



*International Civil Aviation Organization*

**The Fifth Meeting of ICAO Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/5)**

Bangkok, Thailand, 30 March – 3 April 2015

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**Agenda Item 4: Review of Current CDM/ATFM Operations and Problem Areas**

**UPDATES ON ATFM IMPLEMENTATION IN THAILAND**

(Presented by Thailand)

**SUMMARY**

This paper highlights growing air traffic demand in Bangkok FIR and provides the progress of ATM infrastructure upgrades and ATFM implementation plans in Thailand. The main programs discussed include (1) establishment of Air Traffic Management Network Management Center (ATM-NMC), (2) development of initial ATFM automation support tool, (3) implementation of integrated departure management program, and (4) capacity assessment initiatives. It is Thailand's view to successfully implement necessary programs within the next few years to enable efficient operations in response to the ever-growing traffic demand while ensuring the harmonization with neighboring States in Asia-Pacific.

**1. INTRODUCTION**

1.1 Over the past few years, Thailand has experienced sustained growth in air traffic both domestically and internationally, with overall annual growth rate between 10-13% for the past few years, while some regions in the Bangkok FIR seeing as large as 20-30% annual growth rate in domestic air traffic. This is possibly due to the fast-growing aviation market with the booming of low-cost carriers that are making aviation more affordable and popular to the general public. This fast growth in air traffic demand necessitates implementation of effective air traffic flow management (ATFM) program for Bangkok FIR to ensure demand-capacity balance.

1.2 Approximately 45 percent of air traffic in Bangkok FIR are international flights to and from neighboring States in the Asia-Pacific region, which is also seeing a sustained growth in demand over the years. As one of the major aviation hubs in Asia-Pacific, Thailand is also actively participating in the Distributed Multi-Nodal ATFM Operational Trial, a sub-regional effort to introduce harmonized cross-border ATFM solution to effectively and smoothly handle such growth.

1.3 To enhance capabilities necessary for both domestic and cross-border ATFM service, Thailand has been progressing on ATFM support system, and this paper provides updates on this capability enhancement program.

## 2. DISCUSSION

2.1 Thailand is in the process of capability enhancement to implement effective ATFM both domestically and internationally in collaboration with neighboring States through the ATFM Operational Trial program based on Distributed Multi-Nodal ATFM/CDM Network concept. Major efforts include (1) establishment of Air Traffic Management - Network Management Center (ATM-NMC), (2) development of initial ATFM support tool, (3) implementation of integrated departure management program, and (4) capacity assessment initiatives.

### Establishment of ATM-NMC

2.2 With the aforementioned air traffic growth, Thailand's airspace will quickly be saturated without capacity enhancements. To prevent the saturation, Thailand has embarked on major ATM infrastructure upgrade project which includes (1) ATC automation system upgrade, (2) enhanced connectivity between ACC and APP units, and (3) ATM-NMC establishment. These are ongoing work with expected deliveries over the next few years.

2.3 Thailand is upgrading ATC automation system to ensure system-wide interoperability and enhanced automated aircraft handover and coordination between ATS units. Additionally, the new system will also support ATS Inter-facility Data Coordination (AIDC) with neighboring States as well as integration with the ATFM support system (further discussed in subsequent section). This will tremendously reduce ATC's workload stemming from manual coordination, and will allow for capacity enhancement in the airspace. As the new ATC automation system is being delivered, it is expected that transition to the new ATC system will commence in 2016-2017.

2.4 To further enhance connectivity and ease of coordination between Area Control Center and Approach Control Units, the Bangkok ACC and Provincial Approach Control Center will also be relocated and housed in the same room, with the Air Traffic Management Network Management Center (ATM-NMC) being constructed. Colocation of the Bangkok ACC and Provincial Approach Control Center is expected to commence in 2016-2017. Meanwhile, ATM-NMC would need to commence operation prior to expected system transition.

2.5 With the fast-growing traffic demand and airspace currently being operated at or near capacity, a paradigm shift from tactical flow control to strategic and pre-tactical flow management is necessary to keep Air Traffic Control Officers' workload at a manageable level. To support this transition, ATM-NMC is being constructed in AEROTHAI's facility. The ATM-NMC will combine expanded Air Traffic Flow Management Unit (ATFMU), Airspace Management Cell (AMC), Information Management Unit and Flight Information Center. The concept photo and organizational structure of the center is attached for reference in **Attachment A**.

2.6 The main function of ATFMU is to manage strategic and pre-tactical ATFM initiatives to balance demand-capacity at constrained resources. Some examples of the functions include planning and dissemination of ATFM Daily Plan, coordination and execution of ATFM Measures, and operation of ATFM automation support systems.

2.7 Meanwhile, the ATFMU continues to support ATFM procedure for westbound flights through Afghanistan airspace (Kabul FIR) using the Bay of Bengal Cooperative ATFM System (BOBCAT). Recent concerns on continuity of Air Navigation Service Provision in Afghanistan prompted ICAO to setup cross-regional Ad-Hoc Afghanistan Contingency Group (AHACG), latest meeting of which (AHACG/2 – Istanbul, Turkey – November 2014) requested AEROTHAI to support H24 slot allocation for flights operating through Afghanistan in case of contingency using the BOBCAT system.

2.8 Another important unit in the ATM-NMC is the AMC, which mainly handles pre-tactical coordination of Special Use Airspace activations in Bangkok FIR. Thailand is currently

undergoing a project to enhance coordination in airspace use between civil and military units by establishing the AMC unit of ATM-NMC, which will help maximize pre-planned use of conditional routes (CDRs), allowing Airspace Users more flexibility in planning those routes and thereby increasing available capacity.

2.9 Overall, the ATM-NMC project is progressing well with much of the infrastructure constructed. The completion of infrastructure is expected in 2015 with expected transition to operation commencing in 2016.

#### Development of Initial ATFM Support Tool

2.10 In the effort to establish initial ATFM support automation, Thailand developed an Air Traffic Flow Advisory System (ATFAS) to support ATFM implementation. The system is currently capable of graphically displaying both real-time and expected traffic demand using flight plan, airport slot allocation and schedule databases. This development will continue to expand capability to include initial pre-tactical ATFM using CTOT. The goal of the development is for major aerodrome control towers in Thailand to be ready to participate in the Distributed Multi-Nodal ATFM Operational Trial planned in June 2015 at the highest participation level.

2.11 Additionally, the system will also support an integrated departure management program, which will bring together existing Gate Hold procedure with CTOT-based ATFM/Ground Delay Program initiative. This will allow for smooth management from start-up / push-back to proper take-off time to ensure a smooth flow of traffic in the airspace and into constrained resources.

2.12 In the meantime, Thailand is also continuing to develop Terms of Reference (TOR) for the full ATFM automation support tool, which will need to be integrated into the new ATC automation system prior to transition to the new ATC support system and also to provide accurate air traffic demand prediction as well as support flexibility in departure slot management efficiently.

#### Implementation of Integrated Departure Management Program

2.13 To address the growing demand and effectively manage flights departing from both airports in Bangkok (VTBS and VTBD) into Bangkok TMA, Thailand has been operating Gate Hold procedure during peak departure hours using internally developed system. The procedure held aircrafts at gates when needed to prevent traffic congestion at TMA, thereby reducing safety risk and minimize airborne delays.

2.14 Gate Hold procedure support tool will continue to be developed. The scope and capability of the tool is planned to be broadened into a more effective departure flow management, allowing smooth flow of traffic from major airports into the TMAs.

2.15 Meanwhile, as mentioned in previous section, the ATFAS support tool for ATFM will also be developed in parallel to begin delivering CTOT for departures into constrained resources by June 2015. This will support Thailand's participation in the cross-border ATFM operational trial as well as implementation of domestic ATFM to address demand-capacity imbalance in the airspace.

2.16 With both departure flow management and CTOT-based ATFM support tools developed, Thailand aims to effectively integrate the flow management operations which will allow for smooth and efficient delivery of flights from their gates through TMAs and airspace with proper advance information disseminated to Airspace Users / Aircraft Operators to enable efficient pre-flight planning and avoid unnecessary delays.

2.17 It is further expected that departure management process would be further streamlined after transition to new ATC automation system, which includes integrated departure manager and arrival manager for Bangkok airports and arrival manager for major provincial airports.

Capacity Assessment Initiatives

2.18 Apart from establishment of ATM-NMC, joint leadership in ATFM Operational Trial program based on Distributed Multi-Nodal ATFM/CDM Network concept and associated system support development, Thailand is also currently carrying out capacity assessment/review initiatives.

2.19 While an airspace capacity assessment of the Bangkok ACC was carried out in 2010 as part of development of Terms of Reference for new ATC automation system, the Bangkok ACC airspace capacity continued to be fine-tuned from the initial assessment. AEROTHAI is currently in a phased approach review of sector capacity in the Bangkok ACC in collaboration with EUROCONTROL and the EU-ASEAN Air Transport Integration Project. Capacity assessment/review project for the Bangkok ACC is being carried out in the following phases:

- a) Phase 1 (ongoing): Bangkok ACC Sector Capacity Review based on current airspace configuration and current ATC automation system;
- b) Phase 2: Bangkok ACC Sector Capacity Assessment based on current airspace configuration and new ATC automation system; and,
- c) Phase 3: Flexible Sector configuration; review sector boundaries to improve support of various traffic flow patterns taking advantage of new ATC automation.

2.20 It is expected that know-how gained from Phase 1 Capacity Review could be applied to the follow phases of capacity assessment and airspace sector re-design.

2.21 In addition to airspace capacity, AEROTHAI and AOT are collaboratively reviewing airport capacity to take into account airport development projects and changes in traffic pattern. It is expected that airport capacity review will also be carried out in phases focusing on airports with need for analysis such as Phuket, Don Mueang and Suvarnabhumi.

Summary

2.22 In summary, Thailand has been progressing on a number of projects to address fast-growing air traffic demand in Bangkok FIR. During the upcoming few years, much work will be accomplished to address the demand and move Thailand toward efficient management of air traffic flow throughout the airspace with the view of ensuring harmonization with neighboring States in the Asia-Pacific region.

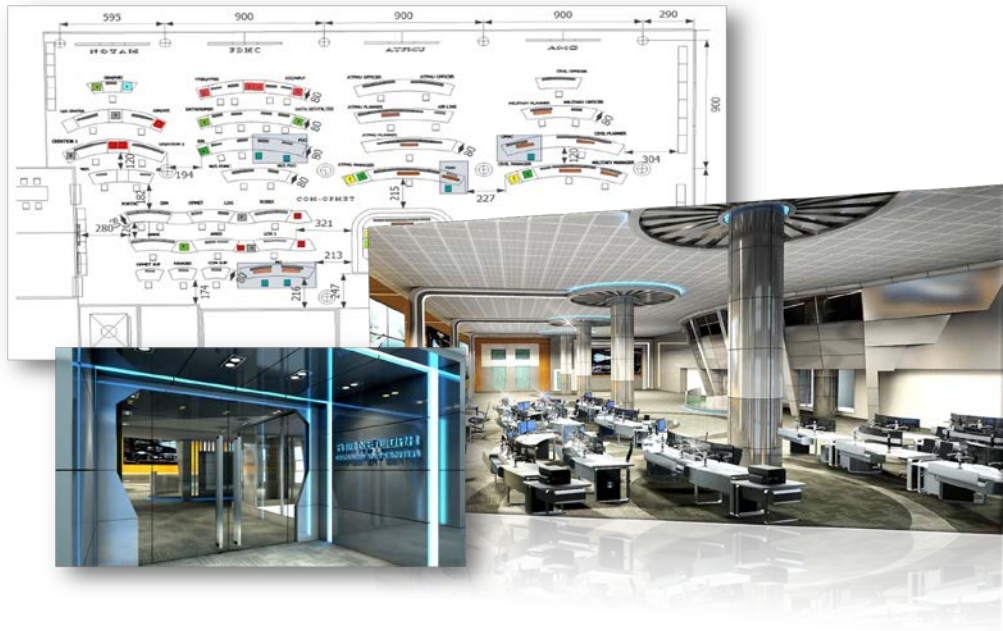
**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the information contained in this paper; and,
- b) discuss any relevant matters as appropriate.

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**Attachment A - AEROTHAI ATM-NMC Concept Photo**



**AEROTHAI ATM-NMC Organizational Structure**

