Thirty First Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/31)

Video Teleconference - Bangkok, Thailand, 14 to 16 December 2020

Schedule: 10:00 – 13:15 Bangkok Time [UTC+7hrs]

Agenda Item 3: **Performance Framework for Regional Air Navigation Planning and Implementation**

3.2: **ATM**

FF-ICE AND THE FUTURE OF ATM

(Presented by Singapore)

SUMMARY

This paper presents the envisaged benefits and role of FF-ICE in future Air Traffic Management (ATM). In the implementation plan for FF-ICE, this paper also proposes the different roles ICAO and States could take to facilitate the transition in order to minimise the potential confusion caused by mixed mode operations, as well as to maximise the benefits brought about by FF-ICE.

Strategic Objectives:

B: ***Air Navigation Capacity and Efficiency*** *— Increase the capacity and improve the efficiency of the global aviation system*

1. INTRODUCTION

1.1 The Flight and Flow Information for a Collaborative Environment (FF-ICE) is a concept which will modernise the present day ICAO flight plan and flight planning process in order to enable the realisation of the *Global Air Traffic Management Operational Concept* (GATMOC, Doc 9854). In a collaborative ATM environment, enabled by system wide information sharing (SWIM), the ATM community will be able to balance the various demands on the ATM system, thereby improving operational efficiency, predictability and flexibility across the system. With the introduction of system wide information management and associated services, the ATM environment will become more sophistically advance. In an information-rich ATM environment, stakeholders will have access to timely, accurate and comprehensive information for decision making, paving the way for future ATM concepts such as Trajectory Based Operations (TBO).

2. DISCUSSION

2.1 FF-ICE forms the cornerstone of the performance-based air navigation system. Guided by the principles as laid down in the GATMOC, FF-ICE is envisioned to be the mechanism for flight planning and sharing of flight intent, both pre, post and during the life cycle of the flight. This enhanced sharing of updated and more accurate flight trajectories among stakeholders facilitates a collaborative decision making environment where flight trajectories could be optimised based on the Airspace Users' (AUs) preferences as well as restrictions and constraints from the Air Navigation Service Providers (ANSPs), ultimately forming the foundation of TBO, thereby materialising the ICAO Global vision for ATM.

Role of FF-ICE in the Future of ATM

2.2 FF-ICE seeks to overcome the many limitations of the current flight plan and flight planning mechanism. For instance, FF-ICE replaces the current paper-based, point-to-point, teletype communications system with an XML schema for flight data exchanges, which would enable sharing of flight information with multiple stakeholders, in a harmonised manner, in near real-time. The use of an XML schema also allows expansion of fields within a flight plan in FF-ICE to accommodate new communications, navigations and surveillance technologies and capabilities. Collectively, the use of FF-ICE will increase information sharing accurately among ANSPs and AUs, facilitating collaborative decision making to generate an optimised flight trajectory for the flight in the ATM system, taking into account operating preferences and conditions of all parties.

2.3 The extensive use of automation in FF-ICE also alleviates the workload of the human operator, both in the flight operations centres of the AUs, and in the flight planning units of the ANSPs. This automated system exchange supports a systematic and simple collaboration or negotiation between AU and ANSP in determining the optimal trajectory of a flight which is far more superior and efficient than the current process.

2.4 Adding to the enhancements of the current flight planning method, new FF-ICE services will be made available to improve processing in the current ATM system. In the first release of FF-ICE (which focuses on planning activities in the pre-departure phase), two services – the Planning service and the Trial service – have been included to enhance the demand capacity balancing functionality in ANSPs. While the implementation of FF-ICE Filing and Flight Data Request services would replace the current ICAO flight planning method, the Planning service allows AUs to submit flight intent in advance for consideration and evaluation by ANSPs. This enables the AUs to plan ahead and optimise their flight trajectories, and offers the ANSPs more accurate information which can be used in planning for utilisation of airspace and other resource needs according to the expected demand. Similarly, the Trial service allows AUs to test out alternative trajectories without committing to them, hence increasing opportunities for AUs and ANSPs to collaboratively develop optimised flight trajectories. The use of FF-ICE, coupled with the new generation of information exchanges and services through SWIM, would thus form the basis and foundation for realising TBO, a step towards achieving the GATMOC vision.

Global, Regional and National Approaches in the Implementation of FF-ICE

2.5 To ease the implementation process, the first release of FF-ICE had been designed to be able to be implemented independently and incrementally, subject to the needs of the States / ANSPs. However, this could potentially cause confusion in the differing modes of FF-ICE operations within a region for both the ANSPs and AUs. Recognising the benefits of FF-ICE in the future of ATM as well as to minimise the period of mixed mode operations in Asia Pacific, it would thus be beneficial for the region to develop a plan for a harmonised transition towards FF-ICE.

2.6 The sixth edition of the *Global Air Navigation Plan* (GANP, Doc 9750), adopted by the 40th ICAO Assembly in 2019, illustrated a multi-layer structure for the modernisation of ATM and global interoperability. The four-layer structure of the GANP offers roles and responsibilities to Global, Regional and National layers of the GANP, forming a multi-prong approach for global implementation of FF-ICE.

2.7 For the Global layer, ICAO has been instrumental in the development, review and provision of the FF-ICE concept document (Doc 9965) and an implementation guidance, as well as the review of current ICAO SARPs and Annexes to accommodate future principles of FF-ICE. Additionally, ICAO had been publicising and sensitising States and Industry on the FF-ICE concept at global meetings such as the 13th Air Navigation Conference in 2018, as well as the 40th ICAO Assembly in 2019.

2.8 Armed with the guidance from ICAO, the ICAO regional offices and PIRGs would then be well-positioned to plan for the implementation of FF-ICE. For Asia Pacific, APANPIRG and the ICAO Asia Pacific Regional Office should take FF-ICE into account while reviewing the eANPs, particularly Vol III, as well as the performance ambitions of the region. The inclusion of FF-ICE as a target for the Asia Pacific region would both encourage the uptake rate of FF-ICE implementation as well as harmonise the implementation of FF-ICE within the region. To this end, ICAO Asia Pacific Regional Office and Sub-Regional Office could consider conducting information sharing / educational sessions with regard to FF-ICE. Additionally, the regional offices and APANPIRG are also well placed to support, facilitate and coordinate implementation activities such as trials, sub-regional harmonised implementation and/or demonstrations within Asia Pacific.

2.9 For the National level, Asia Pacific States are encouraged to conduct benefit analysis and prioritisation on FF-ICE for addition into their National Air Navigation Plan. State-wise, ANSPs could engage their national carriers to plan for a national-wide implementation of FF-ICE (both ANSPs and AUs) and to build up competencies required for the various FF-ICE services for both the AUs and ANSPs. On a State-to-State basis, Asia Pacific States could also explore organising trials or demonstrations to highlight the workflow and benefits made possible by the enhanced capabilities and the enriched information that would be shared using FF-ICE. In this regard, Singapore and Thailand have developed plans to conduct trials and demonstrations on selected FF-ICE services over the next few years using FF-ICE prototype systems.

2.10 A regionally harmonised approach to FF-ICE implementation is essential to maximise the benefits to all ATM stakeholders. While the needs of the various States in this region may differ from one to another, a coordinated approach to transition would ensure a stronger benefit case for all AUs and ANSPs. States/Administrations and ANSPs are encouraged to initiate and/or participate in FF-ICE trials and demonstrations together with airspace users to build up their experience and expertise in a FF-ICE environment. Considering that ATM system upgrades typically requires a long lead time, it is imperative that the harmonised transition plan towards FF-ICE should be performed as early as possible.

2.11 FF-ICE is the cornerstone of the future performance-based air navigation system. While the first release of FF-ICE focuses on the pre-departure phase, future releases of FF-ICE goes beyond that to include post-departure and in-flight exchanges of flight information to support TBO. The implementation of FF-ICE will thus not only open up vast opportunities to improve current operations, but also form the essential step towards achieving ICAO’s vision of an integrated, harmonised and globally interoperable ATM system.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to:

a) note the information in this paper;

b) note the role and benefits of FF-ICE in the future of ATM;

c) consider conducting regional seminars or workshops to improve regional knowledge and understanding of FF-ICE, with a view to future development of a regional strategy for FF-ICE implementation; and

d) encourage States to conduct benefit analyses and FF-ICE technical and/or operational trials and demonstrations to illustrate the benefits of FF-ICE in the region.

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