



International Civil Aviation Organization

**The Third Meeting of the APANPIRG ATM Sub-Group
(ATM /SG/3)**

Bangkok, Thailand, 03-07 August 2015

Agenda Item 4: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

CROSS BORDER AIR TRAFFIC FLOW MANAGEMENT (ATFM) OPERATIONAL TRIAL

(Presented by Australia, Cambodia, China, Hong Kong China, Indonesia, Malaysia, Philippines, Singapore, Thailand, Viet Nam, CANSO and IATA)

SUMMARY

This paper presents the developments and collaborative efforts among Australia, Cambodia, China, Hong Kong China, Indonesia, Malaysia, Philippines, Singapore, Thailand, Viet Nam, CANSO and IATA to conduct cross border Air Traffic Flow Management (ATFM) Operational Trial using the Distributed Multi-Nodal ATFM concept.

This paper highlights the preparation process prior to the commencement of the operational trial and provides an overview on the experience encountered at the onset of the trial, enabling the sharing and refinement of operational procedures, communication framework and harmonization of rules to achieve an effective cross-border ATFM.

In addition, this paper calls for collaboration with the aeronautical meteorology (MET) service providers to enhance MET products to support ATFM.

Progressing from the trials, this region will need to work together to develop the ATFM implementation plan in line with the Seamless ATM Plan and the Aviation System Block Upgrade (ASBU) methodology.

1. INTRODUCTION

1.1 A total of six Distributed Multi-Nodal Operational Trial project meetings have been conducted over a period of one year since June 2014 in preparation for the Cross Border ATFM Operational Trial. Members of group worked together to develop guidance on building up capability for readiness to actively participate in the trial. The close cooperation and collaboration led to the commencement of the Cross Border ATFM Operational Trial on 29 June 2015.

2. DISCUSSION

Operational Trial based on the Distributed Multi-Nodal ATFM concept

2.1 The Cross Border ATFM Operational Trial was based on the Distributed Multi-Nodal ATFM concept that was developed through research and development in 2013. The concept involves each Air Navigation Service Providers (ANSPs) operating an independent, ATFM node within their domain. An ATFM Node comprises of an ANSP and its associated Airport Operators (AOs) and Airspace Users (AUs). The network of ATFM nodes forms a “virtual” ATFM for the larger region.

2.2 The foundation of Distributed Multi-Nodal ATFM Network comprised efficient interconnected information sharing platform and effective Collaborative Decision Making (CDM) with comprehensive stakeholder participation. This framework in turn forms a viable ATFM solution that can better manage the cross-border flow of traffic in Asia Pacific region.

A Phased Approach with Tiered Participation

2.3 The Operational Trial consists of 2 phases. Phase 1 focuses on addressing Demand-Capacity Balancing (DCB) at individual airports by regulating arriving flights using Ground Delay Program (GDP) through the issuance of Calculated Take-Off Time (CTOT). Subsequently, Phase 2 will focus on DCB within sectors and airspace managed by participating ANSPs as well as the inclusion of flow management of long-haul international flights.

2.4 To methodically work toward the goal of the operational trial, the project group adopted a multi-stage, multi-phase approach with a realistic timeline to achieve the desired objectives. Phase 1 will be conducted over a period of 12 months from 29 June 2015. It involves three stages of increasing operational complexity to regulate arriving flights by applying take-off time restrictions before they leave upstream airports. The table below outlines the details of the various stages adopted for Phase 1 of the ATFM operational trials.

Phase 1: Distributed ATFM for Airport Arrival Constraints (Jun 2015 – Jun 2016)		
Stage 1: CTOT Communications (Jun – Sep 2015) Ensure proper CTOT communication flow among ATFM Nodes and stakeholders	Stage 2: CTOT Adherence (Oct 2015 – Jan 2016) Initial ATFM operations under scripted scenarios with provisions of addressing ad-hoc demand-capacity imbalance	Stage 3: Advanced CTOT Management (Feb – Jun 2016) More complex ATFM operations including CTOT revisions, cancellation and improvements
Phase 2: More Advanced Distributed ATFM - Consider airspace constraints		

2.5 A tiered participation level approach was adopted in preparation for the trials for ATFM Nodes with the view that Node Leaders will ensure stakeholder readiness appropriately. This approach provides a coherent linkage among individual stakeholders within the same FIR and ensures harmonized capability development across the industry. It is important to note that the participation level of members would continue to evolve as they become more capable. The participation levels and associated capabilities are shown in the table below. Details of the ATFM Node participation can be found in Appendix A of this paper.

Tiered Participation Level	Capabilities	Number of Members
Level 3 ATFM Nodes	Capable to generate, deliver, receive, and comply with CTOT	4 ANSPs, 13 airports, 13 airlines
Level 2 ATFM Nodes	Capable to receive and comply with CTOT	2 ANSP, 13 airports, 8 airlines
Level 1 ATFM Nodes	Observe and participate in the Trial Progress	4 ANSPs

2.6 Independently, ANSPs progressed with capability development which includes: establishing an ATFM unit, acquiring or developing ATFM tools, staffing and training of Flow Management Positions (FMP), crafting of ATFM Operating Procedures, collation of Node contact list and establishing teleconference facility, etc.

2.7 Through the series of operational trial project meetings, Business Rules, Awareness Package and Weekly Trial Plan have been developed to ensure that the trial will be conducted efficiently. The Business Rules outlines key principles and requirements for all stakeholders to follow to ensure a common understanding of processes, procedures and outcomes. The Business Rules has been divided into 3 stages in association with the trial. This will be reviewed and updated as the trial progresses. To reach out to the larger aviation community, an Awareness Package was developed to provide an overview of the activities related to the trial. The Awareness Package includes brief outline of the concept, leaflets to facilitate widespread distribution and the ATFM web portal user guide to enable user to familiarize with the CTOT information interface. These were aimed at raising awareness and generating interest in Distributed Multi-Nodal ATFM concept and the activities during the trial.

2.8 For the Stage 1 trials, a Weekly Trial Plan with identified test objectives was developed to provide a structured and effective approach to conduct the Operational Trial. The plan includes reviews at various points (weekly, mid stage and end of stage) for refinement and adjustments.

Trial Plan Items	Week(s)
Test telecommunication and conferencing framework	1
Stakeholder familiarization of web-portal for CTOT delivery	2
FPL submission and ICAO message handling	3
Monitor effectiveness of demand prediction	4
Mid-Term Operational Trial Review	5
Determine and declare Airport Arrival Rate (AAR) and AAR adjustment based on stakeholder inputs	6
Generate, Transmit, Receive ATFM Daily Plans (ADPs) including Revisions	7
Use of ATFM Tool to Model CTOT; Transmit and receive CTOT	8
Simulate multiple ATFM Measures	9
End of Stage 1 Operational Trial Review	10
Preparation for Stage 2	11-13

2.9 The end of Stage 1 Review Meeting is scheduled for 14-16 September 2015 in Bangkok, Thailand. At this meeting, members will review all Stage 1 test results and compliance, as well as finalise the preparations (Awareness Package, Harmonized Business Rule, Operational Trial Plan, etc.) for Stage 2.

On-going Lessons Learnt from the Trial

2.10 Stakeholders have gained valuable experience from the initial weeks of Stage 1 trial. This involves communication tests, CTOT dissemination, monitor compliance for flight plan submission and monitor effectiveness of demand prediction. Lessons Learnt will be important for the effective conduct of the subsequent stages of the trial, as well as the Distributed Multi-Nodal ATFM implementation following the trial.

2.11 One key lesson learnt was the importance of having an efficient and well defined communication framework within individual nodes and between nodes at cross border level. This involves all stakeholders to clearly identify operational and key project point-of-contacts for efficient and effective information sharing and dissemination. The dissemination of alerts and

acknowledgement of information via email was timely and effective. Conduct of CDM processes were well supported through the use of web conferencing facility. Beyond this, the trial also provides an opportunity for the group to identify areas of improvements in tele-conferencing etiquette which is paramount to an effective CDM.

2.12 To enhance demand prediction, AUs are recommended to file flight plans (FPLs) at least 3 hours ahead of Estimated Off-Block Time (EOBT) and submit ICAO messages when there are changes to EOBT of at least 15 minutes. AUs will need to continuously support these requirements in order for the aviation community to gain the full benefits of ATFM.

Aeronautical Meteorology Service (MET) Support for ATFM operations

2.13 Accurate capacity determination and adjustments is the key element for an effective ATFM. The ability for the FMP to roll-out delay programs in anticipation of a reduction of capacity hinges on the information that is available for the decision making process. Inclement weather is one of the common critical factors that contribute to a reduction in capacity. As such, accurate weather forecast and prediction is necessary. This is where ANSPs needs to work closely with the MET service providers to develop tailored products to support ATFM operations. The ATFM community needs to engage MET services actively to explore ideas, share experiences and developments on weather observations and forecasts for ATFM operations.

Next Steps

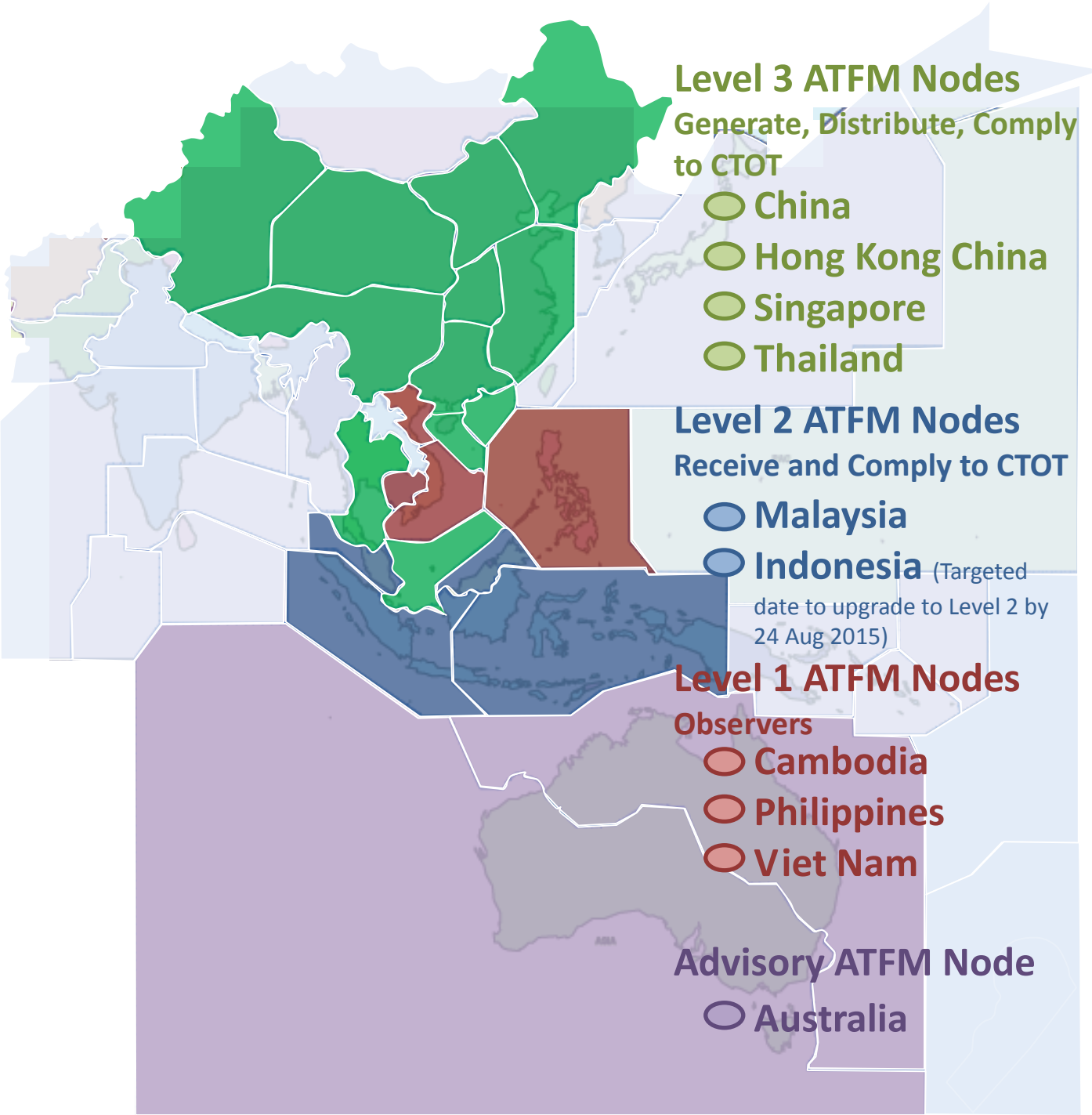
2.14 The Cross Border ATFM Operational Trial has set the stage for harmonized regional cross-border ATFM operations. This is a crucial step toward the eventual implementation of ATFM. The Operational Trial has thus far made good progress with increasing efforts and participation from stakeholders. The progress in the subsequent stages will be shared at various platforms to provide updates and create greater ATFM awareness within the aviation community. Subsequently, there will be a need for States to work together to develop the implementation plan for ATFM in the Asia Pacific Region. The ICAO ATFM Steering Group provides an excellent platform for States to collaborate and progress with ATFM implementation. Beyond the existing effort to develop the Regional ATFM Framework, States should also come together to work out an implementation plan for ATFM for the Asia Pacific Region in line with the Asia-Pacific Seamless ATM Plan and the Aviation System Block Upgrade methodology.

3. ACTION BY THE MEETING

- 3.1 The meeting is invited to;
- a) note the information contained in this paper;
 - b) urge for continued support by all stakeholders to commit resources and collaborate to the success of the ATFM Operational Trial;
 - c) acknowledge the importance of engaging the MET community to develop tailored products to support ATFM;
 - d) consider the next step towards ATFM implementation in the region in-line with the Seamless ATM Plan and the ASBU methodology; and
 - e) discuss any relevant matters as appropriate.

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**Distributed Multi-Nodal ATFM Operational Trial
Phase 1 Stage 1 ATFM Node Participation**



Information on 24 Jul 2015

ANSP Participation

ATFM Node	ANSP (with Regulator Support)
<i>Level 3 ATFM Nodes</i>	
China	Civil Aviation Authority of China, Air Traffic Management Bureau (CAAC ATMB)
Hong Kong, China	Civil Aviation Department, Hong Kong (Hong Kong CAD)
Singapore	Civil Aviation Authority of Singapore (CAAS)
Thailand	Aeronautical Radio of Thailand Ltd (AEROTHAI) Supported by Department of Civil Aviation, Thailand (DCA Thailand)
<i>Level 2 ATFM Nodes</i>	
Malaysia	Department of Civil Aviation, Malaysia (DCA Malaysia)
Indonesia	AirNav Indonesia
<i>Level 1 ATFM Nodes</i>	
Cambodia	Cambodia Air Traffic Services (CATS) Supported by State Secretariat of Civil Aviation, Cambodia (SSCA)
Philippines	Civil Aviation Authority of the Philippines (CAAP)
Viet Nam	Viet Nam Air Traffic Management (VATM) Supported by Civil Aviation Authority of Viet Nam (CAAV)
<i>Advisory ATFM Node</i>	
Australia	Airservices Australia

Information on 24 Jul 2015

Airport Operations Involved

ATFM Node	Level 3 Airport Operations: Generate, deliver, receive & comply with CTOT	Level 2 Airport Operations: Receive & comply with CTOT
<i>Level 3 ATFM Nodes</i>		
China	Guangzhou (ZGGG) Shenzhen (ZGSZ) Haikou (ZJHK) Sanya (ZJSY)	
Hong Kong, China	Hong Kong (VHHH)	
Singapore	Singapore Changi (WSSS)	
Thailand	Suvarnabhumi (VTBS) Phuket (VTSP)	Don Mueang (VTBD) Chiang Mai (VTCC) Krabi (VTSG) Samui (VTSM) Hat Yai (VTSS)
<i>Level 2 ATFM Nodes</i>		
Malaysia		Kuching (WBGG) Miri (WBGR) Kota Kinabalu (WBKK) Kota Bharu (WMKC) Ipoh (WMKI) Johor (WMKJ) Kuala Lumpur (WMKK) Langkawi (WMKL) Penang (WMKP) Subang (WMSA)
Indonesia		Jakarta (WIII) Surabaya (WARR) Denpasar (WADD)
<i>Level 1 ATFM Nodes</i>		
Cambodia		
Philippines		
Viet Nam		

Information on 24 Jul 2015

Airport Operator Participation

ATFM Node	Airport Operator
<i>Level 3 ATFM Nodes</i>	
China	Airport of China
Hong Kong, China	Airport Authority Hong Kong (AAHK)
Singapore	Changi Airport Group (CAG)
Thailand	Airports of Thailand PCL (AOT)
<i>Level 2 ATFM Nodes</i>	
Malaysia	Senai Airport
Indonesia	PT.Angkasa Pura I PT.Angkasa Pura II
<i>Level 1 ATFM Nodes</i>	
Cambodia	
Philippines	
Viet Nam	

Information on 24 Jul 2015

Airline Participation

ATFM Node	Airline
<i>Level 3 ATFM Nodes</i>	
China	China Southern Airlines Hainan Airlines Shenzhen Airlines
Hong Kong, China	Cathay Pacific Airways
Singapore	Silk Air Singapore Airline Tiger Airways
Thailand	Bangkok Airways Nok Air Thai AirAsia Thai Airways International Thai Lion Mentari Thai Smile Airways
<i>Level 2 ATFM Nodes</i>	
Malaysia	AirAsia Berhad AirAsia X FireFly Malaysia Airlines
Indonesia	Garuda Indonesia Lion Air Indonesia Air Asia Citilink Indonesia
<i>Level 1 ATFM Nodes</i>	
Cambodia	
Philippines	
Viet Nam	

Information on 24 Jul 2015