



ICAO

*International Civil Aviation Organization***Twenty Ninth Meeting of the Communications/
Navigation and Surveillance Sub-group (CNS SG/29)
of APANPIRG**

Bangkok, Thailand, 16-20 June 2025

Agenda Item 5: Information Management (IM)

5.3 Outcomes of SWIM Seminar

OUTCOMES OF SWIM SEMINAR

(Presented by the Secretariat)

SUMMARY

This paper presents the outcomes of SWIM Seminar held on 19 May 2025 for meeting information.

1. INTRODUCTION

1.1 The ICAO Asia/Pacific System-Wide Information Management (SWIM) Seminar 2025 was held on **19 May 2025** at the ICAO Asia and Pacific Regional Office, Bangkok, Thailand. The theme of the Seminar was **Establishing SWIM – A Key Enabler for FF-ICE**. At the 14th Air Navigation Conference in 2024, Recommendation 3.2/2 was approved, outlining the transition to Flight and Flow – Information for a Collaborative Environment (FF-ICE) services and the cessation of the ICAO 2012 flight plan by 2034. SWIM plays a critical role as a key enabler for FF-ICE, and its implementation must occur prior to the start of FF-ICE deployment. With only nine years remaining until 2034, the timely implementation of SWIM is essential. This Seminar provided insights into the minimum SWIM capabilities necessary for FF-ICE implementation. It also served as a platform for the ICAO APAC SWIM TF to gather feedback from regional aviation stakeholders on how to effectively support them in meeting this goal within the limited timeframe. The SWIM Seminar report and presentations can be accessed by [this link](#).

1.2 This paper summarized the outcomes of the SWIM seminar for CNS SG29 Meeting information.

2. DISCUSSION

2.1 A total of **seven** (7) presentations were delivered by various SWIM Experts. The presentation materials can be accessed via the [link](#).

Summaries of all presentations*SP01 – Setting the Scene*

2.2 Dr. Amornrat Jirattigalachote, ICAO APAC SWIM Task Force Co-Chair, shared the background information on the motivation to conduct the Seminar and the specific topics to be explored. Notably, it was highlighted that the Seminar aimed to assist participants in understanding the minimum SWIM capabilities required to support the implementation of FF-ICE. Given the various developments

made so far by SWIM TF, she shared how the Seminar will provide insights into how these developments will be implemented in relation to the realization of FF-ICE.

SP02 - JCAB's Journey to SWIM and FF-ICE

2.3 Mr. Yukinobu Ryu, Director for Flight Information Management Planning, Japan Civil Aviation Bureau, delivered a briefing on Japan's experiences with SWIM and FF-ICE. He shared information on the development of CARATS (Collaborative Actions for Renovation of Air Traffic Systems), Japan's long-term vision for the future air traffic systems. This long-term vision aimed to address the increasing traffic congestion and demand as well as align with international trends. It was highlighted that, as part of this long-term vision, SWIM-related efforts have been conducted under the leadership of JCAB in close collaboration with R&D institutes and commercial vendors. Moreover, he outlined the SWIM journey in Japan, starting from participation in R&D activities to entering the implementation phase. He also informed about the launch of the SWIM Portal site, a platform where users can explore the current SWIM information services being provided. Additionally, he presented details about the SWIM Education and Enhancement (SWIMEE) team, comprising members from the aviation industry. This team aims to promote awareness, understanding, and usage of SWIM as well as explore its potential for improvement. He also shared lessons learned to date and the planned next steps for Japan's SWIM implementation. Furthermore, he reiterated the AN-Conf/14 Recommendation on the cessation of the 2012 FPL and emphasized the relationship between SWIM, FF-ICE, and TBO. Lastly, he explained the high-level planned system integration to support mixed-mode FF-ICE/FPL2012 operations, along with Japan's participation in regional FF-ICE related forums. The Seminar noted that Japan is planning to upgrade its information services to implement the initial FF-ICE/R1 mandatory service (Filing service and Flight data request service) by 2028.

SP/03 – CAAS's Journey to SWIM and FF-ICE

2.4 Mr. Elvin Liow, Head (Open Platform for Air Navigation Services), Civil Aviation Authority of Singapore, provided examples of potential SWIM use cases, e.g., flow management, data analytics, etc., along with the necessary SWIM-related components to enable the use cases. He suggested adopting a "Start Small" approach, beginning with the identification of a single use case, using simulated data sources and networks to explore various SWIM technologies such as message broker, message protocol, and method for information service provisioning. He also emphasized the importance of participation in the SWIM TF and other regional trials to learn from and exchange insights with other stakeholders in the region. He further advised a gradual expansion of SWIM development by identifying additional use cases, data sets, and data sources. Moreover, it was shared that operationalizing SWIM would require considerations of additional aspects, e.g., cybersecurity, maintenance, and governance. He emphasized that SWIM implementation extends beyond the role of ANSPs and requires participation from other stakeholders across the aviation industry. He outlined CAAS's SWIM journey and plan for operational SWIM implementation. He reiterated the "Start Small" approach, which has also been adopted for their FF-ICE development and implementation. CAAS's experiences to date in FF-ICE activities and how these are related to SWIM activities were provided. Finally, he offered perspectives on the minimum SWIM capabilities required for FF-ICE, including connectivity with the internal flight planning system, connectivity with other organizations, and considerations for cybersecurity and governance.

SP/04 – AEROTHAI's Journey to SWIM and FF-ICE

2.5 Mr. Arthit Tosukolvann, Air Traffic Engineering Manager, and Mr. Worapong Jirojkul, Executive Air Traffic Systems Engineer, AEROTHAI, presented AEROTHAI's journey in the development and implementation of SWIM and FF-ICE. They shared development timelines and key milestones achieved to date, along with plans for the implementation of operational SWIM and FF-ICE/R1 services. They also provided a draft of the high-level architecture of AEROTHAI's FF-ICE system, which is to be established over the SWIM Technical Infrastructure (SWIM TI). They explained the expected FF-ICE message flow within this architecture and the functions of various SWIM-related components in supporting FF-ICE operations. Furthermore, essential SWIM TI capabilities, both

functional and non-functional, were highlighted, including messaging, security, TI management, and performance requirements. In terms of security, it was shared that authentication and authorization are considered minimum requirements. Lastly, they shared lessons learned thus far from both technical and general perspectives. They also encouraged participants to adopt a “Start Small” approach and emphasized the importance of participation in regional trials in enhancing understanding of SWIM.

SP/05 – SWIM Routing for FF-ICE Implementation and FF-ICE Mandatory Services on SWIM Demonstration- CANSO

2.6 Mr. Wayne Osse, Co-Chair of the CANSO Digital Transition Workgroup, shared global updates on SWIM and FF-ICE developments. He particularly outlined SWIM Global Routing and Information Service Definitions (ISDs) efforts to support globally harmonized FF-ICE/R1 services implementation over SWIM. He also shared the current challenges related to SWIM routing, especially for FF-ICE/R1 implementation, emphasizing the lack of implementation guidance or standards for information labels. To address this issue, the Seminar was informed that a dedicated group under the ICAO Air Traffic Management Requirements and Performance Panel (ATMRPP) has been established to develop a harmonized approach for SWIM routing among FF-ICE stakeholders. Moreover, he explained that the potential solution would involve establishing a standard SWIM routing label, utilizing message metadata (topics and properties) for information delivery without payload inspection, and implementing governance mechanisms for access control. The FF-ICE/R1 filing service demonstration was also conducted to showcase how eFPL, submission response, and filing status could be routed based on topics.

SP/06 – Transition from FPL2012 to FF-ICE: Advancing Towards SWIM-Enabled Operations- IATA

2.7 Mr. John Moore, Assistant Director – Flight and Technical Operations, IATA Asia-Pacific, outlined the limitations of the FPL2012 flight planning system, especially the inability of the current FPL2012 format to accommodate all necessary information required for more efficient trajectory planning and demand/capacity balancing. He highlighted the need for a transition to FF-ICE to address these shortcomings. He explained the benefits to airlines of accessing and processing aeronautical information in the Aeronautical Information Exchange Model (AIXM) and MET information in the ICAO Meteorological Information Exchange Model (IWXXM) formats through SWIM information services. He also provided an example of how the increased information shared through the FF-ICE flight plan would enhance ANSP’s trajectory calculation. He briefly described the overview of the Flight Information Exchange Model (FIXM), the standard format used for the FF-ICE flight plan, and emphasized its ability to accommodate a wider range of flight-related data, particularly aircraft performance and flight profile information. He further noted that the airline flight planning system would need to interpret constraints/restrictions in AIXM and IWXXM in order to generate flight plans in FIXM. He stressed that the full benefits of FF-ICE benefits can only be realized within a SWIM-enabled environment. Additionally, he presented the benefits of FF-ICE from the airline perspective, the baseline SWIM capabilities to support FF-ICE operations, the challenges associated with transition, and expectations and desired outcomes from the airline industry’s viewpoint.

SP/07- Integrating SWIM into a global TBO/FF-ICE service architecture: Challenges and vendor perspectives- Frequentis

2.8 Mr. Ulrich Kaage, ATM Solution Consultant, Frequentis, shared an overview of SWIM as described in ICAO Doc 10039, along with a timeline of TBO/FF-ICE activities for a flight based on ICAO Doc 9965 Vol II. He described how communication networks and messaging are anticipated in a mixed-mode environment in which SWIM and legacy communication systems will coexist. He explained key challenges in integrating SWIM with TBO/FF-ICE, including the relationship between information types and corresponding SWIM information services complexity and the associated cost in standardizing information and SWIM information services at global, regional, and national levels. Lastly, he provided information on mitigation strategies from the perspective of Frequentis, e.g., the importance of strong international cooperation to harmonize regional implementations, the need for

ANSPs and industry collaboration during the standardization phase to reduce system costs, the adoption of local system adapters instead of national or regional gateways in mixed-mode environments, the review of current service definitions and information exchange models (e.g., digital NOTAM and AIP data sets) to support ICAO compliant improvements.

Key outcomes of the Seminar

2.9 The following suggestions, recommendations, further dialogues and actions required for various aspects were shared in the Seminar:

- As per the survey conducted in the second FF-ICE Ad-hoc Group meeting and workshop, the regional sunset of FPL2012 is considered to be 2032, giving only 7 years left for APAC States/Administrations to implement FF-ICE/R1 services.
- Formation of a multidisciplinary team comprising representatives from across the aviation industry, e.g., airspace users, airport operators, ANSPs, ATM industries, academia and research institutes, other related governmental bodies, etc., is recommended to ensure effective communication and coordination for SWIM implementation.
- States/Administrations are currently exploring various mechanisms to support airspace users in submitting, translating, delivering, and forwarding FF-ICE flight plans. However, these diverse approaches may lead to a complex and fragmented operational environment. Establishing a mandate for SWIM and FF-ICE implementation could promote harmonized regional implementation. Nevertheless, such mandates may introduce unintended challenges. Careful consideration and close coordination among stakeholders, especially between airspace users and ANSPs, are essential to achieving a balanced and practical implementation.
- It was noted that, for some APAC States/Administrations, the current policy is to provide SWIM information through both the Internet and CRV.
- Airspace users expect that ANSPs will use the information shared through the FF-ICE process in their airspace management and ATFM planning to ensure that airspace and airport resources are utilized efficiently.
- Airlines expect that when an airline transitions to FF-ICE, any ANSP not yet capable of processing FF-ICE flight plans will internally handle the internal translation from the FF-ICE flight plan to FPL2012. This approach would relieve airspace users from the burden of maintaining both the FF-ICE flight plan and FPL2012 flight planning systems.
- It was discussed that the benefits of the richer information provided in the FF-ICE flight plan will be limited if ANSPs do not adapt their ATM automation systems to utilize this additional information. Relying solely on translating FF-ICE flight plans into FPL2012 to input into the ATM automation system may diminish the potential advantages of FF-ICE.
- It was shared that the provision of a centralized SWIM technical infrastructure service is being discussed among some key airlines and IATA to support airlines in fulfilling the FF-ICE requirements.

2.10 Regarding the Minimum SWIM capabilities necessary for FF-ICE implementation, the following recommendations were made:

For Airspace Users (AU):

- Airlines' system capabilities to consume, process, utilize, and share information in AIXM, IWXXM, and FIXM formats. These XML schemas permit the exchange of richer data.
- Connection to the SWIM network, registry, etc., for receiving and sharing information, as well as for discovering necessary SWIM services – including connected aircraft.
- AIS databases are to be baselined in AIXM format.

- Integration with ANSPs and EUROCONTROL Network Manager services to consume AIXM feature data as published in the Route Availability Document (RAD) and Airspace Usage Plan (AUP). This information provides definitions of Free Route Airspace (FRA) airspace and any associated constraints.
- Capability to consume dynamic route segment and airspace constraint data harmonized with NOTAM constraints. The availability of digital versions of NOTAM information will help make this process seamless.

For ATM Service Providers (ASP)

- Connectivity to internal flight data/flight plan management system to receive and publish flight plans and related messages.
- Connectivity with other organizations through CRV and the Internet.
- Cybersecurity mechanism.
- Governance framework, especially data sharing policy.
- Minimum functional and non-functional SWIM TI capabilities, including messaging, security (at a minimum, authentication and authorization), TI management, and performance requirements.

Closing of the Seminar

2.11 Dr. Amornrat Jirattigalachote expressed her gratitude to the delegates for their active participation and contribution, especially for sharing ideas and questions. At the wrap-up session, she summarised the key messages from each presentation. Lastly, she extended sincere appreciation to all speakers for joining the Seminar and sharing the information with APAC Member States/Administrations. Additionally, she expressed appreciation and gratitude to the event participants and sponsors.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) review the outcomes of the seminar; and
- c) discuss any relevant matter as appropriate.
