

International Civil Aviation Organization**FOURTEENTH MEETING OF THE SOUTH EAST ASIA
AND BAY OF BENGAL SUB-REGIONAL ADS-B
IMPLEMENTATION WORKING GROUP
(SEA/BOB ADS-B WG/14)**

Bangkok, Thailand, 7 - 9 November 2018

Agenda Item 4: Report on ground system and avionics performance monitoring and improvement in compliance**SPACE BASED ADS-B AND FLOW MANAGEMENT**

(Presented by ICCAIA)

SUMMARY

This paper addresses possible uses of Space Based ADS-B to support long range flow management, traffic load calculation and ATC planning and airspace safety.

1. INTRODUCTION

Space based ADS-B will become available as a service in 2019.

The Aireon ADS-B receivers are now operating successfully in orbit around earth and providing valuable test data. The final satellite launch will take place late 2018 and service to customers will commence early in 2019.

In addition, the Aireon system, organization, procedures and capabilities will be examined by the European Safety Agency (EASA) and certified as an ATC surveillance service provider. EASA will provide ongoing certification review.

From early 2019 Aireon will provide high performance ADS-B based surveillance data, usable for ATC separation, position reporting and safety nets. The surveillance coverage volume is “world wide” and hence for the first time, surveillance for ADS-B equipped aircraft will be available from all Departure locations to all Destination locations worldwide.

2. DISCUSSION**2.1 ATC flight planning**

The ICAO system of flight planning allows States to plan for air traffic as the result of

- Receiving ICAO flight plans based on a specified expected departure/off blocks time.
- Receiving a DEP message to allow all downstream FIRS to calculate an expected arrival time at their FIR boundary, based on Flight plan specified EET (Estimated elapsed time) values.

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- AIDC or ICAO messages providing updated boundary estimate information during the progress of the flight.

However, this system has weaknesses such as lack of precision, lack of information flow and procedures not being followed. For example :

- In Asia Pacific a high percentage of flights take place for which no Departure message is received (Refer APANPIRG/29 Report).
- EET estimates are not always included
- EET estimates may have been calculated based on outdated wind information
- AIDC is not always implemented
- The estimated times for the boundary are often provided as a “one shot” and are not always kept up to date until a short co-ordination time before the boundary

2. 2. A method to improve estimates

The Aireon Space based ADS-B surveillance system collects ADS-B for all aircraft worldwide.

An Aireon customer could request surveillance data relating to each flight plan held, no matter where in the world the aircraft may be. Updates could be as frequent or infrequent as required to suit the needs of the customer ANSP.

As an illustrative example , CAAS (Singapore) could be provided with a position report (based on Surveillance data) for all aircraft departing London UK, bound for Singapore at appropriate times. This could be, for example, at detected departure, and/or at each FIR crossing and/or could be supplied every “x minutes” with the value of x decreasing as the aircraft flew closer to the Singapore FIR.

In this case, Singapore would no longer be reliant on receiving the DEP message.

Singapore would likely be able to calculate more accurate FIR boundary arrival times, and runway times for these flights, many hours ahead of arrival.

Whilst this paper does not propose the detailed method of calculation of improved estimates, ATC and flow management systems can calculate estimates using various information such as flight plan data, aircraft performance data, profile information and wind models. However, accurate position reports can provide essential “real world” feedback adjusting initial estimates to achieve higher accuracy and realism. Of course, ATC intervention in prior FIRs will continue to cause change in original estimates, but automated position report updates will allow those changes to automatically update flow management and traffic load calculation systems.

This envisaged “departure to destination” surveillance capability, independent of FIR boundaries and conventional surveillance, could enhance flow management efficiency – and hence safety, because more accurate estimates would exist more often.

Draft Conclusion xx - SPACE BASED ADS-B and FLOW MANAGEMENT			
What: That, given the need to ensure greater awareness of aircraft progress before FIR and ATC sector boundaries to improve position estimates, States are encouraged to consider the application of space-based ADS-B which provides surveillance from “Departure to Destination” – worldwide.		Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical	
Why: To assist states considering how to improve arrival estimates and to counter the lack of DEP messages received in APAC ATC systems		Follow-up:	<input type="checkbox"/> Required from States
When:	7-Nov-18	Status:	Draft to be adopted by Subgroup
Who:		<input checked="" type="checkbox"/> Sub groups <input type="checkbox"/> APAC States <input type="checkbox"/> ICAO APAC RO <input checked="" type="checkbox"/> ICAO HQ <input type="checkbox"/> Other: XXXX	

3. ACTION BY THE MEETING

The meeting is invited to:

- a) note the information contained in this paper;
- b) note the potential safety improvement with the increased ability to plan and predict controller workloads;
- c) discuss how worldwide surveillance data could be used to enhance the accuracy of estimated boundary and runway arrival time, to improve predictability and certainty of Air Traffic Operations in a seamless way especially in South East Asia or Bay of Bengal; and
- d) and consider how this concept could be best considered further by ICAO.
