



THIRTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 9 to 19 October 2018

COMMITTEE A

Agenda Item 3: Enhancing the global air navigation system

3.3: Air traffic flow management (ATFM)

TOWARDS THE IMPLEMENTATION OF THE GLOBALLY HARMONIZED AIR TRAFFIC FLOW MANAGEMENT AND COLLABORATIVE DECISION MAKING

(Presented by the Republic of Korea, China and Japan)

EXECUTIVE SUMMARY

This paper presents air traffic flow management/collaborative decision-making (ATFM/CDM) implementation status and challenges in Asia and the Pacific Region, and highlights the importance of global ATFM harmonization to enhance the collaborative cross-border ATFM capabilities. The paper also stresses the necessity of the development of various operational scenarios for ATFM information exchange, a harmonized method of airspace capacity estimation, key performance indicators and performance metrics for ATFM, and guidance reflecting the flight and flow-information for a collaborative environment (FF-ICE) and the trajectory-based operations (TBO) concept .

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

1. INTRODUCTION

1.1 The air traffic flow management (ATFM) is one of ICAO's priorities as described in the fifth edition of the *Global Air Navigation Plan* (Doc 9750), and one of ten priorities in Asia and the Pacific Region as agreed in the *Asia/Pacific Seamless ATM Plan*. The ATFM/CDM is an enabler of air traffic management (ATM) efficiency and effectiveness, aiming at not only ensuring an optimum flow of air traffic by balancing traffic demand and available capacity but also enhancing safety by ensuring the delivery of safe traffic densities and minimizing traffic surges.

1.2 This paper presents ATFM/CDM implementation status and challenges in Asia and the Pacific Region, and highlights the importance of ATFM harmonization to enhance the cross-border ATFM capabilities. It also stresses the necessity of the development of various operational scenarios for ATFM information exchange, a globally harmonized method of airspace capacity estimation, key performance indicators and performance metrics for ATFM, and guidance reflecting the flight and flow-information for a collaborative environment (FF-ICE) and the trajectory-based operations (TBO) concept.

2. DISCUSSION

Cross-border ATFM Implementation in Sub-Regional Level

2.1 To address dynamic air traffic growth in the Northeast Asia region and achieve implementation of the harmonized cross-border ATFM/CDM, the establishment of the Northeast Asia Regional ATFM Harmonization Group (NARAHG) was agreed by China, Japan and the Republic of Korea (ROK) at the third meeting of the ICAO Asia and Pacific ATFM Steering Group (ATFM/SG/3) in March 2014.

2.2 The first meeting was held in Beijing in August 2014 and the sixth NARAHG meeting was lately held in Seoul, Republic of Korea from 12 to 14 March, 2018, attended by 51 participants from the ROK, China, Japan, ICAO Regional Sub-Office (RSO), International Air Transport Association (IATA) and airlines. Three states signed a Memorandum of Understanding (MOU) on the establishment of NARAHG in November 2015, and have been implementing the cross-region ATFM collaborative platform (CRACP) project for ATFM information exchange through the cross-border ATFM network, between ROK's air traffic command centre (ATCC), Fukuoka air traffic management centre (ATMC) and Shanghai air traffic control centre (ATCC), since July 2018.

2.3 The CRACP project manages the exchange of information required by ATFM/CDM process in the phases of pre-tactical, tactical and the oost operation analysis. The accurate and timely ATFM information exchanged on the CRACP project assists ATFM units to take appropriate ATFM measures, and serves as a key enabler for implementing cross-region airspace flow program (AFP).

2.4 The CRACP project will mature through the three-phased development approach and the details of each are described as follows:

- a) Phase 1: install CRACP software in general-purpose computer (hereinafter called CRACP unit) and connect each CRACP unit via internet to exchange ATFM information. Be noted that functions at this Phase is limited to ATFM daily plan (ADP) exchange and coordination of start/end approve/deny/modify of ATFM measures;
- b) Phase 2: use more secure line than Internet to connect CRACP unit in each State, and make avail of receiving aircraft position information and calculated take-off time (CTOT)/ calculated time over (CTO) etc.; and
- c) Phase 3: connect ATFM systems of the three States directly based on the Interface Control Document (ICD). More items are shared with each ATFM units.

Regional ATFM Harmonization

2.5 In Asia and the Pacific region, there are mainly two parallel ATFM groups, the Multi-Nodal and the NARAHG. The Multi-Nodal ATFM project has been participated by eleven States/Administrations/air navigation service providers (ANSPs) in Southeast Asia region, whereas the NARAHG project has been joined by China, Japan and the ROK.

2.6 For regional ATFM implementation and harmonization, two ATFM documents, the *Regional Framework for Collaborative ATFM (The Frameworks)*; and its companion document - the *Asia/Pacific Air Traffic Flow Management Concept of Operations (CONOPS)*, were developed and adopted as guidance and common regional framework. Both projects have been contributing to the development of the regional cross-border ATFM with their experiences and technical assistance.

2.7 Meanwhile, there are differences between NARAHG and the Multi-Nodal ATFM project on the ways and processes of determining the ATFM measures for demands/capacity balancing on account of different geographical, cultural and operational environment. Moreover, these sub-regional ATFM systems tend to display discrepancies in technical perspective, such as methodologies, functionalities, interactions and system connectivity.

2.8 To minimize these differences and harmonize regional ATFM, the fifth meeting of the ICAO Asia/Pacific ATFM Steering Group (ATFM/SG/5) decided to establish an ATFM Information Requirements Small Working Group (ATFM/IR/SWG) to draft a regional operation requirements document for the exchange of and interaction with ATFM information. In addition, a set of varied actions for ATFM harmonization have also been underway, including the adoption of twelve data attributes for an Asia/Pacific flight information exchange model (FIXM) extension and the development of the system-to-system ICD. To achieve regional interoperability, removal of potential contradictory in ATFM/CDM measures, and technical cooperation on information exchange network and infrastructure will be necessary. Moreover, in the first ATFM/IR/SWG Meeting, which was held in September 2018, all sub-regional ATFM cooperation groups including NARAHG and Multi-Nodal agreed the regional harmonized information exchange solution by monitoring and modifying the boundary time overfly (BTO). All APAC States/Administrations and the APAC RSO work together to develop the regional ICD for seamless connectivity in APAC region.

Towards Global ATFM/CDM Harmonization

2.9 To foster collaboration in the implementation of processes, tools and methods for ATFM, the *Manual on Collaborative Air Traffic Flow Management* (Doc 9971) was established as a global reference for the ATFM/CDM implementation. With various ATFM projects and new proposals of regional cross-border ATFM initiative under development, the global ATFM harmonization is becoming increasingly important to ensure that all these initiatives are within the agreed framework for collaborative cross-border ATFM network.

2.10 Successful implementation of ATFM/CDM can be achieved by interoperability of systems, harmonization of procedures and standardization of information exchange between ATFM systems. Development of various operational scenarios for ATFM information exchange will increase maturity of the ATFM implementation, and enable global harmonization of the ATFM/CDM tools. Those scenarios will also lead to standardization of information and a globally harmonized ATFM information exchange requirements.

2.11 The accurate airspace capacity estimation is an enabler for successful and efficient ATFM/CDM implementation by balancing traffic demand and available capacity and optimizing the airspace capacity. ICAO provided the guidance material on capacity estimation in the *Air Traffic Services Planning Manual* (Doc 9426). In addition, the example of a simplified methodology to assist ATFM implementation was also provided in Doc 9971. Recently, the ROK conducted a case study that made an estimate of an airspace capacity on one of the busiest en-route sector in the Incheon flight information region (FIR), applying two different estimation models: Schmidt model (macroscopic analysis); and total airspace and airport modeller (TAAM) model (microscopic analysis). The result was assumed that the different capacity models and methods might cause divergent results ([AN-Conf/13-WP/243 refers](#)). In this regard, a globally harmonized method of airspace capacity estimation can result in more accurate and reliable values, and sharing best practices and experience of the advanced methodology by Member States would help aviation stakeholders to implement ATFM/CDM in more efficient manner.

2.12 To achieve a performance-based approach to ATFM/CDM implementation, development of globally agreed key performance indicators and performance metrics will be also fundamental to

effective performance monitoring and measurement of implementation benefits. Likewise, integration of ATFM with airport operations planning, such as airport-CDM and arrival manager/departure manager (AMAN/DMAN), and civil-military cooperation is also vital to ensure more effective ATFM/CDM implementation. Considering the importance of ATFM/CDM implementation as a core part of Air traffic Management (ATM), ICAO should encourage States and region to actively participate in ATFM/CDM implementation, and continue to develop guidance in order to be prepared for FF-ICE and TBO.

3. CONCLUSION

3.1 The Conference is invited to agree to the following recommendations:

- a) urge States to implement a collaborative decision-making and air traffic flow management aligned with global and regional plans;
- b) request regions to identify the current challenges of cross-border ATFM implementation and guide States regional ATFM harmonization;
- c) request ICAO to develop various operational scenarios for ATFM information exchange, and guidance in preparation for FF-ICE and TBO; and
- d) consider the necessity of a harmonized method of airspace capacity estimation, and globally agreed key performance indicators and performance metrics for ATFM to achieve a performance-based approach to ATFM/CDM implementation.

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