



**Agenda Item 2: SAT SOG ToRs implementation**

**f) States/ANSP Safety Management Updates**

**Increase ASECNA Airspace Capacity: Implementation of ASEPS  
(Advanced Surveillance-enhanced procedural separations) in Dakar oceanic airspace**

*(Presented by ASECNA)*

**SUMMARY**

This working paper focuses on the implementation of Space Based Automatic Dependent Surveillance in Broadcast Mode (**SBA**) (ADS-B out 1090 MHz Extended Squitter (ES)) related to the continental survey carried out by ASECNA during the 3 years of use of this technology over oceanic and/or remote continental airspace; and also the future ConOps on the implementation of ASEPS (Advanced Surveillance-Enhanced Procedures Separation).

ASECNA has been using Space Based ADS-B surveillance in its airspace since 2020 in addition to Mode S radars and has full coverage of the airspace under its jurisdiction. With ADS/B surveillance data, ASECNA has been applying Radar separation minima in its various TMAs, UTAs and now is intending to apply ASEPS in Oceanic and remote continental Airspace.

**REFERENCES**

- Annex 10 – Aeronautical telecommunications,
- Annex 11 – Air Traffic Services
- DOC 4444 – PANS /ATM
- DOC 9750- GANP 6<sup>th</sup> Edition
- APIRG Conclusion

**1. Background**

1.1 The ADS-B based ATS surveillance system (1090 MHz ES transponder) is identified as an essential component identical to radar to improve the overall safety of air traffic services and achieve safety and efficiency objectives that bring operational benefits to users. ADS-B out avionics is designated as a catalyst in the global ATM concept to deliver substantial safety and capacity benefits.

1.2 At the standard level, the requirements for ADS-B based surveillance are specified in Annex 10 Volume IV (Chapter 3 and 4). ICAO's Global Air Navigation Plan (GANP) in its 6<sup>th</sup> edition has identified ADS-B as part of ASBU B0-1 ASUR to support the provision of air traffic services and operational applications at reduced cost and enhanced surveillance coverage.

1.3 A benchmarking carried out in different regions of the world shows that ADS-B mandates have been in force in almost all regions since 2020. where it is not in force, it is planned for 2023 as in the SAM region. For the AFI Region, ADS-B-based operations are allowed for areas of operation where the equipped aircraft rate is beyond 90%.

## 2. Analysis

2.1 The implementation of (ground-based or space-based) ADS-B in addition to Mode S Secondary Radar to expand aeronautical surveillance coverage, either as redundant to Radar/MLAT coverage or as the only means of ATS surveillance is widespread across the planet today. DOC 4444 PANS ATM specifies separation minimums based on ATS surveillance systems (Radar, ADS-B, MLAT).

2.2 Several countries in different regions have ADS-B mandate implementation and phasing plans based on airspace classes and volume for aircraft with take-off weight which is more than 5.7 tons.

2.3 It is evident that the percentage of ADS-B equipped aircraft is critical to the decision-making process regarding its use for the provision of air traffic services. Therefore, we conduct surveys on ADS-B out-equipped aircraft in our 6 FIR.

2.4 For a reminder, ASECNA has implemented ADS-B in all the airspace under its jurisdiction (6 FIRs in 2020. Since then, it has conducted three (03) surveys on the payload rate of ADS-B-equipped aircraft in Central Africa, West Africa, and the Indian Ocean region.

2.5 These surveys, carried out according to two methods one from the scoring of controllers in working conditions and the other by extraction from ATM systems give the same result. These results show that equipped aircraft vary between 90% and 99% depending on the area of operations. The average percentage is as follows:

- Oceanic airspace (Dakar Oceanic FIR): 98%
- West Africa continental airspace (Niamey and Dakar continental FIRs): 92 %
- Central Africa continental airspace (Ndjamena and Brazzaville FIR): 91 %
- Indian Ocean airspace (Antananarivo FIR): 92%

2.6 After all Safety assessments and training, ASECNA ATM system is using Space-Based ADS-B (SBA) surveillance technology for separation in its TMAs and UTAs providing a separation minimum of 10 NM and 5 NM. ASECNA decision-makers intend to capitalize on these achievements and move forward to implement ASEPS in oceanic and remote continental airspaces. The objective is to increase the efficiency and capacity of en route operations in Dakar oceanic airspace where 80NM (10 min) longitudinal separation is applied. The new targeted horizontal separation minimum is 20NM between ADS Positions.

2.7 The ADS-B CONcept of OPerationS (CONOPS) for the Advanced Surveillance-Enhanced Procedural Separations (ASEPS) indicates how to deal with degraded situations, including the "residual" unequipped aircraft. Also, prior coordination with neighboring ANSPs will be done in order to optimize the benefits of such separation minima.

## 3. Suggested actions

3.1 The meeting is invited to:

- a) Note the information provided;
- b) Take a decision to conduct a joint survey of aircraft Equipment ADS/B in the SAT region and encourage ANSPs to collaborate in these trials and;
- c) Provide direction as deemed necessary.