



International Civil Aviation Organization

**The Combined Meeting of the South Asia Indian Ocean Co-ordination Group
SAIOACG/4 and the South East Asia Co-ordination Group SEACG/21**

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Agenda Item 4: Implementation of CNS/ATM Systems

ADS-B IMPLEMENTATION WITHIN THE SINGAPORE FIR

(Presented by Singapore)

SUMMARY

This paper presents an update on the implementation of Automatic Dependent Surveillance-Broadcast (ADS-B) in Singapore FIR

The initiatives aim at enhancing safety and efficiency through a measured increase in capacity to meet the future growth of air traffic in this region.

1. INTRODUCTION

1.1 Air traffic movement in this region has grown at a steady rate for the past decade. It is estimated that air traffic in the Asia Pacific region will continue to grow by more than 6% a year, for the next 20 years. To prepare the region for the future growth of air traffic, Singapore supported the call by ICAO to establish a seamless environment for air traffic to operate in. As a result, Indonesia, Singapore and Viet Nam collaborated to implement ADS-B surveillance data sharing. Cross-boundary application of surveillance separation has also been introduced at a gradual pace as ADS-B application is new to the South China Sea area.

1.2 Singapore published AIC 14/10 on 28 December 2010 to inform airspace users on Singapore's plan to implement the use of ADS-B Out on December 2013 within parts of the Singapore FIR, specifically, on ATS routes N891, M753, L642, M771, L644 and N892 at FL290 and above, to support future increase in airspace capacity and allow better flight accessibility to these routes. This early notification is also to allow airspace users to plan ahead their forward purchasing, retrofitting and scheduling to meet the requirements for ADS-B equipage.

2. DISCUSSION

Safety

2.1 On 6 November 2013, Singapore issued an AIP Supplement (243/13) to inform airspace users that with effect from 12 December 2013, aircraft operating on ATS Routes L642, M771, N891, M753, L644 and N892, at or above FL290 must comply with the following:

- a) Aircraft must carry serviceable ADS-B transmitting equipment that has been certified as meeting EASA AMC 20-24, or meets the equipment configuration standards in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia; and
- b) Aircraft operator must have the relevant operational approval from the State of Registry.

2.2 Aircraft that do not have the relevant ADS-B operational approval from the State of Registry will not be accorded priority in the delineated airspace and flight level assignments would be subject to air traffic conditions.

2.3 If an aircraft carries ADS-B transmitting equipment but does not comply with the requirements stipulated in paragraphs 2.1 a) and b), the aircraft will operate below FL290 on the ATS Routes.

2.4 Safety is enhanced for aircraft equipped with ADS-B as the surveillance picture is now available to controllers around the area outside radar coverage.

Capacity

2.5 Back in July 2008, under the auspices of the ICAO RNP-SEA Task Force, Singapore and Viet Nam implemented the reduction of horizontal separation on ATS routes L642 and M771 based on the PBN RNP10 specification. This allowed the longitudinal separation to be reduced to 50 NM between two flights that are ADS-C and CPDLC equipped.

2.6 The implementation of ADS-B within Singapore FIR extended surveillance coverage on ATS routes L642 and M771 along with M753 and N892. Singapore and Viet Nam have agreed on a progressive phased approach to reduce longitudinal separation to allow airspace users to reap the full benefits of ADS-B surveillance on the respective ATS routes. The following phased approach to reduce longitudinal separation, for aircraft that are suitably equipped, is adopted;

- a) From the current 50 NM to 40 NM on 12 December 2013;
- b) 30 NM planned by end of 2014; and
- c) 20 NM planned by end of 2015.

Efficiency

2.7 With the implementation of the surveillance coverage, 5NM horizontal separation is applied for flights operating within Singapore FIR.

2.8 Due to the weather phenomenon in the South China Sea area, there are frequent requests for weather avoidance and previously such deviations would require controllers to descend and/or climb aircraft to ensure lateral separation between aircraft operating on the ATS routes. This is no longer required with the surveillance coverage unless the weather deviation is very severe. Thus the need for numerous level changes and coordination with Ho Chi Minh ACCs has reduced tremendously, leading to increase efficiency on controllers' and pilots' workload.

2.9 A revised operational letter of agreement (LOA) between Singapore and Viet Nam, incorporating the use of ADS-B as part of ATC procedures, was signed on 21 November 2013.

Post Implementation Issue

2.10 The implementation of ADS-B exclusive airspace in Singapore FIR has been successful. However a few issues were discovered during the first 2 months of ADS-B operations:

- a) Incorrect filed flight-plan with regard to ADS-B equipage;
- b) Aircrew equipment handling; and
- c) Erroneous ADS-B equipment (observed through a monitoring system).

2.11 Singapore were constantly engaging airspace users on these issues. As the occurrences are far and few, there is no urgent need to blacklist these airspace users as they have been very forthcoming in their replies to us. However, until the issues are resolved; these affected airframes will not be allowed to operate on the ADS-B mandated ATS routes.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) Note the implementation of ADS-B in Singapore FIR;
 - b) Note the close collaboration between Indonesia, Singapore and Viet Nam to enhance ATM in this region through ADS-B data sharing;
 - c) Note the gains in enhancing safety, capacity and efficiency on ATS Routes L642, M771, M753 and N892; and
 - d) Encourage States to collaborate on ADS-B data sharing to enhance safety, capacity, and efficiency, and to achieve seamless ATM within Asia Pacific Region.
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