



INTERNATIONAL CIVIL AVIATION ORGANIZATION

Ninth Meeting of the AASPG Infrastructure and Information Management Sub-Group (IIM/SG9)

Dakar, Senegal, from 3 to 7 August 2026.

Agenda Item 6: Activities to be coordinated with the AAO and SMO Subgroups

WP6.2 ADS-B height Monitoring in AFI

(Presented by ICAO Secretariat)

SUMMARY
This working paper presents the result of the ADS-B carriage rate in the AFI region in response to APIRG/27 & RASG/10 Conclusion 6/10 relating to the safe implementation of a resilient ADS-B operations in the AFI Region.
The action by the Meeting is in paragraph 3
REFERENCE(S): • AASPG Procedural Handbook • Reports of APIRG previous meetings and AASPG/1 • Aireon ADS-B data 2022-2025
Related ICAO Strategic goal(s): <i>A - Every Flight is Safe and Secure</i> <i>C - Aviation Delivers Seamless, Accessible, and Reliable Mobility for All</i>

1. INTRODUCTION

- 1.1 APIRG/22 through Conclusion 22/40 urged States and aircraft operators to ensure that all aircraft operating within the AFI RVSM airspace are equipped with ADS-B Transponder Extended Squitter 1090 by June 2023; and all aircraft operating within the AFI region airspace be equipped with ADS-B Transponder Extended Squitter 1090 by January 2025.
- 1.2 During AAO SG/7 ARMA submitted its project to use ADS-B data to perform height monitoring in the AFI RVSM airspace by calculating the Altimetry System Error using ADS-B as data source. The use of this method requires the aircraft to be ADS-B equipped and for the aircraft to fly in a region where ADS-B monitoring is performed.

- 1.3 At the joint APIRG/27 & RASG AFI/10, the African Airlines Association (AFRAA) and the International Air Transport Association (IATA) presented a joint paper on the recent developments on the loss of GNSS signals and the challenges faced by the airspace users related to retrofitting aircraft operating in the region to meet the requirements of APIRG/22 Conclusion 22/40 related to the mandate of implementation of the use of ADS-B OUT.
- 1.4 The Joint session of APIRG/27 & RASG-AFI/10 tasked a Study group, composed of AAO and IIM Sug Groups Secretariats and relevant Project Team Coordinators (PTCs), ARMA, IATA, AFRAA, ASECNA and ATNS to gather and analyze data on the level of equipage of the aircraft fleet operating in the AFI region as well as the availability and reliability of GNSS signal as support required for the implementation of the ADS-B in the AFI region; and to review and submit to the AASPG, proposal for requirement for the mandatory carriage of ADS-B for Non-ADS-B equipped aircraft operating in the AFI Airspace, pending the outcomes of the data gathering and analysis.

2. DISCUSSION

ADS B Carriage Rate

- 2.1. The Study Group tasked by APIRG & RASG did not provide a status report at AASPG/1 due to lack of data and analysis. A meeting conducted in the sideline of AASPG/1 by the Study group proposed that ICAO Secretariat carry out the task of collecting data on ADS-B carriage rate in the AFI region with emphasis on regional fleet ADS-B capability.
- 2.2. ADS-B data collected were mainly graciously provided by Aireon the space-based ADS-B service provider. The data included period from 2022 to 2025 and encompass all ADS-B flight hours traced between FL180 and FL660 in all AFI FIRs. Leveraging specific FIR characteristics, these raw data were converted to ADS-B traffic movements to enable its consistent use for the analysis.
- 2.3. The estimation of ADS-B carriage rate requires both ADS-B data and the overall traffic movement in specific airspace and timeframe. The use of ADS-B data as a standalone input could not support the estimation of ADS-B carriage rate in the region. Traffic movement statistics from 2022 to 2025 were therefore collected and processed from various FIRs to complete the analysis.
- 2.4. Not all FIRs provided traffic data to enable a comprehensive assessment of ADS-B carriage rate. However, FIRs which provided their traffic data represent 60% of regional air traffic in upper airspace (FL245-FL660). The average ADS-B carriage rate in the FIRs considered is at **86%**. ADS-B and traffic movement analysis are presented as **Attachment A** to this paper.

GNSS Radio Frequency Interference (GNSS RFI)

- 2.5. The use ADS-B in flight operations and ATM is subject to operational risks such as GNSS RFI. In application of the APIRG/27 & RASG-10 conclusion 6/10, data collection on GNSS RFI in AFI region was conducted both through online sources and report provided by States.
- 2.6. Based on information collected from some reliable safety organizations such as EASA and States in the AFI region, the level of GNSS RFI remains low in the AFI region. In 2024 and 2025, some cases of GNSS RFI were reported in various areas in the AFI region including FIRs in central Africa as well as in the horn of Africa. In 2026, GNSS RFI events remain persistent in Asmara and Mogadishu

FIRs. However, no report on GNSS RFI has indicated significant impact on flight operations and air traffic management including height keeping in RVSM airspace.

Way forward

- 2.7. The ADS-B carriage rate in the AFI region is reasonably high, however its use for RVSM height keeping monitoring requires consideration of safety risks related to GNSS. Some mitigating measures must be adopted to ensure data consistency, reliability, integrity and availability while conducting ADS-B based height keeping monitoring. Criteria such as the Navigation Integrity Category (NIC) as well as GNSS RFI event occurrences frequency in FIRs can be used to determine the quality of data used for height keeping monitoring.
- 2.8. As an interim measure, both the Enhanced Generation 2 GPS Monitoring Unit (E2GMU) and ADS-B can be used by ARMA to calculate the Altimetry System Error (ASE) in AFI. However, the collection of height keeping data based on E2GMU should be done on a cost recovery basis to be incurred by the aircraft operator.
- 2.9. Aircraft operators should timely communicate to ARMA, the list of their fleet to be monitored in RVSM airspace using E2GMU.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to:
 - a) Take note of the information provided in this paper;
 - b) Support the proposed recommendations as a way forward and formulate draft decision accordingly for AASPG;
 - c) Provide additional guidance as deemed necessary.

ATTACHMENT A – ADS-B CARRIAGE RATE IN AFI