



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**SEVENTH MEETING OF THE PERFORMANCE BASED NAVIGATION
TASK FORCE (PBN/TF/7)**

Bangkok, Thailand, 1 – 3 September 2010

Agenda Item 5: State / Industry Presentations

THAILAND PBN IMPLEMENTATION IN 2010

(Presented by Thailand)

SUMMARY

This paper discusses the progress of PBN implementation within Bangkok FIR. The paper notes the completion of Thailand PBN Implementation plan and the publications of RNP APCH procedures for Phuket, Hat Yai and Samui Airports, along with progress made for PBN implementations for Suvarnabhumi, Don Mueang, Chiang Mai, and Karbi Airports.

1. Introduction

1.1 Challenges in aviation and needs for better efficiency in aircraft fuel consumption call for new navigation technologies and operation procedures to be implemented. In respond to this call for actions, ICAO Asia/Pacific Air Navigation Planning and Implementation Regional Group, APANPIRG, adopted several conclusions to promote the uses of Performance-Based Navigation (PBN) and Global Navigation Satellite System (GNSS) as the navigation elements of CNS/ATM systems. These navigation technologies and specifications have promising potentials to provide accurate, reliable and seamless position determination and navigation capabilities to airspace users.

1.2 Implementations of PBN and GNSS facilitate more efficient use of airspace and more flexibility for procedure design. They cooperatively result in improved safety, access, capacity, predictability, operational efficiency, fuel economy, and environmental effects.

1.3 The 36th Session of the ICAO Assembly held in Montreal from 18 to 28 September 2007 adopted Resolution A36-23 urging all the States to implement RNAV and RNP air traffic services (ATS) routes and procedures in accordance with ICAO PBN concept described in the *Performance Based Navigation Manual* (Doc 9613). The resolution calls on the States and Planning and Implementation Regional Groups (PIRGs) to develop PBN implementation plans by 2009 to ensure globally harmonized and coordinated implementation of PBN.

1.4 APANPIRG, through its Conclusion 18/52, established a Regional Performance Based Navigation Task Force (PBN/TF) to address PBN related regional implementation issues. In its Conclusion 18/53, APANPIRG stipulated development of State PBN Implementation Plans in harmony with the Asia/Pacific Regional PBN Implementation Plan.

1.5 During the 6th APEC Transportation Ministerial Meeting in Manila, the Philippines in April 2009, Transportation Ministries of Asia-Pacific Economic Cooperation (APEC) Economies,

encourage the continued implementation of PBN aiming to result in more efficient fuel utilization for aircrafts.

2. Thailand PBN Implementation Plan

2.1 Recognizing the benefits of PBN and GNSS, in May 2007, Thailand has established a national Working Group to foster a cooperative approach among Thailand aviation stakeholders in the implementations of PBN and GNSS over Thailand airspaces. Planning and implementation activities involve participations from Department of Civil Aviation of Thailand, representatives from Thai airline operators, Thai Pilot's Association, Airports of Thailand Public Company Limited, and Aeronautical Radio of Thailand Ltd.

2.2 The Working Group is responsible for developing policy, implementation plans, and implementation standards for the deployment of PBN and GNSS procedures and operations in Thailand airspace. The Working Group has three areas of responsibility in regards to the implementation of PBN and GNSS in Thailand airspace. The three areas of responsibility are:

- Policy & Implementation Planning
- Establishments of Standards and Requirements in accordance to appropriate ICAO requirements
- Communication with Stakeholders

2.3 In June 2009, the Working Group has approved Thailand PBN Implementation Plan. This Thailand PBN Implementation Plan aims to provide aviation stakeholders with appropriate implementation guidance and timelines to allow proper preparation for PBN implementations within Bangkok Flight Information Region (FIR). The Plan is aligned with the Asia/Pacific Regional PBN Implementation Plan developed by ICAO Asia/Pacific PBN Task Force and 2007 ICAO Assembly Resolutions.

2.4 Thailand PBN Implementation Plan provides assessments of fleet readiness status and CNS infrastructure, which results in selection of appropriate PBN navigation specifications and implementation strategies for En-route and Terminal Area operations. It also explains some tangible operational benefits, derived from actual PBN implementations.

3. Progress of Thailand PBN Implementation

3.1 Since February 2009, the Department of Civil Aviation has approved full operation of RNP Approach Procedures for Phuket International Airport. These procedures enhance safety and efficiency in the approach operation and resolve the offset problems caused by the limitation of installation sites of conventional navigation aids.

3.2 The following safety benefits were the results of RNP Approaches implementation for Phuket International Airport:

- Runway 27 - Provide runway-aligned approach path as compared to current ILS approach which has 1.4 degree offset.
- Runway 09 - Provide runway-aligned approach path as compared to current VOR approach which has 5 degree offset.

3.3 RNP APCH Procedures for Hat Yai airports have been designed and successfully flight validated by AEROTHAI. RNP APCH Procedures for Hat Yai have been available for commercial operations since December 2009. These RNP APCH Procedures help enhance the level of safety and efficiency in approach and landing operations to Hat Yai International Airport, especially

to Runway 08, of which no instrument approach procedure with conventional navigation aids was feasible. Moreover, RNP APCH Procedures for RWY 26 also provides back-up approach procedures for existing ILS procedures.

3.4 Two RNP APCH Procedures for Samui airports have designed and successfully flight validated by AEROTHAI. The procedures have been authorized to be used in commercial operations by the Thai DCA since May 2010. These RNP APCH Procedures help enhance the level of safety and efficiency in approach and landing operations to Samui Airport, especially to Runway 17, since their flexible flight path can navigate the aircrafts around mountainous areas while still providing runway-aligned final segment.

3.5 AEROTHAI in coordination with Thailand's National Working Group for PBN and GNSS Implementation has completed the design for additional RNP APCH procedures for Chiang Mai and Krabi airports. All of which are being reviewed by DCA Thailand prior final flight validation. The procedures are expected to be in operation by early 2011.

3.6 AEROTHAI is now also re-designing Standard Instrument Arrivals (STARs) and Standard Instrument Departures (SIDs) for Suvarnabhumi and Don Mueang airports based on RNAV-1 navigation specification using DME/DME/IRU and GNSS. The new design is expected to provide more efficient terminal area operations, while reducing needs for radar vectoring and supporting continuous descent and unimpeded climb operations. Moreover, the company is designing RNP PACH with Baro-VNAV to provide back-ups to ILS to both Suvarnabhumi and Don Mueang airports.

4. **Actions by the Meeting**

4.1 The Meeting is invited to note:

- a) the roles of Thailand's National Working Group on PBN & GNSS Implementation;
- b) that Thailand PBN Implementation Plan has been approved by the National Working Group;
- c) that Thailand PBN Implementation Plan is developed in consistent with the interim Asia/Pacific Regional PBN Implementation Plan;
- d) that actual PBN deployments at Phuket, Hat Yai and Samui Airports provide safety and operational benefits to airlines and air traffic controllers; and
- e) the progress made on PBN implementation for Suvarnabhumi, Don Mueang, Chiang Mai, and Karbi Airports.

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