*International Civil Aviation Organization*

**The First Meeting of the APANPIRG ATM Sub-Group (ATM /SG/1)**

Bangkok, Thailand, 20 – 24 May 2013

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

# Development of a Sub-Regional CDM/ATFM Concept

(Presented by Hong Kong China, Singapore and Thailand)

**SUMMARY**

This paper updates the ATM Sub Group on the collaborative effort by Hong Kong China, Singapore and Thailand to develop a sub-regional air traffic flow management (ATFM) concept with collaborative decision-making (CDM). With the continued strong growth of air traffic in the Asia Pacific Region, there will be a need to effectively manage the demand against 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 provided an opportunity for the three ANSPs to collaborate and develop a sub-regional ATFM concept based on CDM with a view to ensuring sustainable growth of air traffic in this region.

This paper relates to –

**Strategic Objectives:**

*A:* ***Safety*** *– Enhance global civil aviation safety*

*C:* ***Environmental Protection and Sustainable Development of Air Transport*** *– Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

**Global Plan Initiatives:**

GPI-6 Air traffic flow management
GPI-19 Meteorological Systems
GPI-22 Communication infrastructure

## 1. INTRODUCTION

1.1 The Asia Pacific region has seen a steep increase in the volume of air traffic over the last few years. As this trend is expected to continue, various hubs in the region have forecast traffic movements to steadily increase between 5-15% every year. Such steep increase in traffic volume and robust growth will lead to increasing complexity of the operating environment.

1.2 While States in this region are progressing well to build up ATM capabilities to meet the increasing traffic volume, there will still be a need to manage demand efficiently at times where capacity reducing events occur.

1.3 There has been recognition through various frameworks including the ICAO Aviation

System Block Upgrade (ASBU) module on Network Operations (B0-NOPS / B0-35) that there is a need to improve air traffic flow performance and management through collaborative ATFM. To that end, ICAO initiated development of Manual on Collaborative ATFM (Doc 9971), ATFM part of which Hong Kong, China and Thailand were privileged to be contributors of. The overall effort to finalize ATFM part of Doc 9971 based on comments received at the 12th ICAO Air Navigation Conference (AN-Conf/12) in November 2012.

1.4 Meanwhile, States recognise that currently implemented ATFM solutions may not be universally adaptable across all States or regions especially in cases where majority of traffic volume is not necessarily contained within States' Area of Responsibility. While concepts such as a single ATFM entity to serve a region may work well in Europe or Americas, it may not necessarily be the ideal solution for Asia Pacific region. Therefore, there is a need to carry out research to develop a CDM/ATFM concept that could be implemented at a regional or sub-regional level in Asia Pacific region.

1.5 Recognizing this need, Hong Kong China, Singapore and Thailand have collaborated to develop an Air Traffic Flow Management concept to deal with such a situation. The concept to develop a sub-regional ATFM with Collaborative Decision Making (CDM) was initially presented at APANPIRG/23 in September 2012 and subsequently at the ICAO AN-Conf/12 in November 2012. The tripartite initiative was welcomed and seen as a progress toward the enhancement of the seamless ATM initiative in the region.

## 2. DISCUSSION

CDM/ATFM Tripartite Initiative

2.1 The commonality of the air traffic management issues faced by Hong Kong China, Singapore and Thailand such as traffic volume, composition handled, seasonal monsoons and tropical weather phenomena drives the collaboration to develop a sub-regional ATFM concept. The traffic volume handled by each airport exceeds 350,000 annually with predicted yearly growth of 5% or above. The daily traffic movement figures at these airports averages 1,000 air traffic movements, with peak hour traffic at 60 air traffic movements per day. The traffic composition indicates Hong Kong CAD and CAAS handle 100% international traffic movements whilst AEROTHAI handles 75% international and 25% domestic.

2.2 The Bangkok - Singapore CDM operational trial under the auspices of CANSO in July – August 2012 laid the foundation for the development of the tripartite initiative. The three ANSPs met at the inaugural Tripartite ATFM/CDM Planning Meeting in August 2012 in Hong Kong China and explored the concept of networked CDM through collaboration and information sharing to better manage the traffic flows between these three hubs at a sub-regional level.

2.3 The project group met again in Singapore in April 2013 to further work on the ATFM/CDM concept. The project group discussed on details which forms the foundation of inputs for the research process. The research process will involve a proof of concept on an integrated test bed which includes fast time and human in the loop (HITL) simulations.

CDM/ATFM Concept

2.4 The notional concept of a sub-regional CDM/ATFM will involve ANSPs operating on independent virtual CDM/ATFM nodes supported by interconnected information sharing framework. Where possible, Airport-CDM (A-CDM) mechanisms from participating airports could aid the collaborative decision making process between ANSPs. The flows of air traffic will then be managed effectively on the basis of a common principles or agreements. With maximized participation and established procedures, ANSPs could potentially manage demand/capacity through

target landing time (TLDT) consequentially leading to possible issuance of calculated takeoff time (CTOT) for participating airport/s within a defined catchment area, which could be coordinated into assigned Target Start-up Approval Time (TSAT) where A-CDM is implemented. Maturity to the concept could eventually lead to networking between other existing ATFM nodes.

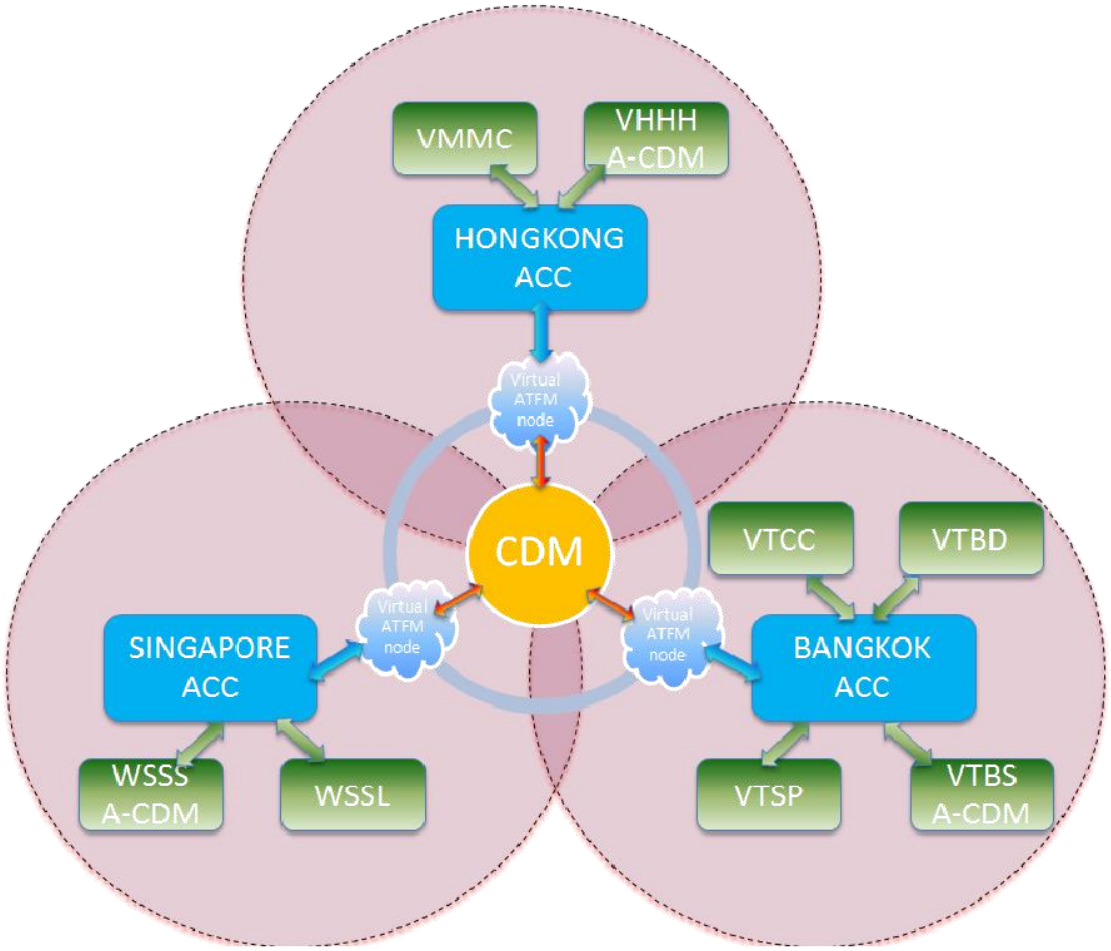


Figure 1. A Sub-Regional CDM/ATFM Tripartite Concept

Project Phase

2.5 It is recognized that a long and challenging endeavor may be inevitable for such a sub-regional ATFM/CDM concept to materialize and mature in this Asia Pacific region. Therefore the project team agreed on a more suitable approach for this project to be carried out in 2 phases.

2.6 Phase 1 will concentrate on short term objectives such as preparing and establishing information sharing framework which will lay the foundation for effective communication for collaborative decision making process between the three ANSPs.

2.7 Development plans for this phase includes, establishing a communication framework that enables daily information exchanges between the ANSPs via teleconferences supplemented by standard e-mails. The information exchanges aim to provide the predictably of operations through common awareness between the three ANSPs of any expected traffic congestion due to daily capacity reducing events such as adverse MET forecast and declared airport acceptance rate. Further plans for

the exploration and development of a web-based portal to enhance information sharing between ANSPs are being considered as well. A target operational trial to commence in August 2013 and a post-trial analysis is expected to be conducted in November 2013.

2.8 Phase 2 of the project will focus on concept development and exploring the potential for implementation at a sub-regional scale. The proof of concept for sub-regional CDM/ATFM is targeted for completion by December 2013 on an integrated test bed using fast time and HITL simulation. Part of the output from the research will also be the benefit analysis to strengthen the business case to pursue for such concept. The materialization of the sub-regional concept will then be explored on a notional time frame to be decided by the project group in coordination with key partners involved.

## 3. CONCLUSION

3.1 The project group agreed to continue the collaborative effort to explore ways to improve the communication framework, complete the proof of concept and subsequently examine potential measures to encourage a wider participation. The findings and developments of the project will be continuously updated at relevant international forums to ensure that the project remains transparent and to urge participation from key stakeholders. It is foreseeable that as the concept matures, the project group could be expanded to progressively include other States.

## 4. ACTION BY THE MEETING

4.1 The meeting is invited to:

a) note the developments and directions of the Hong Kong, Singapore and Thailand tripartite initiative to develop an CDM/ATFM concept through research process;

b) note that eventual wider participation from States in the region will be required as the concept matures;

c) discuss that there will be an eventual need to agree on a common framework and procedure to manage air traffic flows in the region based on the virtual CDM/ATFM concept; and,

d) discuss any relevant matters as appropriate.

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