International Civil Aviation Organization

**TWELFTH MEETING OF THE SOUTH EAST ASIA
AND BAY OF BENGAL SUB-REGIONAL ADS-B
IMPLEMENTAITON WORKING GROUP
(SEA/BOB ADS-B WG/12)**

Guangzhou, China, 08 – 10 November 2016

Agenda Item 3:   **Review implementation and co-ordination activities and sub-regional implementation plans**

UPDATE ON ADS-B IMPLEMENTATION IN THAILAND

(Presented by Thailand)

SUMMARY

This paper presents update on ADS-B implementation in Thailand, including the overview of system architecture and current signal coverage. The future surveillance development plan, particularly WAM implementation, is also discussed.

1. INTRODUCTION

1.1   In 2006, Aeronautical Radio of Thailand Limited (AEROTHAI), Thailand's Air Navigation Service Provider, installed the first ADS-B ground station able to output messages in ASTERIX CAT 21 Version 0.26 format at its headquarters in Bangkok for research and development purpose. With the good experimental results obtained, five more ADS-B ground stations were installed in Chiang Mai, Ubon Ratchathani, Udon Thani, Hat Yai, and Samui in 2014 to extend the study. These ground stations are able to support ASTERIX CAT 21 Version 1.4 and Version 2.1 format. Also in 2014, the first ground station installed in Bangkok was upgraded to support ASTERIX CAT 21 Version 1.4 and Version 2.1 format as well. In addition, all ADS-B ground stations implemented comply with ED-129 standard.

1.2   With the objective to provide update on ADS-B implementation in Thailand, in this paper the overview of system architecture and signal coverage gained using ADS-B ground stations currently installed is discussed. Moreover, AEROTHAI's surveillance development plan, particularly WAM (Wide Area Multilateration) implementation, is presented.

2. DISCUSSION

2.1   Figure 1 exhibits the overview of AEROTHAI's ADS-B system architecture. ADS-B signal reception is done using DME antenna, while overall system time synchronization and ADS-B message timestamp are done using GPS antenna installed separately at ADS-B ground station. ADS-B target reports in ASTERIX CAT 21 (Version 1.4 or 2.1) format decoded from downlink messages are then transmitted to central processing system using AEROTHAI Internet Protocol (IP) cloud network. Furthermore, Control and Monitoring System (CMS) is utilized to monitor the status of all ADS-B ground stations.
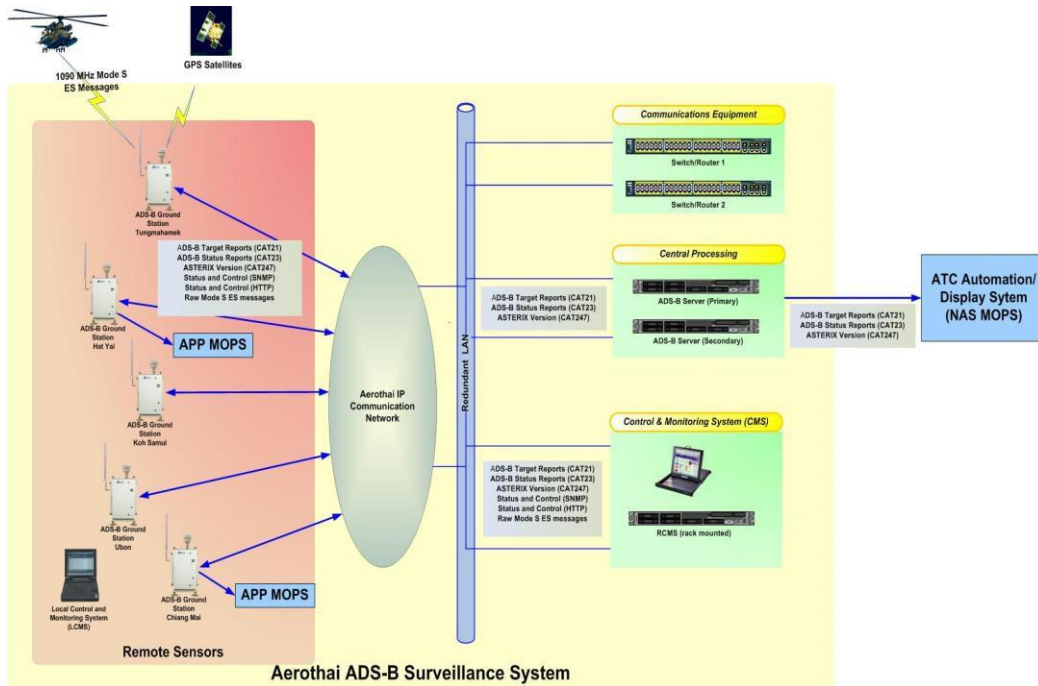
Figure 1. AEROTHAI's ADS-B System Architecture.

2.2   Coverage provided by each ADS-B ground station is within 250 NM radius and up to 45,000 feet altitude. With 6 ADS-B ground stations currently installed around Thailand, the airspace at and above 20,000 feet is mostly covered as shown in Figure 2, making it possible to provide ADS-B surveillance service for en-route operation in Bangkok FIR at 20,000 feet and above. At present, the ADS-B ground system previously mentioned is being certified by Civil Aviation Authority of Thailand (CAAT) with expectation to finish by 2017.
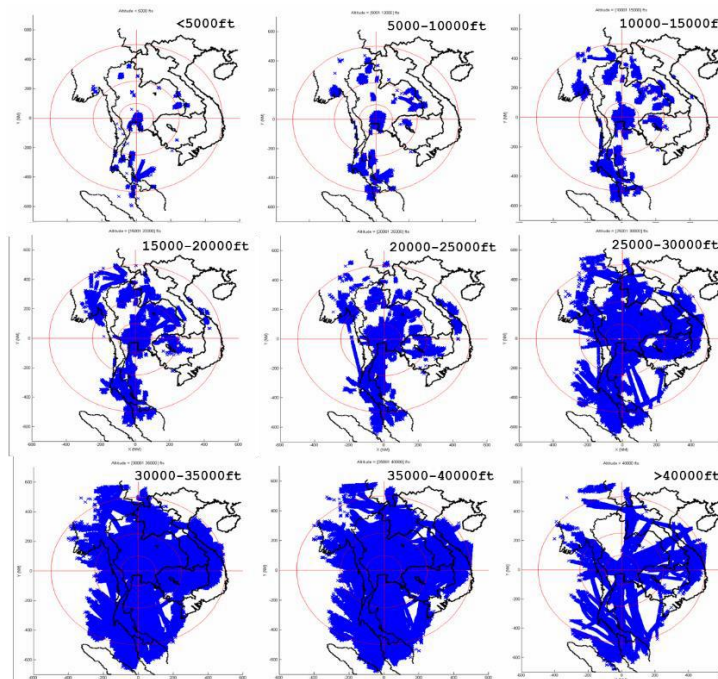

Figure 2. Current ADS-B Coverage in Thailand.

2.3   To be able to provide ADS-B service in the lower controlled airspace, more ADS-B ground stations are required. Therefore, additional ground stations capable of dual functions, i.e. ADS-B and WAM, are planned to be deployed around Thailand, aiming at being able to provide ADS-B coverage from 13,000 feet to around 45,000 feet for en-route operation and from 2,000 feet to 11,000 feet for TMA operation at 8 airports, i.e. Mae Hong Son, Nakhon Phanom, Khon Kaen, Buriram, Nakhon Ratchasima, Krabi, Samui, and Nakhon Si Thammarat. It is expected that the installation of these ground stations will start in mid or late 2017.

2.4   Moreover, data from multiple surveillance sensor types, including SSRs, ADS-B, and WAM, will be integrated using the new ATM system expected to be operational by the end of 2018.

2.5   On the other hand, AEROTHAI recently held the "Safety Assessment Case Study for ADS-B Surveillance Service in Bangkok FIR" workshop in order to prepare all stakeholders involved to be ready for the operations in ADS-B environment within Bangkok FIR.

3.   ACTION BY THE MEETING

3.1   The meeting is invited to:

   a)   note the information contained in this paper; and

   b)   discuss any relevant matters as appropriate.

— — — — — — — — — — —