IFATCA
INTERNATIONAL FEDERATION OF AIR TRAFFIC CONTROLLERS' ASSOCIATIONS
65th ANNUAL CONFERENCE
20 April – 24 April 2026, Bucharest, Romania

Agenda Item: B.3.1.4 **INFORMATION PAPER** **WP No: 79**
IFATCA'26

Report of ATMRPP-WG/46 & WG/47

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SUMMARY

This paper provides a summary of the outcomes from the ICAO Air Traffic Management Requirements and Performance Panel (ATMRPP), specifically the 46th and 47th Working Group (WG/46 and WG/47) meetings held in Montreal in 2025. It highlights ATM developments relevant to Air Traffic Control Officers (ATCOs), including the transition from FPL2012 to FF-ICE services, SWIM routing and interoperability, updates to surveillance/equipage coding (e.g., ADS-B capability codes), and work towards Trajectory-Based Operations (TBO) such as air-ground trajectory synchronisation and trajectory negotiation concepts. These developments will progressively change how flight information is exchanged, how trajectories are managed, and eventually how ATCOs interact with automation, adjacent units and airspace users.

1. INTRODUCTION

1.1. The ATMRPP is an expert panel of the ICAO Air Navigation Commission (ANC). Its objectives are to guide the transformation of the global ATM system, develop standards and procedures, and ensure harmonised implementation of future flight planning and information exchange concepts.

1.2. WG/46 (Apr 2025) and WG/47 (Oct 2025) focused on addressing key outcomes from the 14th Air Navigation Conference (AN-Conf/14), in particular FF-ICE implementation and the cessation of FPL2012.

1.3. These developments have direct operational relevance to ATCOs, as they will influence

- how flight plans are filed, updated and accessed;
- how constraints and trajectories are coordinated with airlines;
- how automation supports situation awareness;
- how clearances will be delivered and monitored in increasingly digital environments; and

- how to manage safety and workload risk during the transition from FPL2012 to FF-ICE (mixed-mode operations).

1.4. To recap, there are a few essential enablers and concepts required to achieve TBO. This includes the following:

· Flight and Flow Information for a Collaborative Environment (FF-ICE) – new flight planning format that will replace the current FPL2012. It contains more data to enable collaborative decision-making amongst all stakeholders, including airlines, ATCOs and airport operators.

· System Wide Information Management (SWIM) – a framework of data and security standards to enhance the exchange of information in ATM, shifting from a traditional point-to-point communication model to an integrated, system-wide approach that enables seamless and secure information sharing among stakeholders.

· Connected Aircraft Concept – a framework guiding the operational use of performance-based communication links, where advanced communication technologies enable more continuous connectivity between aircraft and ground systems and support near real-time data exchange.

1.5. Mr Lim De Wei has been IFATCA's representative to ATMRPP since 2021. The work to develop future ATM concepts is demanding, involving two week-long meetings each year and additional working group meetings in between. Nonetheless, the process has been meaningful and rewarding, made possible with the generous support of the Civil Aviation Authority of Singapore and IFATCA.

2. DISCUSSION

2.1. The following paragraphs summarise the key developments and work arrangements from the ATMRPP WG/46 and WG/47 meetings and explain their relevance to current and future ATM operations from an ATCO perspective.

Transition from FPL2012 to FF-ICE

2.2. Discussions at ATMRPP are focused on FF-ICE implementation and the global transition away from FPL2012, in line with the endorsement from AN-Conf/14 Recommendation 3.2/2 on the transition to FF-ICE services and the cessation of the ICAO 2012 flight plan by 2034.

2.3. The panel is now moving from concept definition to transition governance, safety risk management and implementation readiness, with the target cessation of FPL2012 by 2034. However, it was envisioned that there would be a long mixed-mode transition period beforehand.

2.4. Globally, there had been a lot of work done by various Air Navigation Service Providers (ANSPs) to push for FF-ICE implementation.

i. Europe: EUROCONTROL Network Manager has implemented almost all the FF-ICE/R1 services (Filing, Trial, Flight Data Request, Notification and Publication Services), except for Planning service. DSNA (France) has been testing the use of eFPLs, with operational use targeted for 2029. Germany and Spain have planned for phased deployments by 2025–2029.
ii. Asia-Pacific: A few Asia-Pacific ANSPs have come together to conduct FF-ICE-related tabletop exercises and laboratory demonstrations to validate the concept. An FF-ICE Ad Hoc Group had also been formed to align APAC's regional FF-ICE implementation frameworks, aiming for full FF-ICE/R1 services by 2028–2030.
iii. Canada: NAV CANADA is developing a centralised Canadian Network Management Unit, with operational implementation around 2029–2030.
iv. China: Conducted validation of FF-ICE/R1 services through a few operational trials, including automated flight plan negotiations and SWIM-based data sharing.

2.5. Key Relevance to ATC Operations:

i. Mixed-mode operations will persist for many years and present real workload and safety risks if not actively managed.
ii. ATCOs will need training for the shift from static, message-based flight plan handling to richer and more dynamic flight information maintained through automation.
iii. There will be decommissioning of legacy ATS messages (e.g., FPL, CHG, DLA, CNL, DEP, ARR, ALR, RCF) as FF-ICE services mature. However, some coordination/transfer functions (e.g., CPL, EST, CDN and other AIDC messages) are expected to remain in use because there is no FF-ICE equivalent yet.
iv. Incremental changes to flight data content are being introduced to support safe transition (e.g., additional guidance to include SSR Mode A and code in FF-ICE departure/arrival notifications, and new ADS-B capability codes to distinguish aircraft without antenna diversity for space-based ADS-B use).
v. ATCOs should expect mixed equipage indications during transition and ensure local tools/procedures handle these fields consistently.
vi. Robust contingency procedures for degraded systems and non-equipped users remain essential.

<u>SWIM routing and interoperability</u>

2.6. The meeting also highlighted SWIM message routing as a critical prerequisite for FF-ICE/R1 and FPL2012 cessation. The meeting discussed how stakeholders will route FF-ICE information service messages globally (e.g., via Information Service Definitions and agreed routing metadata) and agreed to establish additional work to develop implementation guidance to ensure interoperability and avoid fragmented regional solutions.

2.7. Key Relevance to ATC Operations:

i. Interoperable routing of FF-ICE messages is essential for seamless cross-boundary coordination and consistent flight data availability across adjacent units and FIRs.
ii. Clear routing and addressing conventions (including station-to-station continuity concepts) support exception handling and contingency operations when automation or service endpoints are degraded.
iii. Better information consistency reduces controller workload associated with duplicate coordination, missing flight data, and manual re-entry during mixed-mode operations.

FF-ICE/R2 and Trajectory Negotiation – Maintaining ATC Authority

2.8. FF-ICE/R2 focuses on flight trajectory negotiation during the inflight phase, primarily between airspace users (AUs) and ATM Service Providers (ASPs).

2.9. However, to maintain the integrity of ATC clearances, the panel agreed that negotiation results are not ATC outcomes. It should be noted that only ATCOs have the authority to issue and validate ATC clearances.

2.10. Concerns were raised about potential inconsistencies between the trajectory agreed through AU–ASP negotiation and the ATC-cleared trajectory issued by the ATCO. Procedures are being developed to address these issues in the FF-ICE/R2 Implementation Guidance.

2.11. Key Relevance to ATC Operations:
i. ATC authority and accountability remain protected, even with the implementation of FF-ICE trajectory negotiations.
ii. IFATCA's involvement remains critical to prevent any erosion of ATC responsibility through automation or planning tools.

Connected Aircraft and Data Link Evolution

2.12. The Connected Aircraft concept prioritises operational use cases, with technology as an enabler. The concept discussion has since evolved towards Hybrid Communications Networks (HYCON), which consist of in-flight connectivity links along with safety links and a fallback mechanism to support performance-based communications, resilience, and practical fallback options across multiple communication links.

2.13. Key Relevance to ATC Operations:

i. Increased connectivity is intended to reduce routine voice congestion and improve information consistency.
ii. This is intended to reduce the complexity of ATCO – AU communications.
iii. ATCO roles and responsibilities should remain unambiguous during system failures and degraded modes.

Higher Airspace Operations (HAO)

2.14. ATMRPP is also developing a holistic vision and concept of operations (CONOPs) for HAO, including new vehicle types and performance, cross-border coordination challenges, together with other ICAO expert groups.

2.15. Key Relevance to ATC Operations:

i. HAO may not fit into traditional ATC service models.
ii. It is important to define the realistic roles and responsibilities of ATCOs and prevent inappropriate expectations of ATC services.

3. CONCLUSION

3.1. The development of TBO is a major milestone in the evolution of global air traffic management. Timely implementation will require coordinated action by all aviation stakeholders, supported by standardised and globally harmonised rules and procedures to improve operational efficiency, safety, and environmental sustainability.

3.2. The outcomes of ATMRPP-WG/46 and WG/47 mark a decisive shift from concept development to implementation planning, transition governance, and safety risk management. For ATCOs, the next decade will bring gradual yet fundamental changes in how flight information is exchanged, how trajectories are coordinated, and how automation supports decision-making across units.

3.3. Early awareness, sustained IFATCA engagement, and a strong emphasis on human-centred design are essential to ensure future ATM remains safe, operationally realistic, and ATCO-led.

3.4. ATCOs should anticipate an extended mixed-mode transition period up to 2034, requiring adaptation to new services, data fields, and message formats.

3.5. ATCOs should remain vigilant throughout the transition. ATC clearances remain the responsibility and authority of the ATCO, notwithstanding increased automation and electronic trajectory updates.

3.6. The IFATCA representative will continue to participate in ATMRPP work to ensure that emerging policies and procedures include appropriate safeguards, enabling ATCOs to perform their primary role without adverse impact and to transition safely as new services are introduced.

4. RECOMMENDATIONS

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

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