International Civil Aviation Organization

Fifteenth Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/15)

Bangkok, Thailand, 28 April – 02 May 2025

Agenda Item 6: Regional ATFM Framework, A-CDM Plan and related Guidance Material

PROPOSAL FOR A COLLABORATIVE ASIA-PACIFIC ATFM CLOUD NETWORK (ACN)

(Presented by CHINA)

SUMMARY

This working paper proposes the establishment of a Collaborative Asia-Pacific ATFM Cloud Network (ACN). It outlines the imperative need for a unified, technology-driven platform to enhance regional collaboration, streamline air traffic flow management, and optimize operational efficiency amid growing air travel demand in the Asia-Pacific region. The proposal details the strategic framework, operational architecture, technical requirements, governance, and transitional roadmap towards a more resilient, data-driven ATFM environment that benefits all stakeholders.

1. INTRODUCTION

1.1 Over the past decade, air traffic flow management in the Asia-Pacific region has evolved from a conceptual framework to an operational cornerstone. This evolution reflects not only accumulated experience and regional cooperation but also the emergence of new challenges in an increasingly complex aviation environment. Traditional reliance on manual processes is now proving inadequate, necessitating the adoption of robust, system-based solutions that underpin effective traffic flow management.

1.2 Developing advanced air traffic flow management systems is neither instantaneous nor simple; it requires years of technical maturation, significant human resource investment, and substantial financial commitment. For emerging ANSPs and those constrained by limited investment capabilities, constructing state-of-the-art systems poses a considerable challenge. Consequently, these constraints have, in many cases, restricted their full integration within the broader Asia-Pacific air traffic flow management community.

1.3 In response to these challenges, a collaborative, region-wide approach is essential. Pooling expertise and resources to build a shared ATFM system not only democratizes participation among States/Administrations but also allows for the synthesis of regional strengths. A unified and shared ATFM system would facilitate high performance, operational reliability, and full-spectrum engagement for all stakeholders, ranging from ANSPs to airspace users, airports, and all the stakeholders.

2. DISCUSSION

The Need for an Integrated Cross-Border ATFM Capability

2.1 Cross-border air traffic flow management differs fundamentally from services such as Air Traffic Services (ATS). In a multi-national environment, not only is the initiating ATFM unit responsible for formulating measures, but the effectiveness of the entire system is equally contingent on the collaboration and responsiveness of facilitating ATFM units. Even when the chosen ATFM measures are both scientifically and operationally robust, the achievement of their intended outcomes is undermined without cohesive cross-border cooperation.

2.2 Several challenges exacerbate this scenario. First, many facilitating units face resource constraints; the absence of sophisticated, integrated tools forces reliance on labor-intensive processes that rarely achieve the desired level of precision. Second, in situations where ANSPs must implement new measures, the lack of a supportive system impedes the optimal calculation of CTOT or the employment of more scientifically rigorous ATFM solutions. Instead, traditional measures—such as the MIT—are often employed as a makeshift solution.

2.3 Moreover, disparate capabilities across the Asia-Pacific complicate the landscape further. When operational proficiency varies considerably from one States/Administrations to another, the theoretical advantages of advanced ATFM concepts are largely negated by pragmatic limitations, including uneven funding and technical support. If we liken air traffic services to a sporting contest, individual proficiency is analogous to a single athlete's performance; however, ATFM is a team sport that requires a synchronized, collective effort. The integrated performance of the group ultimately determines the outcome.

ATFM Cloud Network (ACN): A Collaborative Solution for the Asia-Pacific

2.4 After more than a decade of evolution in the region, conceptual approaches to ATFM have matured significantly. Yet, when transitioning these concepts into operational reality, practical challenges abound. A sophisticated CTOT calculation, for instance, demands substantial system support, and building an independent ATFM system from scratch requires heavy capital and continuous investment—an option that many ANSPs cannot immediately afford.

2.5 From an operational standpoint, system support emerges as the critical cornerstone for enhancing overall ATFM capabilities in the Asia-Pacific. When state-of-the-art tools are deployed, most of the existing operational hurdles can be efficiently addressed. However, expecting every ANSP to independently shoulder the financial and technical burden of these systems is unrealistic. Therefore, a shared solution—built on collaboration and mutual support—presents itself as an optimal strategy.

2.6 The proposed ATFM Cloud Network (ACN) is born from this very need. Rooted in the collaborative spirit suggested by the International Civil Aviation Organization's "No Country Left Behind" initiative, ACN is envisioned as a unifying platform that offers region-wide integration of ATFM operations. By harnessing shared resources and expertise, ACN promises a transformative approach to managing air traffic flow, ensuring that every participant in the Asia-Pacific region has equal access to advanced ATFM tools.

ACN Operational Concept

2.7 The operational concept underpinning ACN is multifaceted, aiming for both flexibility and efficiency:

2.8 *Shared, Cloud-Based Infrastructure:* ACN is designed as a cloud-enabled platform accessible to all Asia-Pacific members. This single, unified system streamlines the process of managing air traffic flow, allowing seamless integration and real-time data exchange among participating entities.

2.9 *Comprehensive Functionality:* Beyond the core capability of CTOT calculation, ACN will incorporate functionalities such as strategic planning, pre-tactical preparation, real-time situational awareness, and post-operation analysis. These features ensure that the platform not only meets immediate operational needs but also supports long-term strategic objectives.

2.10 *Universal Accessibility:* With an emphasis on ease-of-use and minimal setup costs, any authorized participant can access the network through standard web interfaces or dedicated terminals. This "plug-and-play" approach minimizes additional financial burdens and technical barriers, allowing for immediate and efficient integration.

2.11 *Integration with National Systems:* ACN is designed to act as both an independent system and a collaborative extension. For those nations or regions that already possess mature ATFM systems, ACN offers the possibility of integration rather than replacement. This interoperability ensures that the strengths of existing infrastructures are preserved while benefiting from the shared capabilities of the network.

2.12 *Neutral and Collective Ownership:* The ACN platform is not the property of any single nation or region. Instead, it is a collaborative asset managed through international aviation bodies such as ICAO, CANSO, or AMNAC. This neutral governance model ensures that all stakeholders share equal rights and responsibilities in maintaining and improving the system.

Challenges Addressed by the ACN

2.13 The introduction of ACN promises to effectively address several critical challenges currently faced by the Asia-Pacific region:

2.14 *Mitigating High Investment Costs:* Developing a high-performance ATFM system demands considerable financial outlay, including investment in specialized technical personnel and ongoing system upgrades. A shared ACN model allows nations to pool resources, alleviating individual financial burdens and fostering a region-wide standard of excellence.

2.15 *Eliminating Redundant Development:* With a multitude of countries and regions attempting to develop similar systems independently, there is a significant risk of duplicative efforts leading to redundant, costly, and relatively homogeneous solutions. A single, shared system prevents wasteful overlaps and promotes resource optimization.

2.16 *Enhancing System Performance and Reliability:* Variability in funding, expertise, and system design among different ANSPs has led to a broad disparity in the quality and reliability of ATFM solutions. ACN provides a uniform, high-performance standard, making it easier for all users to trust the system’s outputs and ensure smoother cross-border operations.

2.17 *Harmonizing Algorithmic Calculations:* Different ANSPs often use varied algorithms for key calculations such as CTOT. These discrepancies can result in inconsistent outcomes even under similar operational scenarios. By adopting a common algorithmic framework, ACN facilitates the sharing of best practices and the use of optimal computational methods across the region.

2.18 *Facilitating Regional Situational Awareness:* One of the major operational challenges facing regional ATFM is the fragmentation of information, which hampers effective decision-making. With all participants accessing data through a unified network, ACN eliminates communication barriers and fosters a real-time, holistic picture of air traffic conditions throughout the Asia-Pacific.

2.19 *Universal Operational Access:* Many smaller ANSPs, airlines, and airports currently lack access to advanced ATFM systems. ACN's collaborative model ensures that even those with limited resources can benefit from sophisticated ATFM capabilities. This inclusive approach maximizes the operational efficiency of the entire region, ultimately enhancing safety and service quality.

Conclusion

2.20 The proposed Collaborative Asia-Pacific ATFM Cloud Network (ACN) embodies the vision of a unified, high-performance ATFM system that transcends national boundaries. By integrating cutting-edge technology, shared financial resources, and collaborative governance, ACN can address the disparate challenges that have long hindered effective air traffic management in the region. This proposal aims not only to elevate the current state of ATFM but also to set a precedent for future regional cooperation and technological innovation in aviation management.

2.21 In embracing the ACN concept, the Asia-Pacific region takes a significant step forward toward achieving seamless, efficient, and mutually beneficial air traffic operations—a crucial advance in meeting the escalating demands of modern aviation.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) review and Finalize Operational Concepts of ACN;

c) encourage all stakeholders collaborate to jointly develop and implement the ACN;

d) discuss any relevant matters as appropriate.

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