



WORKING PAPER

TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

Agenda Item 4: Optimum capacity and efficiency – through global collaborative ATM
4.1: Efficient management of airspace and improved flow performance through collaborative decision-making (CDM)

**SUBREGIONAL AIR TRAFFIC FLOW MANAGEMENT (ATFM)
CONCEPT WITH COLLABORATIVE DECISION-MAKING (CDM)**

(Presented by Singapore, Thailand and Hong Kong, China)

SUMMARY

With the continued strong growth of air traffic in the Asia/Pacific Region, there is a need to effectively manage demand and capacity especially at major international air hubs like Bangkok Suvarnabhumi International Airport, Hong Kong International Airport and Singapore Changi Airport. The common challenges faced by the three States/Administrations provide an opportunity for the three ANSPs to collaborate and develop a sub-regional ATFM concept based on CDM with a view to supporting sustainable growth of air traffic in this region.

This paper presents an update on the collaborative effort by Hong Kong, China, Singapore and Thailand to develop a sub-regional air traffic flow management (ATFM) concept through collaborative decision-making (CDM).

Action: The Conference is invited to agree to the recommendation in paragraph 3.

1. INTRODUCTION

1.1 The Asia/Pacific Region has seen strong air traffic growth for the past decade and the robust growth is expected to continue globally at 6 per cent per annum till 2014¹. Major international air hubs in the region contributed significantly to the continued global air traffic growth. Amidst the strong growth, there is an urgent need for airport operators and air navigation service providers (ANSPs) to manage the binomial demand and capacity of airports and ATM systems. Air traffic flow management (ATFM) is one of the tools to ensure a sustainable air traffic growth for the future.

1.2 ICAO has long recognized the growing importance of ATFM to the global aviation industry. Efforts to progress ATFM across various fronts have been developing well in recent years.

¹ Expected growth of 6.0% for 2013 and 6.4% for 2014. Source: ICAO (2012, 5 July) ICAO News Release: Robust Traffic Growth Expected Until 2014.

Individual States through ANSPs have implemented ATFM successfully to manage their domestic air traffic. At a regional level, such as Europe, ATFM has effectively enabled sustained air traffic growth. At the global level, ICAO is working to finalize the Global ATFM guidance material to harmonize development and progressive implementation of ATFM. Concurrently, the ICAO aviation system block upgrade (ASBU) concept emphasises the significance of collaborative decision-making (CDM) to allow a sustainable growth of air traffic for the future and ICAO also developed the CDM guidance being presented to this conference.

2. BACKGROUND

2.1 There have been various ATFM initiatives in the Asia/Pacific Region in the past few years. Apart from ATFM implementation at individual States to manage domestic air traffic, there are other developments to manage regional air traffic. One example would be the implementation of the long-haul ATFM procedures over the Bay of Bengal area. Through the collaborative efforts of the States and stakeholders in the ICAO ATFM Task Force, Aeronautical Radio of Thailand Limited (AEROTHAI) developed the BOBCAT system, established and managed by the Bangkok ATFM unit to ensure the westbound air traffic flow from South East Asia to Europe in a safe and orderly manner through busy airspace in South Asia.

2.2 The Civil Aviation Department of Hong Kong, China (HKCAD) has recently developed and implemented the Capacity Notification Scheme as well as a trial CDM Portal for Hong Kong International Airport. The Capacity Notification Scheme aims at providing information to upstream ATM units, airlines and handling agents at the Hong Kong International Airport (HKIA) on the anticipated arrival capacity and any expected arrival delay at HKIA within a period of 8 hours in advance. The CDM portal aims to improve predictability of flight arrival, departure and turnaround operations by enhancing common situation awareness among local airport stakeholders.

2.3 AEROTHAI and the Civil Aviation Authority of Singapore (CAAS) have also been collaborating to conduct “collaborative decision-making (CDM)” trials between Bangkok’s Suvarnabhumi Airport and Singapore Changi Airport. Under the auspices of the Civil Air Navigation Services Organization (CANSO), the pilot project aims for flights between these city-pair to demonstrate the efficiency gains achievable through the integration of airport and en-route CDM. Trials conducted in July and August 2012 have been encouraging in delivering benefits to the stakeholders in terms of predictability to allow better planning.

2.4 AEROTHAI and HKCAD have also been supporting the ICAO initiative to develop the Global ATFM Guidance Material, through the provision of expert ATFM input, with the goal to deliver the document to this Air Navigation Conference (AN-Conf/12). The document is part of the *Collaborative Air Traffic Flow Management* (Doc 9971), along with CDM Guidance Material, also developed by ICAO. The Part II Doc 9971 in draft form is presented to the Conference through AN-Conf/12-IP/10, supporting AN-Conf/12-WP/10 by ICAO Secretariat.

2.5 Hong Kong, China and Thailand also supports the ICAO Southeast Asia ATM Coordination Group (SEACG) in co-leading ATFM Small Working Group (SWG), while Thailand has the honor to lead the ATFM SWG of the ICAO South Asia / Indian Ocean ATM Coordination Group (SAIOACG) to coordinate ongoing development of ATFM in major sub-regions, in coordination with Singapore leadership of ATS Surveillance SWG of both SEACG and SAIOACG.

2.6 Moreover, Hong Kong, China, Singapore and Thailand are cooperating in support of ICAO Asia-Pacific Seamless ATM initiatives through the ICAO Asia/Pacific Seamless ATM Planning Group forum in various forms such as collation of combined communications and surveillance.

2.7 AEROTHAI, CAAS and HKCAD faces common challenges in managing today's growth of air traffic in the Asia/Pacific Region. These three ANSPs manage air traffic movements at some of the busiest international air hubs in the region, each with average annual movements of about 300 000 in 2011. More significantly, the composition of air traffic in Singapore and Hong Kong Airports are wholly international traffic. Bangkok Airport also manages a significant number of international traffic, accounting for over 75 per cent of the total aircraft movements. The predominant composition of international air traffic would mean that current localised ATFM concepts would not serve these international hubs with the fullest benefits.

2.8 The unique yet common challenge faced by the three ANSPs in managing air traffic at busy international hubs provides an opportunity for the parties to collaborate toward developing an ATFM concept based on networked Airport-CDM (A-CDM). The three ANSPs met at the inaugural Tripartite CDM/ATFM Planning Meeting on 29 August 2012 in Hong Kong, China.

2.9 Based on the concept of expanding the development of A-CDM at various hub airports along with the other established concepts that have been developed previously, the tripartite aims to develop a robust sub-regional ATFM concept that is both flexible and scalable for eventual widespread application in areas where ATFM is necessary.

2.10 For a start, HKCAD, AEROTHAI and CAAS will be exploring the concept of networked A-CDM to manage the traffic flows between these three hubs at a sub-regional level. Given the high volume of international traffic at the three air-hubs, the collaboration could act as a "Petri Dish" to seed such concepts and also provide a test-bed facility for further research in applying ATFM at a regional level. Through collaboration and information sharing, such concept could potentially be further expanded to manage air traffic in the hubs' catchment areas. These catchment areas could be a union of areas defined as flight time from within 4 to 5 hours range from these hubs. The concept could potentially serve as virtual ATFM Units to manage air traffic flows among major air-hubs in the sub-region.

2.11 It is envisioned that processes involved in implementation of ATFM at a subregional level for major air-hubs serving largely international traffic would involve careful synchronization of individual A-CDM programmes, tightly coupled with collaborative implementation of ATFM in the form of virtual ATFM Units serving catchment areas surrounding the major air-hubs. The project could potentially start from sharing information on arrival capacity, common traffic demand and anticipated delay, then evolving into collaborative ATFM implementation among the virtual ATFMUs.

2.12 CDM leading towards ATFM is an element in Block 0 of the ASBU, which is based on current available technology of ATM systems. The collaborative efforts of Hong Kong, China, Singapore and Thailand to develop a sustainable regional ATFM Concept are in line with ICAO's aviation system block upgrade (ASBU) concept. In future, the regional ATFM Concept could also be incorporated into the ICAO Doc 9971.

3. CONCLUSION

3.1 There are obvious benefits in CDM/ATFM which includes enhanced safety, reduction of aircraft fuel consumption, reduction in greenhouse gas emissions, lowering airline operating costs and

capacity optimization of airport and ATM systems. As the air traffic demand continues to grow, a robust regional ATFM concept through a collaborative approach would be required to support the sustainable growth. The conference is invited to agree to the following recommendation:

Recommendation 4/x – Recognize the need for a collaborative effort to enable widespread collaborative decision-making/air traffic flow management (CDM/ATFM) under Block 0 of the aviation system block upgrade and encourage States to progress with CDM/ATFM as a building block to achieve the vision of seamless air traffic management

That the Conference:

- a) note the tripartite collaboration between the three air navigation service providers to develop a subregional air traffic flow management concept based on collaborative decision-making that could also be incorporated into the ICAO manual *Collaborative Air Traffic Flow Management* (Doc 9971);
- b) note the relevance of this collaborative effort to enable the widespread collaborative decision-making/air traffic flow management under Block 0 of the aviation system block upgrade;
- c) urge States with major air-hubs expedite implementation of Airport-collaborative decision-making, particularly for major airports where projected traffic demand is approaching capacity, in line with the ICAO aviation system block upgrade Block 0 framework to achieve the vision of seamless air traffic management.

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