



**Twenty First Meeting of the Africa-Indian Ocean Planning and Implementation Regional Group (APIRG/21)  
(Nairobi, Kenya, 9 – 11 October 2017)**

**Agenda Item 5: Regional Air Navigation Deficiencies**

**Industry initiatives and other Air Navigation matters**

**ADS-B Implementation in the AFI Region**

*(Presented by International Air Transport Association)*

<b>SUMMARY</b>	
<p>This paper presents IATA position with respect to the implementation of ADS-B in the AFI Region and highlights implementation considerations for States/ANSPs. IATA requests States to consider development and publication of associated technical and separation standards and engage with Users the Collaborative Decision Making (CDM) process when possible in order to address cost-effective safety and operational benefit.</p>	
<p><b>REFERENCE(S):</b></p> <ul style="list-style-type: none"> <li>▪ Doc 9426 Air Traffic Services Planning Manual</li> <li>▪ Doc 4444 Procedures for Air Navigation Service (PANS--ATM)</li> <li>▪ Cir 326 AN/188 Assessment of ADS-B and Multilateration Surveillance to Support Air Traffic Services and Guidelines for Implementation</li> </ul>	
<p><b>Related ICAO Strategic Objective(s)</b></p>	<p>This working paper related to the following Strategic Objectives:</p> <ul style="list-style-type: none"> <li>▪ <b>Safety:</b> Enhance global civil aviation safety</li> <li>▪ <b>Air Navigation Capacity and Efficiency:</b> Increase the capacity and improve the efficiency of the global civil aviation system</li> </ul>

**1. INTRODUCTION**

1.1 ICAO Circular 326 considers that the current ground-based ADS-B or MLAT technology can be used as a mean of supporting the provision of ATS surveillance including supporting aircraft separation. This consideration is in accordance with the requirements in PANS-ATM, Doc 4444, Chapter 8.

1.2 In the near future the first space-based ADS-B service is expected to become globally operational. This service will enable global coverage, with a significant reduction in “line of sight” limitations. The planned service will rely upon satellite reception of ADS-B messages from certified aircraft transponders.

1.3 As of June 2016, ICAO Separation and Airspace Safety Panel is developing new reduced longitudinal and lateral separations standards namely Advanced-Surveillance Enhanced Procedural

Separation (ASEPS), to be supported by space-based ADS-B in combination with ADS-C, CPDLC and HF.

## **2. DISCUSSION**

2.1 Various AFI States have recently implemented ADS-B and Secondary Surveillance Radar (SSR) without involving airspace users. Implementation considerations need to be addressed with users in particular with respect to aircraft certification, avionics performance requirements, safety requirements and the Concept of Operation. Any new Concept of Operation should be founded on measurable benefits.

2.2 For any specific operations, States and ANSPs are highly encouraged to follow the implementation roadmap guidelines in the ICAO circular 326. IATA supports the ground-based ADS-B, based on Mode S Extended Squitter (1090ES). ADS-B should not be implemented as a redundant surveillance capability or to be used. It should be used in a non-radar airspace to improve ATS surveillance if a positive business case has been proven. In any case, transition timelines need to be determined in consultation with airspace users. The potential cost savings that can be achieved from the implementation of ADS-B system life cycle surpass the operational expenditures associated with installation, maintenance and operation of the SSR system.

2.3 Thus, a mandate for ADS-B avionics should be considered only for the airspace where ADS-B is planned to eventually be the only ATS surveillance capability. Once ADS-B ground stations become operational, ANSPs should, in consultation with airlines and airspace users, publicly and transparently establish a timeline to decommission other surveillance infrastructure such as SSR.

2.4 IATA considers that Space-based ADS-B technology is a potential candidate for reduced separations within oceanic and remote airspace, such as the North-Atlantic. However, for this oceanic application, appropriate infrastructure for ATC – Pilot communications and suitable regulatory and performance frameworks for space-based ADS-B will be needed to fully complement its capability.

2.5 For reliable satellite reception of ADS-B data, the messages should be transmitted from a top-mounted antenna on the aircraft. To comply with ACAS equipage requirements, an aircraft must have both a top mounted and bottom mounted antenna; however, there is currently no regulatory requirement to verify that signals are being correctly broadcast from the top mounted antenna.

2.6 While considering using space-based ADS-B, ANSPs are encouraged to develop a concept of operations which will make full use of the potential operational improvements, such as increased efficiency and capacity (e.g. the use of User Preferred Routings).

2.7 The current PBCS standards are intended for use in airspace with procedural separations, such as oceanic and remote, which currently involved the uses of ADS-C, CPDLC and satellite voice (SATVOICE). The RSP framework as currently defined in the PBCS manual does not however apply to many surveillance sensors, such as SSR, Multilateration, and ADS-B.

2.8 ICAO has set up a PBS SG which is a new subgroup under the ICAO Surveillance Panel in order to revisit the concept of Performance-based Surveillance (PBS) and Required Surveillance Performance (RSP) to appropriately address technical and performance requirement for various surveillance systems.

2.9 The tasks of PBS SG in reviewing PBS and RSP will naturally influence the activities of ICAO SASP. Noting that, there is an end-of-2018 estimated timeline for PBS SG for reviewing the concept of PBS and RSP, this timeline will likely influence the schedule for the development of ASEP separation standard.

2.10 PBS SG will first focus of developing PBS and RSP framework to support 3 NM and 5 NM separation minima due to readiness of technical material and operational experience. Other applications of PBS framework will then expand to ASEPS, 2.5 NM Separation, parallel approach operation/departure, 10 NM Sep and 30/30 NM (as needed).

2.11 IATA is fully supporting this new technology with the condition that ICAO develops associated technical and separation standards that result in cost-effective safety and operational benefit. Any new Concepts of Operations should be found on measurable benefits.

2.12 During the implementation process of Space based ADS-B, State regulators should be involved in any discussions to ensure economic transparency in accordance with ICAO principles of cost-relatedness as per ICAO Documents 9082 and 9161. The detailed information on the capital investment, costs associated to operation and operational benefits that Space Based ADS-B within the context of cost-benefit analysis should be provided.

2.13 In light of the information presented above, IATA propose the following recommendations to the meeting:

- a) AFI States are urged, in accordance with the CDM process to involve Users at early stage, before any funding for the implementation of surveillance sensors (SSR/ground-based ADS-B/Space Based ADS-B, Multilateration) in order to address implementation considerations in particular with respect to aircraft certification, avionics performance requirements, safety requirements, the Concept of Operation and associated operational and economic benefits;
- b) AFI States and ANSPs are highly urged to follow the implementation roadmap guidelines in the ICAO Circular 326 when implementing surveillance technology, for any specific operations.
- c) With regards to the mandate on ADS-B avionics, AFI States/ANSPs are encouraged to engage in a consultation with airspace users and consider the ADS-B Mandate only for the airspace where ADS-B is planned to eventually be the only ATS surveillance capability. AFI States/ANSPs should then transparently establish a timeline of decommission other surveillance infrastructure.
- d) AFI ANSPs are encouraged to develop a Concept of Operations in collaboration with airspace users, while considering using ADS-B and to consider first the development of ICAO associated technical and separation standards that result in cost-effective safety and operational benefit.
- e) AFI ANSPs are encouraged to involve their regulators during the implementation process of Space Based ADS-B, in any discussions to ensure economic transparency in accordance with ICAO principles of cost-relatedness as per ICAO Documents 9082 and 9161. The detailed information on the capital investment, costs associated to operation and operational benefits that Space Based ADS-B within the context of cost-benefit analysis should be addressed with users.

**Conclusion 21/X: Implementation of surveillance infrastructure in the AFI Region:**

*That, in order to facilitate harmonized implementation of infrastructure that support seamlessness in the provision of air traffic management and realization of benefits by all stakeholders, while avoiding unnecessary duplication of investment on the ground and in the air, AFI States are urged:*

- a) apply the principles of collaborative decision making that include users at early stages when planning investments into surveillance infrastructure (SSR/ground-based ADS-B/Space Based ADS-B, MLAT);*
- b) follow the guidelines in the ICAO Circular 326 when implementing surveillance technology;*
- c) avoid the imposition of mandates on a State by State or FIR by FIR;*
- d) ensure economic transparency in accordance with ICAO principles of cost-relatedness as per ICAO Doc 9082 and Doc 9161.*

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the information provided; and
- b) consider the IATA recommendations mentioned in paragraph 2.13 of this WP as a pragmatic approach to implement ADS-B for the AFI Region and in particular adopt the following conclusion:

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