International Civil Aviation Organization

THE FIFTEENTH MEETING OF THE COMMON AERONAUTICAL VIRTUAL PRIVATE NETWORK OPERATIONS GROUP (CRV OG/15)

Mumbai, India, 15-19 June 2026

Agenda Item 2: Review outcomes of relevant meetings

OUTCOMES OF SWIM TF/11

(Presented by the Secretariat)

SUMMARY

The paper presents the relevant outcomes of the Eleventh Meeting of the System Wide Information Management Task Force (SWIM TF/11).

1. INTRODUCTION

1.1 The Eleventh Meeting of the System Wide Information Management Task Force (SWIM TF/11) was held from **25 – 29 May 2026** in the ICAO APAC Regional Office, Bangkok, Thailand. The Meeting was attended by **100** participants from **16** Member States/Administrations and **3** International Organisations. The Meeting report, working papers, information papers, and other resources can be accessed by the following link:

https://www.icao.int/APAC/meetingdocs?fid=60144#block-icao-page-title

1.2 This paper summarises relevant information and updates from the SWIM TF/11 Meeting.

2. DISCUSSION

2.1 The summary of discussions in the Meeting is given in the following paragraphs.

Review of Relevant CNS Meetings – Sec (WP/02)

2.2 The Meeting acknowledged the need for interconnection among different regional IP networks to support global SWIM implementation and requested additional information on CRV updates as well as the establishment and upgrade plans of other regional networks, particularly with regard to ensuring interoperability and interconnection among these networks. ICAO Secretary provided detailed updated information as per the details shared in WP/19 of ACSICG/13 Meeting.

2.3 The SWIM Task Force Co-Chair provided an update on the funding support available for the SWIM implementation support initiative under the Information Management (IM) Section at ICAO Headquarters. The ICAO Secretariat informed that, as part of this new initiative, a range of activities is being planned to facilitate the implementation of seamless information management, including SWIM, AIS/AIM, IP network interconnection, and related educational programmes. It was

further noted that, subject to budget availability and necessary approvals, a workshop on the interconnection of CRV and REDDIG III is tentatively planned for the fourth quarter of 2026.

Summary of SWIM-Related Outcomes from Relevant APAC MET Meetings – Sec (WP/03)

2.4 This paper provided a consolidated update on SWIM-related outcomes from recent APAC MET Meetings (MET SG/29, MET/R WG/15, and MET/IE WG/24). It highlighted progress in MET-SWIM guidance, development of SWIM-based MET information services and use cases, and key implementation challenges affecting regional SWIM readiness. It also outlined implications of IWXXM implementation gaps for SWIM interoperability and service readiness to support SWIM TF/11 in refining APAC Common SWIM Information Services and enhancing cross-domain coordination.

2.5 The Meeting discussed the use of SWIM-based MET use cases to support the refinement and alignment of MET-related SWIM information services, including service definitions and exchange models, and to promote consistent development and coordination across relevant domain groups. The Meeting also discussed the use of service interaction models (in particular publish/subscribe and request/reply) for MET information services within the SWIM environment.

2.6 In response to the request to consider the use of SWIM-based MET use cases to support the refinement and alignment of MET-related SWIM information services, including service definitions and exchange models, and to promote consistent development and coordination across relevant domain groups, it was recalled that the Information Management Panel (IMP), at its 4th Meeting, had reviewed the Information Service Definition (ISD) template, which could be used by all aviation-related information domains to ensure consistency in the development of information services.

2.7 It was informed that the work undertaken by the APAC region on the APAC Common SWIM Information Services was presented to the **IMP – Working Group Information/Services** at its 3rd Meeting in June 2025. It was further added that the fields included in the APAC Common SWIM Information Service list are aligned with, and constitute a subset of, the fields contained in the ISD template defined by the IMP.

2.8 It was added that the MET Panel (METP) is expected to undertake work on defining future MET information services. However, no work is currently planned within the METP to define MET information services for traditional MET products.

2.9 The Meeting discussed in detail the need to define MET information services for traditional MET products, and the contributory bodies responsible for defining information services and maintaining the APAC Common SWIM Information Services list as a whole. The Meeting agreed that the approach similar to that adopted by the Panels should be applied. Specifically, the IMP would be responsible for developing the ISD template, while the domain expert groups would be responsible for providing the detailed ISD content for services within their areas of expertise. Accordingly, for the APAC region, the MET/IE WG could consider providing details of MET information services and the FF-ICE Ad-hoc Group could consider providing details of FF-ICE related flight information services, while the consolidation and publication of the APAC Common SWIM Information Services would remain under the responsibility of the SWIM TF.

2.10 It was recalled that the request for the regular review and update of the APAC Common SWIM Information Services by the relevant expert groups had already been conveyed by SWIM TF to all relevant groups under CNS SG, ATM SG, and MET SG. Therefore, the Meeting agreed that there was no need to formulate an additional action item for this task.

2.11 The Meeting discussed the need to ensure alignment among ISDs for similar information services developed by different regions, in addition to the ISDs for information services to be developed by the Panels. It was considered that the need for interregional coordination on this matter should be raised and addressed at the global level, particularly for the ISD of information services related to existing services or products, such as MET products. The Meeting agreed on a two-pronged approach to address this issue, i.e. (*i*) for APAC members of the IMP and APAC members of other related Panels (e.g. METP) to share this concern with the IMP and their respective Panels, **ACTION ITEM 11-1** and (*ii*) formulating the following draft Decision for CNS SG/29 considerations.

<table>
<tr><td colspan="3">Draft Decision SWIM TF/11/01 Need for Alignment of Information Service Definitions across Regions</td></tr>
<tr><td colspan="2">What: To propose to the Information Management Panel (IMP) and relevant Panels to consider the need for alignment of Information Service Definitions for similar information services developed by different regions.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Considering that the Asia/Pacific regional SWIM will form part of the global SWIM, that ISD template was agreed at IMP/4, and that ISDs for similar information services have been developed by various regions, the consideration of IMP and relevant Panels to ensure alignment of ISDs and cross-regional interoperability of information services is required.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 29-May-26</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☐APAC States ☒ICAO APAC RO ☒ICAO HQ ☒Other: SWIM TF</td></tr>
</table>

2.12 Considering that SWIM serves as a foundation for ANS modernisation, and noting the example discussed regarding the challenge in achieving alignment in the implementation of similar information services across regions, the Meeting further agreed to prepare a presentation for the APANPIRG/37 Meeting, apart from regular updates of SWIM TF through the CNS SG Meeting report. This presentation aims to highlight the challenges related to SWIM implementation and seek consideration for further actions to be taken by ICAO HQ and the relevant Panels. **ACTION ITEM 11-2**

2.13 Regarding the request to support alignment between MET and SWIM activities, taking into account ongoing regional coordination and related work, the Meeting discussed options such as conducting joint Meetings of MET and SWIM experts, or holding SWIM TF and MET/IE WG Meetings in parallel with one designated joint Meeting day. It was recalled that SWIM TF Task Leads usually meet quarterly and also conduct quarterly joint Meetings with CRV OG experts. In such situations, conducting an additional quarterly Meeting with MET/IE WG experts would create a significant workload for SWIM TF experts. Regarding the option of holding MET/IE WG and SWIM TF Meetings in parallel, it was shared that many MET experts would miss the SWIM TF Meeting. Therefore, this option was not recommended.

2.14 It was decided that the SWIM TF Co-Chair and MET/IE WG Chair/Vice Chair will discuss together topics of common interest and plan for further Meetings as required. **ACTION ITEM 11-3**

Asia/Pacific Regional Flight and Flow Information for a Collaborative Environment (FF-ICE) Release 1 Implementation Plan – FF-ICE Ad Hoc Group (WP/09)

2.15 Singapore and Thailand, on behalf of the ICAO APAC FF-ICE Ad-Hoc Group, presented the draft APAC Regional FF-ICE Release 1 Implementation Plan.

2.16 The Meeting was informed that the APAC FF-ICE/R1 Plan recommended implementation timeline for APAC as follows:

a) 2030: commencement of technical tests and trials involving eAUs and cross-border eASP interactions;

b) 2031: begin operational tests to identify and resolve any issues; and

c) 2032: full operationalisation of three FF-ICE/R1 services (Filing Service, Flight Data Request Service and Notification Service).

2.17 The Meeting reviewed the draft APAC FF-ICE/R1 Plan provided in **Appendix A**, particularly the implementation timeline. It was informed that the draft APAC FF-ICE/R1 Plan, including all feedback from ATFM & A-CDM SG/16 and SWIM TF/11, will be submitted to CNS SG/30 (6-10 July 2026) and ATM SG/14 (3-7 August 2026) for approval. Subject to approval by both groups and the availability of Doc 9965 Manual on FF-ICE Vol. II – Implementation Guidance, the draft APAC FF-ICE/R1 Plan will be submitted to APANPIRG/37 (tentatively in November 2026) for endorsement.

2.18 Additionally, the Meeting was informed that the **dissolution of the FF-ICE Ad-Hoc group and the establishment of the APAC FF-ICE Implementation Task Force** will be proposed to ATM SG. The Implementation Task Force would, *inter alia*, address the transition from FPL2012 to FF-ICE, operations in a mixed-mode environment, and FF-ICE/R1 implementation issues in the APAC region.

2.19 The Meeting shared the concern about the proposed implementation timeline. It was discussed that, if the timeline proposed by the FF-ICE Ad-Hoc Group is based on the assumption that fully operational SWIM would be available by 2030, the proposed three-year period from the commencement of technical tests and trials to the full operationalisation of three FF-ICE/R1 services is highly challenging. It was suggested that the FF-ICE Ad-Hoc group consider testing the FF-ICE R/1 services over the SWIM TI prototype being developed by SIPG, which is expected to be ready by Q2 2027. **ACTION ITEM 11-8**

2.20 By doing so, it would allow ample time for services testing, while ensuring that the regional SWIM TI would be able to support the requirements of FF-ICE/R1. For further discussion on the possibility of conducting tests and trials on the regional SWIM TI prototype starting from Q2 2027, it was suggested that the FF-ICE Ad-Hoc group and SIPG first discuss the feasibility of such tests and trials. **ACTION ITEM 11-9**

2.21 In response to a question regarding the appropriate timeframe for the FF-ICE Ad-hoc Group to initiate coordination with SIPG for testing activities, it was suggested that coordination commence from March 2027, given that the regional SWIM TI prototype is expected to be ready by Q2 2027. **ACTION ITEM 11-10**

Work Progress of SIPG Task 2: Refine the Revised Hierarchical Architecture – China (WP/24)

2.22 China presented the progress of SIPG Task 2: Refine the revised hierarchical architecture. The Meeting was informed that SIPG Task 2 is led by China, with participants including

Australia, Hong Kong China, India, Japan, Fiji, Singapore, Thailand, Malaysia, USA, Republic of Korea, New Zealand, and CANSO. It was informed that a hierarchical architecture scheme has been proposed, with participants currently conducting joint testing and verification based on consensus. It was also noted that SIPG Task 2 collaborates with Tasks 1 and 3 to establish a unified test environment to provide stable, interoperable architectural support for the implementation of APAC SWIM.

2.23 China shared that the SIPG Task 2 research currently focuses on routing mechanisms under different business scenarios, naming and configuration specifications of multiple queues and the specification of message priority, data model and other features through message metadata. It was further explained that the SIPG Task 2 test plan adopts a layered approach that progresses from simple to complex and supports continuous expansion in order to ensure effective support for the research work. The detailed task, technical solutions and test plan were shared with the Meeting.

2.24 The Meeting was informed that SWIM TI Interoperability Routing Mechanism integrates on-demand routing strategies, relying on message brokers and routing services to meet the Message Exchange Patterns (MEPs) and Quality of Service (QoS) requirements of SWIM information services. Proposals for Business Scenario Routing, Transmission Path Routing, and Granularity-Adapted Routing were shared with the Meeting.

2.25 For APAC SWIM Address Naming Pattern, scope and environment identification, routing-oriented address architecture, and information domain classification were explained.

2.26 It was noted that based on the APAC SWIM hierarchical architecture, SIPG Task 2 has formulated a seven-level test plan for heterogeneous EMSs interconnected over the CRV network. The test plan follows the principles of progressive correlation and full-scenario coverage:

a) Level 1 and Level 2 focus on basic connectivity to verify inter-node reachability;

b) The middle three levels (Level 3 - 5) focus on message transmission and routing to ensure reliable and accurate message delivery;

c) The upper two levels (Level 6 and Level 7) focus on stability and adaptability to guarantee service availability under anomalies and adaptation to topology adjustments.

2.27 The Meeting noted that to date, some participants of SIPG Task 2 have constructed their physical SWIM TIs based on hierarchical architecture, enabling participants to conduct testing on the SWIM TI. Six participants have indicated their intention to deploy EMS nodes and join the testing activities. Five participants have successfully passed the Level 1 (Basic Network Connectivity) and Level 2 (Direct EMS Interconnection) tests, with all inter-node communication links verified as fully qualified, as shown in Figure 1.

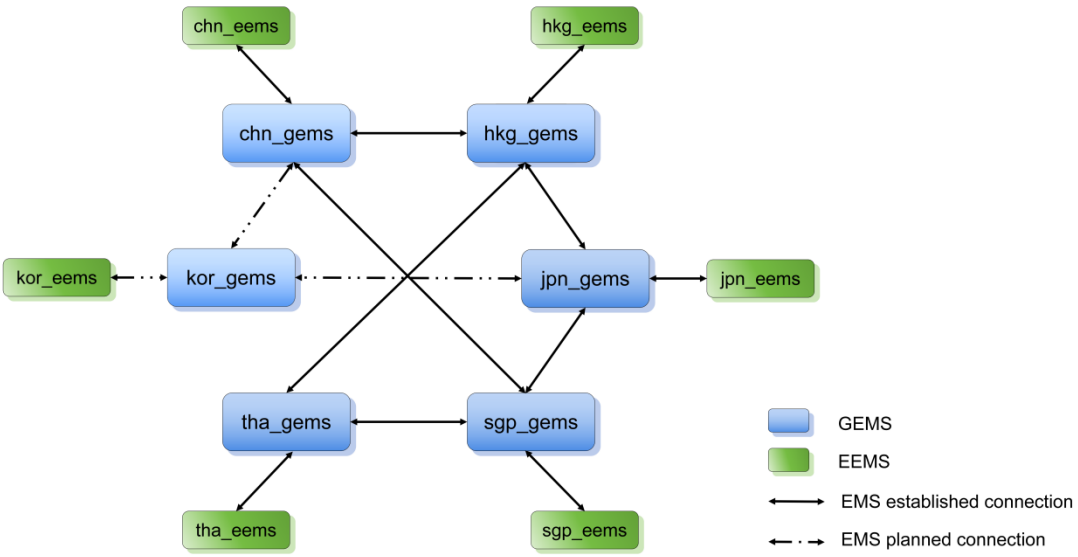

Figure 1: Participants' connection status

2.28 The Meeting noted that the Level 3 (Basic Message Transmission) testing is progressing as scheduled, laying a solid foundation for subsequent advanced testing phases, including multi-node routing and exception fault tolerance. Additionally, it was shared that verification is planned to be completed in 2026. As the testing activities move forward, test levels and EMS participants will be expanded as required by actual operational and testing needs.

2.29 The Meeting was presented with "**APAC SWIM Hierarchical Architecture Test Plan",** provided in **Appendix B,** drafted by SIPG Task 2**.** The Meeting encouraged more States/Administrations to consider participating in the SIPG Task 2 activities and to provide feedback on the Test Plan.

2.30 In response to a query regarding performance testing, such as latency and failover tests, it was clarified that these tests will be conducted in coordination with SIPG Task 1. Regarding a question on the plan to conduct testing over the internet, it was shared that currently, there is only a plan to conduct tests using CRV.

2.31 It was queried whether SIPG Task 2 will conduct testing using other types of routing, e.g. topic-based routing, in addition to message-header based routing, and whether a comparison of message header-based routing and topic-based routing will be assessed. Task 2 Lead shared that other types of routing are being considered for future testing, including evaluation of the outcomes of tests using different routing methods under various scenarios. The Meeting was informed that the results of such testing will be shared in the future.

Hierarchical SWIM Architecture to Achieve Message Exchange Patterns in the APAC Region – Japan (WP/21)

2.32 The Meeting noted that in accordance with the decision of the SWIM TF, a hierarchical architecture has been adopted for the APAC SWIM implementation. Therefore, the approaches to achieving the different message exchange patterns defined in ICAO Doc 10203 Manual on SWIM Implementation based on this architecture need to be discussed and clarified. This working paper clarified the application requirements for these message exchange patterns and discussed technical approaches for achieving them through coordination among Edge and Gateway Enterprise Messaging Services (EMSs).

2.33 It was informed that to ensure the utilisation of various information services, the Manual on SWIM Implementation (ICAO Doc 10203) defines several Message Exchange Patterns (MEPs), including synchronous and asynchronous request/reply, publish/subscribe and one-way. These MEPs are expected to be supported by SWIM TI. However, the practical implementation of these patterns within the APAC SWIM hierarchical architecture requires further discussion and clarification. In particular, the coordination between Edge and Gateway EMSs introduces specific technical and operational considerations that need to be addressed to ensure interoperability and consistency across States.

2.34 Processes and constraints of Synchronous Request/Reply MEP, Asynchronous Request/Reply MEP, Publish/Subscribe MEP and one-way MEP were shared with the Meeting.

2.35 The Meeting noted that the practical validation and evaluation have been conducted through SIPG activities and agreed to provide this working paper to the relevant SIPG Tasks and SWIM TF Task group, particularly SIPG Tasks 1, 2, and 3, and SWIM TF Task 6, for further deliberation.

2.36 The Meeting discussed in detail all recommendations provided in this Working Paper and agreed that there remains a need for more detailed deliberation on each recommendation to ensure alignment with other work being conducted under SIPG, such as the development of Guidance Material on Request/Reply MEP. It was suggested that these recommendations be further discussed at the SIPG Meeting. **ACTION ITEM 11-13**

ATFM FIXM Message and Associated Message Templates based on FIXM Version 4.3 – ATFM SG (WP/12)

2.37 This paper presented the work on the development of ATFM FIXM message and associated message templates based on FIXM version 4.3 to support cross-border ATFM operations, A-CDM, ATFM/A-CDM integration, and traffic synchronisation in the SWIM environment in Asia/Pacific region. The Meeting noted that FIXM version 4.3 was formalised as the regionally agreed information exchange model for information exchange between operational ATFM systems. In support of cross-border ATFM operations and ATFM/A-CDM integration, successive regional FIXM extensions were developed collaboratively by the ATFM SG and the SWIM TF. In line with *Conclusion APANPIRG/35/4* and to ensure readiness of the implementation of ATFM FIXM information exchange, the Technical Sub-Group (TSG) of the Asia-Pacific Cross-Border Multi-Nodal ATFM Collaboration (AMNAC), in collaboration with members of the SWIM TF, identified the ATFM FIXM message data attributes, mapped them to the FIXM version 4.3 Core and Extension, and developed the associated message templates.

2.38 It was informed that this work was presented to the ATFM & A-CDM SG/16 through WP-6b-02 in April 2026. Consequently, the ATFM & A-CDM SG/16 agreed, through its *Draft Conclusion ATFM & A-CDM/SG/16-6*, to the adoption of the identified ATFM FIXM message data attributes, mapping, and the associated message templates, based on FIXM version 4.3, as regional standard templates effective Q1/2027.

2.39 The Meeting noted that additional feedback was received after ATFM & A-CDM SG/16, and the templates were subsequently updated. Singapore and Thailand successfully validated the updated message templates in May 2026. It was highlighted that with the updated message template schema, the identified ATFM message data attributes and their mapping to the FIXM version 4.3 Core and the APAC Extension, as agreed by ATFM & A-CDM SG/16, remain unchanged.

2.40 With the abovementioned, the following draft conclusion was proposed, which was endorsed by the SWIM TF/11 Meeting for APANPIRG/37 adoption through CNS SG/30 endorsement.

<table>
<tr><td colspan="3">Draft Conclusion SWIM TF/11/02 – Adoption of ATFM FIXM Message Data Attributes and Associated Message Templates Based on FIXM Version 4.3 as Asia/Pacific Regional Standard</td></tr>
<tr><td colspan="2">What: The ATFM FIXM version 4.3 message templates be:
a) adopt the ATFM FIXM message data attributes and associated message templates, based on FIXM Version 4.3, as Asia/Pacific regional standard templates effective Q1/2027 to support cross-border ATFM information exchange via SWIM
b) uploaded to the ICAO Asia/Pacific Regional Office website for use by Asia/Pacific Administrations, to support cross-border ATFM operation, A-CDM, ATFM/A-CDM integration, and traffic synchronisation.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To support harmonised and automated message validation for cross-border ATFM system-to-system data exchanges, in alignment with Conclusion APANPIRG/35/4 and Draft Conclusion ATFM & A-CDM/SG/16-6.</td><td>Follow-up: ☐Required from States</td></tr>
<tr><td>When: 29-May-26</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: ATM/SG</td></tr>
</table>

2.41 In response to a query regarding whether the ATFM FIXM message template schema is required to be published on the official FIXM website (www.fixm.aero), it was clarified that such publication may not be necessary, as the ATFM FIXM message template scheme is intended for regional use within APAC. It was further noted that publication on the ICAO Asia/Pacific Regional Office website should sufficiently serve the purpose.

APAC SWIM Implementation Framework – Japan (WP/20)

2.42 This paper re-examined key outstanding issues related to the APAC SWIM implementation framework within the scope of the SWIM TF and sought further guidance from the Meeting to facilitate the finalisation of associated agreements and technical specifications. It was noted that there is a need to establish a common understanding of what constitutes APAC SWIM and to accelerate the development of consensus-based documentation and technical specifications, SWIM implementation framework, including the roles, responsibilities and accountabilities of stakeholders, governance structure, standards and specifications, policies and processes were clarified and proposed in the Meeting.

2.43 The Meeting was informed about the concern that several elements of the implementation framework for SWIM remain insufficiently defined, particularly in terms of governance structure, role allocation, and policy alignment at the regional level, which may impact the consistency and interoperability of SWIM implementation across the APAC region.

2.44 Roles, responsibilities and accountabilities of different SWIM stakeholders were shared. Given that APAC SWIM is a federated system involving multiple States and stakeholders, a governance structure is essential to ensure coordination, consistency, and transparency, and the following structure was proposed:

- **Regional SWIM Board (working title)**

The highest decision-making body responsible for regional policy direction, approval of standards, and resolution of cross-border coordination issues.

- **Technical Steering Group (working title)**
  Responsible for the development, maintenance, and harmonisation of technical specifications. This function may evolve from the current SWIM Task Force.

- **Operations Committee (working title)**
  Responsible for operational coordination, including service deployment, monitoring, and usage management.

2.45 It was noted that, while the draft APAC SWIM implementation framework identifies a governance structure comprising a Regional SWIM Board, a Technical Steering Group, and an Operations Committee, further clarification may be beneficial with regard to the institutional positioning and decision-making arrangements of such governance bodies at the regional level.

2.46 The Meeting was also informed that, taking into account the federated and multi-State nature of APAC SWIM, as well as different possible approaches to regional coordination, the following two governance options were identified for further consideration. It was added that these options are not mutually exclusive and may evolve over time depending on regional consensus and implementation maturity.

Option 1: Governance Based on ICAO APAC Institutional Framework	***Option 2***: State-Led Governance Independent of ICAO Structures
1. Under this option, APAC SWIM governance would be established by leveraging existing ICAO APAC institutional arrangements, in particular within the framework of APANPIRG.	1. Under this option, APAC SWIM governance would be established through a multilateral, State-led arrangement outside the formal ICAO institutional structure, while remaining aligned with ICAO standards and guidance.
2. A dedicated **APAC SWIM Board** could be established as a subordinate body under APANPIRG, with participation from States of the Asia/Pacific Region and support from the ICAO APAC Office. This Board would serve as the highest regional decision-making body for APAC SWIM, providing strategic direction, endorsing governance arrangements, and approving key policies and specifications related to SWIM implementation.	2. A **APAC SWIM Board** could be established based on a governance agreement or memorandum of understanding among participating States. The Council would be composed of officially designated State representatives and would be responsible for approving regional SWIM policies, technical specifications, and participation arrangements.
3. The existing SWIM Task Force could evolve into, or form the basis of, a **Technical Steering Group**, operating under the oversight of the APAC SWIM Board. This group would be responsible for the development, maintenance, and harmonization of technical specifications, including APAC-specific extensions to ICAO information exchange models, as well as supporting implementation activities across the region.	3. A supporting **Technical Steering Group** would be responsible for developing and maintaining technical and architectural specifications, informed by practical implementation experience, trials, and demonstrations. While ICAO information exchange models and guidance would be used as the baseline, this group could manage regional adaptations and implementation-driven refinements in a flexible manner.

4. An **Operations Committee** could be established to support coordination of operational deployment, service monitoring, and operational issue resolution among participating stakeholders, reporting to the APAC SWIM Board as appropriate.	4. An **Operations Committee** could be established to address practical aspects of federated operations, including service availability coordination, trust frameworks, security arrangements, and information-sharing practices among participating stakeholders.
5. This option would ensure strong alignment with ICAO global provisions, including PANS-Information Management (Doc 10199), and would benefit from established ICAO governance processes and regional recognition, while recognising that decision-making processes may be subject to existing ICAO procedural timelines.	5. Under this model, the ICAO APAC Office could participate as an observer or advisor, facilitating information exchange with ICAO activities and supporting consistency with global SWIM developments. This option may offer increased flexibility and implementation agility, while requiring careful consideration of how outcomes are coordinated with ICAO regional and global processes.

2.47 It was noted that both governance options provide viable pathways for establishing effective regional SWIM governance in the APAC region. The choice of approach, or a phased combination of both, may be informed by regional consensus, implementation priorities, and the desired balance between institutional alignment and operational flexibility.

2.48 The Meeting noted that SWIM TF has developed, or is developing, a range of standards and specifications. Key deliverables include:

- APAC SWIM Service Overview Extensions (draft)
- SWIM Discovery Service (SDS) Implementation Specification (v1.0.0)
- SWIM Metadata Exchange Service (SMXS)
- FIXM v4.3 APAC Extension
- APAC SWIM Technical Infrastructure Profiles (TI Profiles) v1.0
- APAC SWIM Implementation Guidance (IGD)

2.49 Additional specifications, including those related to information security, are expected to be developed. The Meeting recommended that the APAC SWIM implementation framework be formalised by consolidating governance arrangements, roles, standards, and procedures into a single agreed framework document, subject to endorsement by relevant stakeholders.

2.50 The Meeting agreed that Option 1 is the preferred approach, as it ensures harmonisation of SWIM implementation in line with ICAO provisions, supports SWIM interoperability, and promotes adherence to United Nations policies and ethical principles. The Meeting requested Japan to continue exploring further details of Option 1 together with the SWIM TF Task 5 group and to share the outcomes with SWIM TF at a future Meeting. **ACTION ITEM 11-14**

2.51 The Meeting discussed that, in the future, the SWIM TF may evolve into a new Subgroup, as the SWIM concept extends beyond CNS. The ICAO Secretary shared that each section within the ICAO APAC Regional Office is responsible for one Subgroup, and that the establishment of additional Subgroups would require additional resources, which are not currently available. The Meeting was recalled that SWIM TF has been retained under the CNS Subgroup as its current work is highly technical in nature. For the time being and in the near future, the SWIM TF will continue to ensure appropriate coordination with other relevant domain expert groups. Once the regional SWIM

technical foundation has been established, should the SWIM TF consider it appropriate, it may request APANPIRG to establish a new Subgroup or consider other alternatives, such as reassignment to another existing Subgroup.

Establishment of a SWIM Test Environment for APAC SWIM – Japan (WP/22)

2.52 Japan presented potential options for the establishment of an evaluation environment within APAC SWIM, including an analysis of their respective advantages and disadvantages, in order to support decision-making by States concerning regional implementation.

2.53 It was recalled that the APAC SWIM infrastructure is envisaged to comprise Gateway Enterprise Messaging Services (GEMS) provided by several States, as well as Edge EMS (EEMS) implemented by individual APAC States. SWIM operations depend on user systems (applications), such as those operated by airlines, which consume information services primarily provided by national ANSPs via the platform. In this context, it is essential that both service providers and service consumers undertake appropriate validation and evaluation activities.

2.54 Relevant requirements and guidance from ICAO Doc 10199 PANS-IM, a part of the Information Service Overview requirements and existing practices, such as a case study of FAA, Eurocontrol, and JCAB, were shared with the Meeting.

2.55 A proposal to build a Testing Environment for APAC SWIM, along with its advantages and disadvantages, was shared.

Option 1: Continuation of the SIPG Test Environment (CRV-based)	Option 2: Internet-Based SWIM Sandbox Environment
Advantages • Closely replicates the operational (live) environment **Disadvantages** • Participation may be limited due to resource constraints • Connectivity challenges may arise for certain States • Bandwidth testing requires CRV provisioning, incurring additional costs • No established framework for connectivity via the Internet **Risks** None	**Advantages** • Facilitates simpler, faster, and more cost-effective connectivity • Supports accelerated implementation, testing, and capacity-building • Enables flexible bandwidth testing • May function as an interim Edge EMS • Particularly suitable for MET information services **Disadvantages** • Does not fully replicate the operational CRV environment • Potential concerns regarding data sensitivity **Risks** • May require policy adjustments in certain States • Potential implications in terms of operational costs

2.56 The Meeting noted that Option 1, the regional SWIM testing environment over CRV, is aligned with the current SIPG test setting. Maintaining this approach during the initial phase of APAC SWIM implementation may therefore be advantageous. However, as APAC SWIM evolves with

operational SWIM traffic carried over CRV and the demand for service validation increases, constraints on CRV capacity may arise. On the other hand, a regional SWIM testing environment over the Internet may accommodate a wider group of information consumers and support testing of bandwidth-intensive information services (e.g. MET) in a regional environment. Accordingly, it was recognised that there may be a future need to transition from the regional SWIM testing environment from CRV to the Internet. The Meeting therefore requested Japan to further explore feasible approaches for transitioning the testing environment from CRV-based connectivity to Internet-based connectivity **ACTION ITEM 11-16** It was further suggested that the study considers the associated technical work and costs required for such transition and the long-term maintenance of the environment. In this regard, the CRV network model, which is based on cost-sharing among APAC member States, may serve as a useful reference.

IMP Updates – Japan (IP/04)

2.57 Japan provided an overview of the fourth Meeting of the Information Management Panel (IMP/4), held at ICAO Headquarters in Montréal from 20 to 24 April 2026. Proposed amendments to the *Procedures for Air Navigation Services — Information Management (PANS-IM, Doc 10199)* and the *Manual on SWIM Implementation (Doc 10203)* were discussed with a view to enhancing SWIM interoperability. In addition, an action plan to improve global interoperability was developed, and the Panel's work programme (Job Card) was reviewed in the IMP/4 Meeting.

2.58 The Meeting was informed that progress related to the ATM Information Reference Model (AIRM), including the planned release of version 1.3.0 in 2026 (current approved version: 1.2.0), was reported to the IMP/4. It was added that submission of AIRM 1.3.0 to the IMP for approval is planned for autumn 2026.

2.59 The Meeting noted that the Services Working Group introduced the Global SWIM Registry Interoperability Concept, which proposed a method to improve interoperability among SWIM registries. It was also reported that no major revisions to existing SWIM guidance are currently envisaged. In addition, updates were provided on the SWIM Discovery Service (SDS) Specification under development within the APAC SWIM TF. IMP/4 also shared that APAC and the FAA plan to conduct operational scenario development and testing in 2026. Future work at the IMP level will continue in coordination between the Services and Architecture Working Groups.

2.60 It was noted that several working and information papers were submitted addressing topics related to the Global SWIM environment. Given the complexity of issues related to the Global SWIM environment, including the need to consider operational aspects across multiple domains and coexistence with existing systems such as AFTN/AMHS, the IMP agreed to request the Air Navigation Commission (ANC) to establish a dedicated task force involving relevant panels, recognising that the work would require border coordination across multiple domains and stakeholders.

SWIM Discovery Service (SDS) Update: Schema release, testing, and global adoption for Registry Interconnection – United States (WP/15)

2.61 The paper discussed updates to the SWIM Discovery Service (SDS) development, a standardised approach to support registry interoperability and federated information service discovery across independently managed SWIM registry environments. It was informed that recent SDS developments (post APAC SWIM TF/10) include alignment with the latest PANS-IM data model and standardisation of protocols for registry metadata exchange and preparation for demonstration, testing, and implementation.

2.62 The Meeting was informed that originally developed as a collaboration between the FAA and Korea Airports Corporation (KAC), SDS has been further matured and adopted in the APAC

region and the FAA, both regionally and as members of the IMP, through collaborative initiatives. The recent schema release and updated service description artefacts now enable ICAO States implementing SWIM registries with harmonised metadata exchange and service discovery across individual registries.

2.63 The paper highlighted how SDS aligns with the regional frameworks and ICAO IMP objectives under the SWIM Registry Interoperability Job Card, and upcoming initiatives to develop operational scenarios, test cases, and an implementation plan for registry interconnection and adoption at both regional and global ICAO levels. The Meeting noted the importance of SDS implementation to achieve the global SWIM registry interoperability concept and enable SDS as a candidate global technical solution.

2.64 It was stated that regional test cases and test plans should be developed for SDS testing and continued maturity, implementation plans and schedules should also be socialised for SDS development and service roll-out. Additionally, it was noted that cross-regional SDS demonstrations should be conducted for global adoption. States/Administrations were encouraged to continue socialisation and adoption efforts among both SWIM TF and IMP stakeholders to support the implementation of the SDS concept and associated data exchange mechanisms across SWIM registries for global interoperability.

2.65 Regarding the proposal to develop regional test cases and test plans for SDS testing and continued maturity, it was noted that this task is already within the scope of SIPG activities.

2.66 Regarding the proposal to conduct cross-regional SDS demonstrations for global adoption, it was recalled that SDS demonstrations have previously been conducted between Europe and the United States, as well as within the APAC region. It was added that SWIM TF, through members common to both SWIM TF and IMP, continues to share updates on SDS developments at IMP Meetings. To continue demonstrations with other regions, it was highlighted that there is currently no information about the availability of SWIM registry in regions other than those mentioned above. Therefore, further SDS demonstrations cannot be planned at this time.

2.67 Regarding the proposal to **conduct SDS demonstrations over CRV** in addition to the Internet, it was agreed that, as most APAC States currently plan to implement SWIM registries over the Internet, demonstrations over CRV may be reconsidered in the future.

2.68 The Meeting discussed the need for a baseline standardised version of SDS for the APAC region. It was recalled that all APAC States/Administrations intending to implement SWIM registries would need to implement SDS in accordance with the agreements reached at SWIM TF/3 and SWIM TF/8. In this context, the Meeting agreed that it would be prudent to adopt SDS v2.0 as the baseline SDS version for the APAC region. Following detailed deliberation, the Meeting drafted the following draft Conclusion for APANPIRG/37 adoption through CNS SG/30.

<table>
<tr><td colspan="3">Draft Conclusion SWIM TF/11/03 Adoption of SWIM Discovery Service Baseline Standardised Version for APAC Region – SDS v2.0</td></tr>
<tr><td colspan="2">What: To adopt the SWIM Discovery Service version 2.0 (SDS v2.0) as a regional baseline standard for Asia/Pacific SWIM implementation.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Considering that the target completion of the Asia/Pacific regional SWIM implementation is 2030, and that many APAC States/Administrations intend to</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
</table>

implement SWIM registries, the provision of a baseline SDS version is essential to support harmonised SWIM implementation within the APAC region. SDS v2.0 has been studied and tested by the SWIM TF and that it is aligned with Doc 10199 PANS IM, to support its adoption as the regional baseline standard for SDS.			
When:	29-May-26	Status:	Draft to be adopted by PIRG
Who:	☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: CNS SG		

2.69 To ensure accessibility to the SDS Implementation Specification, Version 2.0, the Meeting requested the United States to upload the latest edition of the document to the SWIM Service Discovery website (discovery.swim.aero). **ACTION ITEM 11-20**

2.70 The Meeting discussed the need for a minor update to SDS v2.0 to include additional information service overview fields, i.e. "Information service definition reference" and "Use limitation", which were recently agreed at IMP/4. The United States agreed to undertake the task of updating SDS v2.0 accordingly. **ACTION ITEM 11-21**

API Management and Gateway Introduction, Framework, and Best Practices for Harmonised SWIM Request/Reply Messaging – United States (WP/18)

2.71 The Meeting noted that the FAA and APAC region are considering Application Programming Interface Management and Gateway solutions to implement web services with Request-Reply message exchange patterns for SWIM data exchange. It was informed that Application Programming Interfaces (API) enable software systems to securely communicate and share data across government agencies and international partners. API gateways serve as a centralised entry point, managing routing, security, and system performance. API management provides governance through monitoring, access control, and lifecycle oversight. Together, they support the development of scalable, secure, and reliable digital services. Organisations benefit from faster system integration; users gain greater control and consistency with improved user experience.

2.72 The Meeting was informed that FAA is modernising its SWIM messaging infrastructure with API Gateways for synchronous messaging and event-brokers for asynchronous messaging. FAA provided an overview of the latest FAA-APAC developments on API Gateways for SWIM messaging, benefits of an API Management and Gateway solution, and best practices to develop a framework for API governance and harmonised cross-regional SWIM data exchange. Operational use cases and examples of SDS implementation leveraging API Gateway were noted by the Meeting.

2.73 The Meeting was requested to include API Governance Framework and guidance materials development in the Governance Working Group and offered to collaborate in SIPG and related APAC Task Force regarding API Gateway strategy discussions and demonstrations.

2.74 The Meeting shared concerns about schema validation requirements as part of the API Gateway governance, as in some States/Administrations' SWIM implementations, information service providers and the information service consumers are responsible for conducting schema validation, while the API Gateway is considered part of SWIM TI. However, in the FAA framework, schema validation is treated as a security requirement for all data entering the system. Due to these differing considerations, it may be difficult to reach an agreement on the proposed API governance framework, as different States/Administrations may impose varying national security regulations and measures.

2.75 Regarding the request to include the development of an API Governance Framework and related guidance materials under the Governance Working Group, it was noted that additional

detailed discussions on the features and functionalities of API Gateway are still required. It was therefore recommended to first establish and agree on the **minimum required features and functionalities of the API Gateway** before considering its adoption at the APAC regional level. Once these foundational elements are defined, development of the API Governance Framework can be revisited at a later stage. Considering that the current stage of work is to focus on agreeing upon the minimum features and functionalities of the API Gateway, it was agreed to assign this activity SIPG Task 3, rather than Task 5 under the SWIM TF. **ACTION ITEM 11-27** As the work of SIPG Task 2 is closely related to the API Gateway concept, it was further suggested that SIPG Task 3 work closely with Task 2, as the minimum features and functionality to be agreed upon may affect the implementation topology, namely a centralised or distributed API Gateway. **ACTION ITEM 11-28**

2.76 In response to concerns regarding the incorporation of this new activity under the limited SIPG timelines, the SWIM TF Co-Chair informed the Meeting that the finalisation of various MEP mechanisms and guidance materials related to the Request and Reply MEP should be given the highest priority for SIPG. If the proposed API Gateway study cannot be completed before Q2 2027, it can instead be considered under a future SIPG task. **ACTION ITEM 11-29**

Progress on Development of R-R MEP Guidance Material – SIPG (WP/27)

2.77 This paper presented the progress on development and main contents of R/R MEP Guidance Material drafted by SIPG Task 3 and outlined implementation approaches for the APAC SWIM TI prototype. The Meeting noted that this guidance material is not the final version but rather serves as the initial baseline for implementing R/R MEP within the APAC region. It was recalled that, since SWIM TF/10, extensive discussions have been held at the SIPG level regarding the implementation of R/R MEP in the APAC region. While consensus has been reached on certain topics, such as the adoption of HTTP for synchronous R/R MEP, others, including the choice between full mesh and hierarchical architectures, remain subject to ongoing debate. These unresolved issues will be further discussed under SIPG Task 3. It was added that under the SIPG, R/R MEP will be implemented, tested and validated in the APAC SWIM TI prototype based on the current version of guidance material and, through a continuous feedback loop, any deficiencies or areas for improvement identified during the prototyping phase will be iteratively reflected in the guidance material to improve its maturity.

2.78 The Meeting discussed the significance of this document. It was noted that this document serves as guidance material providing a regional baseline for the major MEPs to be used in the future. It was recommended that all States/Administrations review the document and provide their feedback to SIPG Task 3 for further improvement. **ACTION ITEM 11-30**

2.79 MET/IE WG Chair informed that the proposed description of synchronous and asynchronous R/R MEP for FF-ICE scenarios may not align with many MET scenarios. It was agreed that the MET/IE WG will provide feedback to ensure the guidance document covers most use cases in the region. **ACTION ITEM 11-31**

Comments on Technical Memorandum of Cooperation (TMC) Document for ATM Information Exchange through SWIM – New Zealand (WP/25)

2.80 This paper presented New Zealand's comments on the draft Technical Memorandum of Cooperation (TMC) document for ATM Information Exchange through SWIM, following Actions 10-11 and 10-12 from SWIM TF/10.

2.81 As part of the collaboration outlined in Action 10-12, Australia advised Malaysia and New Zealand that they understood the original intent of the SWIM TMC, based on the SWIM TF/8 working paper, to: 1) To have States formally "establish SWIM", 2) To clarify boundaries of responsibility (in terms of SWIM TI), and 3) Establish operational capability. New Zealand agreed with

this core of this understanding and with the intent expressed, with the following additional views/proposals:

a) Creation of a unilateral agreement issued at the ICAO APAC-level rather than bilateral or multilateral agreements. In this, New Zealand agrees with Australia's feedback from their SWIM TF/10 Information Paper, section 2.3.2, which suggested a non-binding head agreement at the regional level. New Zealand agrees that a memorandum of cooperation is needed (as outlined in section 2.3 of the SWIM TF/8 Working Paper) but bilateral agreements between contracting states would result in too many agreements to be workable, while multilateral agreements could be hard to reach consensus on.

b) Creation of a suite of documents that includes but is broader than the TMC to allow the appropriate level of detail to be developed at the right time and by the relevant parties. In this, New Zealand largely endorses Australia's feedback from their SWIM TF/10 Information Paper, section 2.3.3, which suggested a subordinate set of documents to the head agreement to address any specific, detailed procedural and administrative matters.

c) Revision of the approach to the TMC (or equivalent artefact) within this suite of implementation and operational documents, such that it becomes a document that describes intent and practical arrangements rather than technical implementation. This allows it to be agreed between interconnecting parties without constraining technical implementation or requiring the documentation of successful transition to operations. This revised TMC should address Thailand's feedback from SWIM TF/8 Final Report, section 2.2, that it would be premature to adopt the draft TMC given the status of SWIM implementation within the region. New Zealand agrees with this feedback and notes that, with the changes proposed, New Zealand expects that an earlier agreement of a revised TMC would be possible and beneficial. The revised TMC would also still be aligned with the intent behind the TMC, to ensure participants within APAC are aligned on SWIM, as outlined by Malaysia in their working paper to SWIM TF/8 (section 2.3, which noted that the first Meeting of SIPG identified the need for a TMC.

2.82 New Zealand's proposal for this suite of documents is to adapt the CRV suite of documents to SWIM, based on learnings from CRV, as outlined in the table below:

SWIM Artefact	Purpose (SWIM)	Approvers (SWIM)	Developed by:
ICAO letter, from APAC statement at the regional level	Outlines the cooperative intent and outcome of SWIM	Signatories not required – issued by ICAO to APAC members	Drafted by the Task Force, endorsed by the Chair and the majority on behalf of the Task Force, issued by ICAO for APAC members, and added to the Implementation Guidance
Technical Memorandum of Cooperation (TMC) aligned to the ICAO Letter	Establishes high-level technical/procedural arrangements and obligations between APAC participants	Potentially design/system owners or operational management within the participant organisation	Drafted by the Task Force, template added to the Implementation Guidance

SWIM Artefact	Purpose (SWIM)	Approvers (SWIM)	Developed by:
Implementation Manual	Sits next to the TMC – outlines the detailed technical and other requirements to establish a messaging system and connections	Design authorities and/or their representatives (e.g., SIPG members)	Drafted by SIPG, evolved by the Task Force, and added to the Implementation Guidance
Operations Manual	Sits next to the TMC - outlines the operational details for SWIM, i.e., who is who, who has what connections, etc.	Design / operational authorities and/or their representatives (e.g., SIPG members)	Drafted by SIPG, evolved by the Task Force, and added to the Implementation Guidance

Table 1: Suite of documents for SWIM

2.83 New Zealand proposed a revised TMC that reflects the above structure, as well as the following approach and addresses feedback to date in the following way:

a) The scope should be for the long-term relationship between APAC members, and not just for the Pioneer Group/trial and initial implementation of SWIM. The revised TMC incorporates implementation and operations.

b) By focusing on Message Systems, it allows non-ANSP / non-Country Message System participants to be included as well as ANSPs.

c) The proposed revised TMC removes the ANSP/country aspect but suggests a common type of agreement among integrating Message Systems without imposing agreements on Information Service Providers (ISPs) and Information Service Consumers (ISCs), which are able to be devolved to Edge Message System providers independently. The country aspect would be tackled by the head agreement (i.e., ICAO APAC letter) level instead, which addresses Australia's feedback.

d) Agreements for connection of ISPs and ISCs to Edge Message Systems (assuming Gateway Message Systems do not connect directly to ISPs and ISCs, only through Edge Message Systems) would be down to the terms and conditions established by each Edge Message Systems' provider for connection to their services. These are, therefore, not considered part of the SWIM TMC.

e) There is a need for participants to cooperate on SWIM for operational, and non-operational (i.e., testing/development systems), systems. However, a participant may decide to vary from a specific SWIM specification (especially for non-operational systems). In this instance, the assumption is that the participant would establish their own agreement with all other affected participants for its non-operational systems, outside of the SWIM TMC.

f) The Need for SWIM Operations Group was reflected in the 'Governance' section of the revised TMC, New Zealand agrees in principle with Australia's feedback from their SWIM TF/10 Information Paper that they would support a dedicated group (such as SWIM OG), however New Zealand sees the Task Force performing this function until such time as such a body exists and the Task Force relinquishes its role to that group.

g) New Zealand proposes that Australia's feedback from their SWIM TF/10 Information Paper, which was related to wording in the draft TMC, could be covered in the subordinate agreements instead of the TMC.

h) The revised TMC has been reviewed by Airways' Legal team, who agree that it includes relevant required feedback from the previous working paper, noting one change to earlier feedback, specifically reversing the original 'settlement of dispute' feedback back to the original, simpler text. This is due to the proposal that there should be a head of agreement ICAO APAC-wide and the resulting non-technical / specific nature of the revised TMC lessens the concerns about disputes.

2.84 The Meeting expressed its appreciation to New Zealand for providing a comprehensive paper and a revised TMC document. The Meeting agreed to adopt a revised multilayer approach; however, it was noted that the roles and details of each SWIM Artefact require further review and discussion. It was suggested that WP/20 from SWIM TF/11 and the proposals contained in this paper be considered jointly within Task 5 of the SWIM TF. **ACTION ITEM 11-33** Australia, Malaysia, and New Zealand were invited to participate in Task 5 to support further discussions on TMC. Australia and New Zealand confirmed their willingness to join Task 5. The ICAO Secretariat will coordinate with Malaysia on this matter. **ACTION ITEM 11-34**

Updates from Editorial Ad-hoc Group - Editorial Ad-Hoc Group (SP/03)

2.85 The Editorial Task Ad-hoc Group recalled the topics discussed and agreed at SWIM TF/9 to be addressed in the APAC Regional SWIM Implementation Guidance Document (IGD), including:

- SWIM TI specifications;
- Information exchange models;
- Registry model; and
- Service specifications.

2.86 The Meeting was informed that major challenges in drafting the first version of IGD are stability and maturity of the content required for the drafting process. It was noted that, prior to SWIM TF/11, only details of the APAC SWIM TI specifications and FIXM version 4.3, including the regional Extension, were considered sufficiently mature for inclusion in the IGD. It was further noted that the updated version of the APAC Common SWIM Information Services list, which will form part of the Service Specifications chapter of the IGD, would be reviewed during SWIM TF/11, while agreement on a specific SDS version, the regional baseline would also be discussed at the SWIM TF/11.

2.87 A request was received to compile all key documents related to the APAC SWIM implementation that have been developed or are being developed under the SWIM TF. SWIM TF Co-Chair agreed to prepare a document titled **" Existing References for ICAO APAC SWIM Documents ",** which will be uploaded on the ICAO APAC e-documents webpage to provide consolidated reference information for APAC States/Administrations in support of their SWIM implementation activities. **ACTION ITEM 11-35**

APAC SWIM Implementation Progress Indicators - SWIM TF Co-Chair (SP/04)

2.88 The Meeting recalled that, under the ANS commitments in the Delhi Declaration, there is a commitment related to SWIM: *Expediting the implementation of ICAO provisions related to SWIM*. It was informed that the ICAO Secretariat provides progress updates on all Delhi Declaration Commitments in every Subgroup, APANPIRG, DGCA Conference, and Ministerial Conference

Meetings. However, difficulties were encountered in measuring SWIM implementation progress within the APAC region due to the absence of established indicators.

2.89 The Meeting was informed that, in response to Action Item 10-31, the ICAO Secretariat informed the **DGCA/60 Conference** that indicators to measure SWIM implementation progress in the APAC region were under development, and the latest status of APAC States/Administrations' readiness for SWIM implementation will be shared with the **DGCA/61 Conference**. At the same time, Action Item 10-32 was assigned to the ICAO Secretariat and the SWIM TF Co-Chair to draft indicators for finalisation at the SWIM TF/11 Meeting.

2.90 Following the Action Item 10-32 of SWIM TF/10, three SWIM implementation progress stages – "In Preparation/Planning", "Under Development/Implementation", and "In Operation" – were agreed upon during SWIM TF Task Leads held Meetings held in August 2025, November 2025, and February 2026. For each stage, further refinements were presented to the Meeting, taking into account feedback received from Japan and Singapore.

2.91 The proposed SWIM indicators were reviewed by the Meeting. The finalised indicators are provided in **Appendix C**.

2.92 The Meeting noted that, for the scoring, a status of "Not implemented" will be assigned a score of 0, "Partially implemented" will be assigned a score of 0.5, and "Fully Implemented" will be assigned a score of 1. It was further agreed that the score of each stage will be represented by the average score of the relevant criteria.

2.93 It was also agreed that all key criteria of each stage will be assessed using the same methodology and weighed equally. It was also agreed that the consolidated SWIM implementation progress survey results will be processed and presented, including details of the implementation levels for each stage. **ACTION ITEM 11-36**

2.94 For the way forward, it was agreed that all SWIM TF/11 participants will provide feedback to the finalised ICAO APAC SWIM Indicators **before 12 June 2026** for any proposed changes; however, major changes will not be considered. **ACTION ITEM 11-37**

2.95 Furthermore, it was agreed that the ICAO Secretariat will develop an online platform for reporting of SWIM implementation progress in accordance with the finalised indicators. Access to the platform will be shared through a State letter and by email **on 3 July 2026** for States/Administrations' reporting. **ACTION ITEM 11-38** It was added that all States/Administrations are required to respond to the SWIM implementation progress reporting request, **ACTION ITEM 11-39,** as this information and detailed analysis of results will be presented to **the DGCA/61 conference**, as requested by the **DGCA/60 Meeting. ACTION ITEM 11-40**

2.96 It was also added that **only one response** from each State/Administration will be accepted. Therefore, States/Administrations were advised to conduct broader consultation, primarily with AIS providers, ANSPs, MET service providers, and airport operators, when reporting their SWIM implementation status. States/Administrations are expected to submit their response through the online reporting platform **by 14 August 2026**, so that results can be processed and presented to the DGCA/61 Conference, planned for the first week of September 2026. **ACTION ITEM 11-41**

SWIM TF Tasks restructuring- SWIM TF Co-Chair (SP/05)

2.97 The Meeting was informed of the current SWIM TF task structure, and leads are as follows:

Groups	Task No.	Subject/Task	Task Leads
Implementation Planning	1	Regional implementation philosophy & roadmap	David Leow (Singapore) Amornrat Jirattigalachote (Thailand)
SWIM infrastructure	2	Regional SWIM infrastructure	Xiaodong Lu (Japan), Yosuke MORO (Japan) Henry Chan (Hong Kong, China)
	3	Security service	Jim Laymon (USA)
Technical Architecture	4	Development and maintenance of regional information exchange models	Amornrat Jirattigalachote (Thailand) Wen Zhu (USA)
Governance	5	Regional SWIM Governance Framework	Young Jin Ha (ROK) Mark Kaplun (USA), Yosuke MORO (Japan) Xiaodong Lu (Japan), Honglei Gao (China)
Information Services	6	Information services	Marco Kok (Hong Kong, China) Jeremy Bienkowski (Australia)
Validation & Demonstration	7	SWIM Demonstration	David Leow (Singapore) Amornrat Jirattigalachote (Thailand)
	8	SWIM services and application validation	Yosuke MORO (Japan) Xiaodong Lu (Japan), Honglei Gao (China), Young Jin Ha (ROK)
Coordination and Promotion	9	Monitoring of Panels' work	Yosuke MORO (Japan)
	10	Regional coordination and SWIM-related information sharing	John Moore (IATA)
	11	SWIM implementation education and promotion (New task)	Vacant

Table 2- The Existing Task Structure leads

2.98 It was noted that, during the SWIM TF Task Leads Meetings conducted after the SWIM TF/10 Meeting, there were discussions on the need for restructuring of tasks under SWIM TF. The proposal presented by the SWIM TF Co-Chair included the removal of **Task 3 – Security Service**, as the ANSIA TF is currently working on the ANS information security aspects. It was clarified that the SWIM TF will continue collaborating and coordinating with the ANSIA TF to ensure SWIM security requirements are incorporated into their relevant deliverables. The second proposal was to remove **Task 7 – SWIM Demonstration**, as the APAC region is currently in the SWIM implementation phase rather than the validation stage. The third proposal was to rename **Task 8 – SWIM Services and Application Validation** to **Task X – SWIM Services Validation,** as SWIM applications are beyond the scope of SWIM as defined in Doc 10039 Manual on the SWIM Concept**.** Lastly, it was suggested to merge three tasks: **Task 9 – Monitoring of Panels' Work**, **Task 10 – Regional Coordination and SWIM-related Information Sharing**, and **Task 11 – SWIM Implementation Education and Promotion** into a single task entitled "Coordination and Promotion", considering that regional coordination is currently

conducted through the well-established coordination process between the ICAO Secretariat of SWIM TF and relevant expert groups.

2.99 The Meeting discussed the proposed restructuring of tasks and their respective leads. After detailed deliberations, the agreed task structure and corresponding task leads are as follows:

Groups	Task No.	Subject/Task	Task Leads
Implementation Planning	1	Regional implementation philosophy & roadmap	David Leow (Singapore) Amornrat Jirattigalachote (Thailand)
SWIM infrastructure	2	Regional SWIM infrastructure	Xiaodong Lu (Japan), Yosuke MORO (Japan) Henry Chan (Hong Kong, China)
Technical Architecture	3	Development and maintenance of regional information exchange models	Amornrat Jirattigalachote (Thailand) Vacant
Governance	4	Regional SWIM Governance Framework	Young Jin Ha (ROK) ~~Mark Kaplun (USA)~~ (retired) Justin Prasai (U.S) Yosuke MORO (Japan) Xiaodong Lu (Japan), Honglei Gao (China)
Information Services	5	Information services	Marco Kok (Hong Kong, China) vacant
Validation & Demonstration	6	SWIM services ~~and application~~ validation	Yosuke MORO (Japan) Xiaodong Lu (Japan), Honglei Gao (China), Young Jin Ha (ROK)
Coordination and Promotion	7	Coordination and Promotion	Yosuke MORO (Japan) Elvin Liow (Singapore)

Table 3- New Task Structure and leads

SWIM harmonization

2.100 The Meeting discussed the need for a harmonised level of implementation among all significant APAC States/Administrations in order to realise the full benefits of SWIM across the region. The Meeting expressed concern regarding the absence of India from SWIM TF meetings in recent years, which has resulted in an incomplete understanding of the SWIM implementation status in the State. It was recalled that, in the past, India had been highly active in sharing progress on SWIM implementation, as well as participating in regional trials and demonstrations.

2.101 The Meeting requested the ICAO APAC Office to kindly encourage India to re-engage in SWIM TF meetings and to share its implementation status, with a view to ensuring the benefits of harmonised and timely SWIM implementation across the APAC region. **ACTION ITEM 11-46**

Date and Venue for the Next Meeting

2.102 The SWIM TF/12 is tentatively planned to be held from **7 to 11 June 2027**.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matter as appropriate

_ _ _ _ _ _ _ _ _ _ _ _ _

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC REGIONAL FLIGHT AND FLOW – INFORMATION FOR A COLLABORATIVE ENVIRONMENT RELEASE 1 (FF-ICE/R1) IMPLEMENTATION PLAN

Version 1.0, xxxx yyyy

This guidance was developed by the Asia/Pacific Flight and Flow Information for a Collaborative Environment Ad Hoc Group

Approved by APANPIRG/xx and published by the
ICAO Asia and Pacific Office, Bangkok

CONTENTS

1. SCOPE OF APAC REGIONAL FF-ICE/R1 IMPLEMENTATION PLAN

1.1 Alignment with Global Framework

1.1.1 This *Asia/Pacific Regional Flight and Flow – Information for a Collaborative Environment Release 1 (FF-ICE/R1) Implementation Plan* (the "Plan") has been developed to complement the International Civil Aviation Organization (ICAO) global framework and guidance. This Plan supplements and tailors the global Flight and Flow – Information for a Collaborative Environment (FF-ICE) concepts and objectives to the regional context of the Asia/Pacific (APAC), providing a practical roadmap for implementation in APAC States while remaining aligned with ICAO's provisions. This Plan operates on established relevant ICAO materials and on the foundational concepts, principles, and guidelines of System-wide Information Management (SWIM), Air Traffic Flow Management (ATFM) practices, and aviation information security requirements. Therefore, this Plan does not duplicate fundamental explanations from the *Manual on Flight and Flow — Information for a Collaborative Environment (FF-ICE)* (ICAO Doc 9965) or other global manuals. Instead, it focuses on regional implementation aspects bridging the gap between ICAO's global guidance and the specific needs of APAC stakeholders.

1.1.2 In accordance with other APAC regional plans, such as the *Asia/Pacific Plan for Collaborative Aeronautical Information Management*, this Plan is not intended to duplicate or pre-empt global guidance issued by ICAO expert groups. Rather, it builds upon the issued guidance to outline how FF-ICE can be implemented across the APAC region in a coordinated and harmonized manner. Global reference documents, i.e. *Manual on FF-ICE - Implementation Guidance* (ICAO Doc 9965 - Volume II), *Manual on System-wide Information Management (SWIM) Concept* (ICAO Doc 10039), etc., contain these foundational concepts, and this Plan serves to apply those concepts in the regional implementation setting.

1.1.3 This Plan uses the terms "shall", "should", and "may" to indicate the level of compliance expected from States in following this document.

1.1.3.1 "Shall" indicates provisions that are compulsory for States to implement as these provisions are considered necessary for regional harmonization and interoperability.

1.1.3.2 "Should" indicates provisions that are recommended as best practices for regional coordination. States are encouraged to implement these provisions where operationally feasible.

1.1.3.3 "May" indicates provisions that are optional and can be implemented at the discretion of individual States based on their operational requirements and capabilities.

1.1.4 This Plan recognizes that States retain control over their implementation decisions, while encouraging regional harmonization.

1.2 APAC Regional Context and Guidance

1.2.1 The FF-ICE implementation in the APAC region is being undertaken in parallel with the region's broader air navigation modernization strategies. The *Asia/Pacific Air Navigation Plan Volume III* explicitly identifies FF-ICE and Trajectory-based Operations (TBO) as key elements of future Air Traffic Management (ATM) enhancements. The *Asia/Pacific Air Navigation Plan (ANP) Volume III* calls on APAC States to work collaboratively through ICAO and regional platforms towards a seamless ATM environment, including the implementation of SWIM, FF-ICE, and TBO to support future traffic growth

and sustainability. Particularly, the implementation of SWIM, a key enabler for FF-ICE, within the APAC region, should follow the regionally agreed-upon guidelines, including *APAC SWIM Technical Infrastructure Profiles Version 1.0*, and the *APAC Common SWIM Information Services*. Following these guidelines will ensure interoperability and harmonized implementation.

1.2.2 Moreover, the *Asia/Pacific Plan for Collaborative Aeronautical Information Management Version 4.0* and the *Asia/Pacific Regional Framework for Collaborative ATFM Version 4.0* complement the FF-ICE initiative by simultaneously addressing the Aeronautical Information Management (AIM) and ATFM improvements that are needed. The *Asia/Pacific Plan for Collaborative Aeronautical Information Management* provides guidance on the transition from Aeronautical Information Services (AIS) to AIM and digital data exchange, which is a foundational element for successful FF-ICE implementation.

1.3 Mandatory and Optional FF-ICE Services

1.3.1 In accordance with *Procedures for Air Navigation Services – Air Traffic Management* (ICAO Doc 4444), Filing Service and Flight Data Request Service are mandatory. Additionally, to support the sunsetting of ICAO 2012 Flight Plan (FPL2012) and, at a minimum, DEP and ARR related Air Traffic Services (ATS) messages, the Notification Service is a mandatory service within the APAC region. The FF-ICE Planning Service, Trial Service, and Publication Service are considered optional within the APAC region.

2. EXECUTIVE SUMMARY

2.1 This Plan provides regional strategy and guidance for the implementation of the FF-ICE within the APAC region. This Plan also supports the transition from the traditional FPL2012 to the modernized FF-ICE environment, enabling collaborative, service-based information exchange among ATM Service Providers (ASPs), Airspace Users (AUs), and other aviation stakeholders. This Plan is aligned with the *Global Air Navigation Plan* (GANP) (ICAO Doc 9883), and the *Asia/Pacific ANP Volume III*.

2.2 The implementation of FF-ICE represents a significant step towards achieving TBO in the region. Through standardized information services and system-to-system interoperability, FF-ICE will facilitate the sharing and management of comprehensive flight and flow data through all phases of flight. This Plan defines the regional approach to implementing FF-ICE/R1 covering the pre-departure phase and lays the foundation for a future expansion to Release 2 (FF-ICE/R2 - post-departure operations).

2.3 The APAC region is adopting a harmonized approach to the use of global data standards, particularly the Flight Information Exchange Model (FIXM) version 4.3.0, together with the APAC regional FIXM version 4.3.0 Extension to support cross-border ATFM and Airport Collaborative Decision Making (A-CDM) integration. Mixed-mode operations between legacy and FF-ICE environments are expected during the transition period, and guidance has been included regarding translation mechanisms, validation procedures, and coordination processes necessary for maintaining seamless operation.

2.4 This Plan details the operational and technical requirements for the implementation of FF-ICE services. Filing Service and Flight Data Request Service are established as mandatory in accordance with *the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM)*, ICAO Doc 4444), with the Notification Service also identified as mandatory within the APAC region to support the eventual retirement of the FPL2012 and related ATS messages. The Planning, Trial, and Publication Services are considered optional but are recommended, to enhance collaborative decision-making and information availability.

2.5 Recognizing the importance of data integrity and operational assurance, this Plan introduces a common validation process, standardized submission response codes, and uniform filing-status interpretations. It outlines cybersecurity considerations for FF-ICE operations, recommending implementation of secure communication protocols and promoting adherence to ICAO information security guidance.

2.6 Implementation of FF-ICE/R1 across the APAC region will be achieved in phases. Technical trials and cross-border testing are targeted to begin in 2030, followed by operational testing in 2031. The testing will lead to full operational capability (FOC) of the regionally mandatory FF-ICE/R1 services (Filing Service, Flight Data Request Service and Notification Service) by 2032. This timeline supports regional readiness for the planned global sunset of the FPL2012 in 2034. States and Administrations will report progress to the ICAO APAC Regional Office annually to ensure synchronous advancement and to identify any areas requiring additional support or coordination.

2.7 This Plan will be maintained and updated in alignment with revisions to *GANP* (ICAO Doc 9883), and the *Asia/Pacific ANP Volume III*. Post-implementation coordination and performance monitoring will ensure continuous improvement and harmonization across the region. Through the collaborative and progressive implementation of FF-ICE, the APAC region will advance towards a fully information-driven ATM environment that enhances safety, efficiency, and predictability in support of the global vision for a seamless and interoperable air navigation system.

3. DEFINITIONS (REFERENCED FROM DOC 9965)

Air Traffic Management (ATM) — The dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

ATM community — The aggregate of organizations, agencies or entities that may participate, collaborate and cooperate in the planning, development, use, regulation, operation and maintenance of the ATM system.

ATM configuration — The arrangement of the non-flight elements of the Air Traffic Control (ATC) System. The ATM configuration imposes constraints on flights through such factors including military airspace reservations and releases, sector configurations, runway combinations and runway usage.

ATM Service Provider (ASP) — A Unit involved in performing Air Traffic Management responsibilities as introduced in the PANS-ATM.

ATM system limitations — Inherent characteristics that limit its ability to support desired aircraft operations or effectively accommodate demand on resources.

Coordinated airport — Any airport where, in order to land or take off, it is necessary for an aircraft operator to have been allocated a slot by an appropriate authority.

Effective flight constraints — The subset of flight constraints that actually affected the flight's unconstrained trajectory.

Emergency Service Provider (ESP) — Provider of emergency services, such as search and rescue organizations.

Flight and Flow – Information for a Collaboration Environment (FF-ICE) — Information necessary for planning, coordination, and notification of flights exchanged in a standardized format between members of the ATM community, including those involved in flight operations and aerodrome operations.

FF-ICE can refer to a single instance (an individual flight) and also to an aggregation of flights (each with their own flight information in FF-ICE).

Flight and Flow – Information for a Collaboration Environment (FF-ICE) services — A set of services established for the purpose of facilitating the exchange of flight and flow – information for a collaborative environment, more accurate assessment of demands, appropriate resource planning, and optimum flight planning and execution.

Flight constraint — Results from applying a restriction to a particular flight and describes bounds (e.g. in altitude, speed, time, and route) that constrain free movement of the flight.

Note: Throughout this document, the term 'constraint' should be understood as 'flight constraint' unless explicitly indicated otherwise.

Flight plan — Specified information relative to an intended flight or portion of a flight of an aircraft.

Note 1: the term "flight plan" may be prefixed by the words "preliminary", "filed", "current" or "operational" to indicate the context and different stages of flight.

Note 2: when the word "message" is used as a suffix to this term, it denotes the context and format of the flight plan data as transmitted.

Operational flight plan. The operator's plan for the safe conduct of the flight, based on considerations of aeroplane performance, other operating limitations, and relevant expected conditions on the route to be followed and at the aerodromes concerned.

Preliminary flight plan (PFP). The flight plan submitted by an operator or a designated representative to conduct collaborative planning of a flight, prior to filing a flight plan for use by ATS units.

Filed flight plan. The latest flight plan as submitted and updated by the pilot, an operator or a designated representative for use by ATS units.

Note: the FPL denotes a filed flight plan exchanged using aeronautical fixed services while eFPL denotes a filed flight plan exchanged using FF-ICE services. The eFPL allows for the exchange of additional information not contained within the FPL.

Current flight plan (CPL). The flight plan that reflects changes to the filed flight plan by subsequent ATC clearances.

Repetitive flight plan (RPL). A flight plan related to a series of frequently recurring, regularly operated individual flights with identical basic features, submitted by an operator or a designated representative, for retention and repetitive use by ATS units.

eFPL. A symbol used to designate a filed flight plan exchanged using FF-ICE services.

FPL. A symbol used to designate a filed flight plan exchanged via Aeronautical Fixed Services (AFS).

Flight plan originator — An operator or the operator's designated representative that has flight planning responsibility for the flight.

Gate-to-gate — An expression that describes the ground and airborne segments of aircraft operations from the first movement with intention of flight (from gate, stand or parking position) to completion of movement after flight (gate, stand or parking position).

Globally unique flight identifier (GUFI) — An unchangeable data element associated with a flight that allows all eligible members of the ATM community to unambiguously refer to information pertaining to the flight.

Message — A discrete unit of communication, expressed electronically, and intended by the source for consumption by some recipient or group of recipients. The term "message" is thus not limited only to ATS messages over AFTN, but can include communication via other technologies including those described in ICAO Doc 10039.

Message originator — An operator, their designated representative, or an ATS unit that transmitted the message.

Note: This is equivalent to the use of Originator in PANS-ATM Chapter 11.

Operator — The person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Procedure — A procedure is an established practice or prescribed method of proceeding with an action, normally non-systematic, under given circumstance or situation, in the provision of a service or part thereof.

Process — A process is an operation or series of operations performed in a definite manner, normally systematically, in the provision of a service or part thereof.

Ranked trajectories — A series of desired trajectories organized in the order of preference, with tolerances supplied, if necessary, by the airspace user, to define when the next ranked trajectory should be used.

Note: *Tolerances are used to express the bounds of variation on the trajectory, triggering a preference for the next ranked trajectory.*

Relevant ASP — Unit(s) designated by the appropriate ATS authority to which the flight plan for a particular flight needs to be provided and includes:

- The Area Control Centre (ACC) or flight information centre serving the control area of the Flight Information Region (FIR) within which the departure aerodrome is situated;
- The centres in charge of each FIR or upper FIR along the route;
- For flights along specified routes or portions of routes in close proximity to FIR boundaries, the centres in charge of each FIR or upper FIR adjacent to such routes or portions of routes;
- When a potential re-clearance in flight (RIF) request is indicated in the flight plan, the additional centres concerned and to the aerodrome control tower of the revised destination aerodrome;
- The aerodrome control tower at the destination aerodrome;
- Flow management centres responsible for ATS units along the route.
- Flight and flow – information services unit along the route of the flight.

Restrictions — Documented rules that are aimed at managing the ATM System, which act on, and reduce the freedom of a group of flights (i.e., flights with certain common characteristics). Restrictions result from ATM system limitations.

Note: a published restriction, in addition to the cause and applicability criteria, may also include the constraint. For example, "due to congestion all flights departing ABCD between Monday and Friday during the hours from 07:00 to 17:00 and routing via AWY1 to destination WXYZ must remain below FL250".

Typically, an Air Traffic Flow Management (ATFM) measure, which is a type of restriction, will require a specific flight constraint to be issued to each impacted flight. For example, "between 09:00 and 14:00, the airspace <airspace ref> can only accept 15 aircraft per hour. Flights planned to enter the airspace during this time period will be issued with an ATFM slot".

Runway Visual Range (RVR) — The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

Service — A service is the provision of a pre-defined set of work including any associated information intended to benefit the customer.

Trajectory — The representation of an aircraft continuous path, both in the air and on the ground, comprised of position (x, y, z) and time.

Desired trajectory — The trajectory that is requested and generated by the airspace user with its knowledge of the ATM system's configuration and published restrictions and that reflects the most recent request of the airspace user.

Note: *there is only one desired trajectory for any given flight at any time. To allow for flexibility and as the ATM system has unpredictable or uncontrollable events, it is likely that it will be necessary to renegotiate trajectories leading to a revision in the agreed trajectory. The desired trajectory therefore reflects the most recent airspace user request. Where the agreed trajectory is not the desired trajectory then the ASP will negotiate to obtain a revised agreed trajectory.*

Negotiating trajectory — A trajectory proposed by eAU or eASP as a potential agreed trajectory.

Note: *each participant would be allowed only one negotiating trajectory at a time which represents their most recent proposal in the negotiation. These trajectories may not necessarily be a gate-to-gate trajectory and are intended to be transitory.*

Agreed trajectory — The trajectory that reflects the most recent agreement between the airspace user and the ASP after collaboration, and/or imposition of pre-collaborated rules.

Note: *There is only one agreed trajectory for any given flight at any time.*

Executed trajectory — The actual trajectory of the aircraft from the start-up to the last known position.

Note: *The executed trajectory is what was executed and is not necessarily the desired or agreed trajectories. The executed trajectory relates only to the current flight of the aircraft (and does not contain information from previous flights, even with an en-route to en-route perspective). The executed trajectory information can be used for performance and operational analysis.*

Trajectory synchronization — The process of aligning the trajectories for a single flight held by operationally relevant entities (including ground and airborne) such that remaining differences are operationally negligible for the execution of the flight.

Minutes in Trail (MINIT) / Miles in Trail (MIT) — MINIT/MIT are tactical ATFM measures and are expressed as the number of minutes or miles between each successive aircraft at an airspace boundary point. (Doc 9971)

4. INTRODUCTION

4.1 FF-ICE is a global ICAO initiative to modernize flight planning and trajectory management through enhanced information exchange methods and collaboration. At the global level, FF-ICE is designed to address the limitations of the traditional FPL2012 by enabling a fully collaborative TBO environment. This means that a flight's trajectory can be shared, managed, and adjusted among stakeholders in all phases of flight, improving predictability and efficiency in line with the TBO concept. By exchanging more comprehensive flight and flow data (such as detailed route trajectories and aircraft performance information) in a standardized, system-wide manner, FF-ICE aims to increase airspace capacity and flight efficiency while maintaining safety. This is a key objective identified in the *Global Air Traffic Management Operational Concept* (GATMOC) (ICAO Doc 9854) for future ATM systems, and a critical goal for the FF-ICE effort overall.

4.2 ICAO's FF-ICE concept is documented in ICAO Doc 9965, which is organized into two volumes. Volume I outlines the overall FF-ICE Concept, covering how information for flight planning, flow management, and trajectory management will support a collaborative ATM environment. Volume II, *FF-ICE Implementation Guidance,* provides detailed guidance to ASPs and AUs for implementing FF-ICE in the pre-departure phase, particularly the FF-ICE/R1 capabilities. According to this ICAO guidance, FF-ICE/R1 introduces a set of new services including Planning Service, Filing Service, Trial Service, Flight Data Request Service, Notification Service, and Publication Service, which collectively enable stakeholders to file collaborative flight plans, perform trial trajectory analyses, update or cancel plans, share flight event updates, and request flight information through SWIM-based messages. Each service is defined through agreed-upon procedures and message formats to help ensure consistent information exchange among FF-ICE participants, while allowing flexibility in interface implementation. The subsequent FF-ICE/R2 will extend these principles into the post-departure phase by supporting in-flight trajectory updates and collaborative adjustments between ASPs and AUs, further building on the foundation established by FF-ICE/R1.

5. BACKGROUND

5.1 SWIM as an Enabler for FF-ICE

5.1.1 The implementation of FF-ICE is fundamentally supported by the concept of SWIM. SWIM provides the technical infrastructure, standards, and governance needed to allow seamless information exchange among ATM stakeholders.

5.1.2 In the FF-ICE environment, flight data sharing is accomplished through SWIM-based information services rather than traditional point-to-point messaging. FF-ICE operates within a SWIM operational environment where the key flight planning processes are described and offered in terms of services.

5.1.3 These services are published and discovered via SWIM, enabling authorized stakeholders to exchange flight and flow information in real time, using common formats and protocols. SWIM ensures that all FF-ICE messages are exchanged on a secure, interoperable network with agreed-upon data exchange models and service interfaces. Crucially, SWIM's service-oriented architecture means that FF-ICE information exchanges are standardized at the service level, even as the underlying technologies and implementations may differ between States.

5.1.4 Guidance on implementing SWIM information services, such as those to support FF-ICE, are provided in the *Procedures for Air Navigation Services – Information Management* (PANS-IM, ICAO Doc 10199) requirements and *Manual on the SWIM Implementation* (ICAO Doc 10203).

5.1.5 As the SWIM technical infrastructure evolves over time, the focus for FF-ICE will be on creating and maintaining adaptive operational services and data exchanges, ensuring that any State's system can communicate using the standard FF-ICE service definitions. The hardware/software implementation within each State can be flexible and technology-agnostic on the condition that the State is able to provide and consume the defined FF-ICE services and related information services through SWIM.

5.2 FIXM and Regional Extensions

5.2.1 The information exchange mechanism of FF ICE relies on standardized data formats. Notably, it relies on the Flight Information eXchange Model (FIXM) for encoding flight information. While FF-ICE defines what flight information needs to be exchanged among stakeholders, FIXM defines how that information is structured for digital exchange within a SWIM environment. As the globally standardized information exchange model, FIXM provides the rich, detailed, and structured flight and flow information required by the FF-ICE concept, representing a major advancement from the traditional teletype-format flight plan (FPL2012).

5.2.2 APAC stakeholders implement FF-ICE using the globally defined FIXM standard for flight data. However, in recognizing certain regional operational needs, the APAC region has developed its own endorsed extensions to FIXM to accommodate additional information specific to the region. An APAC FIXM extension was developed to include flight-specific data attributes necessary for cross-border ATFM operations, A-CDM, ATFM/A-CDM integration, and traffic synchronization. The APAC FIXM extension adds fields for information such as target take-off time, target time over, and other collaborative decision-making parameters that are crucial for coordinating operations across Flight Information Regions (FIRs) within the region.

5.2.3 This approach allows APAC States to exchange all necessary flight and flow information, including regional specifics, under FF-ICE, supporting the implementation of regional initiatives while still adhering to global standards and ensuring interoperability between APAC and other ICAO regions.

5.2.4 **Appendix A** provides guidance on translating FF-ICE FIXM information to ATS messages, and the structure of the legacy FPL2012, which may be needed to support ingestion of the FPL2012 flight plan.

5.2.5 **Appendix B** maps the FIXM Core version 4.3.0 data attributes required to support cross-border ATFM information exchanges.

5.3 Mixed-Mode Operations During Transition

5.3.1 As the APAC region begins implementing FF-ICE, there is expected to be an extended transition period during which legacy and new systems will operate in parallel. Not all States or ASPs will be ready to switch to FF-ICE/R1 on the same date. System upgrades and operational readiness will vary. Consequently, a mixed-mode environment will exist for several years, wherein some flights will be filed and managed using traditional FPL2012 procedures, while others will use the new FF-ICE services.

5.3.2 Section 6.1.8 provides regional implementation considerations for mixed-mode operations.

6. APAC REGIONAL IMPLEMENTATION PLAN

6.1 General

6.1.1 Information Exchange Standards

6.1.1.1 FF-ICE operations, as described in ICAO Doc 9965 Volume II, are performed through FF-ICE services. Each FF-ICE service is encompassed with a set of FF-ICE messages for exchanging flight information between stakeholders. These messages are constructed using FIXM, a globally standardized information model for flight and flow information exchange.

6.1.1.2 ATM Information Reference Model (AIRM) (https://airm.aero/), a standardized dictionary for ATM information, shall be used as a reference for ATM vocabulary in digital information exchange among stakeholders within the FF-ICE/R1 processes, to prevent ambiguities. To ensure semantic interoperability and consistency across information domains, AIRM also underpins the development of FIXM, Aeronautical Information Exchange Model (AIXM), and the ICAO Meteorological Information Exchange Model (IWXXM).

6.1.1.3 FIXM is comprised of the following components:

a) FIXM Core – provides globally harmonized flight data structures;

b) FIXM Applications – built upon FIXM Core to provide specific flight data structure such as FF-ICE messages and FF-ICE message templates; and

c) FIXM Extensions – Extends FIXM Core to support additional local, national, or regional information exchange requirements.

6.1.1.4 To ensure harmonized FF-ICE operations, the FF-ICE message templates specified in ICAO Doc 9965 Volume II and published on the official FIXM website (https://fixm.aero/) shall be used for FF-ICE implementation. Use of these templates will ensure consistent validation of data fields across stakeholders.

6.1.1.5 FIXM version 4.3.0 shall be used as the standard format for the implementation of FF-ICE/R1 services in the APAC region starting from Q3/2026, as agreed by APANPIRG/35 through its *Conclusion APANPIRG/35/4.*

6.1.1.6 The APAC regional FIXM version 4.3.0 Extension shall be used for cross-border ATFM operations, A-CDM, ATFM/A-CDM integration, and traffic synchronization within the region, as agreed by APANPIRG/36 through its *Conclusion APANPIRG/36/12*.

6.1.1.7 The change process for the cross-border FIXM operating version used to support system-to-system information exchange via SWIM shall follow the procedure agreed by ATM/SG/13 through its *Conclusion ATM/SG/13-5*.

6.1.1.8 It is recommended that the FIXM version used within the APAC region for FF-ICE services implementation and cross-border ATFM information exchange remain aligned to ensure effective communication and interoperability across ATM operation support systems throughout the region.

6.1.2 Globally Unique Flight Identifier (GUFI)

6.1.2.1 Under the current operational format, multiple fields are used to identify a specific flight, such as aircraft identification, departure aerodrome, destination aerodrome, date of flight, and Estimated

Off-Block Time (EOBT). However, this method may not always uniquely identify a flight, for example, when a flight is delayed. Automation will play a critical role in the FF-ICE environment where large volumes of simultaneous transactions and message exchanges are expected.

6.1.2.2 To avoid ambiguity in flight identification and accurate correlation of flight data, GUFI shall be used. The GUFI provides a unique reference to each flight and ensures clear distinction between flights with otherwise similar information.

6.1.2.3 When a flight plan is cancelled and a new flight plan is submitted, a new GUFI shall be assigned, even if the flight is considered the same by the operator. Alternatively, in place of the cancel and refile option, a new filed flight plan message can be provided with the same GUFI but with an incremented flight plan version and as a consequence, it will be treated as a complete replacement of the existing data.

6.1.2.4 It is recommended that the current flight association practices continue to be applied in parallel with the use of GUFI, during the initial implementation of FF-ICE. This approach will provide more robust data correlation and support operations in a mixed-mode environment.

6.1.3 Flight Plan Differentiation

6.1.3.1 In the early stage of FF-ICE implementation and the introduction of using GUFI as an additional field to differentiate a flight, it is possible that two flight plans with two different GUFIs may refer to the same flight. One of the scenarios is a system failure causing incomplete cancellation but followed by re-filing of eFPL. eAUs and eASPs should perform typical flight plan differentiation using aircraft identification, departure aerodrome, destination aerodrome, and EOBT, in addition to the check using only GUFI.

6.1.3.2 During the transition period, the eASPs should verify that multiple eFPLs with distinct GUFIs do not refer to the same flight. When such incidents are detected, manual resolution may be required.

6.1.4 GUFI Allocation Criteria

6.1.4.1 For GUFI allocation, the operation of an aircraft is considered “a flight” from the submission of its first flight plan – whether a Preliminary Flight Plan (PFP) or an eFPL – until the aircraft is in-block at the arrival aerodrome. For multi-leg operations, a different GUFI shall be allocated for each leg, as the departure aerodrome differs.

6.1.4.2 A key consideration in determining a flight is whether the aircraft becomes airborne. Once airborne, and subsequently landed at an aerodrome – whether the intended destination aerodrome, a diversion aerodrome, or even the departure aerodrome – the flight is deemed complete. If the aircraft intends to continue its operation, a new flight plan with a new GUFI shall be required.

6.1.4.3 If an aircraft is compelled to return to its parking stand prior to becoming airborne, such as in a “ground return” or “aborted take-off”, the original flight plan and GUFI may be retained, provided the intention is to continue the same flight. Otherwise, the flight plan shall be cancelled.

6.1.5 GUFI Procedure

6.1.5.1 An operator, or its designated representative, shall generate and allocate a GUFI to each flight plan. The operator should also ensure that all flight data submitted for that flight uses the same GUFI, and that no GUFI is reused for any other flight.

6.1.5.2 Upon receipt of either a PFP or an eFPL, the eASP shall verify it against the flight plan differentiation checks to ensure that:

a) the same PFP with a different GUFI does not already exist in the system;

b) the same eFPL with a different GUFI does not already exist in the system; and/or

c) a different PFP or eFPL with the same GUFI does not already exist in the system. If such a case exists and the newly received PFP or eFPL contains a later version number, it should be treated as a complete replacement of the existing data.

6.1.5.3 An eFPL should carry the same GUFI as its corresponding PFP, if submitted, but with an incremented version number.

6.1.5.4 Upon receipt of a Flight Plan Update message or a Flight Cancellation message, the eASP shall use the GUFI to retrieve the associated flight plan information before performing the required actions. It is also recommended that the eASP perform verification using other key fields in the received messages (e.g. aircraft identification, departure aerodrome, destination aerodrome, EOBT, etc.) to ensure accurate flight plan association.

6.1.6 GUFI Composition and Validation

6.1.6.1 A GUFI shall include a version 4 Universally Unique IDentifier (UUID) that has been standardized by the Open Software Foundation (OSF). The UUID specification is published by the Internet Engineering Task Force (IETF) as RFC 9562.

Note: RFC 9562 supersedes RFC 4122 (referenced in ICAO Doc 9965) and is backward compatible.

6.1.6.2 The UUID used in a GUFI shall be supplemented with the following additional information:

a) Namespace Identifier: captures the originator of the GUFI. Recommendations for constructing the namespace are as follows:

   i) eAU should use the three-letter designator in accordance with the *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services* (ICAO Doc 8585);

   ii) eASP should use the four-letter location indicator in accordance with the *Location Indicators* (ICAO Doc 7910); and

   iii) Other GUFI originators should construct their namespace based on the Fully Qualified Domain Name (FQDN) of their organization.

b) Creation Timestamp: provides increased uniqueness of the generated GUFI. The timestamp should be in the Coordinated Universal Time (UTC), in accordance with FIXM version 4.3.0 schema.

6.1.6.3 The namespace portion of the GUFI should be static for a given originator. The UUID portion of the GUFI should be validated for proper formatting. In addition, the UUID portion should also be checked for duplication against existing UUIDs, generated by its own system and previously received from external systems.

6.1.6.4 The sole use of UUID as a GUFI is not recommended as it may lead to interoperability issues among stakeholders and potential GUFI collisions.

6.1.7 Cyber Security

6.1.7.1 eASPs and eAUs shall ensure that their FF-ICE systems are protected against cyber-attacks and that all exchanged information is authentic. Network and server protections such as a firewalls shall be implemented. Cybersecurity recommendations provided in *Aviation Common Certificate Policy* (ICAO Doc 10169) and *Manual on Aviation Information Security* (ICAO Doc 10204) should be utilized.

6.1.7.2 In the absence of a regionally agreed-upon Public Key Infrastructure (PKI) framework, a Transport Layer Security (TLS) self-signed certificate should be implemented, at minimum.

6.1.8 Mixed Mode Operations

6.1.8.1 eASP Responsibility

6.1.8.1.1 An eASP may provide a translation service to convert eFPL into FPL2012 to support the varying capabilities of AUs and ASPs within the APAC region during mixed-mode operations.

6.1.8.2 eAU Responsibility

6.1.8.2.1 An eAU or its designated representative shall submit eFPL to all relevant eASPs and FPL2012 to aASPs in accordance with ICAO Doc 4444 Chapter 17. The eAU or its designated representative shall ensure that all Flight Plan Updates are submitted to all relevant eASPs and aASPs using the appropriate message type:

a) If any changes are made after submitting eFPL (e.g. aircraft, route, delay): the eAU shall submit a Flight Plan Update to all relevant eASPs, and a CHG or DLA message to aASPs.

b) If a flight is expected to be delayed by more than 30 minutes: the eAU shall submit a Flight Plan Update to all relevant eASPs and a CHG or DLA message to aASPs.

c) If a flight is cancelled: the eAU shall submit a Flight Cancellation to all relevant eASPs and a CNL message to aASPs.

6.1.8.3 Translation

6.1.8.3.1 Translation between legacy FPL2012 and other relevant ATS messages in the current flight planning process into FF-ICE messages will play an important role in accommodating differing implementation timelines during the transition to full FF-ICE/R1 operations. ASPs may need to consider implementing the legacy-to-FF-ICE translation function to support its internal automation.

6.1.8.3.2 Translation is, however, only considered an interim solution. FF-ICE operations represent not only a change in flight plan format, but a paradigm shift in flight information exchange and management among ATM stakeholders.

6.1.8.3.3 Potential data loss may occur during translation between eFPL and FPL2012, because eFPL contains significantly more information than the legacy FPL2012. eAUs and eASPs are therefore encouraged to leverage the full benefits of FF-ICE services rather than prolonging reliance on translation.

6.1.8.3.4 For translation guidance, reference should be made to ICAO Doc 9965.

6.1.9 Access Management for FF-ICE Services

6.1.9.1 All FF-ICE services should implement robust access control mechanisms to ensure that only authorized parties can access FF-ICE services and receive flight data, safeguarding the confidentiality and integrity of sensitive information.

6.1.9.2 The following security safeguards should be implemented for all FF-ICE services:

a) authentication mechanisms to verify the identity of service users; and

b) authorization controls to ensure users can only access data and services appropriate to their role.

6.1.9.3 All FF-ICE service usage should be logged for operational monitoring, troubleshooting, and accountability purposes.

6.2 Common Validation Process for FF-ICE Services

6.2.1 Submission Response Message

6.2.1.1 Submission Response Messages are responses provided by the message recipient for every message submitted to them to acknowledge that they have received the messages and to indicate whether they are able or unable to process the messages. Submission Responses are used in a similar manner for five of the FF-ICE/R1 Services (Filing Service, Flight Data Request Service, Notification Service, Planning Service, and Trial Service). A Submission Response shall be “ACK”, “REJ” or “MAN”, where:

a) ACK: indicates the message will be processed by the eASP.

b) REJ: indicates the message cannot be processed and no data will be retained by the eASP.

c) MAN: indicates that manual intervention is required before processing can be completed.

6.2.1.2 Status Response Messages (Filing Status, Planning Status, and Trial Response) are only provided when the Submission Response status is “ACK”. If an eAU receives a Submission Response of “REJ”, no status response will be provided. The eAU must address the issues identified in the Submission Response explanation and resubmit the message until an “ACK” Submission Response is received, after which the appropriate status response will be provided.

6.2.2 General Validation Requirements

6.2.2.1 Upon receipt of any messages, the message recipient shall perform the following checks before returning a Submission Response. These checks include:

a) Basic syntax and semantic validation including FIXM version 4.3.0 schema compliance and applicable FIXM FF-ICE Applications; and

b) Other validation checks specific to the individual FF-ICE/R1 services.

Note: these are explained in greater detail in subsequent sections under each of the relevant FF-ICE/R1 services.

6.2.3 Submission Response "REJ"

6.2.3.1 When validation fails, the message recipient shall provide a Submission Response of "REJ" and include an explanation in the explanation note field. While harmonization of explanation notes is not required, eASPs should ensure that explanations are precise enough for eAUs to rectify their original message if necessary.

6.2.3.2 **Table 1** provides a sample template for eASPs to use within the explanation note regarding the various types of validation checks that might result in a Submission Response of "REJ".

Table 1: FF-ICE Submission Response Feedback for General Validation

Checks	Explanation Note
Syntax and Semantic Check	Wrong data format in field <X>
FIXM schema compliance	Field <X> not compliant to FIXM version 4.3.0
Mandatory Fields	Mandatory field <X> missing

6.2.4 Manual Processing Requirements

6.2.4.1 While FF-ICE processes are expected to be predominantly automated, manual processing may be required for specific operational needs. eASPs should clearly document their manual processing procedures and criteria and make them available to AUs.

6.2.4.2 When manual processing is required, eASPs shall send a "MAN" Submission Response to the message originator.

6.2.4.3 No action is required of the message originator on receipt of a "MAN" Submission Response from the eASP. The message originator should not submit any other messages relating to that flight until such time as an "ACK" or "REJ" Submission Response is received for that message.

6.2.4.4 After manual processing is completed, an "ACK" Submission Response shall be sent if the issue is resolved. A "REJ" Submission Response shall be sent if the issue remains unresolved. The eASP shall also provide a clear explanation of any manual changes made in their copy of the eFPL, within the explanation field of the Submission Response message.

6.2.4.5 Upon receipt of an "ACK" following a "MAN" Submission Response, the eAU should determine the need to submit a Flight Plan Update or Filed Flight Plan to all relevant ASPs incorporating the manual change that has been made to maintain a consistent flight plan across all ASPs.

6.2.4.6 The following scenarios should be considered for manual processing:

a) Special Handling Flights: flights requiring special handling (e.g. MEDEVAC, SAR) as identified in the Special Handling field, as defined in ICAO Doc 4444.

Note: these flights should normally not be rejected, even if they are non-compliant with standard restrictions. If these flight plans fail automatic validation checks, manual processing is recommended to ensure prompt facilitation and appropriate consideration of their special status.

b) Known System Issues: flights requiring manual intervention.

Note: these are cases where ATM system errors or configuration data errors which require manual intervention.

c) Other Exceptional Cases: these cases will be identified and documented by the eASP.

6.3 Filing Service

6.3.1 Introduction

6.3.1.1 The Filing Service is a mandatory service. Operators use the Filing Service to submit eFPLs and send updates, which are necessary to receive air traffic services.

6.3.1.2 To support the organized implementation of Filing Service in this region, a set of operational requirements and business rules should be utilized to provide clarity and operational consistency. While each eASP may have unique considerations and priorities, the transboundary nature of flights necessitates that certain processes be regionally agreed-upon, to allow for efficient flight planning for both eAUs and eASPs.

6.3.1.3 The Filing Service encompasses three primary processes:

a) Flight plan filing;

b) Flight plan updating; and

c) Flight plan cancellation.

6.3.1.4 **Figure 1** depicts the workflow and associated FF-ICE message exchanges for each Filing Service process, detailing the interaction between eAUs and eASPs throughout the flight plan lifecycle.

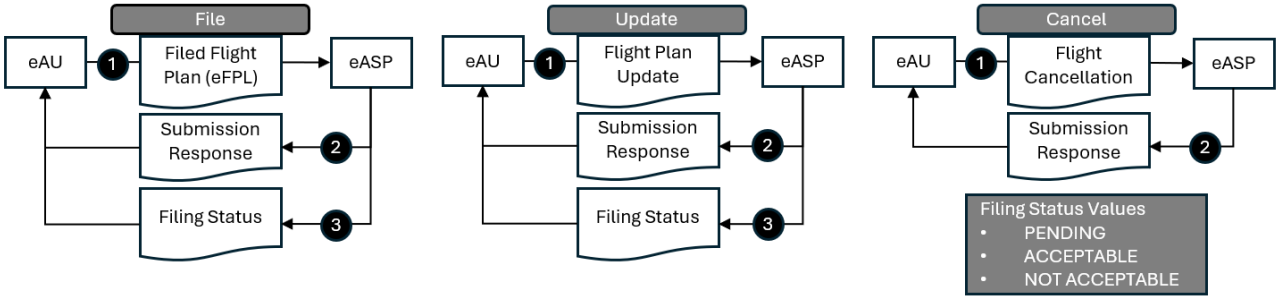

Figure 1: Filing Service Process Overview

6.3.1.5 There are five FF-ICE messages available under the Filing Service:

a) Filed Flight Plan Message;

b) Flight Plan Update Message;

c) Flight Cancellation Message;

d) Submission Response Message; and

e) Filing Status Message.

6.3.1.6 The following sections discuss the necessary processes and identify areas that would benefit from regional co-ordination for each of the Filing Service messages.

6.3.2 Filed Flight Plan Message

6.3.2.1 eFPLs are submitted by the eAUs as the first step under the Filing Service to obtain air traffic services. The eFPLs are subjected to validation checks resulting in a Submission Response, and evaluation checks resulting in a Filing Status.

6.3.3 Flight Plan Filing Cut-off Times

6.3.3.1 Flight plan filing cut-off times refer to the earliest and latest submission times for the filed flight plan. The earliest and latest submission times are defined in ICAO Doc 4444. However, regional agreements may impose stricter requirements necessitating that eAUs file their flight plans earlier than the standard latest submission time. The relevant cut-off times should be published by eASPs in the States' Aeronautical Information Publication (AIP). The flight plan filing cut-off times for the APAC region include:

a) Earliest submission timings: in accordance with ICAO Doc 4444 Section 4.4.2.1.1, eFPL shall not be submitted more than 120 hours before the EOBT of a flight. This requirement applies specifically to eFPL and does not extend to PFP.

b) Latest submission timings: In accordance with ICAO Doc 4444 Section 11.3.2, basic flight plan data necessary for flow control procedures shall be furnished at least 60 minutes in advance of the flight. eFPL shall therefore be submitted at least 60 minutes before EOBT.

6.3.3.2 The requirements specified in the *Asia Pacific Regional Framework for Collaborative Air Traffic Flow Management* should be followed, i.e. eFPL is to be submitted no less than three hours prior to the EOBT, except where operational or technical constraints necessitate otherwise.

6.3.4 Versioning

6.3.4.1 eASPs should refer to ICAO Doc 9965 Volume II Chapter 3.8 *Versioning & Reference Information*. It is the sole responsibility of the eAUs to increase the versioning of the flight plans. eASPs shall refer to the version numbers provided by eAUs and not change the flight plan versions.

6.3.4.2 eAUs shall increment the flight plan version by one, for the following scenarios:

a) a Flight Plan Update is made to the PFP;

b) a PFP has been previously submitted and the eAU is filing the flight plan (eFPL) for the same flight; or

c) an update is made to the eFPL.

6.3.4.3 It should be noted that the version number for the first submission of the eFPL received by an eASP might not be "1". This might occur when:

a) the eASP does not provide Planning Service and the eAU has previously submitted PFP to other eASPs that provide Planning Services; or

b) route changes result in the eASP becoming newly relevant to the flight, requiring the eAU to submit an eFPL with the current version number to inform the eASP of the existing flight plan.

6.3.4.4 If there is a concern of inconsistent version numbers between eAU and eASP, Flight Data Request Service can be used to obtain the eFPL which includes the version number.

6.3.5 Submission Response

6.3.5.1 The general validation requirements in accordance with section 6.2.2.1 also apply to the Submission Response Message.

6.3.5.2 Specific Validation Requirements for Filed Flight Plan

6.3.5.2.1 In addition to the checks listed in paragraph 6.2.2.1, submission timeframe, versioning, and flight association checks should also be conducted for Filed Flight Plans and Flight Plan Updates. eASPs may also implement additional checks based on local requirements to ensure that route/trajectories filed by eAUs contain valid routes, fix names, coordinates, etc. These checks include, but are not limited to:

a) trajectory syntactic checks; and

b) semantic checks.

6.3.5.2.2 **Table 2** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of "REJ":

Table 2: FF-ICE Submission Response feedback for Filed Flight Plans and Flight Plan Updates

Additional Checks for Filed Flight Plans and Flight Plan Updates	
Checks	***Explanation Note***
Submission Timeframe	EOBT is outside allowable submission timeframe
Versioning	A later version <Y> exists in the system
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Route validation (Structure of route, lat/long of point, fix names)	Trajectory Info Error Invalid Route Structure Invalid Fix/waypoint

6.3.6 Filing Status Message

6.3.6.1 Overview

6.3.6.1.1 Filing Status reflects the operational acceptability of a flight plan based on the eASP's evaluation or re-evaluation against its operational environment, including but not limited to airspace configuration, published restrictions, and other relevant constraints. eASPs provide feedback to eAUs to identify the restrictions and constraints applicable to the flights. The Filing Status serves as a key mechanism for eASPs to communicate flight plan acceptability to eAUs before departure.

6.3.6.1.2 eASPs should evaluate eFPLs against restrictions and constraints managed by existing ATM systems to ensure comprehensive evaluation of flight plan acceptability. Restrictions and constraints considered should include but are not limited to:

a) aerodrome, airspace and route availability;

b) ATFM measures;

c) environmental conditions such as SIGMETs, WAFs, TAFs, and volcanic ash areas, affecting airspace availability or constraints; and

d) aircraft operations requirements (e.g. required navigation performance specifications, required equipage, etc.)

Note: the above list represents constraints and restrictions that eASPs should consider. However, not all of these will necessarily result in a "Not Acceptable" Filing Status.

6.3.6.2 Filing Status Values and Expected Actions from the eAUs

6.3.6.2.1 While eASPs retain the option to determine the specific criteria for each Filing Status based on their operational environment, the interpretation and expected actions from the eAUs for each Filing Status value shall be established as described in **Table 3**.

Table 3: FF-ICE Filing Status Interpretation and Expected eAU Action

Filing Status	Interpretation	Expected eAU Action
ACCEPTABLE	The flight plan complies with operational requirements. Any constraints identified can be accommodated without flight plan modifications.	No immediate action or update required. Note any provided constraints for awareness. Prepare for possible tactical clearances reflecting identified constraints.
NOT ACCEPTABLE	The flight plan does not comply with operational requirements and requires modification.	Submit Flight Plan Update to address non-compliance. If close to EOBT, the operator may be unable to update their flight plan in time, using FF-ICE/R1 processes. In these cases, the operator may update their flight plan as needed through tactical coordination with ATC. *Note: if departure eASP provides a "Not Acceptable" Filing Status, eAU can expect refusal to start-up clearance if non-compliance requires flight plan modification (e.g. aerodrome closure). This does not apply to "Not Acceptable" status received from downstream eASPs.*
PENDING	Flight plan evaluation has not yet been performed. More details under Section 6.3.6.5.1	Await subsequent filing status update. Monitor Expected Evaluation Time if provided.

6.3.6.2.2 The Filing Status is intended to indicate the acceptability of a proposed route or trajectory within airspaces where ATS are provided. It cannot be interpreted as the issuance of ATC clearance.

6.3.6.2.3 A “NOT ACCEPTABLE” Filing Status indicates that the flight plan is operationally inconsistent with the ATM configuration and/or with published restrictions and that operator action is required to obtain a clearance. eAUs are expected to submit Flight Plan Updates to address the non-compliance. Note that the Filing Status reflects route/trajectory acceptability only and does not prevent ATC tactical coordination during operations.

6.3.6.2.4 An “ACCEPTABLE” Filing Status can include potential constraints to alert eAUs of constraints that may affect the flight plan. For example, if a flight plan is 'Acceptable' but there is an applicable ATFM program for the arrival airport, the arrival eASP should include this constraint in the Filing Status even though its specific impact (e.g. constraint time) is not yet known. When Filing Status is “ACCEPTABLE”, eAUs are not expected to make any changes to their eFPLs.

6.3.6.2.5 When a Filing Status is “PENDING” or “NOT ACCEPTABLE”, an explanation shall be included within the Filing Status response to eAU.

6.3.6.3 **Feedback Methods for Restrictions/Constraints**

6.3.6.3.1 When providing restrictions and/or constraints to eAUs within the Filing Status, eASPs shall make use of one or more of the following methods:

a) Filing Status Explanation;

b) General Flight Constraint; and/or

c) Route/Trajectory (R/T) Point Constraint.

6.3.6.3.2 eASPs should retain flexibility in determining their Filing Status feedback methods and content, except in the scenarios described in paragraph 6.3.6.4.1, which require harmonized responses to ensure regional interoperability and consistent handling of situations.

6.3.6.3.3 <u>Filing Status Explanation</u>

6.3.6.3.3.1 The Filing Status Explanation is a mandatory field when the status is “PENDING” or “NOT ACCEPTABLE”, but is otherwise optional. It should provide information necessary for eAUs to understand why a flight plan is not operationally acceptable or to be alerted to potential constraints that could impact the flight. Where available, the explanation should include references to published restriction identifiers to facilitate the eAU’s understanding and response.

6.3.6.3.4 <u>General Flight Constraint</u>

6.3.6.3.4.1 General Flight Constraints may be used to indicate constraints that apply to the entire flight rather than specific trajectory points. These types of constraints may include:

a) applicability period of the constraint;

b) operational impact on the flight;

c) reference to published restriction identifiers where available; and

d) other operational information affecting flight.

6.3.6.3.5 Route/Trajectory (R/T) Point Constraints

6.3.6.3.5.1 Providing an "Agreed" or "Negotiating R/T" within the Filing Status is optional. When provided, eASPs may include specific constraints at route or trajectory points. These constraints may specify speed, level, and/or time requirements that the flight is expected to meet. Such constraints should be accompanied by information for the eAU to understand their operational impact, including but not limited to:

a) description of the constraint;

b) speed, level, and/or time constraints where relevant;

c) reference to published restriction identifiers, where available; and

d) other point-specific operational requirements.

6.3.6.4 **Harmonized Filing Status Responses for Identified ATFM Scenarios**

6.3.6.4.1 While eASPs maintain flexibility in determining their trajectory evaluation criteria and feedback methods, certain scenarios require pre-determined Filing Status responses to ensure regional interoperability and consistent handling of operational conditions. The following ATFM scenarios were identified to benefit from pre-established Filing Status responses:

a) Calculated Time Over (CTO) a point or Calculated Landing Time (CLDT) imposed by eASPs;

b) Ground Stop (GSt) imposed by arrival eASPs;

c) flight level restrictions imposed by relevant eASPs;

d) fix balancing imposed by relevant eASPs; and

e) re-routing imposed by relevant eASPs.

6.3.6.4.2 Harmonized Filing Status Responses

6.3.6.4.2.1 The regionally agreed-upon Filing Status Responses for these scenarios are detailed in **Table 10**. Consistent implementation by all eASPs in APAC is necessary to facilitate the processing requirements of eAUs.

6.3.6.4.2.2 eASPs are not required to suggest alternative solutions to eAUs. However, if eASPs choose to offer suggestions to assist eAUs, they may:

a) add additional suggested details to the end of the regionally agreed-upon explanation format in the Filing Status Explanation field; and/or

b) provide a Negotiating R/T containing the suggested alternative trajectory, including route, levels, or timing.

6.3.6.4.2.3 The regionally agreed-upon explanation format shown in **Table 10** should remain the primary response, with any additional suggested information considered as supplementary content rather than replacing the required format.

6.3.6.4.3 Scenario A) Calculated Time Over (CTO) a point or Calculated Landing Time (CLDT) imposed by eASPs

6.3.6.4.3.1 Due to demand capacity imbalance, the eASP may impose a time constraint of CTO or CLDT to flights.

Note: eASP shall provide feedback only on constraints within airspace where it provides ATS or ATFM service. Where constraints are to be applied outside this airspace, e.g. assignment of Calculated Take-Off Time (CTOT) at the departure aerodrome in an airspace outside the eASP's jurisdiction, special arrangement between ASPs shall be established.

6.3.6.4.3.2 When a CTO or CLDT is imposed on flights, the following responses shall be provided as presented in **Table 10**:

a) Filing Status value shall be "NOT ACCEPTABLE";

b) an explanation shall be provided, specifying at a minimum the ATFM constraint/restriction affecting the flight;

c) a Negotiating R/T shall be included to indicate the constrained point and its associated time constraint;

d) when providing constraint details in the Negotiating R/T, eASPs should:

i) use ElementStartPoint to identify the location of the constraint;

ii) provide the time constraint using Constraint.Time, and any additional level/speed constraints using Constraint.Level/Constraint.Speed, if applicable;

iii) provide the REGCAUSE in the constraint description;

iv) provide the REGUL in restriction reference; and

e) the message format for REGCAUSE and REGUL should be in accordance with the *Asia/Pacific Region AFTN/AMHS-based Interface Control Document (ICD)* for ATFM.

6.3.6.4.4 Scenario B) Ground Stop (GSt) imposed by arrival eASPs

6.3.6.4.4.1 The arrival eASP may need to restrict arrivals for a period when capacity has been severely reduced.

6.3.6.4.4.2 When a GSt is implemented, the eASP initiating the measure the following responses shall be utilized as detailed in **Table 10**:

a) Filing Status value shall be NOT ACCEPTABLE;

b) an explanation shall be provided. The following format should be used: GSt imposed on flights arriving into <aerodrome> from <YYYY-MM-DDTHH:mm:ssZ> to <YYYY-MM-DDTHH:mm:ssZ>;

c) if available, eASP should provide reference to the applicable restrictions within the explanation note: See NOTAM <XXX> / ADP <XXX> for details;

d) if available, SWIM information services should be used to provide more details of applicable restrictions; and

e) a Negotiating R/T is not required for GSt restrictions.

6.3.6.4.5 Scenario C) Flight level restrictions imposed by relevant eASPs

6.3.6.4.5.1 Restrictions resulting in unavailability of certain flight levels may be imposed.

6.3.6.4.5.2 When flight level restrictions are imposed, the following responses shall be utilized as detailed in **Table 10**:

a) Filing Status value shall be "NOT ACCEPTABLE";

b) an explanation shall be provided. The following format should be used: <FL or altitude, FL or altitude> on route <XXXX> not available;

c) if available, eASP should provide reference to the applicable restrictions within the explanation note: See NOTAM <XXX> for details;

d) if available, SWIM information services should be used to provide more details of applicable restrictions; and

e) a Negotiating R/T is not required for flow restrictions.

6.3.6.4.6 Scenario D) Fix balancing imposed by relevant eASPs

6.3.6.4.6.1 Fix balancing is a tactical ATFM measure aimed at distributing demand and avoiding delays, whereby the aircraft is assigned a different arrival or departure fix. This can be used, for example, during conditions where a STAR or a SID is unusable.

6.3.6.4.6.2 When fix balancing measures are imposed on flights, the following responses shall be utilized as detailed in **Table 10**:

a) Filing Status value shall be NOT ACCEPTABLE;

b) an explanation shall be provided. The following format should be used: Trajectory Point <XXXXX> not available;

c) if available, eASP should provide reference to the applicable restrictions within the explanation note: See NOTAM <XXX> for details;

d) if available, SWIM information services should be used to provide more details of applicable restrictions; and

e) a Negotiating R/T is not required for fix-balancing.

6.3.6.4.7 Scenario E) Re-routing imposed by relevant eASPs

6.3.6.4.7.1 eASPs may require flights to use alternative routing if specific routes/airspace are unavailable or constrained.

6.3.6.4.7.2 When re-routing measures are imposed on flights, the following responses shall be utilized as detailed in **Table 10**:

a) Filing Status value shall be "NOT ACCEPTABLE";

b) an explanation shall be provided in the format: Route <XXXXX> not available;

c) if available, eASP should provide reference to the applicable restrictions within the explanation note: See NOTAM <XXX> for details;

d) if available, SWIM information services should be used to provide more details of applicable restrictions; and

e) a Negotiating R/T is not required for re-routing.

6.3.6.4.8 Expected eAU Action

6.3.6.4.8.1 Upon receiving a "NOT ACCEPTABLE" Filing Status, eAUs shall submit a Flight Plan Update (refer to Section 6.3.7 for more details on Flight Plan Updates) to comply with assigned restrictions/constraints. In a mixed-mode environment, the corresponding CHG/DLA message should be submitted when applicable.

6.3.6.4.9 eASP Compliance Checking and Filing Status Response

6.3.6.4.9.1 eASPs shall evaluate the Flight Plan Update to check for compliance against the restrictions/constraints where applicable. Paragraphs 6.3.6.4.9.2 to 6.3.6.4.9.6 provide an example on how this evaluation can be performed for the following scenarios.

6.3.6.4.9.2 For Scenario A, eASPs should check the Estimated Time Over (ETO) of the constrained point submitted within the Flight Plan Update for compliance to the CTO:

a) If the ETO falls within the compliance window, the Filing Status response of the Flight Plan Update will be "ACCEPTABLE".

b) If the ETO falls outside the compliance window, the flight will be re-evaluated by the eASP.

c) The compliance window parameters as established through regional ATFM procedures shall be applied.

6.3.6.4.9.3 For Scenario B, the arrival eASP should check that the updated estimated landing time of the Flight Plan Update is not within the constrained period.

6.3.6.4.9.4 For Scenario C, the eASPs should check the Flight Plan Update to ensure that the unavailable Flight Levels of the specific trajectory points are not being used.

6.3.6.4.9.5 For Scenario D, the eASPs should check the Flight Plan Update to ensure that the unavailable trajectory points are not being used.

6.3.6.4.9.6 For Scenario E, the eASPs should check the Flight Plan Update to ensure that the unavailable routes are not being used.

6.3.6.4.9.7 When ATFM restrictions are cancelled and the last Filing Status value was "NOT ACCEPTABLE", the eASP shall provide an updated Filing Status with the value of "ACCEPTABLE" and an explanation that the ATFM restriction is no longer applicable or has been cancelled.

6.3.6.4.9.8 When ATFM restrictions are cancelled and the last Filing Status value was "ACCEPTABLE", the eASP should provide an optional updated Filing Status with the value of "ACCEPTABLE" and an explanation that the ATFM restriction is no longer applicable or has been cancelled.

Note: an "ACCEPTABLE" Filing Status may include information about applicable ATFM restrictions that do not constrain the flight (e.g. MIT/MINIT). This additional information is provided for situational

awareness. The eAUs may choose to modify their flight plan to optimize operations or may proceed without changes. The flight remains acceptable as filed, but operators can use this information to make informed decisions about potential route adjustments or other operational considerations.

6.3.6.4.9.9 When ATFM restrictions are cancelled and the eAU had previously modified their Desired Route/Trajectory to comply with the restriction, the eAU may use available SWIM services to identify when restrictions are lifted and may submit a Flight Plan Update to adjust their Desired Route/Trajectory.

6.3.6.5 Usage of "PENDING" Status

6.3.6.5.1 It is recommended that eASPs evaluate flight plans as soon as they are available. However, in situations where immediate evaluation is not possible, a "PENDING" Filing Status may be used when the eASP's system requires more time than the time-out period (see paragraph 6.8.1.1) to provide a definitive Filing Status. This could occur in scenarios such as:

a) When the flight plan has been received well in advance of the eASP's processing horizon for the flight; and

b) When eASPs do not conduct a re-evaluation process and hence prefer to provide the filing status nearer to the EOBT.

Note 1: this is not recommended as it may create a situation where other eASPs have returned a filing status to the flight plan, and there is no clarity for eAUs to determine whether the flight plans are accepted by all relevant eASPs.

Note 2: ICAO Doc 9965 recommends that the first non-Pending Filing Status should be provided no later than three hours before EOBT, provided the submission was made in the correct timeframe.

6.3.6.5.2 When providing a "PENDING" status, the eASP shall include an explanation. An Expected Evaluation Time should be included to indicate when the flight plan is likely to be fully processed.

6.3.7 Flight Plan Update Message

6.3.7.1 Flight Plan Updates are submitted by eAUs to inform on changes to the eFPL. These updates are subjected to similar validation and evaluation checks as the eFPLs.

6.3.7.2 When route changes result in new eASPs becoming concerned with the flight that did not previously receive the eFPL, the eAU shall submit the current version of the complete set of flight plan data in eFPL to those new eASPs, rather than a Flight Plan Update.

6.3.7.3 Flight Plan Update Cut-off Times

6.3.7.3.1 The submission timeframe for Flight Plan Update should provide sufficient flexibility to eAUs to cater to operational issues and any additional considerations that may arise after the filing of the eFPL. It is recommended that Flight Plan Updates are permitted from the time that the eAU receives the Filing Status of a submitted eFPL until route clearance delivery or the flight's AOBT, whichever occurs first.

6.3.7.3.2 eASPs shall ensure that any Flight Plan Update received after route clearance delivery results in appropriate clearance revision by ATC to maintain consistency between the flight plan and delivered clearance.

6.3.7.4 Flight Plan Update Threshold

6.3.7.4.1 ICAO Doc 9965 states that eASPs may publish threshold modification values that trigger the transmission of an update (see ICAO Doc 9965). With FF-ICE automating most of these processes, eAUs should be able to provide eASPs with the most recent data as possible, to increase operational predictability for all stakeholders.

6.3.7.4.2 It is recommended that eAUs submit Flight Plan Update each time there is a change in eFPL data, subject to their system capabilities. At a minimum, eAUs shall submit Flight Plan Update due to changes equivalent to an FPL2012 data update (ICAO Doc 4444 Section 11.4.2.2.4 states that a CHG message shall be transmitted when any change is to be made to basic flight plan data contained in previously-transmitted FPL or RPL data).

6.3.7.4.3 The same recommendation applies for updates to EOBT. eAUs should submit Flight Plan Update each time there is a change in EOBT, subject to their system capabilities. At a minimum, eAUs shall submit Flight Plan Update if EOBT is delayed by more than 30 minutes (ICAO Doc 4444 Section 11.4.2.2.3.1 states that a DLA message shall be transmitted if the flight is delayed by more than 30 minutes after the estimated off-block time contained in the basic flight plan data).

6.3.7.4.4 Providing the most recent data to eASPs ensures that all stakeholders have the most accurate and updated information of the flight plan available to perform their ATM functions, as even minor changes to route can affect trajectory predictions.

6.3.7.4.5 While the varying update thresholds for FPL2012 and eFPL will result in varying information received by eASPs versus aASPs, it should be noted that in a mixed-mode environment eASPs have the advantage of receiving the most updated information that eAUs are most likely to utilize. For this reason, the varied information received by eASPs versus aASPs should not present cause to delay sending more precise Flight Plan Updates to eASPs only.

6.3.8 Flight Cancellation

6.3.8.1 Specific Validation Requirements for Flight Cancellation

6.3.8.1.1 In addition to the general validation checks indicated in paragraph 6.2.2.1, eASPs should perform a flight association check, verify that the flight has not yet departed, and authenticate that the message originator has the authority to cancel the flight.

6.3.8.1.2 **Table 4** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of "REJ".

Table 4: FF-ICE Submission Response Feedback for Flight Cancellation Messages

Additional Checks for Flight Cancellation Messages	
Checks	***Explanation Note***
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Authenticated user	No information available
Flight Plan State	Flight has already departed

Note: If the source of the request has no authorized access to the identified flight, a Submission Response of "REJ" should be returned, with an explanation that the recipient

does not have the requested information. Note that a response indicating non-authorization verifies for the sender that the flight exists, which is information in itself. Therefore, a generic message indicating that there is no information for the flight is preferable.

6.3.8.1.3 In accordance with ICAO Doc 9965, the eASP shall provide an "ACK" response when cancellation is successful, which shall terminate operational use of GUFI, as well as any further processing of all instances of the flight plan (preliminary and filed). A "REJ" response shall be given with an explanation, when cancellation is unsuccessful.

6.3.8.1.4 A cancelled flight cannot be reinstated. If the operator later decides to operate the flight, a new flight plan with a new GUFI shall be submitted.

6.3.9 Filing Requirements for Cross-ANSP and Local Agreements

6.3.9.1 Individual eASPs may consider establishing cross-ANSP agreements and local agreements with eAUs to facilitate seamless filing processes and the coordination of flight plan submissions across different airspace jurisdictions.

6.3.9.2 eASPs may likewise establish regional agreements with other eASPs for regional flight plan distribution and/or coordinated feedback on airspace restrictions.

6.3.9.3 eASPs may also establish local agreements with eAUs to facilitate FF-ICE implementation through translation services, Filing Status handling procedures, and tactical coordination arrangements.

6.3.9.4 However, the operational challenges that could arise from the potential complexity arising of a multitude of agreements, especially in the context of mixed mode operations, should also be a consideration.

6.3.9.5 It is recommended that APAC States adhere to the procedures in this Plan. Any local agreements or cross-ANSP agreements should not contradict the guidance provided in ICAO Doc 9965 or this Plan, which should supersede any supplementary or tangential agreements.

6.4 Flight Data Request Service

6.4.1 Introduction

6.4.1.1 The Flight Data Request Service is a mandatory service that eASPs will provide in the FF-ICE environment to allow authorized parties to obtain information about a flight, including flight plans, supplementary data, and flight status.

6.4.1.2 **Figure 2** depicts the workflow and associated FF-ICE message exchanges between FF-ICE participants during flight data queries.

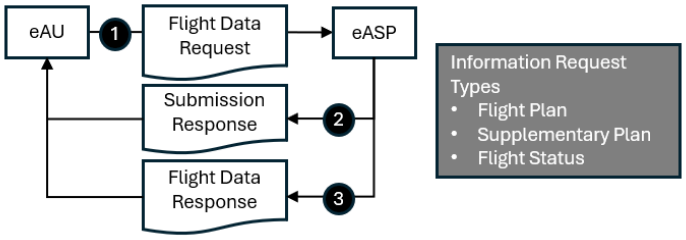

Figure 2: Flight Data Request Service Overview

6.4.1.3 There are three FF-ICE messages available under the flight data request service:

a) Flight Data Request Message;

b) Submission Response Message; and

c) Flight Data Response Message.

6.4.2 Flight Data Request Message

6.4.2.1 Information available for request by the eASPs should include the minimum set of data types as listed in ICAO Doc 9965 (flight plans, supplementary data, and flight status) as well as any additional information which the eASPs may choose to make available. eAUs may also enable eASPs to request relevant information concerning a flight. Request codes should be specified in the Requested Flight Data Item field of the Flight Data Request Message.

6.4.2.2 Access Control

6.4.2.2.1 In addition to the general requirements specified in Section 6.1.9, eASPs and eAUs should implement robust access control mechanisms to ensure that only authorized parties can receive the requested data, safeguarding the confidentiality and integrity of sensitive information. The following safeguards are recommended:

a) eAUs are limited to querying their own flights;

b) relevant eASPs should have full access to the eFPL and associated data;

c) adjacent eASPs (providers of airspaces not planned to be directly traversed by the flight but the boundaries of which are close to the flight trajectory) may be granted limited access to relevant eFPL for planning purposes; and

d) airport operators should have access to departures and arrivals pertinent to their operations.

6.4.2.3 Query Limits

6.4.2.3.1 The Flight Data Request Service is designed for querying information about individual flights, not for bulk data retrieval, in accordance with ICAO Doc 9965. eASPs and eAUs should publish request rate limit (i.e. the number of requests that can be made to the Flight Data Request Service within a specific period). Flight Data Requests that exceed the published request rate limit shall receive a Submission Response with status REJ and an appropriate explanation in **Table 5**, provided in section 6.4.2.6.2, indicating the rate limit violation.

6.4.2.4 Applicability Period

6.4.2.4.1 A flight data request pertaining to a specified eFPL is only valid from the time the eFPL is submitted to the time the flight is completed. A flight is completed when it has landed at the destination, diversion, or other alternate aerodrome.

6.4.2.4.2 An eASP may also support the submission of an information request for PFP data. This request will be valid from the time the PFP is submitted until the submission of the eFPL.

1061

1062 6.4.2.5 **Submission Response Message**

1063 6.4.2.5.1 The general validation requirements in accordance with section 6.2.2.1 apply to the
1064 Submission Response Message criteria.

1065 6.4.2.6 **Specific Validation Requirements for Flight Data Request**

1066 6.4.2.6.1 In addition to the checks listed in paragraph 6.2.2.1, eASPs should perform flight
1067 association checks and validate the legitimacy of the request, ensuring that only authorized parties can
1068 access flight data.

1069 6.4.2.6.2 **Table 5** provides a sample template for eASPs to use within the explanation note field for
1070 the various types of validation checks that might result in a Submission Response of "REJ".

1071 **Table 5: FF-ICE Submission Response feedback for Flight Data Request Messages**

Additional Checks for Flight Data Request Messages	
Checks	***Explanation Note***
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Multiple flights matched	Multiple flights with the requested information: a) Aircraft ID1, dep, dest, EOBT, GUFI b) Aircraft ID1, dep, dest, EOBT, GUFI
Requested flight not found	Flight does not exist
No authorized access to the identified flight	No information available
Requested flight data items not supported by the eASP	Request not supported
Query Limit	Query Limit Exceeded

1072 6.4.3 **Flight Data Response Message**

1073 6.4.3.1 It is recommended that the following R/T be included within the Flight Data Response for
1074 the various requests:

1075 a) Flight Plan Request: eASPs should include the Desired R/T representing the last filed
1076 R/T by eAU. This is based on the understanding that the requestor wants to see the
1077 route information that the eAU last submitted; and

1078 b) Flight Status Request: eASPs should include the latest R/T (either Agreed R/T or
1079 Negotiating R/T) as per the latest Filing Status of the flight, if applicable. This is based
1080 on the understanding that the requestor wants to see the latest response (i.e. Filing
1081 Status) provided by the eASPs.

1082 6.5 **Notification Service**

1083 6.5.1 **Introduction**

1084 6.5.1.1 The Notification Service enables eASPs to notify relevant eASPs, as identified through the
1085 flight plan, of significant flight events such as departure and arrival. While Notification Service is not a

service mandated by ICAO Doc 4444 to be FF-ICE capable, it will likely be necessary to support the sunset of FPL2012 and the associated ATS messages. All ASPs in the APAC region shall implement the Notification Service according to the regional implementation timeline.

6.5.1.2 The Notification Service currently encompasses the full process of flight event notification through the sending of flight departure and arrival messages. **Figure 3** depicts the workflow and associated FF-ICE message exchanges, showing the interaction between FF-ICE participants throughout the flight notification process.

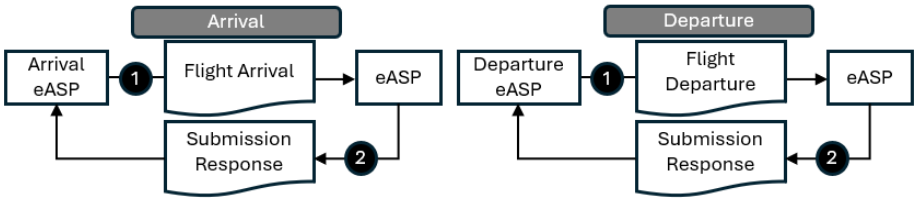

Figure 3: Notification Service Overview

6.5.1.3 There are three FF-ICE messages available under the Notification Service:

a) Flight Departure Message;

b) Flight Arrival Message; and

c) Submission Response Message.

6.5.2 Submission Response Message

6.5.2.1 In addition to the checks listed in paragraph 6.2.2.1, eASPs should perform flight association checks and timestamp validation checks to ensure that the arrival/departure time is not in the future and that the arrival time does not precede departure time in the case of the Arrival message. Additionally, the eASP should check to ensure that the originators of the Flight Departure/Flight Arrival Message are from the appropriate eASPs.

6.5.2.2 **Table 6** provides a sample template for eASPs to use within the explanation note for the various types of validation checks that might result in a Submission Response of "REJ".

Table 6: FF-ICE Submission Response feedback for Flight Departure and Flight Arrival Messages

Additional Checks for Flight Departure and Flight Arrival Messages	
Checks	***Explanation Note***
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Timestamp Check	Arrival/Departure time is in the future Arrival time is before departure time
Permission to send notification	No rights to send Arrival/Departure message

6.5.2.3 Upon receipt of a Submission Response indicating "REJ" status from Notification Service, the sender shall review the Submission Status Explanation to determine the cause of rejection. The sender

shall make the necessary corrections to address the identified issues and re-submit the notification message, if applicable.

6.6 Planning Service

6.6.1 Introduction

6.6.1.1 The Planning Service is an optional service that enables collaborative decision-making between eAUs and eASPs by sharing informal flight plans well ahead of time via Preliminary Flight Plans, allowing improved demand prediction and optimal trajectory planning before the formal filing of flight plans. eASPs providing Planning Services shall publish the availability of the service in their AIP.

6.6.1.2 The Planning Service encompasses three primary processes:

a) PFP submission;

b) PFP updating; and

c) PFP cancellation.

6.6.1.3 **Figure 4** depicts the workflow and associated FF-ICE message exchanges for each process, showing the interaction between eAUs and eASPs throughout the PFP lifecycle.

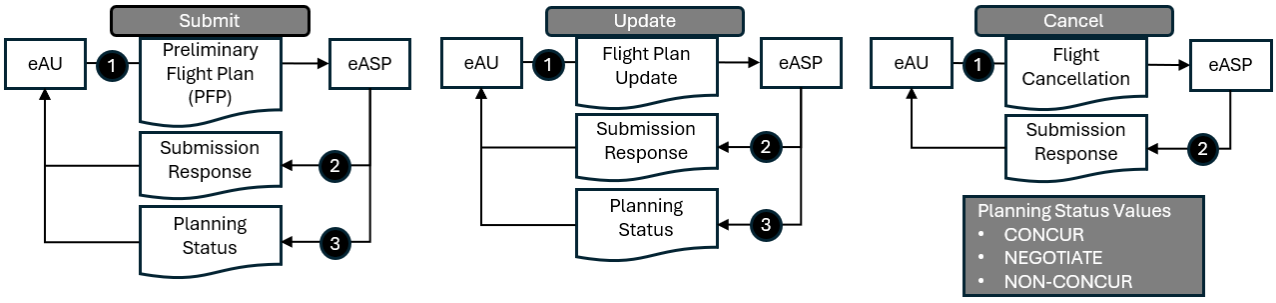

Figure 4: Planning Service Process Overview

6.6.1.4 There are five FF-ICE messages available under the Planning Service:

a) PFP Message;

b) Flight Plan Update Message;

c) Flight Cancellation Message;

d) Submission Response Message; and

e) Planning Status Message.

6.6.1.5 The processes under Planning Service are similar to those related to Filing Service, except that these processes take place in a timeframe designated before the submission of eFPL. This timeframe enables negotiations to take place with more advance notice.

6.6.2 Preliminary Flight Plan Message

6.6.2.1 PFPs are submitted by the eAUs as the first step under the Planning Service. Unlike eFPL which is submitted to all relevant eASPs, eAUs can choose to submit PFPs to select eASPs that they have

designated for cooperative planning efforts. Typically, these eASPs have airspaces that are complex or regularly constrained. The PFPs are subjected to validation checks resulting in a Submission Response, and evaluation checks resulting in a Planning Status.

6.6.3 PFP Cut-off Times

6.6.3.1 The PFP cut-off times refer to the earliest and latest submission times for the PFP. The earliest submission time is dependent on eASPs' capability and the type of advance planning that could be conducted between the eASPs and eAUs. Meanwhile, the latest submission time should be determined by the time that the eFPL is due. The PFP expires when the eFPL is due. PFP expiry refers to the point at which a PFP can no longer be processed or updated by eASP. The due time of eFPL is determined by each eASP and shall comply with the latest submission timing as defined in ICAO Doc 4444 and any regional agreements. This will also be the time after which the PFP will not be accepted. The cut-off times should be published by eASPs in the AIPs.

6.6.3.2 After an eFPL has been submitted, a PFP can no longer be submitted for the same flight.

6.6.4 Versioning

6.6.4.1 As with eFPL, it is the responsibility of the eAUs to increase the versioning of the PFPs. Every new version or Flight Plan Update made to the PFP will increment the version by one.

6.6.5 Submission Response Message

6.6.5.1 The general validation requirements as per paragraph 6.2.2.1 apply to the Submission Response Message criteria.

6.6.6 Specific Validation Requirements for PFPs

6.6.6.1 In addition to the checks listed in paragraph 6.2.2.1, submission timeframe, existence of eFPL, versioning, and flight association check should be conducted for PFPs and Flight Plan Updates. eASPs may also implement additional checks based on local requirements, to ensure that route/trajectories filed by eAUs contain valid routes, fix names, and coordinates, including but not limited to:

a) trajectory syntactic checks; and

b) semantic checks.

6.6.6.2 **Table 7** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of "REJ".

Table 7: FF-ICE Submission Response feedback for Preliminary Flight Plans and Flight Plan Updates

Additional Checks for PFPs and Flight Plan Updates	
Checks	***Explanation Note***
Submission Timeframe	EOBT is outside allowable submission timeframe
Existence of eFPL	eFPL for the same flight has already been submitted
Versioning	A later version <Y> exists in the system
Flight association	Same flight with different GUFI found

	Different flight with same GUFI found
Route validation (Structure of route, lat/long of points, fix names)	Trajectory Info Error Invalid Route Structure Invalid Fix/waypoint

6.6.7 Planning Status Message

6.6.7.1 Overview

6.6.7.1.1 The Planning Status reflects the likelihood that the flight plan will be operationally acceptable if submitted as an eFPL. The evaluations conducted for the PFPs are therefore similar to those conducted for the eFPLs. eASPs provide feedback within the Planning Status to eAUs to identify the restrictions and constraints applicable to the flights.

6.6.7.1.2 In line with the evaluations conducted for eFPLs, eASPs should evaluate PFPs against restrictions managed by existing ATM systems, to ensure comprehensive evaluation of flight plan acceptability. Refer to section 6.3.6.1.2 for the recommended list.

6.6.7.2 Planning Status Values

6.6.7.2.1 eASPs retain flexibility in determining the specific criteria for each planning status based on their operational environment. However, the criteria for a “NON-CONCUR” Planning Status should be similar to the criteria for a “NOT ACCEPTABLE” Filing Status.

6.6.7.2.2 Similarly, the criteria for a “CONCUR” Planning Status should be similar to the criteria for an “ACCEPTABLE” Filing Status.

6.6.7.2.3 A third Planning Status of “NEGOTIATE” is also available. This Planning Status refers to any situation where the flight plan is likely to be accepted if filed, but the R/T details differ.

6.6.7.3 Feedback Methods for Restrictions/Constraints

6.6.7.3.1 When providing restrictions / constraints to eAUs within the Planning Status, eASPs should make use of methods similar to those detailed under the Filing Status, as outlined in Section 6.3.6.3.1.

6.6.7.3.2 eASPs should retain flexibility in determining their Planning Status feedback methods and content, except in the scenarios described in Section 6.3.6.4.1 which require pre-established responses to promote regional interoperability and consistent handling.

6.6.7.3.3 For the five Scenarios (as described in Section 6.3.6.4.1), the Planning Status should therefore be “NON-CONCUR” with a Negotiating R/T provided where applicable, as specified in the established requirements.

6.6.7.3.4 The regionally agreed-upon Planning Status response format and explanation templates for the respective scenarios are detailed in **Appendix C Table 10**. The explanation formats listed within the table shall be used together with the “NON-CONCUR” Planning Status value.

6.6.8 Flight Plan Update Message

6.6.8.1 Flight Plan Updates are submitted by eAUs to provide information regarding changes to the PFPs. These updates are subjected to similar validation and evaluation checks as the PFPs.

6.6.9 Flight Plan Update cut-off times

6.6.9.1 The submission of Flight Plan Update for PFP should be allowed from the time that the eAU submits a PFP to the time that the eFPL is due.

6.6.10 Flight Plan Update Threshold

6.6.10.1 Unlike the flight plan filing process, which operates in a mixed-mode environment, the Planning Service impacts only FF-ICE-capable stakeholders. For this reason, eAUs are advised to submit Flight Plan Update each time there is a change in PFP data. There is no legacy message equivalent to the PFP, meaning that the PFP update may be as frequent as allowed within the system's capabilities, without impact to non-FF-ICE-capable stakeholders.

6.6.11 Flight Cancellation

6.6.11.1 Specific Validation Requirements for Flight Cancellation

6.6.11.1.1 In addition to the general validation checks detailed in paragraph 6.2.2.1, eASPs should perform flight association checks and authenticate that the message originator has the authority to cancel the flight.

6.6.11.1.1.1 **Table 8** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of "REJ".

Table 8: FF-ICE Submission Response feedback for Flight Cancellation

Additional Checks for Flight Cancellation Messages	
Checks	***Explanation Note***
Flight association	Same flight with different GUFI found Different flight with same GUFI found
Authenticated User	No information available

6.7 Trial Service

6.7.1 Introduction

6.7.1.1 The Trial Service is an optional service that allows operators to evaluate "what-if" scenarios for both preliminary and filed flight plans, without affecting the actual flight plan data, enabling better flight planning and constraint resolution.

6.7.1.2 The Trial Service encompasses the process of evaluating alternative flight scenarios without affecting existing flight plans. **Figure 5** depicts the workflow and associated FF-ICE message exchanges, showing the interaction between eAUs and eASPs throughout the trial request and evaluation process.

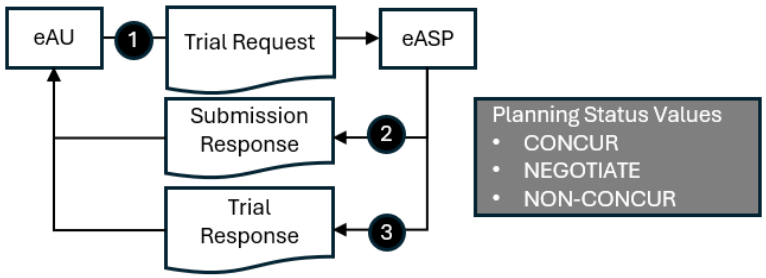

Figure 5: Trial Service Overview

6.7.1.3 There are three FF-ICE messages available under the Trial Service:

a) Trial Request Message;

b) Submission Response Message; and

c) Trial Response Message.

6.7.2 Trial Request Message

6.7.2.1 Trial Requests are submitted by the eAUs as the first step under the Trial Service. As with the PFPs, eAUs can choose to submit Trial Requests to selected eASPs with whom they wish to conduct the trials. Multiple Trial Requests can be submitted to the same eASP and these requests can be submitted even without the presence of PFPs/eFPLs. Trial Requests are subjected to validation checks resulting in a Submission Response and evaluation checks resulting in a Planning Status. Trial Requests shall be treated by the eASP as a separate, standalone transaction which has no impact on existing data.

6.7.2.2 Limits on Trial Request Frequency

6.7.2.2.1 eASPs may set limits on the maximum frequency of requests allowable within a specified period for each eAU to prevent system overload and ensure service availability for all users. These limitations should be published in the eASP's AIP.

6.7.2.3 Submission Response Message

6.7.2.3.1 The general validation requirements as per paragraph 6.2.2.1 apply to the Submission Response Message criteria.

6.7.2.4 Specific Validation Requirements for Trial Requests

6.7.2.4.1 In addition to the checks listed in paragraph 6.2.2.1, submission timeframe and request frequency checks should be conducted for Trial Requests. For submission timeframes, Trial Requests can be allowed up to route clearance delivery, allowing sufficient time to submit a Flight Plan Update arising from a positive Trial Response. This option is only available when Trial Requests are for a flight that is already provided as a PFP or eFPL. eASPs may also implement additional checks based on local requirements, to ensure that R/Ts filed by eAUs contain valid routes, fix names, and coordinates, including but not limited to:

a) trajectory syntactic checks; and

b) semantic checks.

6.7.2.4.2 **Table 9** provides a sample template for eASPs to use within the explanation note field for the various types of validation checks that might result in a Submission Response of "REJ".

Table 9: FF-ICE Submission Response feedback for Trial Requests

Additional Checks for Trial Requests	
Checks	***Explanation Note***
Submission Timeframe	Outside the allowable submission timeframe
Request Frequency	Frequency of Trial Requests has been exceeded
Route validation (Structure of route, lat/long of points, fix names)	Trajectory Info Error Invalid Route Structure Invalid Fix/waypoint

6.7.3 Trial Response Message

6.7.3.1 Planning Status Values

6.7.3.1.1 The Planning Status within the Trial Response Message reflects the likelihood that the flight plan will be operationally acceptable if submitted as a PFP or eFPL. The evaluations conducted for the Trial Requests are similar to those that are conducted for the PFPs.

6.7.3.1.2 However, as eAUs are allowed to submit multiple Trial Requests, it may not be practical for eASPs to consider all Trial Requests as actual traffic demand. It is therefore not expected for eASPs to provide flight specific constraints. For example, if a trial flight plan is expected to operate during the duration of an ATFM program, eASPs are expected to provide feedback to the eAUs that the flight will be caught in the ATFM program. A flight specific constraint need not be provided to the eAUs.

6.7.3.1.3 eASPs should publish the scope of evaluation performed for Trial Requests, in the AIP.

6.7.3.2 Feedback Methods for Restrictions/Constraints

6.7.3.2.1 When providing restrictions/constraints to eAUs within the Trial Response, eASPs should use methods similar to those used for the Planning Service. eASPs should similarly retain flexibility in determining their Trial Response feedback methods and content.

6.7.3.2.2 For the five Scenarios (as described in Section 6.3.6.4.1) which require regionally agreed-upon responses to ensure regional interoperability and consistent handling, the Trial Response shall contain a Planning Status of "NON-CONCUR". In addition, no flight specific constraints or R/Ts will be expected in the response.

6.7.3.2.3 The explanation within **Appendix C Table 10** can be used for relevant scenarios.

Note: eASPs should not include any flight-specific constraints or resource allocations, as Trial Requests are "what-if" scenarios that do not represent actual flight operations. The response should indicate general restriction applicability without reserving operational resources or assigning specific constraint values.

6.8 Message Delivery Assurance

6.8.1 Time-out for submitted messages

6.8.1.1 Time-outs are predefined waiting periods during which a system expects to receive a response from another system or user. If no response arrives within this window, the system marks the request as failed or expired. These time-out periods are deliberately set longer than the typical response time to account for various delays, such as system latency and network delays.

6.8.1.2 States should publish business-level time-out periods in their AIPs to provide operators with expected response times for FF-ICE services. These time-outs represent commitments for completing processes such as flight plan evaluation and trajectory assessment.

6.8.1.3 The time-out periods specified in the following sections are recommended business-level time-outs that eASPs should implement to ensure consistent service delivery across the region.

6.8.2 Submission Response

6.8.2.1 It is recommended that the timeout for the Submission Response message be set at one minute. If Submission Response is not received after one minute, the message originator should resubmit the original message (e.g. eFPL / Flight Plan Update / Flight Cancellation / PFP / Flight Departure / Flight Arrival / Flight Data Request etc).

6.8.3 Filing and Planning Status

6.8.3.1 For Filing Service, it is recommended that the timeout for Filing Status Message be set at one minute from the time the eAU receives a Submission Response of “ACK”. If the first Filing Status is not received one minute after receiving the Submission Response of “ACK”, eAUs may contact the eASPs. Filing Status Message is not expected if a Submission Response of “REJ” or “MAN” was received.

6.8.3.2 For Planning Service, if a re-evaluation process is provided, it is recommended that the timeout for Planning Status Message be set at one minute from the time the eAU receives a Submission Response of “ACK”. If the first Planning Status Message is not received one minute after receiving the Submission Response of “ACK”, eAUs may contact the eASPs. Planning Status Message is not expected if a Submission Response of “REJ” or “MAN” was received.

6.8.4 Trial Response and Flight Data Response

6.8.4.1 It is recommended that the timeout for Trial Response Message and Flight Data Response Message be set at one minute from the time the eAU receives a Submission Response of “ACK”. If the Trial Response or Flight Data Response is not received one minute after receiving the Submission Response of “ACK”, eAUs are expected to contact the eASPs. Trial Response Message or Flight Data Response Message are not expected if a Submission Response of “REJ” or “MAN” was received.

6.9 Publication Service

6.9.1 The Publication Service is an optional FF-ICE/R1 service used to provide flight information to authorized stakeholders. It is an event-based service that disseminates information whenever defined criteria are met.

6.9.2 Subscribers to this service may include a wide range of stakeholders from AUs to customs and immigration authorities, who may use the service to enhance situational awareness and adjust their operations based on the updated flight information received.

6.9.3 An eASP providing a Publication Service should ensure that the service is discoverable by potential subscribers, through the AIP or a SWIM service registry, for example. The eASP shall also ensure that appropriate access control is in place so that the subscribers can retrieve only the flight information relevant to their operations.

6.9.4 Given the nature of the Publication Service, it is recommended that its implementation uses a Publish/Subscribe message exchange pattern, with a push mechanism applied to improve service efficiency.

6.9.5 Currently, no specific FF-ICE message is defined for Publication Service. However, it is recommended that FIXM be used wherever possible, to exchange flight information through this service.

6.10 Re-evaluation Process

6.10.1 Re-evaluation is an optional process that an eASP may perform to determine whether a flight plan still complies with published restrictions or ATM constraints that may have been applied or modified since its last evaluation. Re-evaluation is provided as part of the Filing Service and Planning Service when implemented by an eASP. If implemented, reference should be made to ICAO Doc 9965.

6.10.2 The re-evaluation process is triggered by predefined factors, including:

a) Event trigger: an event affecting ATM configuration such as:

   i) airspace or airport conditions;

   ii) routing availability;

   iii) ATC constraints;

   iv) demand-capacity imbalance situations;

   v) meteorological constraints; and

b) Time trigger: a predefined interval that initiates the re-evaluation process, e.g. every 30 minutes.

   Note: the specific interval is to be determined by each eASP.

6.10.3 The re-evaluation process may continue until the aircraft has off-block. This may vary depending on ATM conditions. Cut-off times for specific ATM conditions are subject to national and/or regional agreement.

6.10.4 If, following a re-evaluation, the Filing Status (or Planning Status) changes, the eASP shall provide the eAU with the updated status and an explanation of the change as specified in Section 6.3.6.4.2.

6.11 Implementation Timeline for APAC

6.11.1 A phased approach to FF-ICE/R1 implementation with the following timeline is recommended for the APAC region:

a) 2030: commencement of technical tests and trials involving eAUs and cross-border eASP interactions.

b) 2031: begin operational tests to identify and resolve any issues.

c) 2032: full operationalization of three FF-ICE/R1 services (Filing Service, Flight Data Request Service and Notification Service).

6.11.2 This recommended timeline will ensure APAC States' readiness to support the sunset of FPL2012 in 2034. Note that SWIM implementation is a prerequisite for FF-ICE/R1 deployment, as FF-ICE services are built upon SWIM infrastructure and information exchange capabilities.

6.12 Implementation Monitoring

6.12.1 This Plan is a supplementary plan to the *Asia/Pacific ANP Volume III*, supporting the transition from current flight planning to FF-ICE operations. Implementation monitoring ensures harmonized regional deployment of FF-ICE capabilities and identifies areas requiring additional support or coordination.

6.12.2 APAC States should report their FF-ICE implementation status to the ICAO APAC Regional Office annually by 28 February. Implementation status will be examined by the APAC FF-ICE/R1 Implementation Task Force and presented at the Air Traffic Management Sub-Group (ATM/SG) of Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) to measure, report, and advance regional implementation progress, and identify implementation challenges.

6.12.3 It is expected that the relevant FF-ICE experts in each APAC State will be responsible for detailed reporting using the *Regional FF-ICE Monitoring and Reporting Form* (**Appendix D**) and coordinate with their APAC Seamless ANS Reporting point of contact to ensure the accuracy of higher-level reporting and consistency between separate reporting levels.

6.13 Plan Update Cycle and Process

6.13.1 This Plan requires periodic updates to maintain alignment with updates to:

a) ICAO Doc 9965;

b) GANP, including ASBU framework restructuring;

c) Asia/Pacific ANP Volume III; and

d) any other relevant documents and APANPIRG Conclusions/Decisions.

6.13.2 This Plan is intended to be reviewed every three years following its initial implementation. Earlier or more frequent review and amendment may be conducted as recommended by the APAC FF-ICE/R1 Implementation Task Force and as agreed-upon by APANPIRG through the ATM/SG.

6.13.3 This Plan shall be reviewed and updated by the APAC FF-ICE Regional Implementation Plan Drafting Group to be established under the APAC FF-ICE/R1 Implementation Task Force. The drafting group will consist of subject matter experts (SMEs) nominated by APAC States and International Organizations.

6.14 Post Implementation Process

6.14.1 To ensure continuous improvement of FF-ICE operations, both in operational procedures and technical capabilities, close and routine coordination among stakeholders should be conducted on an annual basis. This coordination should focus on sharing and reviewing the collective performance of FF-ICE operations, as well as implementing improvements within the region. The APAC FF-ICE/R1 Implementation Task Force will serve as a platform for these activities.

6.14.2 The following indicators are recommended for monitoring, to assess the performance of FF-ICE operations within the region.

a) submission time of the first eFPL, compared to EOBT specified in the eFPL;

b) number of "REJ" Submission Response messages, along with their explanations;

c) number of "MAN" Submission Response messages, along with their explanations;

d) number of "NOT ACCEPTABLE" Filing Status messages, along with their explanations;

e) number of negotiations before achieving "ACCEPTABLE" Filing Status, including time elapsed from the first submission of eFPL to the "ACCEPTABLE" Filing Status;

f) number of flights departing with "NOT ACCEPTABLE" Filing Status; and

g) number of Flight Data Request transactions and type of information requested.

REFERENCED DOCUMENTS

Asia/Pacific A-CDM Implementation Plan

Asia/Pacific ANP Volume III

*Asia/Pacific Common SWIM Information S*ervices.

Asia/Pacific Plan for Collaborative Aeronautical Information Management (AIM), Version 4.0

Asia/Pacific Region ATM Contingency Plan

Asia/Pacific Regional Framework for Collaborative Air Traffic Flow Management

Asia/Pacific SWIM Technical Infrastructure Profiles Version 1.0

Conclusion from APANPIRG/35/4

Conclusion from APANPIRG/36/12

Conclusion from ATM/SG/13-5

ICAO Doc 4444 — *Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)*

ICAO Doc 7910 — *Location Indicators*

ICAO Doc 8585 — *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*

ICAO Doc 9854 — *Global Air Traffic Management Operational Concept (GATMOC)*

ICAO Doc 9883 — *Global Air Navigation Plan (GANP)*

ICAO Doc 9965 — *Manual on Flight and Flow Information for a Collaborative Environment (FF-ICE), Volume I (Concept) and Volume II (Implementation Guidance)*

ICAO Doc 9971 — *Manual on Collaborative Air Traffic Flow Management (ATFM)*

ICAO Doc 10039 — *Manual on the System Wide Information Management (SWIM)*

ICAO Doc 10169 — *Aviation Common Certificate Policy (ACCP)*

ICAO Doc 10199 — *Procedures for Air Navigation Services – Information Management (PANS-IM)*

ICAO Doc 10203 —*Manual on the System-wide Information Management (SWIM) Implementation*

ICAO Doc 10204 — *Manual on Aviation Information Security*

IETF RFC 9562 — *Universally Unique IDentifiers (UUIDs)*

IETF RFC 4122 — *A Universally Unique IDentifier (UUID) URN Namespace*

ABBREVIATIONS AND ACRONYMS[1]

Abbreviation/Acronym	Expansion
ACC	Area Control Centre
A-CDM	Airport Collaborative Decision Making
AFS	Aeronautical Fixed Services
AFTN	Aeronautical Fixed Telecommunication Network
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIRM	ATM Information Reference Model
AIS	Aeronautical Information Services
AIXM	Aeronautical Information Exchange Model
ANP	Air Navigation Plan
ANS	Air Navigation Services
ANSP	Air Navigation Service Providers
AOBT	Actual Off-Block Time
APAC	Asia/Pacific
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ASBU	Aviation System Block Upgrade
ASP	ATM Service Provider
ATC	Air Traffic Control
aASP	Non-FFICE Capable ATM Service Provider
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATM/SG	Air Traffic Management Sub-Group

[1] Refer to ICAO Doc 9965 for definition of terms

Abbreviation/Acronym	Expansion
ATS	Air Traffic Services
AU	Airspace User
aAU	An AU that is not capable of using mandatory FF-ICE services.
CHG	ATS Change Message
CLDT	Calculated Landing Time
CNL	ATS Cancel Message
CPL	Current Flight Plan
CTO	Calculated Time Over
CTOT	Calculated Take-Off Time
DLA	ATC Delay Message
eASP	An ASP that is not capable of providing the mandatory FF-ICE services.
eAU	An AU that is capable of using mandatory FF-ICE services.
eFPL	Filed flight plan exchanged using FF-ICE services
EOBT	Estimated Off-Block Time
ESP	Emergency Service Provider
ETO	Estimated Time Over
FF-ICE	Flight and Flow Information for a Collaborative Environment
FIR	Flight Information Region
FIXM	Flight Information Exchange Model
FPL	Filed flight plan exchanged using via aeronautical fixed services (AFS)
FQDN	Fully Qualified Domain Name
GSt	Ground Stop
GUFI	Globally Unique Flight Identifier
ICAO	International Civil Aviation Organization
IETF	Internet Engineering Task Force

Abbreviation/Acronym	Expansion
IWXXM	ICAO Meteorological Information Exchange Model
MEDEVAC	Medical Evacuation
MINIT	Minutes in Trail
MIT	Miles in Trail
OSF	Open Software Foundation
PFP	Preliminary Flight Plan
PKI	Public Key Infrastructure
R1	Release 1 (for pre-departure phase)
R2	Release 2 (for post-departure phase)
RFC	Request for Comments
RIF	Re-Clearance in Flight
RPL	Repetitive Flight Plan
R/T	Route/Trajectory
RVR	Runway Visual Range
SAR	Search and Rescue
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Hazards
SME	Subject Matter Expert
STAR	Standard Terminal Arrival Route
SWIM	System-wide Information Management
TAF	Terminal Area Forecast
TBO	Trajectory-based Operations
TLS	Transport Layer Security
UTC	Coordinated Universal Time
UUID	Universally Unique IDentifier

Abbreviation/Acronym	Expansion
WAF	Weather Avoidance Field

APPENDIX A FIXM MAPPING TO ATS

Translation of FF-ICE FIXM to ATS Messages is available on the FIXM website at https://docs.fixm.aero/#/ats-message-to-fixm-mapping/translating-ffice-fixm-messages-to-ats-messages

APPENDIX B MAPPING OF FIXM CORE 4.3.0 DATA ATTRIBUTES TO SUPPORT CROSS-BORDER ATFM INFORMATION EXCHANGE

Data Attribute	FIXM version 4.3.0 Core
EOBT	FlightType.departure.estimatedOffBlockTime = (EOBT)
ETO	FlightType.routeTrajectoryGroup.desired.element.point4D.time = (ETO) FlightType.routeTrajectoryGroup.desired.element.elementStartPoint = (point at which ETO is specified)
ELDT	FlightType.routeTrajectoryGroup.desired.element.point4D.time = (ELDT) FlightType.routeTrajectoryGroup.desired.element.point4D.pointProperty.propertyType = WHEELS_ON FlightType.routeTrajectoryGroup.desired.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator
CTOT	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CTOT) FlightType.routeTrajectoryGroup.negotiating.element.point4D.pointProperty.propertyType = WHEELS_OFF FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.departure.aerodrome.locationIndicator
CTO	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CTO) FlightType.routeTrajectoryGroup.negotiating.element.constraint.level = (Altitude, Flight Level or Range) FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint = (point at which CTO is specified)
CLDT	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CLDT)

Data Attribute	FIXM version 4.3.0 Core
	FlightType.routeTrajectoryGroup.negotiating.element.point4D.pointProperty.propertyType = WHEELS_ON FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator

APPENDIX C HARMONIZED FILING STATUS RESPONSES

Table 10: Harmonized Filing Status Responses for Identified ATFM Scenarios

Scenario	**Who to feedback**	**Filing Status Value**	**Planning Status Value**	**Explanation through FF-ICE Message (Mandatory if NOT ACCEPTABLE)**	**Type of Trajectory**	**FIXM Elements to use**	**Type of Constraint (Level, Speed, Time)**	**Constraint. Description (Optional)**	**Constraint. Restriction Reference (Optional)**	**Checking Point**
a) CTO/ CLDT imposed by eASPs	Initiating eASP	NOT ACCEPTABLE	NON CONCUR	REGUL <AAAACCCCCDDMMMVV>	Negotiating	ElementStartPoint for location Constraint.Time for time Constraint.Level/ Constraint.Speed if applicable	Time (Level, Speed if applicable)	REGCAUSE <XX XX>	REGUL <AAAACCCCCDDMMMVV>	ETO / ELDT against CTO /CLDT
b) Ground Stop imposed by Arrival eASPs	Initiating eASP / Arrival eASP	NOT ACCEPTABLE	NON CONCUR	GSt imposed on flights arriving into <WSSS> from <YYYY-MM-DDTHH:mm:ssZ> to <YYYY-MM-DDTHH:mm:ssZ>. Note: If available, *See NOTAM <XXX> / ADP <XXX> for details.*	NULL	-	-	-		- ELDT against restricted period
c) Flight level Restrictions	All relevant eASP	NOT ACCEPTABLE	NON CONCUR	<FL or altitude, FL or altitude> on route <XXXX> not available.	NULL	-	-	-		Flight Level on Point against restricted flight levels

Scenario	Who to feedback	Filing Status Value	Planning Status Value	Explanation through FF-ICE Message (Mandatory if NOT ACCEPTABLE)	Type of Trajectory	FIXM Elements to use	Type of Constraint (Level, Speed, Time)	Constraint. Description (Optional)	Constraint. Restriction Reference (Optional)	Checking Point
				Note: If available, *See NOTAM <XXX> for details.*						
d) Fix Balancing	All relevant eASP	NOT ACCEPTABLE	NON CONCUR	Fix <XXXXX> not available. Note: If available, *See NOTAM <XXX> for details.*	NULL	-	-	-		Flight Trajectory against restricted points
e) Re-routing	All relevant eASP	NOT ACCEPTABLE	NON CONCUR	Route <XXXXX> not available. Note: If available, *See NOTAM <XXX> for details.*	NULL	-	-	-		Flight Trajectory against restricted routes

APPENDIX D REGIONAL FF-ICE MONITORING AND REPORTING FORM

This form is designed to monitor the implementation status of Flight and Flow Information for a Collaborative Environment (FF-ICE) services and capabilities within the region. This form should be completed by States to report their progress in implementing FF-ICE in accordance with ICAO Doc 9965 and the *Asia/Pacific Regional FF-ICE/R1 Implementation Plan*.

States should complete this form annually by 28 February to track implementation progress.

Scoring System

Each element uses a three-level scoring system:

- **0%** = Not implemented or no progress
- **50%** = Partial implementation with gaps, manual intervention required, or development in progress
- **100%** = Full implementation in compliance with regional requirements

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
General			
Implementation of FIXM-based information exchange	0% - State has not implemented FIXM-based information exchange 50% - State has implemented FIXM-based capability but uses older version 100% - State has implemented FIXM-based capability with latest FIXM version (v4.3.0)	State should implement FIXM-based information exchange using FIXM version 4.3.0 for all FF-ICE messages	
Implementation of national FF-ICE procedures, in accordance with ICAO Doc 4444 and ICAO Doc 9965	0% - State has not developed any national FF-ICE procedures 50% - State is in process of developing and implementing its national FF-ICE procedures 100% - State has fully established and published FF-ICE procedures based on ICAO Doc 9965 that are adhered to by stakeholders	State should establish and publish procedures covering FF-ICE operations, communication, and stakeholder responsibilities	

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
Filing Service			
Implementation of Filing Service	0% - No Filing Service implementation 50% - Partial implementation with gaps (e.g. incomplete message set support, incomplete validation/ evaluation capability, manual intervention required) 100% - Full automated implementation with complete message set, validation and evaluation capability in compliance with this document	Filing Service is mandatory service for eASPs Full implementation should include: a) complete message set support b) automated validation and evaluation c) published validation and evaluation criteria in AIP	
Implementation of Filing Re-evaluation Process	0% - No re-evaluation process 50% - Partial re-evaluation (e.g. limited status change handling, re-evaluation only for selected restrictions, and/or procedures not fully established) 100% - Full re-evaluation with established procedures	State should establish and publish clear procedures for the re-evaluation process and handling of status changes	
Implementation of national procedures for Filing Service mixed mode operations to support both FF-ICE and FPL2012 message handling (FPL, CHG, DLA), in accordance with ICAO Doc 4444, ICAO Doc 9965 and regional plan	0% - No mixed mode procedures 100% - Full procedures established for handling both FF-ICE and FPL2012 formats with appropriate message dissemination	State should establish and publish clear procedures so that eAUs understand what messages to submit, how to submit them, and what to expect to receive based on their technical capabilities (FF-ICE or FPL2012)	
Flight Data Request Service			

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
Implementation of Flight Data Request Service	0% - No implementation 50% - Partial implementation with gaps (e.g. limited request types support, manual intervention required) 100% - Full automated implementation in compliance with this document	Flight Data Request Service is mandatory service for eASPs Full implementation should include automated support for all required request types (Flight Plan, Supplementary Plan and Flight Status)	
Implementation of national procedures for Flight Data Request Service mixed-mode operations to support both FF-ICE and FPL2012 message handling (RQP, RQS), in accordance with Doc 9965, Doc 4444 and regional plan	0% - No mixed mode procedures 100% - Full procedures established for handling both FF-ICE and FPL2012 formats with appropriate message dissemination	State should establish and publish clear procedures so that eAUs/eASPs understand what messages to submit, how to submit them, and what to expect to receive based on their technical capabilities (FF-ICE or FPL2012)	
Notification Service			
Implementation of Notification Service	0% - No implementation 50% - Partial implementation with gaps (e.g. limited event types, manual intervention required) 100% - Full automated implementation in compliance with this document	Notification Service is mandatory service for APAC. Full implementation should include automated support for departure and arrival notifications	
Implementation of local procedures for Notification Service mixed mode operations to support both FF-ICE and FPL2012 message handling (DEP, ARR), in accordance with ICAO Doc 4444, ICAO Doc 9965 and regional plan	0% - No mixed mode procedures 100% - Full procedures established for handling both FF-ICE and FPL2012 formats with appropriate message dissemination	State should establish and publish clear procedures so that parties understand the notifications they should expect to receive based on their technical capabilities (FF-ICE or FPL2012)	

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
Planning Service			
Implementation of Planning Service	0% - No Planning Service implementation 50% - Partial implementation with gaps (e.g. incomplete message set support, incomplete validation/evaluation capability, manual intervention required) 100% - Full automated implementation in compliance with this document	Planning Service is recommended for ASPs whose airspace is complex and/or regularly constrained Full implementation should include: a) complete message set support b) automated validation and evaluation c) published validation and evaluation criteria in AIP	
Implementation of Planning Re-evaluation Process	0% - No re-evaluation process 50% - Partial re-evaluation (limited status change handling, re-evaluation only for selected restrictions, and/or procedures not fully established) 100% - Full re-evaluation with established procedures	State should establish and publish clear procedures for the re-evaluation process and handling of status changes	
Trial Service			
Implementation of Trial Service	0% - No Trial Service implementation 100% - Full automated implementation in compliance with this document *Note: Partial implementation of trial service is not expected as manual intervention is not practical for potentially large number of "fire and forget" messages.*	Optional service allowing "what-if" evaluation of flight plan alternatives Full implementation should include automated processing of Trial Requests and responses.	

Reporting Form Element	Reporting Metrices	Expected Outcome/Guidance to States	Response
Publication Service			
Implementation of Publication Service	0% - No implementation 100% - Subscription options published and available through SWIM with clear procedures for information subscription	Optional service for disseminating flight information. State should publish available subscription options and clear procedures for stakeholders to subscribe through SWIM	

APAC SWIM Hierarchical Architecture Test Plan

1. Test Objectives

This test for the CRV network environment verifies the connectivity between APAC SWIM EMS nodes (EEMS/GEMS) and adjacent nodes, along with the compliance, reliability and routing correctness of their message transmission. It is required to ensure successful full-process message delivery under the two core message interaction modes: asynchronous request-response and publish-subscribe. All test results shall comply with the APAC SWIM TI specifications, AMQP 1.0 protocol and relevant message format requirements.

2. Test Premises and Environment Preparation

The CRV network is activated; IP connectivity is available between adjacent EMS nodes involved in the test, meeting the cross-border connectivity configuration requirements.

All EMS nodes (EEMS/GEMS) are deployed; the AMQP 1.0 broker is running normally; the username, password and URI configurations comply with specifications; and the user's read/write access permissions for AMQP addresses are correctly configured.

EMS node information has been entered into the routing table, supporting static/dynamic routing; the binding relationship configuration between EEMSs and their corresponding superior GEMS is completed.

Test data is prepared, covering data formats such as FIXM, AIXM, IWXXM and ASTERIX that conform to the APAC_CATEGORY enumeration.

3. Multi-level Test Design

Level 1: Basic Network Connectivity Test for Adjacent EMS Nodes (Verify "Network Link Reachability Between Adjacent Nodes")

Test Content

Only verify the IP connectivity and port reachability of adjacent EMS nodes in the CRV network, and ensure no network-layer blockage between adjacent nodes (tests for non-adjacent nodes across regions are not involved).

Test Steps

1. Confirm adjacent node combinations: all EEMS bound superior GEMS connections and GEMS-to-GEMS connections (classified based on the actual deployed adjacent relationships).

2. For each group of adjacent nodes, execute the ping command from the initiating node and ping continuously for 100 times (e.g., EEMS → superior GEMS, GEMS → adjacent GEMS).

3. On the EEMS nodes, execute the telnet command to test the AMQP port of the connected GEMS and verify the establishment of TCP connections; similarly, on the GEMS nodes, test the AMQP port of adjacent EEMS/GEMS.

4. Use the route-trace tool to track the link of each group of adjacent nodes, confirm no routing interruption, and ensure the smoothness of the direct link between adjacent nodes.

Expected Results

The ping test success rate of all adjacent nodes is 100%, with average latency ≤ 50 ms and no packet loss.

Telnet connection to the AMQP port between adjacent nodes is successful, returning an AMQP protocol handshake response.

Adjacent nodes are directly connected, with no loops or interrupted nodes.

Test Focus

Focus on the effectiveness of network paths between adjacent nodes, laying a foundation for subsequent EMS layer connections and message transmission.

Level 2: Direct connectivity test between EMS (Verify "EMS layer reachability")

Test Content

Verify the effectiveness of AMQP connections between adjacent EEMS and GEMS, as well as between GEMS and GEMS, to ensure normal communication at the EMS layer.

Test Steps

1. Configure the superior GEMS for a specific EEMS and enter the AMQP URI (IP: Port) of the corresponding GEMS.

2. Initiate an AMQP connection request from this EEMS to connect to the superior GEMS and record the connection status.

3. Repeat Steps 1-2 to complete the following connection tests: connections between all EEMS and their corresponding superior GEMS, as well as between adjacent GEMS.

4. After the connection is established, maintain it for 30 minutes and monitor connection stability (no disconnection or reconnection).

Expected Results

The success rate of AMQP connection establishment between all adjacent EMS nodes is 100%, with no abnormal disconnection during the connection maintenance period.

There are no errors such as authentication failure or protocol incompatibility in the AMQP connection logs.

Test Focus

Verify the configuration effectiveness of the binding relationship between EEMS and their superior GEMS, as well as the direct connectivity between GEMS.

Level 3: Single Transmission Mode Message Sending Test (Verify "Basic Message Transmission")

Test Content

Verify the message sending compliance and success rate between adjacent nodes under the two transmission modes (Point to Point and Broadcast) respectively.

(1) Point to Point Mode Test

Test Steps

This test case addresses scenarios that require an explicit recipient ID, such as the submission of a filed flight plan.

1. SWIM message sender delivers SWIM message with an explicit recipient ID in the message metadata to connected EEMS;
2. EEMS delivers SWIM message with the destination EEMS to connected GEMS;
3. GEMS routes messages to the appropriate next-hop GEMS node;
4. The next-hop GEMS routes SWIM message to the destination EEMS;
5. The destination EEMS routes the message to the SWIM message receiver according to the recipient ID contained in the message metadata.

Expected Results

The message sending success rate reaches 99.9%.

Message format verification passed: addresses comply with lowercase requirements, message metadata are complete, and application attributes conform to APAC enumeration specifications.

(2) Broadcast Mode (Pub/Sub) Test

Test Steps

This test case address recipient-free scenarios such as meteorological information publication.

1. SWIM message sender publishes SWIM message with the recipient-free in the metadata;
2. EEMS publishes SWIM message to connected GEMS;
3. The GEMS publishes SWIM messages, and adjacent GEMSs subscribe to the Topic address to receive the messages;
4. The EEMS subscribes to the Topic address of the superior GEMS to receive SWIM messages and replicate messages to EEMS's own topic;
5. SWIM message receivers subscribe to the Topic address of the EEMS and consume SWIM messages.

Expected Results

The message reception success rate of all subscribers reaches 99.9%; the message content received by each node is consistent without loss or tampering.

Message format verification passed: addresses comply with lowercase requirements, message metadata are complete, and application attributes conform to APAC enumeration specifications.

Level 4: Mixed Multi-transmission Mode Test (Verify "Mode Compatibility")

Test Content

Run Point to Point and Broadcast (Pub/Sub) mode messages simultaneously to verify that there are no conflicts between the two modes and no confusion in message routing.

Test Steps

1. Execute all test steps of the Point to Point mode test specified in Level 3.
2. Execute all test steps of the Broadcast (Pub/Sub) mode test specified in Level 3 simultaneously.
3. Monitor the message sending, receiving, routing and system logs of both transmission modes in real time.

Expected Results

The message sending success rate is $\geq 99.9\%$ in concurrent scenarios, with no message loss or misdelivery.

There are no conflicts between the address formats and routing logic of the two modes' messages, and no routing exception alarms in logs.

Level 5: Multi-node Collaborative Message Routing Test (Verify "Cross-node Routing")

Test Content

Simulate the real hierarchical architecture to verify multi-GEMS hop routing and end-to-end message transmission of EEMS - GEMS - GEMS - GEMS - EEMS (across non-adjacent nodes).

Test Steps

1. Ensure that messages traverse multiple GEMS nodes between the sender and the recipient.
2. Perform Level 4 testing.

Expected Results

The message sending success rate is ⩾ 99.9% in concurrent scenarios, with no message loss or misdelivery.

There are no conflicts between the address formats and routing logic of the two modes' messages, and no routing exception alarms in logs.

Level 6: Exception Scenario Fault Tolerance Test (Verify "Stability and Fault Tolerance")

Test Content

Simulate scenarios such as network interruption, node failure and message abnormality to verify the fault tolerance capability of EMS message transmission.

Test Cases

Exception Scenario	Test Steps	Expected Results
Adjacent node network temporary interruption (10s)	During multi-node routing test, interrupt the CRV connection between transit GEMS and target GEMS (adjacent relationship) for 10 seconds and then restore it.	After network recovery, messages are automatically re-transmitted without loss (success rate: 100%)
Message Timeout	When sending Point to Point messages, set TTL = 1000ms and deliberately block the receiver port	Timed out messages are automatically discarded without duplicate delivery; timeout alarms are recorded in logs
Duplicate Messages	Manually send 2 messages with the same MESSAGE_ID	The receiver performs deduplication and retains only 1 valid message
Non-Compliant Message Format	Send broadcast messages missing the APAC_CATEGORY field	The receiver rejects the messages, returns a format error response, and clearly marks the missing field in logs

Level 7: Topology Structure and Message Routing Adjustment Test (Verify "Adaptability to Topology/Routing Changes")

Test Content

In the CRV network environment, verify the normalcy of adjacent node connectivity, message transmission reliability and routing correctness after EMS node topology adjustments (node addition/decommissioning, adjacent node relationship modification) and message routing strategy adjustments (static routing update, dynamic routing switch, backup routing change). Ensure no connectivity interruption, message loss or routing disorder occur after topology and routing changes, so as to support the system's adaptability to topology iteration requirements in actual deployment.

Test Steps

1. EMS node topology adjustment: Add, decommission EMS nodes and modify adjacent node relation, and verify adjacent node connectivity.
2. Routing info update: modify routing dynamically or statically.

Expected Results

Node adjacent connectivity is normal and routing is correct. No interruption, message loss or routing disorder occurs.

4. Test Entry and Exit Criteria

(1) Test Entry Criteria

The CRV network has completed adjacent node deployment with correct node IP/port configurations, meeting bandwidth and latency requirements.

The AMQP broker of EMS nodes starts normally; routing tables and binding relationships between EEMS and GEMS have been configured completely.

Test data (message templates, node association information) is ready and complies with APAC SWIM specifications.

(2) Test Exit Criteria

The pass rate of all Levels' test cases is ≥ 99.9%, with no critical defects (e.g., connectivity failure, message loss, routing errors).

The compliance verification rate of message format reaches 100% (no violations in addresses, message headers, and application attributes).

The routing latency of cross-region multi-node meets expectations, with no performance bottlenecks in concurrent message processing.

In exception scenarios, EMS nodes have fault tolerance capability without system avalanche, data tampering or similar issues.

ICAO APAC SWIM INDICATORS

1. SWIM Implementation Status- In preparation/planning

Criteria 1: Readiness of the implementation plan

Final Score: (Total Score/6) x 100%

1) Use case development: Identify and develop use case(s)

   Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

2) Stakeholder mapping: Identify information providers and consumers

   Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

3) Gap analysis: Determine required data transformation/preparation to standardised information exchange models

   Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

4) Service identification: Decide on and prioritise information services to be implemented

   Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

5) TI design: Decide on SWIM TI architecture

   Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

6) Governance framework design: Draft SWIM governance and policy framework

   Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

2. SWIM Implementation Status- Under development/implementation

Criteria 1- Engineering buildup and testing

Final Score: (Total Score/6) x 100%

1) Data preparation: Transforming/preparing data into standardised information exchange models
   Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

2) Information services buildup:

   a. Developing and implementing information services

      Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

   b. Ensuring service discoverability through the service registry

      Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

3) TI buildup: Developing and implementing SWIM TI

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

4) Testing & validation

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

5) Governance establishment

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

3. SWIM Implementation Status- In operation

Criteria 1- Establishment of SWIM TI + Trial information service(s)

Final Score: (Total Score/9) x 100%

1) Data delivery: Information delivery in standardised information exchange models through trial information services

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

2) Service discovery: Information services discoverable

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

3) Governance execution (**Governance Score**: (Total Score/7) x 100%)

i. Executing mechanism to ensure Service Level Agreement(s) tracking

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

ii. Executing mechanism to monitor performance through Quality of Service (QoS) metrics

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

iii. Executing mechanism to ensure Information service lifecycle management

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

iv. Executing framework to ensure SLA and QoS of SWIM TI

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

v. Executing mechanism/framework for access control and management

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

vi. Executing framework/guideline for information service onboarding/offboarding

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)

vii. Executing procedures to resolve disputes between the information service provider and the consumer

Options: Not implemented (0), Partial implementation (0.5), Full implementation (1)