

Report of ATMRPP - WG/43

Presented by the Lim De Wei

SUMMARY

The Forty-Third Working Group meeting of the Air Traffic Management Requirements and Performance Panel (ATMRPP/WG/43) was held in Montreal, Canada, from 13 - 17 November 2023, at ICAO Headquarters.

The concept of Trajectory-Based Operations (TBO) represents a fundamental shift in air traffic management, emphasising on precise trajectory planning and execution to optimise airspace capacity and efficiency. Together with the essential enablers such as Flight and Flow for a Collaborative Environment (FF-ICE), System Wide Information Management (SWIM) and Connected Aircraft (CA), TBO research and trials has been gaining traction globally. Many Air Navigation Service Providers (ANSPs) have begun working on table-top exercises (TTX) and flight simulations regionally to validate the concept. IATA organised a TTX prior to the meeting, and it was well received and attended by members of ATMRPP.

There is ongoing work to review and update the Global ATM Operational Concept (GATMOC), CA concept, flight information exchange models and the FF-ICE Release 2 Implementation Guidance.

1. INTRODUCTION

- 1.1. This report details the discussion and key activities that took place at the Air Traffic Management Requirements and Performance Panel (ATMRPP) Working Group 43 meeting, held in Montreal, Canada, from 13 - 17 November 2023. Mr Lim De Wei has been the IFATCA representative to ATMRPP since 2021.
- 1.2. The ATMRPP was first created as the "Air Traffic Management Operational Concept Panel" (ATMCP). The Panel developed the Global ATM Operational Concept (GATMOC) between 1999 and 2003. The concept was accepted by the 11th ICAO Air Navigation Conference (ANConf/11). In December 2004 the Panel was renamed the "Air Traffic Management Requirements and Performance Panel" (ATMRPP), giving recognition to the work done by the group, which has progressed from the development of a concept to the task of implementing the concept.

- 1.3. The main work of ATMRPP is to develop future ATM concepts and their requirements, standards and regulations, in particular towards the implementation of GATMOC.
- 1.4. The GATMOC presents the vision to achieve an interoperable global ATM system, for all users including manned or unmanned vehicles, during all phases of flight, that interacts with other trajectories and hazards to achieve the optimum system outcome, that meets agreed levels of safety, provides for optimum economic operations, is environmentally sustainable and meets national security requirements.
- 1.5. To achieve this vision, it is essential to have global information utilisation, management, and interchange in a safe, secured and timely manner. This is the essence of Trajectory-Based Operations (TBO), which represents a fundamental shift in air traffic management, supporting the evolution towards a holistic, cooperative and collaborative decision making environment, within which the interests and expectations of ATM stakeholders are considered and balanced, to create a precise flight trajectory that optimises airspace capacity and efficiency.
- 1.6. The Panel's work has been inscribed in a series of documents, including:
 - The Global ATM Operational Concept (GATMOC) (ICAO Doc 9854)
 - Manual on ATM System Requirements (ICAO Doc 9882)
 - Manual on Global Performance of the Air Navigation System (ICAO Doc 9883)
 - Manual on Flight and Flow Information for a Collaborative Environment - FF-ICE (ICAO Doc 9965)
 - Service Delivery Management Manual (ICAO Circular 335)
 - TBO Concept Manual (to be published)

2. DISCUSSION

- 2.1. There are a few essential enablers of TBO, namely System Wide Information Management (SWIM) and Flight and Flow Information for a Collaborative Environment (FF-ICE) and Connected Aircraft (CA) Concept.

FF-ICE

- 2.2. FF-ICE will transform the present-day flight plan and flight planning process (FPL2012). It allows for more information exchange, especially sharing of flight intent and trajectory throughout all phases of flight in greater detail, which facilitates a collaborative decision-making environment where flight trajectories could be optimised considering not only the business objectives and preferences of Airspace Users (AUs), but also any forms of restrictions and constraints of the ATM Service Providers (ASPs).
- 2.3. The information in FF-ICE:
 - can be filed for up to a year before departure;
 - is dynamically updated throughout all phases of flight (not a fixed paper flight plan);
 - is used for all coordination regarding the flight;

- is used for exchanging trajectory data;
 - is archived for statistical and research purposes, including performance measurement.
- 2.4. There are two phases in FF-ICE. FF-ICE/R1 entails the flight planning processes in the pre-departure stage, while FF-ICE/R2 entails the flight planning processes of the aircraft trajectory during flight.
- 2.5. FF-ICE/R1 implementation guidance is near the mature stage, and will be ready for implementation soon. The Panel is working on the rules and procedures on FF-ICE/R2, to allow for the post-departure negotiation between the eAU¹ and relevant eASPs² to the flight's Agreed Trajectory. The Agreed Trajectory is shared and maintained across the planning actors of relevant eASPs.
- 2.6. A notional indicative date of 2030s has been set for sun-setting FPL2012 should be set on a global level to encourage the adoption of FF-ICE. It would also help the aviation industry prepare for decommissioning of FPL2012 and work on deploying FF-ICE capabilities. However, it should be noted that such a notional date should be reviewed periodically, considering the resource constraints of the stakeholders.
- 2.7. There are currently concerns on the uneven implementation of FF-ICE, leading to a scenario known as "mixed-mode environment", where the benefits of FF-ICE can be negated as only some users are FF-ICE enabled. The panel is also working on a transition strategy to ensure minimal disruption during the transition phase.

SWIM

- 2.8. The next step would involve the sharing of information across all ground systems to better synchronise the trajectories in use by the various automation systems. This may also involve the sharing of information between ground systems obtained from aircraft automation. This is also known as SWIM.
- 2.9. SWIM consists of standards, infrastructure, and governance which enable the management of ATM-related information and its exchange between qualified parties via interoperable services. FF-ICE services and information exchanges through SWIM will create an information-rich ATM environment, where stakeholders will be able to access and promptly act on the timely, accurate and updated comprehensive flight information, thus enhancing decision making.
- 2.10. During the meeting, many ANSPs shared their research, trials and table top exercises, specifically on FF-ICE/R1 and regional SWIM implementation trails, being conducted to progress their work towards TBO. This shows the keen interest from the regions, as well as inter regional efforts, to push for TBO implementation, ranging from Europe to the USA, and to Asia Pacific States.

¹ eAU: FF-ICE enabled Airspace Users

² eASP: FF-ICE enabled ATM Service Providers

- 2.11. IATA organised a TTX prior to the meeting, and it was well received and attended by members of ATMRPP, as they participate in the exercise to understand the interaction between the relevant stakeholders in the ATM system, identifying the gaps, which can be brought back to ATMRPP for discussion. Moving forward, ATMRPP seeks to have joint TTX and panel meetings to further enhance the research and learning towards TBO.

Connected Aircraft

- 2.12. The Connected Aircraft (CA) concept enables stakeholders to leverage on commercial assets, services, and new communication technology for the air/ground information exchange needs, including general aviation and new entrants. CA also supports the transition from voice to digital communication, so that ASPs and AUs can access richer information for better decision making, through various digital data communication links.
- 2.13. The concept document is currently under exploratory stage, and more details will be shared once the concept document is at the mature stage.

3. CONCLUSION

- 3.1. The introduction of FF-ICE will be a major transformation of the current flight plan processes. It may cause some impact to ANSPs that are not able to implement FF-ICE services, thus the need for translation services between FF-ICE and FPL2012 flight plans. However, there is some concern on the accuracy of the flight plans being translated, including omission or loss of data, and the potential impact to ATC operations.
- 3.2. FF-ICE/R1 Implementation Guidance document is at the mature stage, and will be ready for implementation. Regional SWIM implementation is also progressing well. This will allow for ground/ground and air/ground sharing of trajectory data in order to improve traffic forecast and sector loads, and also allow users to negotiate and choose their most optimum flight route. This will be a step forward in the paradigm shift of ATM towards TBO.
- 3.3. Work on FF-ICE/2 has begun, and IFATCA will be actively involved to contribute to the developments of the concept, taking into account the impact to day-to-day ATC operations.
- 3.4. Significant work has been devoted to managing the transition to FF-ICE. It can be foreseen that the two flight plan formats (FPL2012 and FF-ICE) will coexist for a period of time after the implementation deadline. It is important to have a good transition strategy to ensure minimal disruption to current operations, and ensure fairness in the playing field for ANSPs which may not be able to be implemented in time.

4. RECOMMENDATION

- 4.1 It is recommended that this report be accepted as an information paper.

5. REFERENCES

- 5.1. Global Air Traffic Management Operational Concept (ICAO Doc 9854)
- 5.2. Manual on Flight and Flow – Information for a Collaborative Environment (FF-ICE) (ICAO Doc 9965)
- 5.3. Connect Aircraft Concept Document (draft)

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