

**55th CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

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AGENDA ITEM 1: THEME TOPIC

**ATM TRANSFORMATION AND HARMONIZATION
THROUGH COLLABORATION**

Presented by SINGAPORE

SUMMARY

This paper calls for further collaboration among States/Administrations to achieve ATM transformation and harmonization. The benefits of a collaborative approach are evident in a number of ATM initiatives being implemented in the region. More can be done especially for initiatives that require harmonization, such as ATFM.

ATM TRANSFORMATION AND HARMONIZATION THROUGH COLLABORATION

1. INTRODUCTION

1.1 It is estimated that the air traffic in the Asia Pacific region will triple¹ by 2030. With this anticipated growth in air traffic, the aviation industry faces many challenges. Many States/Administrations have recognized² that air traffic management (ATM) is a critical link in the entire aviation ecosystem. ATM solutions and initiatives must be implemented to optimize capacity, enhance efficiency and maintain high safety standards in the region.

1.2 ATM modernization cannot be done in isolation as it involves regional and international cooperation to ensure interoperability between air-to-ground, and ground-to-ground systems. Harmonization through collaboration is key to keep up with the high traffic growth. It can mitigate inefficiencies in ATM systems which can be caused by bad weather, rigid route structures, restrictions and sub-optimal use of resources.

1.3 The Asia Pacific Region, emerging as the largest aviation market³ in the world with the fastest growth rate, should endeavour to be early adopters of ATM initiatives. They should also step up collaboration amongst one another to meet the rising demand and ensure a safe, secure and sustainable aviation market.

2. DISCUSSION

2.1 The airspace within the Asia and Pacific Region (APAC) is characterized by a dense structure of relatively small Flight Information Regions (FIRs) with high volume of traffic movement between major city pairs traversing several FIRs. In order to facilitate seamless operations, mechanisms need to be put in place to enhance safety, capacity and efficiency to handle the growing number of air traffic.

2.2 With technological advancement in Automatic Dependent Surveillance – Broadcast (ADS-B), the world is moving towards data-sharing to enable wider application of surveillance over areas previously not covered by radars. ADS-B also does not require extensive ground infrastructure support. With ADS-B data-sharing agreements, effective surveillance coverage can be substantially increased with benefits to all parties in the agreement. Singapore’s collaboration with neighbouring States/Administrations had enabled 80% of surveillance coverage across Singapore’s FIR. The collaboration, together with review of the Air Traffic Control (ATC) procedures, had enabled the reduction of longitudinal and lateral separation between aircraft, thus optimizing capacity, within a given space. It also allows aircraft to cruise at more optimal flight levels, saving fuel and contributing to reduction of harmful emissions. The ability to monitor aircraft location also helps to enhance situational awareness and allows ATC to effectively track aircraft deviation over the oceanic airspace.

2.3 Collaboration can also enhance safety and optimization of ATC resources. The introduction of Air Traffic Services Inter-facility Data Communication (AIDC) automates coordination between Area Control Centres (ACCs). Besides reduction in coordination errors due to read-back or hear-back, it had also enabled ATC to focus more on traffic management instead of being preoccupied with voice transfers. AIDC messages cover a broad spectrum of routine ATC coordination processes, allowing Air Traffic Services Units (ATSU) to implement the relevant messages to enhance their inter-ACC operations. In order to operationalize AIDC, ATSUs are required to collaborate to resolve technical issues (if any) and harmonize inter-center procedures prior to implementation. Since 2014,

¹ Report Of The Asia/Pacific Area Traffic Forecasting Group (APA TFG) Sixteenth Meeting reported that Intra-Asia/Pacific passenger aircraft movements are expected to increase from some 1,114.9 thousand in 2011 to about 3,119.7 thousand movements by the year 2032.

² Development of Single European Sky ATM Research (SESAR) and Asia/Pacific Seamless ATM Plan.

³ IATA forecasted that the Asia and Pacific Region will emerge as the world’s largest aviation market around 2022.

Singapore had operationalized AIDC with Ho Chi Minh ACC and is conducting operational trials with Kuala Lumpur ACC. AIDC has also been identified as a key enabler to alleviate Large Height Deviation (LHD) occurrences in areas where manual coordination is still being carried out between adjacent ATSUs.

2.4 Although technology has greatly increased the opportunity for seamless operations in the aviation industry, there would still be a need to put in place measures to allow continuity of aircraft movements in the event of catastrophic failures. These catastrophic failures may be the result of major natural disasters that disrupt provision of air navigation services. There is clearly a need to build up business continuity capabilities as well as the development of States'/Administrations' ATM Contingency Plans to deal with events of partial or total disruption to air traffic services. ATM Contingency Plan provides a contingency response framework for States/Administrations to ensure timely, harmonized and appropriate responses for continued safety of air navigation. It requires collaboration and harmonization among States/Administrations to regularly update the contingency arrangements for the management of aircraft and air traffic operations in or transiting affected FIR(s). To realize the Asia Pacific Seamless ATM Plan, a taskforce was formed and the **Asia/Pacific Region ATM Contingency Plan** document was developed to aid States/Administrations in formulating their Contingency Plans. States/Administrations should endeavour to make use of the document and develop the necessary bilateral/multilateral Contingency Plan agreements to ensure that safe and orderly air traffic services continue to be provided during partial or total disruption to air traffic services in a particular State.

2.5 Another key element in the Asia Pacific Seamless ATM Plan that requires States/Administrations to collaborate and harmonize is Air Traffic Flow Management (ATFM). ATFM is not new and has been widely deployed in the world. However, the APAC region spans across a vast expanse of airspace with 49 FIRs managed by more than 30 ANSPs. As the region moves ahead to face the challenges of high traffic growth, Singapore continually looks out for new and innovative ways to optimize ATM capacity, enhance safety and efficiency. Together with some likeminded States/ANSPs, a Distributed Multi-Nodal (DMN) ATFM Network was developed which enables cross-border ATFM without the need for a centralized controlling entity. The innovative decentralized mode of operation not only allows individual ANSPs to operate their own ATFM system (called a node), but also enables multiple nodes to be connected to facilitate cross-border ATFM operations and information exchange across a network of airports and airways. The initiative has helped aircraft operators and air traffic controllers achieve more precise coordination of take-off and landing at departure and destination airports, and supports management of dynamic routing of flights around constrained airspace. These ultimately ensures a sustainable air transport network that continues to facilitate movement of people and cargo effectively and efficiently, amidst the complex and high air traffic volume environment.

2.6 To date, there are 11 ANSPs with associated stakeholders and 37 airports participating in the DMN ATFM network. Quarterly meetings have been held regularly for project members to discuss and harmonize processes, procedures and systems, review past ATFM implementations and brain-storm the way forward for DMN ATFM traffic management initiatives. The operational trial targeting at airport constraints was conducted since 2016 and the core project team consisting of China, Hong Kong, China, Thailand and Singapore had since embarked on the development of processes and procedures to address airspace constraints. The measures implemented thus far had yielded positive results. The need for stakeholders to participate actively in collaborative decision making (CDM) through web conferences is becoming more evident as traffic grows. Adherence to restrictions, such as Calculated Take-Off Time (CTOT), is a shared responsibility between the ANSPs and airlines, and local processes and procedures should be in place to facilitate the CTOTs.

2.7 Recognizing the various developments of sub-regional ATFM initiatives being pursued and the need for such implementation to be harmonized in accordance with regional guidance⁴, ICAO had initiated the ATFM Information Requirements Small Working Group (ATFM/IR/SWG) meeting in August 2018 to develop operational and technical requirements for cross-border ATFM inter-

⁴ The Asia/Pacific ATFM Concept of Operations evolving from ATFM operational trial conducted by Hong Kong, Singapore and Thailand, and the Regional Framework for Collaborative ATFM

operability amongst different ATFM initiatives in the region. An example of ATFM initiative that needs to focus on interoperability for a seamless phase of operations would be the DMN ATFM Network Project and the Northeast Asia Regional ATFM Harmonization Group (NARAHG). The Concept of Operations (CONOPS) had been shared between the two groups since December 2016 and as the two ATFM initiatives mature, there is greater urgency for closer collaboration on inter-operability issues so as to achieve harmonized information exchange.

2.8 In conclusion, to manage growing traffic while ensuring a safe, secure and sustainable aviation in the APAC region, States/Administrations have to collaborate and harmonize their activities through available means. ATM is trans-boundary. States/Administrations should work together to achieve seamless ATM operations for the benefit of the travelling community.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

- a) note the information in this paper;
- b) urge States/Administration to collaborate and share ADS-B data with other States/Administrations to enhance situational awareness, share flight trajectory information and review current procedures at FIR boundaries;
- c) urge States/Administration to continuously engage adjacent States/Administrations and to formalize ATM Contingency Plans for the purpose of enhancing air traffic service provision and ensuring business continuity;
- d) urge States/Administration to invest early in technology to increase efficiency, such as the enablement of seamless operational coordination between ACCs through AIDC implementation;
- e) urge States/Administration to participate actively in regional ATFM initiatives, provide up to date point of contact for ATFM management and develop local processes and procedures for facilitating ATFM restrictions; and
- f) urge States/Administration to participate actively in ATFM/IR/SWG meetings to develop operational and technical requirements for cross-border ATFM operations.

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