are considered compliant.
  - Central America: If figures of merit parameters equal to or higher than those required by the regulation are reported, they are considered compliant and will be monitored for each aircraft.
5. Are there any actions in Mexico/Central America to accommodate SA-ON (GPS) equipped aircraft?
- Mexico: If they obtain merit parameters equal to or higher than those required by the standard, they are considered compliant.
  - Central America: Not considered a requirement, as long as they meet the parameters required by the regulation.
6. IATA asked if in the planning of the Central American and Mexican States it makes available a tool such as the FAA SAPT/ADAPT <https://sapt.faa.gov/default.php?>
- Mexico: Currently, there are no plans for a similar development.
  - Central America: Currently, there are no plans for a similar development, but it can be evaluated at the regional level and with the collaboration of IATA in the search for alternatives.
7. Asked if the mandate mandates any requirements for ADS-B IN equipment on aircraft.
- Mexico: ADS-B IN is not a requirement for compliance with the standard.
  - Central America: ADS-B IN is not a requirement for regulatory compliance.
8. About the flight levels and airspace covered by the mandate.
- Mexico: The Mexican Official Standard is applicable to all Aircraft Licensees, Permission Holders or Operators of fixed wing or rotary wing aircraft operating in controlled airspace within the Mexico FIR (MMFR) and the Mazatlán Oceanic FIR (MMFO).
  - Central America: The regulation includes all the upper space of the Central American RIS, including the Pacific Ocean and the lower spaces where ADS-B coverage exists.
9. IATA indicated that airlines would like to clarify whether to extend the mandate to oceanic airspace.
- The Mexican Official Standard is applicable to all Aircraft Licensees, Permission Holders or Operators of fixed wing or rotary wing aircraft operating in controlled airspace within the Mexico FIR (MMFR) and the Mazatlan-Mazatlan Oceanic FIR (MMFO).

- Central America: ADS-B satellite coverage is included.

10. What arrangements exist for sharing ADS-B data with adjacent Air Navigation Service Providers (ANSPs)?

- Mexico: Agreements are already in place with adjacent ANSPs, COCESNA and FAA.
- Central America: Agreements are already in place with Cuba, Jamaica, Mexico, Panama and in negotiations with Colombia.

11. How many RADAR facilities (Primary and Secondary) would Mexico seek to deactivate and replace with ADS-B separation?

- There are no plans to replace radars and their coverage with ADS-B; on the contrary, there are plans to strengthen such coverage.
- Central America: The region has optimal en route surveillance infrastructure and the TMAs of each international airport in the region have conventional Mode S radars with elementary and enhanced surveillance, as well as ADS-B capability integrated into the same system.

Note: The implementation of ADS-B seeks an improvement in terms of providing surveillance data to boost operational safety. Each State performs an assessment of its infrastructure and has developed project in this case to cover areas with surveillance data deficiency, in addition to taking into account that surveillance data supports the implementation of automated channels which has several operational benefits, among them the decrease of longitudinal separation between aircraft.

12. What operational and financial penalties would apply to non-compliant aircraft entering mandatory ADS-B OUT airspace?

- Mexico: The issue of penalties must be coordinated with the Executive Directorate of Aviation Safety of the ACAA. It is worth mentioning that, at the beginning, surveillance will be carried out in parallel RADAR-ADS-B, that is, there will be a transition and when SENEAM requires to operate with ADS-B as primary surveillance equipment, possible sanctions will be notified.
- Central America: Initially no actions are considered, but if operational improvements are expected to be implemented in some airspaces based on aircraft that are better equipped, they will be better served.

13. What monitoring tools does Mexico consider using to ensure aircraft compliance with the ADS-B OUT mandate?

- Mexico: The information transmitted by the ADS-Bs within the ADS-B coverage area is being monitored and analyzed. The tools used are developed by IACC, THALES in the control centers and our own.
- Central America: A performance assurance system is in place for automated surveillance systems with permanent recordings, including all ADS-B and satellite systems; additionally, since the beginning of 2019, a system for monitoring avionics capabilities has been in place, which allows generating statistics on ADS-B information

and capabilities.

14. What improved separation standards will Mexico and Central America implement based on ADS-B?

- Mexico: At the moment we are considering maintaining the current separation levels, strengthening the surveillance coverage in the FIR Mexico and FIR Mazatlan Oceanic. Increasing the situational awareness of air traffic controllers and thus, the operational safety in Mexican airspace.
- Central America: The separation standards are expected to be applied as if it were radar, provided that the capacity and integrity criteria are met and that all aircraft are equipped, prior to the operational safety analysis.

Note: it is important to point out that ADS-B as a new implementation needs a monitoring and evaluation period, in addition to the maturity period regarding the implementation of the air traffic control services, in this sense the improvement is not an immediate effect of the implementation, but a consequence of the continuous improvement and that it is integrated to the avionics capacity of the aircraft.

15. Is there any economic incentive offered by Mexico for operators to equip themselves with ADS-B OUT?

- Mexico: NO, no incentive is considered.
- Central America: Not planned.

Note: initially the region has not considered any incentive, however, in the medium and long term the airlines that are better equipped will benefit from better services within the airspace.

16. Does the mandate provide immunity for state/government/military aircraft to operate without ADS-B?

- Mexico: Mexico: Only military aircraft are exempt from the Mexican Official Standard NOM 91/2-SCT3-2022, which establishes the specifications for the installation in aircraft of Automatic Dependent Surveillance-Broadcasting Equipment (ADS-B) OUT.
- Central America: It is under the authority of each Central American State.

## 6. Conclusions

6.1 The implementation of ADS-B in the FIRs of the Central American and Mexican States is carried out in all the coverage of their airspace, where in the case of Mexico it will be done in a controlled manner as the State is ready. In the case of Central America, each Central American State will publish its regulation for tower and approach airspace and a single regulation will be published for the upper airspace.

6.2 States will not penalize non-compliance with ADS-B information quality parameters in their RISs.

6.3 Initially the benefit of the implementation of ADS-B is safety, since it will be covering the areas in the Caribbean where the current radars do not provide coverage, since initially

