Twenty Sixth Meeting of the Africa-Indian Ocean Planning and Implementation Regional Group (APIRG/26)

7 - 8 November 2023

Agenda Item	**3:**	**Implementation of air navigation goals, targets and indicators, including the priorities set in the Regional Air Navigation Plan.**
		Flight and Flow of Information for Collaborative environment (FF-ICE)

IMPLEMENTATION REQUIREMENTS OF FF-ICE

(Presented by South Africa)

SUMMARY

The ICAO Flight and Flow Information for a Collaborative Environment (FF-ICE) provides a globally harmonized process for planning and providing consistent flight information in support of Trajectory Based Operations (TBO).

The purpose of this working paper is to inform APIRG of the FF-ICE developments for consideration within the AFI Region and for the establishment of a project under the IIM/SG to address the requirements of FF-ICE.

Strategic Objectives:	This working paper relates to A – Safety, B – Air Navigation Capacity and Efficiency, D – Economic Development of Air Transport, and E – Environmental Protection.
Financial implications:	Infrastructure investment and utilisation of new technology
References:	ICAO Global Air Traffic Management Operational Concept (Doc 9854) ICAO Global Air Navigation Plan (Doc 9750) ICAO PANS-ATM (Doc 4444) ICAO Annex 2 ICAO Annex 11 Manual on Flight and Flow — Information for a Collaborative Environment (FF-ICE) (Doc 9965)

1. INTRODUCTION

1.1 In 2004, ICAO started developing the "Flight and Flow of Information for a Collaborative Environment" (FF-ICE) concept to support the vision articulated in the Global ATM Operational Concept (GATMOC DOC 9854), by introducing a new mechanism to succeed the present-day ICAO flight plan.

1.2 The flight and flow — information for a collaborative environment (FF-ICE) concept intends to address limitations and constraints of the current flight planning mechanism and enable the transition to a fully collaborative environment, where a flight trajectory is shared and optimized during all phases of a flight (i.e. trajectory-based operations (TBO) environment).

1.3 The first edition of the Manual on Flight and Flow Information for a Collaborative Environment (FF-ICE) was published in 2012. The manual introduced the initial concept of FF-ICE and provided guidance on high level processes for information exchanges, the operational and technical environments to support FF-ICE, including consideration to transition towards FF-ICE.

1.4 ICAO circulated a State Letters, reference AN 13/1.8, AN 7/63.1.2, AN 13/2.5, AN 2/33.1-22/108 on 29th December 2022 containing proposals for the amendment of Annexes 2, 10, Volume II, PANS-ATM (Doc 4444), PANS-AIM (Doc 10066) and consequential amendments to Annexes 1, 6, Parts I, II and III, 9, 11, 16, Volume IV, PANS-OPS, Volume III (Doc 8168), and PANS-ABC (Doc 8400) concerning the initial implementation of the flight and flow — information for a collaborative environment (FF-ICE) services.

2. DISCUSSION

2.1 There has been many standards, recommended practices, and technological developments within the ATM environment since the initial release of Doc 9965 – Manual on FF-ICE.

2.2 To remain up to date with global developments, the Air Traffic Management Requirements and Performance Panel (ATM RPP) began a process to review and propose amendments to Doc 9965. The ATM RPP agreed at ATMRPP/2 in Montreal, November 2016, on a plan that proposals for amendment to Annexes and PANS (core and consequential amendments) to support the initial implementation of FF-ICE services (FF-ICE/R1) be accompanied by comprehensive implementation guidance.

2.3 One of the key elements highlighted within the FF-ICE implementation strategy, is the notion of a sunset date of FPL2012, considering the limitations in FPL2012. This is to align to the System Wide Information Management (SWIM) evolution cycle and considerations for "legacy" information exchange capabilities (FPL2012 format to be replaced by XML-based format), being replaced by SWIM. The proposed global sunset date for FPL2012 is 2034. (All regions should consider setting a sunset date for FPL 2012 by end of 2032.)

2.4 The first release of FF-ICE (FF-ICE/R1) will assist to overcome many limitations of FPL 2012 (Data elements, distribution, and subsequent negotiation), allowing ATM Service Providers (ASPs) to optimise their resources and Airspace Users (Aus) to fly closer to their preferred trajectories. For example, FF-ICE allows a flexible information set which can accommodate extensive information needs, such as trajectory data, facilitating collaborative decision making by allowing ASPs to balance their demand with capacity more accurately and facilitating Aus' preferred trajectories as close as possible. By minimally implementing the FF-ICE filing service, both ASPs and AUs will be able to share more detailed trajectory information and perform negotiations based on known constraints, thus opening opportunities to optimise flight operations. The use of SWIM technology with globally harmonised rules will allow consistent sharing of information to all relevant stakeholders in an efficient, accurate, and timely manner.

2.5 In addition to access to more information, FF-ICE/R1 introduces a new planning service which allows submission of flight intent in advance (potentially up to a year or more, depending on what is reasonably accurate and practicable). AUs will be able to notify ASPs of their flight intent, while ASPs will be able to feedback on the restrictions and associated constraints applicable to that flight, hence allowing a collaborative and iterative planning process to optimise the flight plan for AUs. With the early availability

of flight planning information, ASPs will also enjoy the flexibility to plan their resources such as airspace organisation and staffing allocation accordingly. Requirements for the advanced information will be balanced to ensure reliability of information and more detailed information would only be supplied closer to the day of operations.

2.6 Additionally, these services include the ability for a "trial service" which allows an airspace user (AU) to test out alternative trajectories without committing to them; with this, AUs will be able to assess the feasibility of alternative trajectories before submitting a flight plan. The trial service ensures stability and relevance of information held within the main ATM system, since trial flight plans are not considered for ATM planning by ATM Service providers (ASPs).

2.7 FF-ICE/R1 (Minimum capability), contains a total of six FF-ICE services, structured and designed to be implemented independently. The implementation of Filing Service and Flight Data Request Services would replace the current FPL2012 flight planning services and would be sufficient to support the end of FPL2012. The other four services (i.e. Planning Service, Trial Service, FF-ICE Data Publication Service, and Notification Service) could be implemented independently and incrementally depending on needs of the ASPs and AUs. The incremental implementation would ease transition and lower the risks of operational and system issues.

2.8 As with the implementation of FPL2012 provisions, it is likely that vendors will create translators to allow an ASP to accept a FF-ICE flight plan without changing their underlying system, and to allow an AU to generate a flight plan which would be sent in a FF-ICE format. While such translators may allow an earlier and quicker transition to an FF-ICE environment, the underlying operations remain unchanged and hence, would not see the full benefits of FF-ICE. Based on the above, no further intermediary investment related to the existing flight planning system (FPL2012) is recommended. In this regard, the proposed amendments intend to ensure no impact on airspace users and air traffic services (ATS) providers unless they elect to provide and/or use the FF-ICE services, to avoid the intermediary system modification that would generate significant cost and could delay transitioning to the implementation of the FF-ICE services.

2.9 The traditional way of processing and handling of flight plans would be vastly different under the FF-ICE concept. This would require changes in operating processes and procedures on both ASP as well as AUs.

2.10 For FF-ICE/R1, relevant personnel (such as flight dispatches of AUs or personnel of ASPs performing as little manual intervention as possible) who needs to understand how FF-ICE services work is as important as having the powerful automation tools and systems set up. Additionally, while FF-ICE/R1 had been designed with automated flight plan processing as far as practicable, there could still be instances where manual, human-machine interactions would be necessary. It is therefore essential for the relevant personnel to be trained on the automation of such FF-ICE/R1 services which would also enable them to attain deeper understanding and greater appreciation of the various FF-ICE services and associated processes.

2.11 Other aspects which are included in FF-ICE/R1 include proposed changes to flight plan definition to accommodate FF-ICE service, additional guidance on Global Unique flight identifier (GUFI) and Flight Information Exchange Model (FIXM).

2.12 The proposed core and consequential amendments to support initial implementation of FF-ICE services (FF-ICE/R1) was presented/finalised during ATM RPP/4 held Virtual, 19–30 April 2021 which was presented to the Air Navigation Commission and subsequently circulated via ICAO State Letter, reference AN 13/1.8, AN 7/63.1.2, AN 13/2.5, AN 2/33.1-22/108 on 29th December 2022 for consideration by States.

2.13 As highlighted in the paper above, the FF-ICE services would require not only changes in systems (ATC/ATFM/FPL/SLOTS), but would also require changes in operating processes and procedures (Including regulatory changes for operations, training, and certification).

2.14 FF-ICE/R1 is a very important foundation for transitioning to a trajectory-based operations (TBO) environment.

3. ACTION BY THE MEETING

The meeting is invited to:

a) review and discuss the aspects raised within this working paper relating to the implementation of FF-ICE within the AFI Region; and

b) in considering the timelines and proposed sunset date for the ICAO FPL2012 being 2034, endorse the establishment of a project under the Information and Infrastructure Subgroup (IIM/SG) to address the implementation requirements of FF-ICE within the AFI Region.