International Civil Aviation Organization

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

Bangkok, Thailand, 06 – 10 June 2016

Agenda Item 3: ATFM/CDM Global Update

COMBINED ATFM MEASURES: DISTRIBUTED MULTI-NODAL ATFM OPERATIONAL TRIAL STAGE 3 – TRANSITION TO THE REGIONAL ATFM CONCEPT OF OPERATIONS

(Presented by Australia, China, Hong Kong China, Singapore, Thailand, CANSO and IATA)

SUMMARY

This paper presents a Combined ATFM Measure that supports the Multi-Nodal Stage 3 transition to provide early operational benefits for Multi-Nodal and Regional Cross-Border ATFM deployments prior to the full implementation of the Regional ATFM Concept of Operations endorsed by APANPIRG, September 2015.

1. INTRODUCTION

1.1 Stage 3 of the Distributed Multi-Nodal ATFM Operational Trial Project commences with Limited-Scope Operational Service activities for Level 3 ANSPs where operational changes to flights will occur based on the Regional ATFM Operational Concept. In order to provide early operational benefits for stakeholders and continue validation of the operational concept, a Combined ATFM Measure has been identified that will assist with the Stage 3 trials and in the transition from current operations to Distributed Multi-Nodal Cross-Border ATFM.

1.2 The Regional ATFM Operational Concept, available on the ICAO Asia/Pacific Regional Office Website at http://www.icao.int/APAC/Pages/edocs.aspx, provides a path to automated demand capacity balancing for ANSPs that do not meet the generally accepted criteria for effective and equitable ATFM Measures:

1. Minimum of 70% participation of flights accepting new departure times; and

2. Participating flights within approximately 1,500 NM from the capacity constrained arrival airport (based on existing distances associated with proven operational ATFM deployments).

1.3 Key elements of the final operational concept include aircraft operator delay intent to distribute allocated delay on the ground and in the air and an airport maximum gate delay indicating how much allocated delay can be assigned to the parking stand.

1.4 Multi-Nodal ATFM provides a path for ANSPs in a similar geographic region to autonomously deploy ATFM/CDM systems and processes. Multi-Nodal ATFM sets the technical requirements for implementation of the Regional ATFM Operational Concept for Cross-Border ATFM (involving more than one ANSP in deploying an ATFM system).

1.5 As shown in **Figure**, most Asia/Pacific major airports do not satisfy the minimum participation percentage with domestic traffic; however, participation of flights within 1500 NM does achieve sufficient participation for many airports. Still, some airports including Changi International Airport (Singapore), Bangkok Suvarnabhumi Airport (Thailand), Narita International Airport (Japan), and Incheon International Airport (Republic of Korea) still require additional participation from flights departing from airports further than 1,500 NM for effective and equitable ATFM Measures.

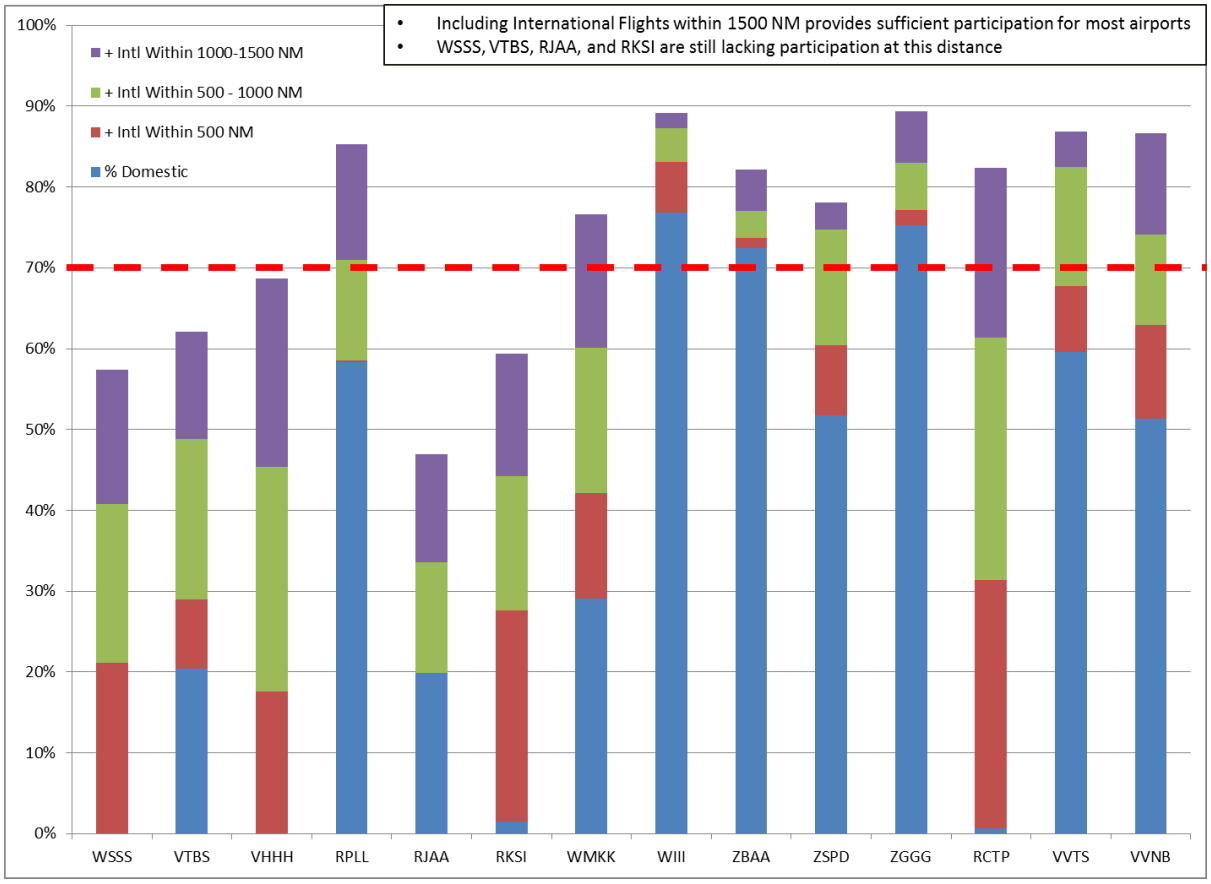

Figure: APAC Airport Demand and ATFM Participation (based on OAG data)

1.6 The Regional ATFM Operational Concept provides an approach for ANSPs to implement ATFM Measures for arrivals to these airports. However, reaching the level of involvement for an efficient and equitable traditional ATFM Measure may require wider stakeholder engagement. This, in turn, can delay the availability of proven ATFM/CDM benefits to the region including fuel savings, reduced emissions, and increased operational predictability for all stakeholders.

1.7 By introducing a Combined ATFM Measure that includes a combination of new departure times (e.g., CTOTs) for some flights and tactical flow control (e.g., Miles-In-Trail, Minutes-In-Trail, Minimum Departure Intervals, Ground Stop) for other flights, the minimum participation level for efficient and effective demand capacity balancing can be reached while still providing ATFM/CDM benefits to stakeholders.

2. DISCUSSION

Combined ATFM Measure for Transition

2.1 A Combined ATFM Measure can be implemented as part of a methodical transition from current operations to the Regional ATFM operational concept for Cross Border ATFM.

Encourage Wider Participation

2.2 Incremental training and deployment of ATFM/CDM can encourage wider participation and reduce the number and type of flow restrictions required to achieve efficient and equitable ATFM Measures.

Determine Effective Measure Via Analysis

2.3 Analysis of participating ANSPs and airports can determine the set of flights to receive CTOTs and the location, extent, and type of flow restriction implemented to account for the initial limited CTOT participation.

Cross-Border Cooperation for Setting Flow Restrictions

2.4 Cooperation across ANSPs in the region allows setting of flow restrictions outside the boundary of the ANSP with the capacity constrained airport. For example, a Combined ATFM Measure for arrivals into airports may include a combination of a Miles-in-Trial restriction and CTOT participation. Miles-in-Trail can be applied to traffic flows where dissemination of CTOT may not be feasible as an interim step to full Multi-Nodal ATFM implementation.

Effect on Tactical ATC

2.5 There should be minimal effect on tactical ATC in the event where Combined ATFM measures are being put in place. While CTOT would help ATC at departure airports to facilitate and optimize surface movements, other flow restrictions including Miles-in-Trail may require ATC to plan the take-off time to achieve the desired in-trail restrictions. This is similar to today’s common practice of having take-off restrictions to meet the en-route restriction. However, en-route ATC should not be expected to change the handling of a flight based on whether or not the flight received a CTOT. The application of tactical flow controls at the discretion of ATC may still occur for safety, separation, or demand capacity balancing.

Combined ATFM Measure Determination

2.6 The Combined ATFM Measure tactical flow controls are determined based on arrival airport ATFM slot allocations (e.g., Calculated Landing Times) for all flights. Using the anticipated new arrival times, the hourly demand from flights that are part of similar flows is used to determine a flow restriction. This approach results in the aggregate flow delivered to the arrival airport as a combination of CTOT compliance for some flights and tactical flow control for other flights.

Combined ATFM Measure as an Interim ATFM Measure

2.7 The Combined ATFM Measure should be seen as an interim measure. Combined ATFM Measures are not as efficient as the ATFM Measure resulting from the Regional ATFM Operational Concept as Miles-in-Trail measures do not provide the same level of predictability for airlines, airports or air traffic control. Such tactical flow controls are less precise than flight-specific CTOTs for all flights. For this reason, the region must continue to work towards the operational use of the Regional ATFM Operational Concept including aircraft operator delay intent and airport maximum gate delay functionality.

Early Operational Benefits

2.8 Nonetheless, the Combined ATFM Measure will help this region to move towards reducing airborne delays and improve predictability. The Combined ATFM Measure will plug the gap to include non-participating flights to ensure a more equitable spread of delay to address capacity-demand imbalance.

2.9 As an operational example of a Combined ATFM Measure, consider arrival traffic to Bangkok Suvarnabhumi Airport (Thailand). The traffic consists of domestic traffic and 5 international traffic flows. The Combined ATFM Measure would be determined based on the level of participation of international traffic.

2.10 **Figure 1** shows the major flows and the indication of which flights will be assigned a CTOT and which flights will be subject to a Tactical Flow Control based on current participation in Distributed Multi-Nodal ATFM Operational Trial project.

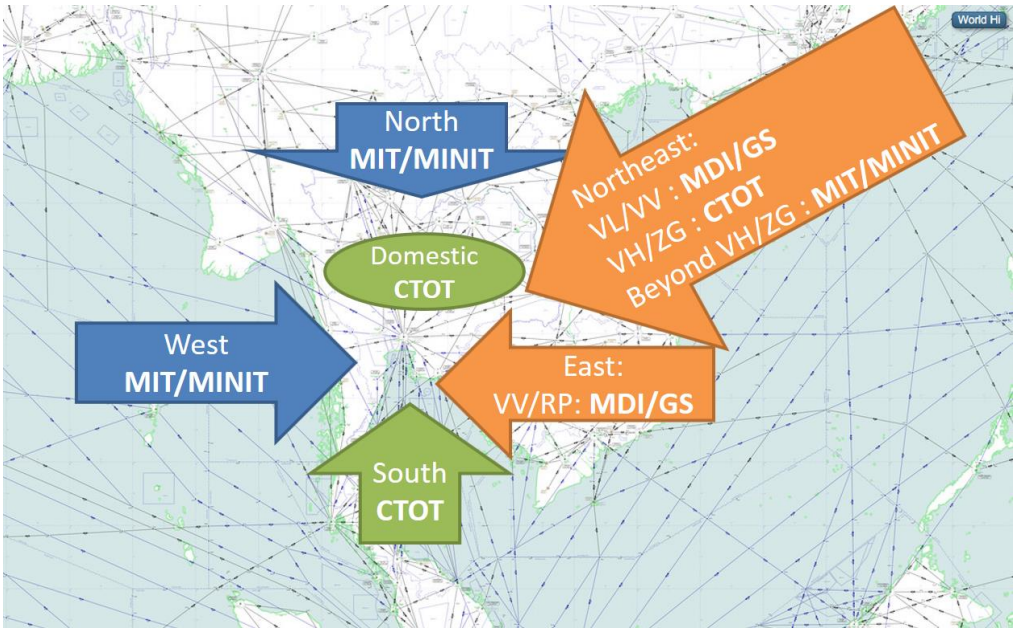

Figure 1: Operational Example of Combined ATFM Measure: Suvarnabhumi (VTBS) Arrivals

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) discuss the use of Combined ATFM Measure in Distributed Multi-Nodal ATFM Stage 3 Trial (Limited-Scope Operational Service);

c) discuss potential of Combined ATFM Measure as candidate for future updates to the ICAO Regional Framework for Collaborative ATFM and ICAO Manual on Collaborative ATFM (Doc 9971); and

d) discuss any relevant matters as appropriate.

…….