



International Civil Aviation Organization

**EIGHTEENTH MEETING OF THE COMMUNICATIONS/NAVIGATION
AND SURVEILLANCE SUG-GROUP (CNS SG/18) OF APANPIRG**

Asia and Pacific Regional Sub-Office, Beijing, China
(21 – 25 July 2014)

Agenda Item 6: Navigation

THAILAND PBN IMPLEMENTATION

(Presented by Thailand)

SUMMARY

This paper discusses the progress of PBN implementation within Thailand. The paper notes the completion of Thailand PBN Implementation plan, the operations of RNP APCH procedures for 11 airports, namely Phuket, Hat Yai, Samui, Chiang Mai, Lampang, Chiang Rai, Udon Thani, Surat Thani, Narathiwat, Nakhon Si Thammarat and Phrae Airports. The paper also summarizes the progress made for PBN implementations at other terminal areas around Thailand as well as for its en-route airspace.

1. Introduction

1.1 Challenges in aviation and needs for higher efficiency in aircraft fuel consumption call for new navigation technologies and operation procedures to be implemented. In response to this call for actions, ICAO has 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. 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.

1.2 The 36th Session of ICAO Assembly held in Montreal in 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 the 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. In its 37th session in September 2010, ICAO Assembly once again reiterated the importance of PBN in its Resolution A37-11 requesting ICAO contracting States to implement PBN as a matter of urgency.

1.3 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's PBN Implementation Plans in harmony with the Asia/Pacific Regional PBN Implementation Plan. Subsequently in September 2009, APANPIRG through its Conclusion 20/41 adopted the first version of the Asia/Pacific Regional PBN Implementation Plan.

1.4 During the 6th APEC Transportation Ministerial Meeting in Manila, the Philippines in April 2009, Transportation Ministers of Asia/Pacific Economic Cooperation (APEC) Economies, encouraged the continued implementation of PBN aiming to result in more efficient fuel utilization for aircraft.

2. Establishment of Thailand PBN & GNSS National Working Group & 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 Thai aviation stakeholders in the implementations of PBN and GNSS over Thai airspaces. Planning and implementation activities involve participations from Department of Civil Aviation of Thailand (Thai DCA), representatives from Thai airline operators, Thai Pilot's Association (THAIPA), Airports of Thailand Public Company Limited, and Aeronautical Radio of Thailand Limited (AEROTHAI).

2.2 The Working Group is responsible for developing policies, implementation plans, and implementation standards for the deployment of PBN and GNSS procedures and operations in Thai airspace. The Working Group has three areas of responsibility in regards to the implementation of PBN and GNSS in Thai 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 had 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 implementation within the Bangkok Flight Information Region (FIR). The Plan is well aligned with the Asia/Pacific Regional PBN Implementation Plan developed by ICAO Asia/Pacific PBN Task Force and 2007 and 2010 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 PBN Implementation in Terminal Airspaces

3.1 The following table shows the list of PBN implementations in terminal airspaces in Thailand currently in operation as published in AIP Thailand:

Airport	RNP APCH	STAR PBN	SID PBN
Phuket (VTSP)	RNAV (GNSS) RWY09 RNAV (GNSS) RWY27 (BARO-VNAV)	STAR RNAV RWY09 STAR RNAV RWY27 (RNAV 1)	SID RNAV RWY09 SID RNAV RWY27 (RNAV 1)
Suvarnabhumi (VTBS)	-	STAR RNAV RWY19L/19R STAR RNAV RWY01L/01R	SID RNAV RWY19L/19R SID RNAV RWY01L/01R
Hat Yai (VTSS)	RNAV (GNSS) RWY08 RNAV (GNSS) RWY26 (LNAV)	-	-
Samui (VTSM)	RNAV (GNSS) RWY17 RNAV (GNSS) RWY35 (LNAV)	-	-
Chiang Mai (VTCC)	RNAV (GNSS) RWY18 RNAV (GNSS) RWY36 (LNAV)	STAR RNAV RWY36 (RNAV 1/ Basic RNP 1)	SID RNAV RWY36 (RNAV 1/ Basic RNP 1)
Don Mueang (VTBD)	-	STAR RNAV RWY21L/21R (RNAV 1)	SID RNAV RWY21L/21R (RNAV 1)
Lampang (VTCL)	RNAV (GNSS) RWY18 RNAV (GNSS) RWY36 (LNAV)	-	SID RNAV RWY18 SID RNAV RWY36 (Basic RNP 1)
Chiang Rai (VTCT)	RNAV (GNSS) RWY03 RNAV (GNSS) RWY21 (LNAV)	-	-
Udon Thani (VTUD)	RNAV (GNSS) RWY12 RNAV (GNSS) RWY30 (LNAV)	-	-
Surat Thani (VTSB)	RNAV (GNSS) RWY04 RNAV (GNSS) RWY22 (LNAV)	-	-
Narathiwat (VTSC)	RNAV (GNSS) RWY02 RNAV (GNSS) RWY20 (LNAV)	-	-
Nakhon Si Thamarat (VTSF)	RNAV (GNSS) RWY01 RNAV (GNSS) RWY19 (BARO-VNAV)	-	SID RNAV RWY01 SID RNAV RWY19 (Basic RNP 1)
Phrae (VTCP)	RNAV (GNSS) RWY01 (LNAV)	-	-

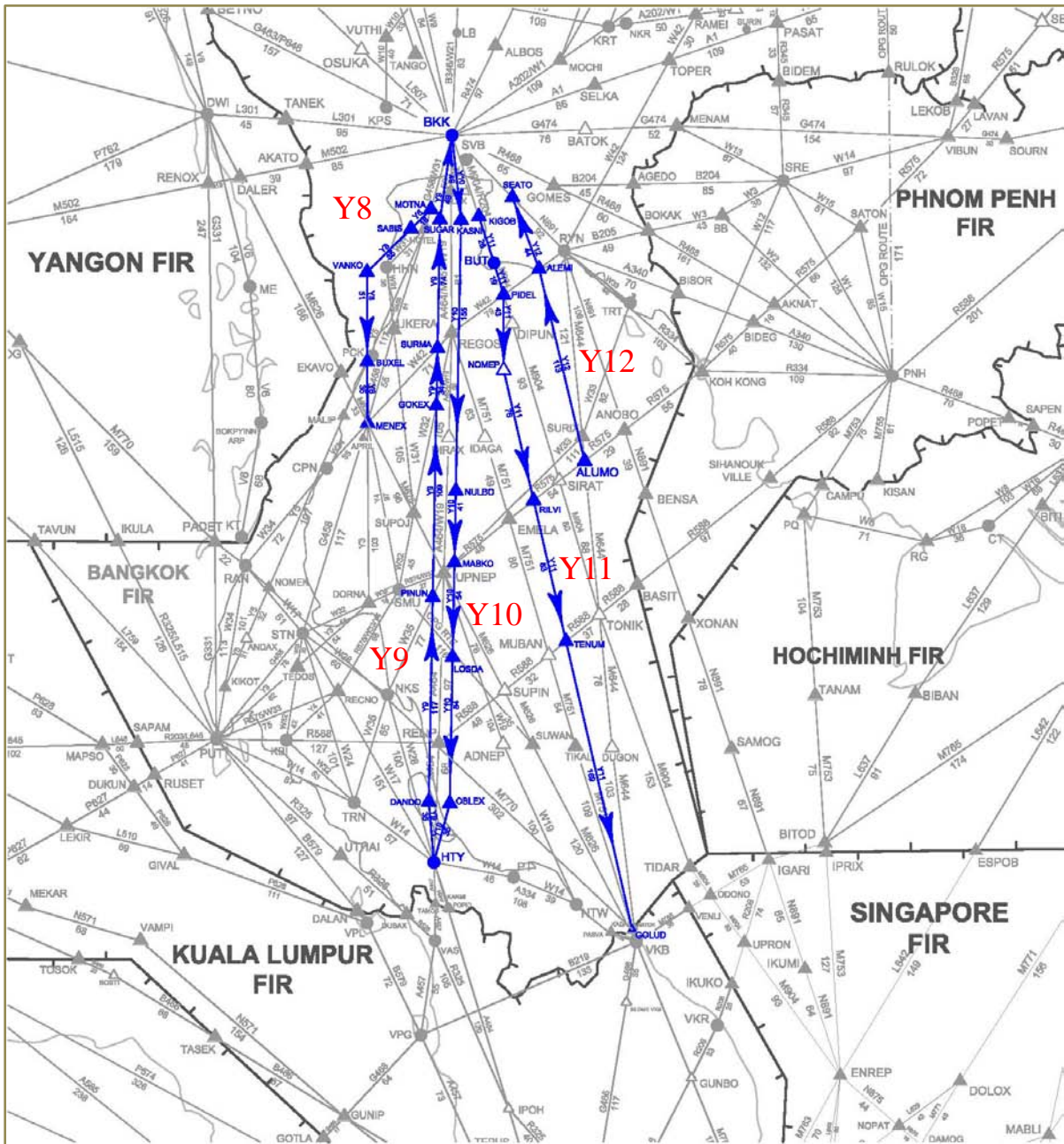
3.2 AEROTHAI, in cooperation with THAIPA and airlines, are now in process of designing additional RNP APCH procedures for Khon Kaen, Ubon Ratchathani, Nakhon Phanom, Sakon Nakhon, Hua Hin, Trang, Krabi, and Ranong Airports. The additions of BARO-VNAV for Chiang Mai and Samui. The design process for these procedures is expected to be completed in 2014. Following the completion of the design, the procedures will be submitted to the Thai DCA for its consideration, prior to the final flight validation by AEROTHAI. The following table shows the list of PBN implementations in terminal airspaces in Thailand expected to be in operation by the end of 2014:

Airport	RNP APCH	STAR PBN	SID PBN
Khon Kaen (VTUK)	RNAV (GNSS) RWY03 RNAV (GNSS) RWY21 (LNAV)	-	SID RNAV RWY03 SID RNAV RWY21 (Basic RNP 1)
Ubon Ratchathani (VTUU)	RNAV (GNSS) RWY05 RNAV (GNSS) RWY23 (BARO-VNAV)	-	SID RNAV RWY05 SID RNAV RWY23 (RNAV 1)
Nakhon Phanom (VTUW)	RNAV (GNSS) RWY15 RNAV (GNSS) RWY33 (BARO-VNAV)	-	-
Sakon Nakhon (VTUI)	RNAV (GNSS) RWY05 RNAV (GNSS) RWY23 (BARO-VNAV)	-	-
Hua Hin (VTPH)	RNAV (GNSS) RWY16 (LNAV)	-	-
Trang (VTST)	RNAV (GNSS) RWY08 RNAV (GNSS) RWY26 (BARO-VNAV)	-	SID RNAV RWY08 SID RNAV RWY26 (Basic RNP 1)
Krabi (VTSG)	RNAV (GNSS) RWY32 (LNAV)	STAR RNAV RWY32 (RNAV 1)	SID RNAV RWY14 SID RNAV RWY32 (RNAV 1)
Ranong (VTSR)	RNAV (GNSS) RWY02 (LNAV)	-	SID RNAV RWY02 SID RNAV RWY20 (Basic RNP 1)
Chaing Mai (VTCC)	RNAV (GNSS) RWY18 (BARO-VNAV)	STAR RNAV RWY18 (RNAV 1/Basic RNP 1)	SID RNAV RWY18 (RNAV 1/Basic RNP 1)
Hat Yai (VTSS)	-	-	SID RNAV RWY08 SID RNAV RWY26 (RNAV 1)
Samui (VTSM)	RNAV (GNSS) RWY17 RNAV (GNSS) RWY35 (BARO-VNAV)	STAR RNAV RWY17 STAR RNAV RWY35 (RNAV 1)	SID RNAV RWY17 SID RNAV RWY35 (RNAV 1)
Chiang Rai (VTCT)	-	STAR RNAV RWY03 (Basic RNP 1)	-

4. Progress of PBN Implementation in En-route Airspace

4.1 For en-route airspace, in 2013 Thailand has established unidirectional RNAV5 routes connecting Phuket-Bangkok (Y5 Route) and Bangkok-Chiang Mai (Y6 and Y7 Routes). The unidirectional routes are designed to increase airspace efficiency based on the PBN concept and the flexible use of airspace (FUA) concept. Moreover, these routes are created to reduce aircraft fuel consumption and green gas emission and to enhance safety and improve flow capacity of air traffic operations.

4.2 For en-route airspace, in June 2014, Thailand has established five additional unidirectional RNAV5 routes connecting Bangkok with southern destinations, as depicted in the following figure and table:



Route Designator	Direction	Main Citypairs Served
Y8	Southbound	Bangkok to Phuket/ Krabi/ Ranong/Surat Thani/ Chumphon /Trang
Y9	Northbound	Hat Yai/Samui/Nakhon Si Thammarat/ Kuala Lumpur/Penang to Bangkok
Y10	Southbound	Bangkok to Hat Yai/Samui//Nakhon Si Thammarat/ Kuala Lumpur/Penang
Y11	Southbound	Bangkok to Singapore/Jakarta
Y12	Northbound	Singapore/Jakarta to Bangkok

These routes are designed based on the PBN concept and the flexible use of airspace (FUA) concept to enhance safety and improve flow capacity of air traffic operations between Bangkok and major cities in the southern part of Thailand, as well as other international destinations south of Thailand.

5. Action by the Meeting

5.1 The meeting is invited to:

- a) note the progress of PBN implementation in Thailand
- b) discuss any relevant matters as appropriate.
