



ICAO

International Civil Aviation Organization

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

Bangkok, Thailand, 16-20 June 2025

Agenda Item 5: Information Management (IM)

5.1 Review Report of the Tenth Meeting of System Wide Information Management Task Force (SWIM TF/10)

REVIEW REPORT OF TENTH MEETING OF SYSTEM WIDE INFORMATION MANAGEMENT TASK FORCE (SWIM TF/10)

(Presented by the Secretariat)

SUMMARY

This paper presents the relevant outcomes on the Tenth Meeting of System Wide Information Management Task Force (SWIM TF/10) of APANPIRG for meeting review.

1. INTRODUCTION

1.1 The Tenth Meeting of the System Wide Information Management Task Force (SWIM TF/10) was held from **20 – 23 May 2025** in the ICAO APAC Regional Office, Bangkok, Thailand. The Meeting was attended by **109** participants from **23** States/Administrations, **2** International Organizations and one industry partner. The SWIM TF/10 meeting report, working papers, information papers, and other resources can be accessed by the following link:

<https://www.icao.int/APAC/Meetings/Pages/2025-SWIM-Seminar-and-SWIM-TF10-SIPG2.aspx>

1.2 This paper summarised relevant information and updates with a highlight on the outcomes of SWIM TF/10 meetings to be reviewed by the Twenty-Ninth meeting of Communications, Navigation, and Surveillance Sub Group (CNS SG/29) of APANPIRG and the Thirty-Sixth Meeting of Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/36).

2. DISCUSSION

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

Election of Co-Chair

2.2 It was recalled that at the SWIM TF/9, an agenda item addressed the election of Co-Chair, and Dr. Amornrat Jirattigalachote was re-elected. The Meeting acknowledged that Ms. Kristin Cropf, SWIM Programme Manager, Federal Aviation Administration (FAA), had served as the Co-Chair of SWIM TF for the last four years. The Meeting noted the achievements of the SWIM TF under

the leadership of Dr. Amornrat Jirattigalachote and Ms. Kristin Cropf. The floor was then opened for nomination of the second Co-Chair position. However, no other nomination was received at the Meeting. As a result, the position remains vacant. It was suggested that the election be held again at a future SWIM TF Meeting.

Outcomes of the Joint Event of SWIM over CRV Demonstration and Surveillance Data over SWIM Trial – Hong Kong China (WP/05)

2.3 Hong Kong China presented the report of the Joint Event of SWIM over CRV Demonstration and Surveillance Data over SWIM Trial, held from 28 – 29 May 2024. The report captured the details of the Joint Event, including (i) the SWIM services developed; (ii) the SWIM infrastructure used; (iii) the development and testing process; (iv) the data format for surveillance data sharing; and (v) the observations and lessons learnt.

2.4 It was informed that the Joint Event was successfully conducted with the system setup and rehearsal on the 1st day and the actual event on the 2nd day. The lessons learned from the Joint Event, including both SWIM and CRV perspectives, were shared with the Meeting. As the lessons learnt from the Joint Event, the Meeting was informed that message headers/metadata, including the names of the fields and format of the contents, must be properly considered and standardized to maintain interoperability within the region and across different regions. It was also shared that some participants of the Joint Event expressed uncertainty regarding whether the hierarchical architecture is the appropriate SWIM TI architecture for the APAC region. Several observations with this architecture were identified during the preparation of the Joint Event, such as specific configuration required for different brands of EMS, potential message loop back if source and recipient checking was not implemented properly, combining byte message and text message into a single queue, single point of failure of the current architecture, etc. Moreover, there was some confusion between the use of AMQP Topics and Queues by participants, which needs to be further examined in order to be able to use them in a more efficient way. In addition, it was learnt that the push and pull approach for message consumption needs to be standardized to maintain interoperability.

2.5 It was noted that the 2 Mbps bandwidth, tentatively offered to each State/Administration, through the pseudo CRV was insufficient for sharing surveillance data at a 1-second data rate for some States/Administrations. The amount of required bandwidth required for sharing of such data type would depend on the traffic volume with State/Administration's FIR as well as their roles in sharing/consuming ADS-B surveillance data within the SWIM environment in the future. This situation may result in the need to subscribe for a higher CRV bandwidth.

2.6 It was informed that, with reference to the AMQP surveillance messages carrying both ADS-B data and FPL information, 32 data fields comprising 14 fields for the message header and 18 fields for the message body were the highest number of data items contained in one message. The size of such a message was around 1.1K bytes, which was nominally the largest size among all types of surveillance messages. Based on the figure observed from these messages, further analysis was conducted with traffic level based on Hong Kong's operational environment of approximately 300 received ADS-B targets during peak hours within the Hong Kong FIR. Total bandwidth required for transmission of these messages would be around 360K bytes (300 x 1.2K) per second, i.e. 2.88 Mbps. For the network packets captured, it was observed that around 8% of network traffic was attributable to transmission overhead. With overhead included, the size required for transmitting such a message increased to around 1.2K bytes.

Outcomes of SWIM TF Task Leads Meetings and Joint Meeting of SWIM TF Task Leads and CRV OG Experts in 2024-25 – Sec (WP/06)

2.7 The paper presented outcomes of SWIM TF Task Leads (TLs) Meetings and Joint CRV OG experts and SWIM TF TLs Meetings, after the SWIM TF/9 meeting, held in 2024-2025. The Meeting noted that a total of **two** (2) SWIM TF TLs coordination meeting was held after SWIM TF/9 to review the outstanding SWIM TF/7 and SWIM TF/8 action items, which included various updates

such as APAC SWIM implementation roadmap, SIPG and editorial ad-hoc group updates, joint event preparation, SWIM TI-related specifications, etc. The SWIM TF TLs Minutes of the Meetings (MoM) of the two meetings on 13 August 2024 and 07 January 2025 were shared with the Meeting.

2.8 In addition, a total of four (4) Joint Meetings of the CRV OG experts and SWIM TF TLs were conducted on 12 June 2024, 17-20 September 2024, 12 November 2024, and 13 March 2025. Out of four meetings, the 17-20 September 2024 meeting was an in-person meeting entitled the ***ICAO Workshop for the preparation of new CRV requirements and specifications for future System Wide Information Management (SWIM)/other aviation services.***

2.9 It was informed that the *ICAO Workshop for the preparation of new CRV requirements and specifications for future SWIM/other aviation services* was held from 17-19 September 2024 in Guam, USA. The workshop reviewed the outcomes of the joint event of SWIM-over-CRV demonstration and surveillance data sharing over the SWIM technical trial held on 28-29 May 2024 in Hong Kong China. The lessons learnt from this joint event were taken as inputs to the new CRV technical specifications. The workshop also deliberated on the current AMHS and other data flows, including the planned future data flows for SWIM messages, and further modified the new CRV requirements. It was noted that this workshop allowed APAC States/Administrations to formulate the enhanced CRV specifications to meet future SWIM needs, based on their firsthand experience in utilizing CRV. The report and other resources of the workshop can be accessed at the following webpage:

<https://www.icao.int/APAC/Meetings/Pages/2024-New-CRV-and-Future-SWIM-WS.aspx>

SWIM Implementation Pioneer Ad-hoc Group Progress Report – Singapore (WP/07)

2.10 Singapore presented the work done by the SWIM Implementation Pioneer ad-hoc Group (SIPG) since the last SWIM Task Force meeting (SWIM TF/9) held in May 2024. It was informed that the SIPG supported the joint event of the SWIM-over-CRV demonstration and surveillance data sharing in the SWIM technical trial hosted by the Hong Kong Civil Aviation Department on 28 -29 May 2024. The Meeting noted that the SIPG constructed SWIM TI for this joint event using a hierarchical architecture, an agreed-upon design since SWIM TF/8, on pseudo CRV. The primary objectives were to test the feasibility of operating SWIM in a CRV-like environment and the feasibility of sharing surveillance data, e.g., ADS-B tracks, in a SWIM environment. Both objectives were met with success, and many lessons were learnt to inform the SIPG of the way forward towards an operational Asia-Pacific SWIM.

2.11 It was stated that following the SWIM TF/9 meeting, the SIPG conducted eight online meetings to maintain the momentum of the SWIM implementation. Through these meetings, a set of work items was developed for the SIPG to complete. These work items were seen as work that the SIPG needs to complete to get to an operational SWIM. The list of items is captured in the table below.

Policy Type	Construction Type
Performance Metrics	SWIM Architecture
SWIM Architecture	REST Type Services
AMHS / AFTN migration Plan	Registry
Standardize Nomenclature	AMHS / AFTN Data Translation
AMHS / AFTN Data Translation	Security
Security	Information Services Implementation
Conditions of SWIM Operationalization	

Table 1- The Work List of SIPG

2.12 The SWIM TF/10 Meeting noted that the list was divided into two categories, Policy

Type and Construction Type. Policy-type work items are work items that require standards, recommendations, and/or plans to be developed, while the construction-type work items are those that require infrastructure to be built or software to be developed or migration to be effected. This list contains what the SIPG currently understands to be necessary for SWIM implementation and may grow as the SIPG's work progresses.

2.13 It was informed that as part of the Registry work item, the SIPG also embarked on a trial of the SWIM Discovery Service based on the SWIM Discovery Service specifications developed by the FAA. This trial, conducted between China, Japan, Korea, Singapore and Thailand, was successfully completed in January 2025.

2.14 The SWIM TF/10 Meeting was recalled that the SIPG conducted its first working session (SIPG WS/1) from 14 – 17 January 2025 at the ICAO Regional Office in Bangkok, Thailand, which resulted in 13 action items for the SIPG and ICAO Secretariat to work on. The Meeting also noted that another outcome of the SIPG WS/1 was the need to conduct a trial using self-signed certificates. The purpose of this trial is to explore and understand how certificates can be used in the SWIM environment to enhance the safety and security of the message transfer. Malaysia has volunteered to lead this effort with Singapore and Thailand as participants.

2.15 SIPG lead encouraged more SWIM TF members to join the group and contribute to building the first version/prototype of the APAC SWIM. Given the increasing workload and the limited number of SIPG members, the SWIM TF/10 Meeting suggested prioritizing SIPG's tasks to ensure effective outcomes. In response to a query on the possibility of distributing work more broadly among SIPG members, the SIPG lead explained that, so far, only the topic of security, i.e., using a self-signed certificate, had reached consensus, with Malaysia designated to lead this area. For other aspects of the SWIM TI, common solutions still need to be agreed upon before responsibilities can be effectively distributed within the group. To support a more focused discussion during the second working session of SIPG (SIPG WS/2), which was held on 26 – 30 May 2025, it was agreed that the SWIM TF/10 Meeting would review and approve the prioritized SIPG work areas. This would enable the group to formulate its work plan and proceed with implementation accordingly. Australia, Japan, New Zealand, Singapore, and Thailand volunteered to prepare a draft prioritization of the SIPG work areas. However, it was acknowledged that additional time and in-depth discussions are required to finalize the list. It was agreed that this matter would be further deliberated during SIPG WS/2, and the finalized list of prioritized SIPG work areas would be shared with SWIM TF members for review via email. The Outcomes of SIPG WS/1 and WS2 are presented in WP/07.

2.16 The SWIM TF/10 Meeting noted that, given the lessons learnt by SIPG so far, a modification to the SIPG ToR was adopted at the SWIM TF/7 meeting. The draft modified ToR was prepared by the group formed to prepare a draft prioritization of the SIPG work areas, and it was presented to the SWIM TF/10 Meeting through [SWIM TF/10 -Flimsy/01](#). The SWIM TF/10 Meeting reviewed and agreed to the revised ToR, provided in **Appendix A**, and adopted the following decision.

Decision SWIM/TF/10/01 – Revised Terms of Reference of the SWIM Implementation Pioneer Ad-hoc Group			
What: To agree on the revised Terms of Reference (ToR) of the SWIM Implementation Pioneer Ad-hoc Group, as provided in Appendix A .		Expected impact:	
		☐ Political / Global	
		☐ Inter-regional	
		☐ Economic	
		☐ Environmental	
		☒ Ops/Technical	
Why: To reflect the necessary changes in the group's work scope, based on lessons learnt since its establishment.		Follow-up:	☐ Required from States
When:	23-May-25	Status:	Adopted by SWIM TF

Who:	☐ Sub groups	☒ APAC States	☒ ICAO APAC RO	☐ ICAO HQ	☒ Other: SWIM
TF					

SIPG Action WS-1-9: Options for internet connection in the Asia-Pacific SWIM – SIPG (WP/08)

2.17 This paper presented the deliberations of the SIPG on the possible options for Internet connectivity for the Asia/Pacific SWIM. Based on the SWIM TF's ToR, the APAC regional SWIM is to be constructed principally over CRV and other Internet Protocol (IP) based networks. The Internet is one such possible IP-based network. Therefore, the possible options for establishing the APAC SWIM over both CRV and the Internet were discussed. In particular, after the SIPG WS/1 held in January 2025, further deliberation on how the APAC regional SWIM can be implemented over both types of network was conducted within the SIPG. Eventually, three options for how this can be achieved were proposed.

2.18 Option 1 is to have one or more Edge EMS connect to the CRV as well as the Internet. The Edge EMS can then publish and consume services from both the Internet and CRV. The Edge EMS is responsible for routing any messages that need to flow between the Internet zone and the CRV zone. It is expected that the Edge EMS should keep the two zones separate and only exchange the necessary messages.

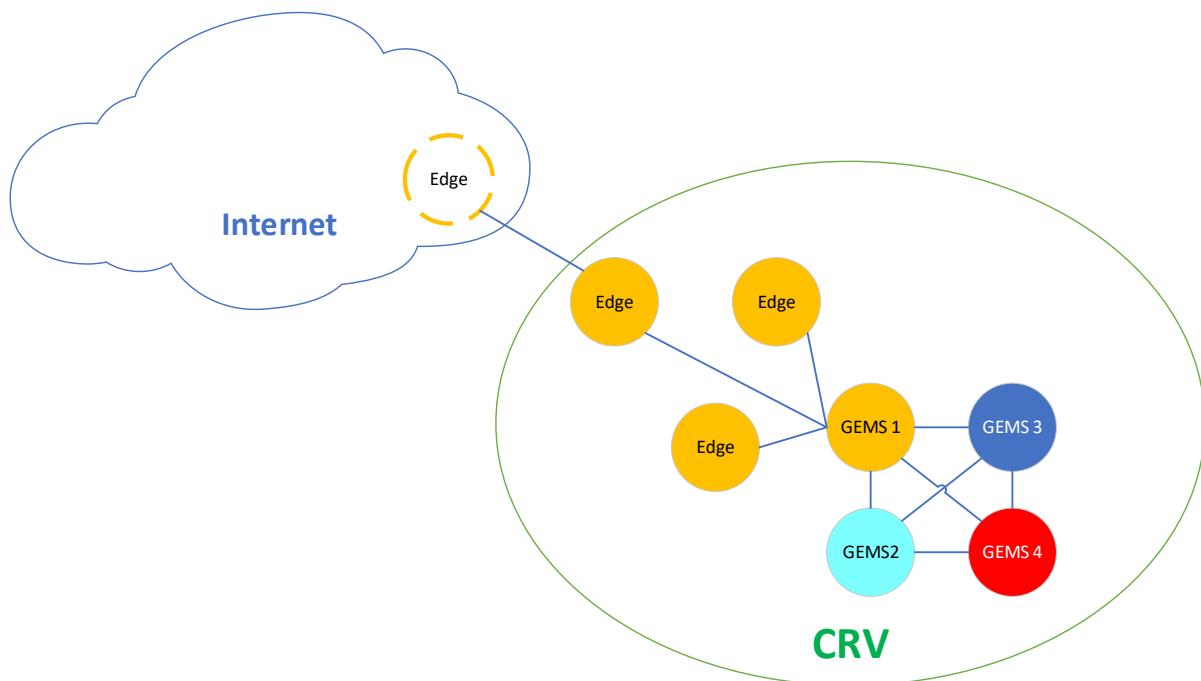


Figure 1- Option 1 SWIM Architecture

2.19 Option 2 is to have the SWIM TI constructed over both the CRV and the Internet. Each Gateway EMS provider will need to span the Gateway EMS over both CRV and the Internet with an appropriate security mechanism to segregate between the two zones. Essentially, there is no significant difference between options 1 and 2. The only difference is that in option 2, the Internet access is at the Gateway EMS.

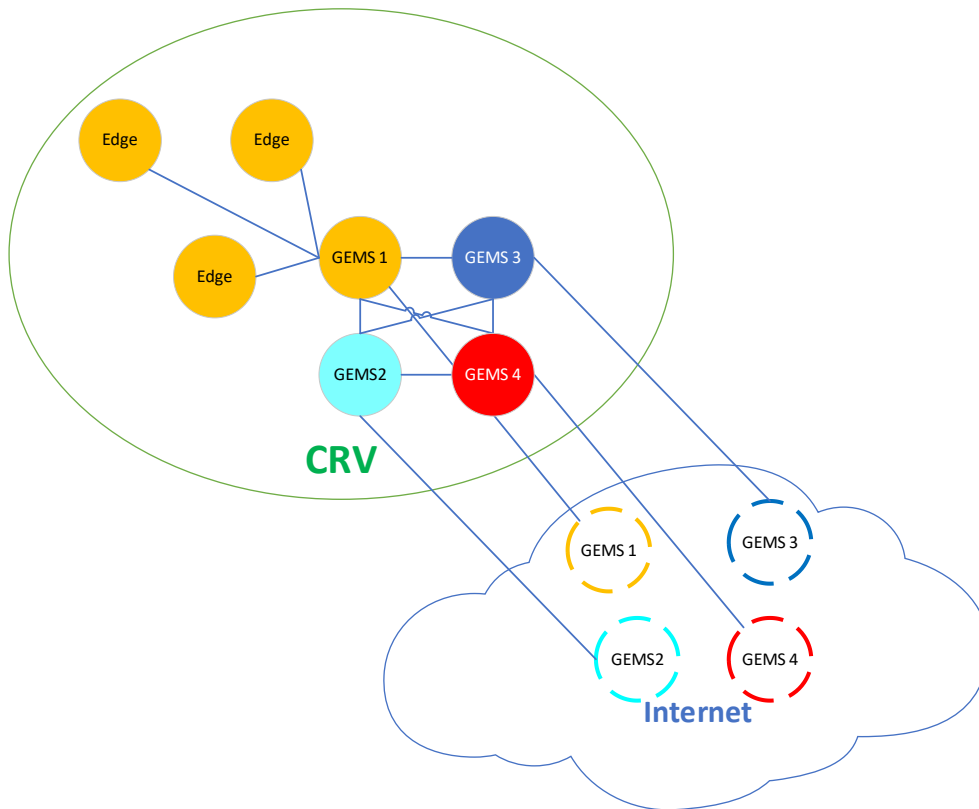


Figure 2- Option 2- SWIM Architecture

2.20 Option 3 is to have the CRV service provider also provide the connectivity to the Internet. This option was discussed during the CRV OG and SWIM TF coordination meeting, held via teleconference on 13 March 2025. The CRV OG informed that it was not a viable option and that the CRV OG does not provide or support an internet only connection.

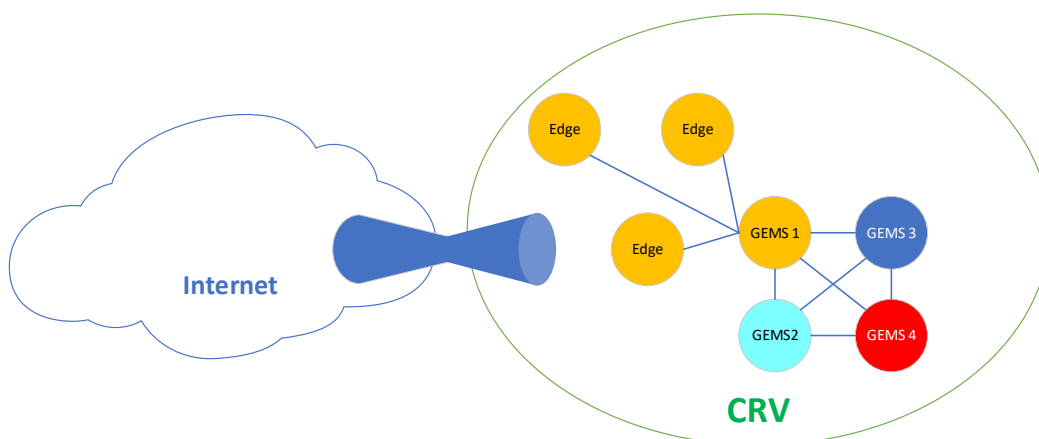


Figure 3- Option 3- SWIM Architecture

2.21 The SWIM TF/10 Meeting noted the need to determine which of the two remaining options would be the most viable for implementing Internet connectivity for the APAC Regional SWIM. It was suggested that option 1 was the simplest and could be implemented first as an interim solution, enabling an early implementation of the APAC Regional SWIM with accessibility via both the CRV and the Internet, while a more permanent solution is being developed.

2.22 The SWIM TF/10 Meeting discussed and agreed to the need to define the functionalities and requirements of edge EMS and gateway EMS to support States/Administrations in

understanding and determining the appropriate level of SWIM TI capabilities required for their implementation. SIPG was assigned the task of developing the definitions as well as identifying the minimum functionalities and requirements for edge EMS and gateway EMS. **ACTION ITEM 10-1**

2.23 Concern was raised regarding option 2, particularly in scenarios where SWIM traffic would always need to be routed through gateway EMS, even for domestic SWIM operations. This approach might not be efficient. SIPG will further discuss this option, taking into account the concern raised. **ACTION ITEM 10-2**

SIPG Action WS-1-12: Conclusions of the Asia-Pacific SWIM Transition Discussions – SIPG (WP/09)

2.24 This paper presented the deliberations of the SIPG for SWIM transition and shared the following 4 recommendations for the SWIM TF's consideration:

Recommendation 1: Reach out to relevant expert groups that govern the various data types being transmitted on AMHS for their SWIM migration strategy and proposed sunset date. (e.g., AAITF, FF-ICE ad-hoc group, MET/IE, ATFM ad-hoc group, etc.)

Recommendation 2: Work closely with the ACSICG AMHS and the SWIM Transition Group to map out a transition plan together. One topic of interest is the need for AMHS to SWIM conversion and how that should be managed.

Recommendation 3: Consider the use of legacy formats in the Asia-Pacific SWIM. This is to enable existing data to be quickly onboarded onto SWIM. The ATM Information Reference Model should be used to maintain semantic interoperability.

Recommendation 4: Inform the ATM Automation Systems Task Force (ATMAS TF) of the need for ATM automation systems to be SWIM compatible.

2.25 The SWIM TF/10 Meeting deliberated the recommendations in detail and agreed to adopt recommendations 1, 2, and 4 as proposed. For recommendation 3, the SWIM TF/10 Meeting discussed whether SWIM TF or operational expert groups would be a more appropriate body to determine the data formats for information exchange within SWIM. Moreover, it was noted that referencing the use of legacy formats in the region could potentially hinder progress towards SWIM transition. As a result, recommendation 3 was revised and adopted by the Meeting as follows:

Recommendation 3: Consider the possible use of any other data formats, in addition to AIXM, FIXM, and IWXXM, in the Asia-Pacific SWIM. This is to enable existing data to be quickly onboarded onto SWIM. The ATM Information Reference Model should be used to maintain semantic interoperability.

2.26 For recommendation 1, the SWIM TF/10 Meeting was informed that the ATFM SG/14 meeting endorsed the draft conclusion, which was later adopted by APANPIRG/35 as **Conclusion APANPIRG/35/4**, on the adoption of FIXM v4.3 as the standard format for cross-border ATFM information exchange in the SWIM environment from Q3/2026.

2.27 The MET/IE WG Chair informed that the 6th meeting of the ICAO Meteorological Panel (METP) was held in March 2025. At this meeting, the Panel was informed that, while the IWXXM format had become a standard format for the international exchange of aeronautical meteorological information since November 2020, it had not yet reached a sufficient level of global implementation. A key reason for this slow implementation of the IWXXM format was attributed to the fact that Annex 3 continued to require States to issue and disseminate products also in TAC format and/or in abbreviated plain language. To encourage global progress towards IWXXM format, it was proposed to amend Annex 3, to specify the removal of TAC and plain text language forms as the standard format for the

international exchange of aeronautical meteorological information with an applicability date of November 2030 (i.e. to align with the expected applicability date of Amendment 84 of Annex 3). The METP agreed to the proposed removal of the use of TAC and plain text language forms for the international exchange of aeronautical meteorological information such as METAR, SPECI, TAF, trend forecasts, SIGMET and AIRMET information, volcanic ash advisory (VAA) information, tropical cyclone advisory (TCA) information, and space weather advisory (SWXA) information.

2.28 The SWIM TF/10 Meeting requested the ICAO Secretariat to coordinate with ICAO APAC Aeronautical Information Services – Aeronautical Information Management Implementation Task Force (AAITF) to share the plan for the AIS to AIM transition, particularly regarding the anticipated sunset date of exchanging aeronautical information over AFTN/AMHS. **ACTION ITEM 10-3**

2.29 In response to a query regarding the global strategy for AMHS to SWIM transition, it was shared that no such discussion is currently taking place within the Air Traffic Management Requirements and Performance Panel (ATMRPP). ATMRPP is presently focused on the transition strategy for FPL2012 to FF-ICE. Discussion on migration of other ATS messages, in addition to FPL2012, CHG, DLA, CNL, RQP, RQS, DEP, ARR, has only recently been initiated.

2.30 The SWIM TF/10 Meeting noted concern regarding the differing suggestions on communication infrastructure implementation provided to APAC States/Administrations. For instance, various MET meetings have emphasized the need for the timely implementation of capable primary and, where relevant, secondary links for the exchange of IWXXM messages. It was highlighted in these meetings that IWXXM, as the successor to Traditional Alphanumeric Code (TAC), can only be transported over links with specific capabilities, which AFTN links do not support. Readiness of AMHS with File Transfer Body Part (FTBP) and the Interpersonal Message (IPM) Heading Extension (IHE) to support the exchange of IWXXM messages/reports has been promoted in MET and ACSICG meetings. However, it had also been informed at these meetings that AMHS would not support the exchange of AIXM and FIXM messages and that SWIM would be required for such exchanges. This differing guidance for ANS communication capacity enhancements has created confusion among States/Administrations, particularly whether to transition from AFTN to AMHS, upgrade existing AMHS, or bypass AMHS entirely and implement SWIM directly.

Need for Additional Specificity in Defining APAC Common SWIM Surveillance Information Services – Australia (WP/10)

2.31 Australia proposed the need for more guidance in defining APAC Common Surveillance Information Services proposed under Task 6. The SWIM TF/10 Meeting was informed that initial Surveillance Information Services intended to support ATFM applications should utilize a reduced track update rate, and that further guidance should be sought on defining future additional Surveillance Information Services to support differing business requirements. The Meeting noted that APAC Common SWIM Information Services incorporated with two distinct surveillance data sharing services, as recently updated by SURICG/10 with SURSG's input via [SURICG/10 – Flimsy 01](#) in April 2025.

2.32 It was proposed to add two additional columns for (i) *Tier 1 or Tier 2 Data Services* and (ii) *Update Rate* in the proposed APAC Common SWIM Surveillance Information Services. The discussion on this proposal was recorded under SWIM TF/10 -WP/11.

Business functionality of APAC Common SWIM Information Services – Hong Kong China (WP/11)

2.33 This paper presented the updates on the work of the SWIM TF Task 6 team on Information Services to identify the business functionality to be supported by APAC Common SWIM Information Services for addressing the operational needs in APAC. The Meeting recalled the development of the list of business functionalities for APAC Common SWIM Information Services,

along with recommendation to apply a three-level prioritization scheme. It was further noted that SWIM TF/9 agreed for SWIM TF Task 6 lead and relevant experts to present the draft list for coordination with expert groups, including AAITF, APSAR/WG, ATFM SG, FF-ICE Ad-hoc Group, MET/IE WG and SURICG.

2.34 The SWIM TF/10 Meeting was informed that the MET SG/28 meeting held on 8-12 July 2024 reviewed and provided corrections to the proposed business functionalities of APAC Common Meteorological Information Services. In addition, the Second Asia/Pacific FF-ICE Ad-hoc Group Meeting and Workshop (FF-ICE/2) held from 18-20 March 2025 reviewed and updated the list of APAC Common SWIM Flight Information Services related to FF-ICE.

2.35 MET/IE WG/23 held from 25-28 March 2025 identified that subsequent updates to the list of APAC Common SWIM Meteorological Information Services would be required to reflect outcomes from the recent METP/6 meeting and suggested that the information service priorities be revisited. MET/IE WG/23 agreed that the proposed updates be prepared for further review and consideration by the SWIM TF, including consistent use of the term “information service”.

2.36 SURICG/10 held from 21-23 April 2025 reviewed the list and recognized that SURSG’s inputs may be valuable for the finalization of the list. The list was modified and further consulted with SURSG/4 delegates by email. After incorporating all inputs, the final list of APAC Common SWIM Surveillance Information Services was prepared by the SURICG/10 meeting for consideration by the SWIM TF/10.

2.37 ATFM SG/15 held from 29 April to 2 May 2025 reviewed the portion of APAC Common SWIM Flight Information Services, specifically the “ATFM/A-CDM integrated service” and “Traffic flow status service”. The ATFM SG/15 meeting advised that the terminology used in the list be further verified against the draft PfA of future PANS-ATM (Doc 4444). The ATFM SG/15 meeting agreed to provide a revised list to the SWIM TF/10 meeting. The updates to APAC Common SWIM Flight Information Services related to ATFM and A-CDM, developed by the ATFM SG, was presented as part of WP/32.

2.38 The SWIM TF/10 Meeting recalled the information shared at SWIM TF/9 that IMP is working on an Information Service Definition (ISD) template for subject-matter-expert Panels, e.g., ATMRPP, METP, to develop domain-specific ISDs. It was suggested that the progress of these works in the IMP, ATMRPP, and METP is monitored to align regional descriptions with the global guidance. While considering the need to develop an APAC version of ISDs for some of the APAC Common SWIM Information Services, the Task 6 team will assess whether the necessary ISDs are covered by the templates/guidance developed at the global-level Panels and indicate this information in a new column of the table for APAC Common SWIM Information Services.

2.39 It was added that the first version of the list of APAC Common SWIM Information Services will be incorporated into the APAC SWIM Implementation Guidance Document being developed.

2.40 The SWIM TF/10 Meeting reviewed the proposed initial set of APAC Common SWIM Information Services, as reviewed and updated by MET SG/28, FF-ICE/2, MET/IE WG/23, and SURICG/10. It was added that the APAC Common SWIM Aeronautical Information Services Ad-hoc Group also reviewed and provided updates to the APAC Common SWIM Aeronautical Information Services as presented by SWIM TF/10 - WP/12.

2.41 The publication of services with incomplete fields was discussed at length. Various suggestions were considered, including creating a separate table for such services, excluding them from the first version of the list, or including all services with a footnote explaining the presence of “TBD” or “?”. After detailed deliberation, it was agreed that the first version of the APAC Common SWIM Information Services list will include only those services for which complete information is provided. Services containing “TBD” or “?” fields will be excluded from the first publication. However, these

services will be retained as the working draft for further refinement and reviewed in the future SWIM TF meetings, following coordination with relevant expert groups. **ACTION ITEM 10-4** As a result, the following services were removed:

APAC Common SWIM Aeronautical Information Services		
1.	ATIS distribution service	Provides continuous and automated broadcast of recorded aeronautical information in airport and terminal areas.
2.	Search and rescue service	Allows Rescue Coordination Centres (RCCs) to exchange information with neighbouring RCCs and ATS units for coordination during SAR operations.
APAC Common SWIM Flight Information Services		
3.	ADP Distribution Service	Supports publication and distribution of ATFM Daily Plan (ADP), based on information included in the APAC ADP Exchange Procedure ¹ . The published ADP is designed to inform for stakeholders on upcoming demand/capacity constraints and possible ATFM measures.
4.	Flow-Specific ATFM Measure Service	Supports <i>notification</i> of information related to “flow-specific” ATFM measures, i.e. measures whose control mechanisms apply to a “group of flights” on a particular traffic flow. An example is the Minutes-in-Trail (MINIT) requirement applied on an eastbound traffic using A1 from VT*, VV* to RK*. Recipients of this information should take actions to comply with the ATFM measure contained herein. ²
APAC Common SWIM Meteorological Information Services		
5.	Special Air Report (ARS) service	Provides reports of special observations made by aircraft when they encounter special weather phenomena, such as moderate/severe turbulence or icing. (Note: Currently there is no plan to implement this information service at MET Panel)
6.	MET derived from Mode S DAPs service	Provides upper air winds and temperatures derived from Mode S Downlinked Aircraft Parameters (DAPs) (e.g. true airspeed, ground speed, magnetic heading, true track angle) and facilitates exchange of derived winds and temperatures among MET service providers.

Table 2- List of APAC Common SWIM Information Services removed from the first adopted version

¹ The ADP template included herein is not updated. The new ADP template had been agreed by the AMNAC group and included into the [AMNAC COP v6.1](#), Appendix D, and was proposed to the ATFM/SG/15 (Apr-May 2025). The meeting agreed that the Secretariat will update the ADP Exchange Procedure to include the new template, which has already been supplied by AMNAC core team post-meeting.

² Common operating procedures for this group of ATFM measures (e.g., MINIT, MIT, MDI, Re-Route, Level Capping) have not been developed for the APAC region yet, and should be developed before finalizing the information service to support the operations.

2.42 It was noted that the information exchange model identified for one of the APAC Common SWIM Surveillance Information Services is **ASTERIX Cat 21+FPL (payload in JSON or RAW format)**. It was highlighted to the Meeting that RAW format of FPL does not exist. The ICAO Secretariat was requested to share this observation with SURSG for further review and clarification. **ACTION ITEM 10-5**

2.43 The SWIM TF/10 Meeting discussed the proposal presented in WP/10 and noted that the APAC Common SWIM Information Services includes multiple service types, which may not require these additional *Tier 1 or Tier 2 Data Services* and *Update Rate* columns. Therefore, it was not recommended to modify the overall structure of the APAC Common SWIM Information Services table solely to accommodate the needs of specific service types. However, it was noted that, as SURSG is currently drafting guidance material for surveillance data sharing in the SWIM environment, reference to this material, particularly regarding the tier of data services, could be included as part of the brief description of the service. Regarding update rate, the Meeting discussed that it would depend on both operational requirements and SWIM TI performance, and could be appropriately included as part of the information service overview.

2.44 Regarding the suggestion in SWIM TF/10 - WP/19 to include a reference for each information service as part of the Task 6 activities, the Meeting discussed the value and potential benefits of the proposal. It was also considered whether such a reference should be added in a separate column or integrated into an existing one. After detailed deliberation, the SWIM TF/10 Meeting agreed to the proposal and requested Task 6 leads to include reference(s) for each information service in the brief description column, where such information is available. **ACTION ITEM 10-6**

2.45 The updates provided by FF-ICE/2 to add REQ/REP in some APAC Common SWIM Flight Information Services were discussed. To support harmonized service implementation, the Meeting highlighted the need for clarification on how REQ/REP should be implemented. Particularly, the distinction between synchronous REQ/REP and asynchronous REQ/REP was noted as essential for facilitating discussion within the FF-ICE Ad-Hoc Group. Accordingly, SIPG, together with China, Japan, and the Republic of Korea, was requested to develop a clear explanation and guidance for further review and discussion of the FF-ICE Ad-Hoc group. **ACTION ITEM 10-7**

2.46 The SWIM TF/10 Meeting recommended that States/Administrations submit suggestions regarding any services to the relevant expert groups. Any subsequent modifications to services, if deemed necessary by the expert groups, could then be proposed to the SWIM TF for consideration at its future meetings.

2.47 The SWIM TF/10 Meeting conducted a detailed review of each service included in the list of APAC Common SWIM Information Services. It was observed that the services were described at varying levels of granularity. For instance, some services within a particular information domain appeared to be divisible into multiple distinct services. The SWIM TF/10 Meeting also noted differing levels of understanding among expert groups regarding SWIM information services and the information required to be filled in the template. However, it was agreed that the review activity undertaken by the relevant expert groups has enhanced overall understanding and supported the groups in visualizing SWIM services in their respective future aviation concepts.

2.48 The SWIM TF/10 Meeting discussed a need for clear guidance to States/Administrations on the proposed first version of Common SWIM Information Services that it is considered as a guidance document for States/Administrations to support their SWIM development and implementation. Additionally, it was agreed that clarification as proposed in [SWIM TF/10 - Flimsy/04](#) should also be provided as part of the first version of the list to ensure the same understanding on the use of these APAC Common SWIM Information Services.

2.49 The SWIM TF/10 Meeting discussed various proposals to improve the APAC Common SWIM Information Services list. Australia consolidated the key suggestions for enhancement into [SWIM TF/10 -Flimsy/02](#) and proposed that APANPIRG subsidiary bodies regularly review the APAC

Common SWIM Information Services document and notify the SWIM TF of any new or changes to existing business requirements for APAC Common SWIM information services. A draft conclusion was proposed for these proposed requirements. In addition, by [SWIM TF/10 - Flimsy/04](#), Australia proposed that a Draft Decision be adopted by the SWIM TF to clarify that, based on the business requirements articulated by Expert Groups to date, the SWIM TI being designed and provisioned at this time is not specified to support the provision of aircraft separation.

2.50 The SWIM TF/10 Meeting suggested Task 6 Leads to consider information shared in [SWIM TF/10 -Flimsy/02](#) and draft guidance document to provide better instructions for other contributory bodies in reviewing and updating the list of APAC Common SWIM Information Services if deemed necessary. It was also suggested that other APANPIRG contributory bodies regularly review the APAC Common SWIM Information Services document and notify the SWIM TF of any new, or changes to existing, business requirements for APAC Common SWIM information services. These suggestions were agreed to be communicated as part of the guidance document to be developed. **ACTION ITEM 10-8** ICAO Secretariat was requested to coordinate with other contributory bodies on the proposed regular review process, sharing the significance of the updated APAC Common SWIM information services. **ACTION ITEM 10-9**

2.51 The list of APAC Common SWIM Information Services finalized by the SWIM TF/10 Meeting is provided in **Appendix B** of the report. The Meeting agreed to publish the list as the first version and present the revised list for consideration by CNS SG/29 through the following Draft Decision and subsequent adoption by APANPIRG/36. After APANPIRG/36's adoption of the proposed Draft Decision, the list of APAC Common SWIM Information Services will be uploaded to the ICAO APAC e-document portal. **ACTION ITEM 10-10**

Draft Decision SWIM TF/10/02 - Adoption of APAC Common SWIM Information Services, v1.0	
What: The first version of APAC Common SWIM Information Services, provided in Appendix B , be adopted for immediate use by APAC States/Administrations. The set of APAC Common SWIM Information Services, and the associated performance of SWIM Technical Infrastructure underpinning these services, is not specified to support the provision of aircraft separation.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To assist APAC States/Administrations in planning and implementing their SWIM information services.	Follow-up: ☐ Required from States
When: 23-May-25	Status: Draft to be adopted by PIRG
Who: ☒ Sub groups ☐ APAC States ☐ ICAO APAC RO ☐ ICAO HQ ☐ Other: MET SG, ATM SG, AOP SG	

Outcomes of the APAC Common SWIM Aeronautical Information Services Ad Hoc Group – APAC Common SWIM AIS Ad Hoc Group (WP/12)

2.52 The APAC Common SWIM AIS Ad Hoc Group presented the outcomes of the discussions held within the Ad Hoc Group. It was informed that experts from several States and international organizations, including IATA, IFAIMA, and ICAO, actively participated in these discussions. Additionally, India contributed an aerodrome expert through the Aerodrome Operations and Planning Sub-Group (AOP/SG) to participate in this task. The group convened five meetings, during which it reached consensus on an initial set of services. To facilitate clearer and more focused discussions, the Ad Hoc Group organized the topic into four subject areas: airspace-related information, aerodrome-related information, digital NOTAMs, and ATIS and SAR-related information.

2.53 The SWIM TF/10 Meeting was informed that the Ad Hoc Group discussed and agreed to adopt *AIXM 5.1.1 as the common regional version for APAC*. The group also proposed clearer definitions for prohibited area information, replacing the term “Airspace availability” with “Availability or activation/deactivation or temporarily change of airspace” to enhance understanding. They further proposed expanding the definition of airspace types included in the Airspace Feature Service. Additionally, the group agreed to include REQ/REP as an additional message exchange pattern for the Airspace Management Service. Furthermore, the Ad Hoc Group agreed to include a remark referencing the consideration of Free Route Airspace (FRA) and User Preferred Route (UPR) information in future planning.

2.54 It was added that the group decided to retain Runway Condition Report Service due to operational importance, despite noting possible redundancy with SNOTAMs. It also agreed to include REQ/REP as an additional message exchange pattern for Aerodrome Feature Service and Digital NOTAM Distribution Service. Besides, the Ad Hoc Group agreed that both ATIS Distribution Service and Search and Rescue Service should be considered for implementation in a future phase, as the information exchange model and message types are yet to be defined and are currently marked as 'TBD'.

2.55 The SWIM TF/10 Meeting noted that matters relating to the Search and Rescue (SAR) service are to be discussed at the Asia and Pacific Search and Rescue Working Group (APSAR/WG) meeting, scheduled for 27–30 May 2025. The ICAO Secretariat will inform the SWIM/TF of any proposed changes arising from the APSAR/WG discussions. The outcomes will be reported to relevant meetings, including AATF/20, AOP/SG/19, and ATM/SG/13.

Proposed addition of information service reference for APAC Common SWIM Information Services – Australia (WP/19)

2.56 Australia proposed the addition of a reference as an attribute for each information service provided in the list of APAC Common SWIM Information Services. In particular, it was suggested that, where available, a reference for each information service be included to establish a clearer link to the definition of its functionality. It was shared that this addition would also provide clearer insight into whether the service is intended to align with a global or regional concept.

2.57 It was noted that, while the global standard would refer to an Information Service Definition (ISD), the maturity of services may vary. In such a case, the most relevant document can be referenced. Additionally, a reference source for each information service would also support the future development of the associated ISDs. The discussion on this proposal was recorded under WP/11.

ATFM SG Outcomes – ATFM SG Chair (WP/32- Part 1) (Only APAC Common Information Services related Discussion)

2.58 This paper presented outcomes of discussions on SWIM-related working papers and draft conclusions thereof in the ATFM/SG/15 meeting. The Meteorology/Air Traffic Management (MET/ATM) Seminar and the Fifteenth Meeting of Air Traffic Flow Management Steering Group (ATFM/SG/15) were held in Bangkok, Thailand, from 28 April to 2 May 2025. The meeting also included a joint plenary session with the 14th Meeting of Meteorological Requirements Working Group (MET R/WG/14). It was recalled that SWIM TF/9 had requested the ATFM/SG to develop a detailed process for revising a mutually agreed FIXM version for cross-border ATFM-related information exchange during the ATFM/SG/15 meeting and share with the SWIM TF/10 meeting for further discussion.

2.59 In addition, the ICAO Secretariat presented a working Paper on APAC Common SWIM Information Services (ATFM SG/15-WP/17). Particularly, the ATFM SG/15 was requested to review and provide comments and input to the portion of APAC Common SWIM Flight Information Services, specifically the “ATFM/A-CDM integrated service” and “Traffic flow status service”.

2.60 The ATFM SG/15 meeting reviewed the document and advised further verification of

the terminology used in the “Proposed business functionality of APAC Common SWIM Information Services” against the draft PfA of future PANS-ATM (Doc 4444). It was informed at the ATFM SG/15 meeting that the ATFM SG would revert to the SWIM TF/10 with proposed updates, if deemed necessary. It was noted that, after the ATFM SG/15 meeting, the ATFM SG members shared their feedback with the ICAO Secretariat via email. The revised section of the table related to ATFM and A-CDM was presented for further review and deliberation by SWIM TF/10. The Meeting discussed the proposed changes and incorporated the revision in the revised list of APAC Common SWIM Information Services.

Comments on TMC Document for ATM Information Exchange through SWIM – Australia (IP/04)

2.61 Australia shared comments on the draft Technical Memorandum of Cooperation (TMC) document for ATM Information Exchange through SWIM, in response to Action Item 9-5 from SWIM TF/9. The Meeting recalled that Malaysia drafted the TMC to assist States in bilateral cooperation/agreement for ATM Information Exchange through SWIM and feedback was provided by New Zealand on the draft TMC via SWIM TF/9-WP/06. The Meeting was informed that the draft SWIM TMC is a guidance document that can be used as a template for discussion between ANSPs.

2.62 Australia provided the following additional considerations:

- SWIM services, by their nature, will include agencies other than ANSPs, either as service originators or service consumers, e.g., Meteorological or ATFM agencies (as service originators) or commercial entities such as EFB providers and flight planners, whose functions may not be provided by a State’s ANSP. It was therefore unclear whether ANSPs would be expected to enter into such an arrangement on behalf of other agencies within their State’s jurisdiction. Australia informed that it has not yet formed its position on the allocation of responsibility for SWIM TI (e.g., ANSP being the primary service provider and consumer, or another agency), and therefore, whether the proposed TMC should be between States (countries) or specified agencies requires further discussion.
- Australia informed that SWIM, as a concept, should be seeking to shift away from bilateral agreements, particularly with respect to TI. While there is an expectation that agencies will need to administer their SWIM services (including authorizing other SWIM consumers to subscribe to their service), another alternative could be establish a non-binding head agreement at the Regional level (e.g. MOU) for defining high level policies and principles of common understanding, e.g. Parties, Purpose, Dispute Resolution, Definitions or Interpretation, Information Sharing (including Confidentiality, Data Protection, Privacy etc.), Financial Arrangements, Record Keeping, Duration, Variation, Extension, Termination etc. The head agreement principles would ideally not change for the duration of the arrangement. Individual ANSPs/States/agencies could then sign up to the regional head agreement, avoiding the need to manage individual agreements between other ANSPs/States.
- Pursuant to 2.3.2, if there was still a need for ANSPs or agencies to deal with specific, detailed procedural and administrative matters such as Technical Specifications, Technical Testing, Day-to-Day Management/Reporting/Liaison Responsibilities, Specific Legal or Regulatory Specifications or Limitations etc., signatories to the head agreement could execute a non-binding subordinate agreement subject to the terms of the head agreement such as a letter of agreement or letter of exchange (LOA or LOE) or an annex, which could be varied at any stage throughout the duration of the head agreement on an as-needs basis.

- Australia would be supportive of the establishment of a dedicated group (e.g., SWIM OG) to administer the transition to SWIM, which could be used to progress relevant processes (such as MOU) and governance in establishing SWIM services in the APAC region.

2.63 Australia provided the following comments and observations based on feedback from legal experts:

- It was unclear how the proposed arrangement would fit in with other international and domestic aviation-related information sharing arrangements and initiatives, e.g., working groups and joint agreements.
- If the agreement/signatories were intended to be “State to State” (or country to country), Country-to-Country agreements attract additional effort to ensure that they are very clearly drafted and administered so as not to be construed as having treaty status that is legally binding and subject to international law. Country-to-country arrangements are also more complex and time-consuming to negotiate due to different bureaucratic processes and formalities within each jurisdiction.

2.64 The SWIM TF/10 Meeting also noted the following on specific wording contained within the draft TMC:

- Reference to Introduction, paragraph 2, ‘SWIM TI’ is ambiguous and should ideally reference a version-controlled APAC publication, whether that be a modified EUROCONTROL Yellow Profile or other endorsed publication.
- Reference to Introduction, paragraph 3, the conditions of what quantifies ‘successful completion’ is recommended for inclusion, preferably specified in the ‘SWIM TI’ document as per 2.5.2 above. ‘Partial success’, or wording to that effect, is also recommended for inclusion to cater for ANSP/agencies that have completed one or more SWIM Information Services (e.g., FF-ICE Filing Service) and are working towards implementing other SWIM Information Services (e.g., Digital NOTAM Distribution Service).
- With reference to Paragraph 3, the definition of a connection point or boundary is expected to vary between countries and within countries. This may depend on a contractual agreement (e.g., PCCW may provide and monitor an on-premise router and associated international circuits to other ANSPs). This also applies, in some cases, to ISPs that provide a router as part of the contract and service level agreements, though there are ISPs that allow bring-your-own (BYO) devices.
- In reference to paragraph 4, section 4.1, it was noted that the EUROCONTROL Yellow Profile TI is outdated (published 5 July 2020) and should be modified where needed to capture the SIPG APAC agreed specifics and be governed as such. Such a document would be a consolidated view of what constitutes an APAC Yellow Profile that reflects APAC nuances, such as distributed ANSP/agency/country-specific rules and regulations versus the centralised EUROCONTROL model. Other aspects of the Yellow Profile include the updating/removal of specific details (e.g., SOAP with AMQP and Publish/Subscribe patterns and service registries expanded upon). There are likely to be other specificities that will be identified by subject matter experts in assessing the suitability of the Eurocontrol Yellow Profile TI for applicability in APAC.

- Reference to Paragraph 5, contingency arrangements should ideally be linked back to the actual type of information exchange and required quality of service and associated supporting service level agreements. More time-sensitive data exchanges (e.g., sharing of surveillance tracks versus sharing Aeronautical data such as airspace or route definitions) are expected to have differing contingency requirements that have differing costs.

2.65 The SWIM TF/10 Meeting reviewed the draft TMC incorporated with Australia’s comments. Given the significant changes anticipated in the operational environment under SWIM, compared to current operations, it was agreed that further discussion is required to assess the need and applicability of TMC in the SWIM context. In light of the current stage of regional SWIM development and implementation, the Meeting agreed that the proposed comments would be taken into account during future SWIM TF meetings, as part of the review of the TMC’s relevance and applicability.

ACTION ITEM 10-11

2.66 Recognizing the importance of the document, the Meeting agreed to include the TMC template as an appendix to the draft regional SWIM Implementation Guidance Document (IGD). Australia, New Zealand and Malaysia agreed to collaborate in compiling the relevant content for the IGD related to TMC. **ACTION ITEM 10-12**

Aggregation Function for MET Information Services – Australia (WP/13)

2.67 Australia presented an update on two options being considered by the ICAO Meteorological Panel for the implementation of a function in the SWIM environment to “aggregate” or “concentrate” information from multiple meteorological information services for distribution to downstream users. It was informed that the 6th Meeting of METP endorsed version 3 of the Roadmap for Meteorology in SWIM (MET-SWIM Roadmap). The MET-SWIM Roadmap described the transition plan and associated timelines for implementing MET in SWIM (MET-SWIM). The SWIM Aggregator function was intended to simplify users’ access to multiple MET information services and the METP is investigating whether this SWIM Aggregator function should be a regulated or unregulated function.

2.68 It was informed that the information exchange flow for MET information in the current environment is fixed. In the future SWIM environment, however, the information exchange flow can be dynamic (e.g. directly from producers to consumers). Given users’ wish to retain access to global MET information, MET-SWIM services will benefit from an aggregator function. It was noted that details related to the entity responsible for aggregation are being developed. For this purpose, the term “SWIM Aggregator” is used.

2.69 The table describes the expected mechanisms over each Aviation System Block Upgrade (ASBU) as the exchange of MET information is modernized. Capabilities deemed as “optional” indicate that the early adoption of SWIM is encouraged by States that are able to do so. It was expected that the MET domain would achieve a full SWIM environment in Block 4 (2037+).

	Capabilities Expected During Block 1 (2019-2024)	Capabilities Expected During Block 2 (2025-2030)	Capabilities Expected During Block 3 (2031-2036)	Capabilities Expected During Block 4 (2037+)
Communication Protocols	AMHS FTBP	AMHS FTBP AMQP/HTTP (optional)	AMHS FTBP AMQP/HTTP	AMQP/HTTP

Information Exchange Services	RODB TAC request/reply RODB IWXXM request/reply	RODB TAC request/reply RODB IWXXM request/reply OGC Standardized Services (optional)	RODB IWXXM request/reply OGC Standardized Services	OGC Standardized Services
Data Addressing	AFS Addressing	AFS Addressing IP (optional) SWIM Registry (optional)	AFS Addressing IP SWIM Registry	IP SWIM Registry
Information Exchange Flow	NOC, ROC, RODB, IROG	NOC, ROC, RODB, IROG Dynamic (optional)	NOC, ROC, RODB, IROG Dynamic	Dynamic
Data Aggregator	NOC, ROC, RODB, IROG	NOC, ROC, RODB, IROG SWIM Aggregator (optional)	NOC, ROC, RODB, IROG SWIM Aggregator	SWIM Aggregator

Table 3- Expected mechanisms over each ASBU

2.70 The SWIM TF/10 Meeting noted that it is not the intention to duplicate the current function of the NOC, ROC, etc., as the premise of SWIM is that the user access the information they require directly from the producer (or publisher) of the service, but rather that the process a user employs to find the necessary information in the SWIM environment, be as simple as possible. The absence of aggregation functions may result in:

- All States need to design and implement SWIM infrastructure that supports a larger number of unique users.
- All States manage a large number of unique users accessing SWIM services.
- Users identify and manage access (e.g., agreements, access keys, etc.) to a large number of service providers, particularly in flight planning.

2.71 For these reasons, METP has decided that this aggregation function will be necessary, and clarity on how this function will be performed will assist States and regions in designing and implementing meteorological SWIM services. Two main options were shared with the meeting:

- 1) **Option 1: Regulated** – Aggregation should be a regulated function by allocated providers under the ICAO framework. This option would ensure the function is performed in a consistent manner globally and offers the possibility of formal oversight and reporting of the function. The process for selecting States to provide this service is unknown at this time and may result in delays in the implementation of this capability.

- 2) **Option 2: Unregulated** – Each MET service provider makes their information available, and any aggregation function would be a purely commercial undertaking, unregulated by ICAO (although the provision of the information services is defined in Annex 3 and therefore under a State's oversight). It is anticipated that in the absence of a regulated service, commercial (or State) entities may provide this service for the globe or their region/s. The availability, cost and quality of such services from different aggregation entities may vary.

2.72 It was added that the European Meteorological SWIM Services Sub-Group (EUR MET3SG) has been discussing the same issue in a regional context, and whilst not reaching any firm consensus yet, the following important points have been noted:

- The term “aggregator” may be misleading, particularly if the intent is to aggregate the locations (e.g., a catalogue-type function) as opposed to aggregating the payloads. There is an urgent need for an alignment of terminology used, especially considering the various options to simplify service access.
- The MET3SG recognised that other domains are having similar discussions, and it will be important for MET to keep apprised of these developments, and, where appropriate, to align to the greatest extent possible to ensure consistency for users.
- The MET3SG is also investigating whether the functionality of the existing EUR SWIM Registry can be repurposed to add new fields to aid users searching for specific meteorological services.

2.73 It was informed that METP's Working Group on Meteorological Information Exchange (WG-MIE) is continuing this work in consultation with user groups.

2.74 The SWIM TF/10 Meeting noted the Roadmap for Meteorology in SWIM (MET-SWIM Roadmap) adopted by the 6th Meeting of METP. It was agreed that forming an action or task to progress this work from an APAC perspective falls outside the scope of the SWIM TF. In addition, the Meeting discussed that the SWIM TF is not in a position to comment on the possible options of the SWIM aggregator for MET information services, specifically options 1 and 2, as the discussion is still ongoing at the global level. It was considered that such evaluations would be appropriately conducted by relevant operational expert/user groups.

2.75 The SWIM TF/10 Meeting was also informed that METP has endorsed a guideline for MET-SWIM Implementation which will be distributed to the PIRGs to support SWIM Implementation.

Enhancing Reliable Message Delivery in Hierarchical Architecture for APAC SWIM Implementation – Japan (WP/14)

2.76 Japan recalled that, based on discussion within the SIPG, the hierarchical architecture has been proposed for APAC SWIM implementation, in comparison to centralized and decentralized approaches. Therefore, certain concerns regarding reliable message delivery in a hierarchical architecture need to be addressed and clarified. Japan proposed an approach for constructing the hierarchical architecture, analyzed methods to enhance reliable message delivery for APAC SWIM implementation, and identified the required functionalities for Gateway and Edge Enterprise Messaging Services (EMSs).

2.77 The SWIM TF/10 Meeting noted that the hierarchical architecture consists of multiple EMSs, which are key components in constructing the APAC SWIM Technical Infrastructure (TI). These EMSs are categorized into Gateway EMS and Edge EMS and are connected to form sub-communities. A Gateway EMS serves as an interconnecting broker between different sub-communities and provides message routing functions. An Edge EMS provides connectivity service for SWIM-enabled users and

routes SWIM messages between the upper-level Gateway EMS and SWIM-enabled users. In addition, the Edge EMS offers connectivity to external IP-based networks, including the Internet, allowing approved aviation partners who cannot directly connect to the CRV to provide existing and emerging SWIM information services (e.g. MET information services).

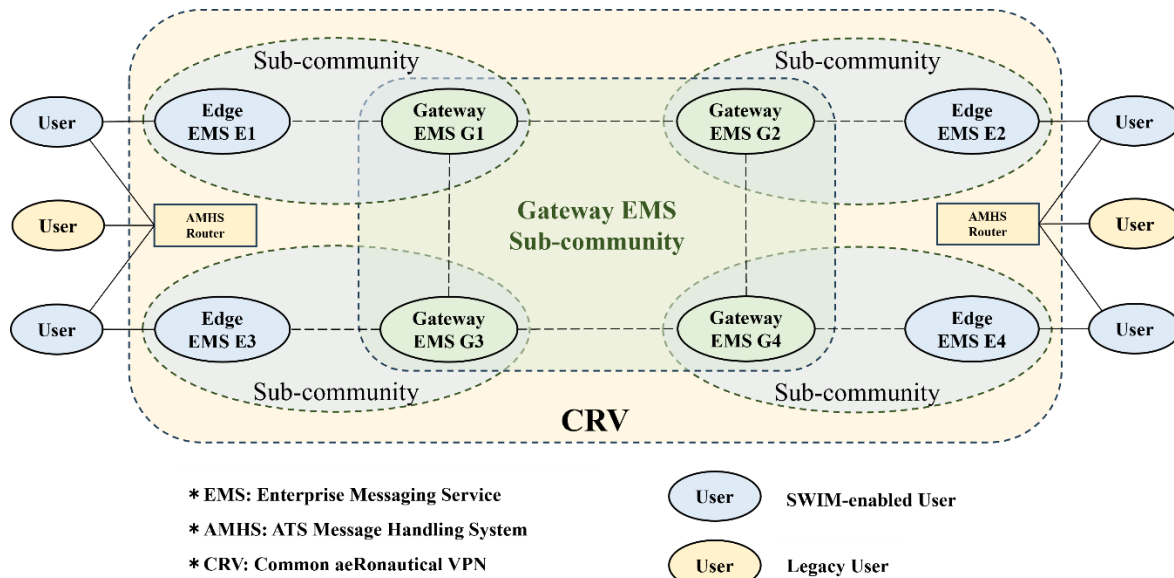


Figure 4- Hierarchical Architecture for APAC SWIM Implementation

2.78 Based on different implementation levels, the hierarchical architecture is considered an appropriate option for APAC SWIM to satisfy the various requirements of Member States and achieve interoperability during the transition.

2.79 The SWIM TF/10 Meeting also noted that the concerns regarding reliable message delivery within a hierarchical architecture have been identified and discussed at previous SWIM TF meetings. The problems, use cases and corresponding solutions for enhancing the reliability of message delivery were summarized in the table below. It was suggested to establish a collaborative environment where all Gateway and Edge EMS service providers agree on a common set of functions and settings to provide a reliable, secure and efficient message exchange service for SWIM-enabled end users.

Problem	Use Case	Solution
1. Priority messaging cannot be applied based on the importance of the information.	Surveillance messages caused queue overflow and loss of FF-ICE messages.	• Deliver surveillance messages using a separate queue and logical network • Set a message TTL for surveillance messages
2. Guaranteed message delivery is disrupted if a message broker malfunctions within the message delivery chain.	When the message broker reaches the maximum number of messages, it drops subsequent messages.	• Set up a persistent or replicated message queue • Support automatic failover and fallback
3. Compensation transactions cannot be performed to recover from transaction failure in the message delivery chain.	The publisher is not aware of failures that occurred in the EMS afterwards.	• Implement retry logic for failed message deliveries • Record Forward Failure List for traceability

4. Message rerouting is not possible in the event of a failure within the message delivery chain.	The publisher is not able to change delivery responsibility even if the publisher recognizes a failure in the message delivery chain.	• Set a backup EMS for each publisher and Edge EMS • Each Gateway EMS has at least two connections to other Gateway EMS
5. The edge node cannot know which message to resend when message loss occurs.	In the case of a missing message that occurs in a subsequent EMS, the publisher cannot specify the message and try to resend it.	• Publish the Forward Failure List, making it accessible to publishers • Subscriber responds “Submission Response” to the publisher

Table 4- Considerations for Reliable Message Delivery in Hierarchical Architecture

2.80 To ensure reliable message delivery in the hierarchical architecture, the required functionalities for Gateway and Edge EMSs were listed. The at-least-once delivery configuration was always applied to support retry and redelivery policies. It was suggested that since at-least-once delivery may result in duplicate messages, SWIM information services should be idempotent, ensuring that processing a message multiple times does not cause any issues.

Functionality	Description
Message Persistence	• Ensure messages are stored reliably until they are successfully delivered • Support durable (replicated) queues and persistent message storage
Acknowledgment & Confirmation	• Implement publisher acknowledgments to confirm message reception • Support consumer acknowledgments to confirm message subscription
Retry & Redelivery Policies	• Support automatic message retries upon failure • Implement exponential backoff and dead-letter queues for failed messages
High Availability & Redundancy	• Deploy in a clustered mode to avoid a single point of failure • Ensure failover/failback mechanisms and redundant EMSs for resilience
Routing & Security	• Support metadata-based message routing between EMSs • Support Transport Layer Security (TLS) encryption for secure communication
Monitoring & Logging	• Provide real-time monitoring for message status and EMS health • Enable logging and auditing for troubleshooting and compliance

Network Failure Handling & Auto-Recovery	• Detect network failures and re-establish connections automatically • Implement message deduplication to prevent duplicate processing
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Table 5- Required Functionalities for Gateway and Edge EMSs

2.81 The SWIM TF/10 Meeting was requested to share the information as contained in this working paper with the related Working Groups/Task Forces for further deliberation. However, considering that SIPG is currently working on the development of regional SWIM TI, it was deemed more appropriate for this information to be first reviewed and deliberated by SIPG. The possibility of sharing of the information with other groups would be reconsidered once the APAC SWIM TI architecture has reached a more mature stage.

Requirements for Implementing Aviation Information Security Framework in the APAC Region – Japan (WP/15)

2.82 Japan informed that, to protect the safety of flight operations from cyber threats and ensure business continuity, the Manual on Aviation Information Security (MAIS, Doc 10204) has been published by the ICAO Trust Framework Panel (TFP). Moreover, to implement an aviation information security framework, the Aviation Common Certificate Policy (ACCP, Doc 10169) for trusted identity management, and the Manual on Trust Framework Implementation for different trust framework instances are being drafted by TFP working groups. Therefore, as a critical technical infrastructure for regional and global aviation information exchange, the requirements of SWIM to support the implementation of an appropriate trust framework instance should be clearly defined.

2.83 Japan shared that, as described in the MAIS, compared to other approaches, the Public Key Infrastructure (PKI) standard can provide a best practice for system-to-system authentication using digital certificates, secure data exchange with digital signatures, and encrypted communication through secure protocols. When developing a PKI policy and implementation strategy, several categories should be considered to establish a robust PKI capability. The categories include capabilities, processes and responsible entities essential for implementing an interoperable PKI framework across multiple aviation stakeholders.

2.84 As PKI-based approaches impact all communications in aviation, it is critical to ensure seamless integration with SWIM-enabled systems, ATC networks, and airborne systems. The issuance and management of digital certificates for SWIM entities (ATM Service Providers, Airspace Users, Information Services, and relevant devices) are essential to securing SWIM-based operations. Additionally, the use of digital signatures for cross-border and multi-regional SWIM message exchanges strengthens data integrity and communication trust.

2.85 The SWIM TF/10 Meeting noted that it is necessary to establish a working group or task force to explore the development of a regional federated PKI architecture that ensures secure interoperability across multiple states and regions. Additionally, a technical community is needed to support the implementation of Trust Framework Instances for various applications. Collaboration with the SWIM TF is also essential to support the implementation of a Trust Framework Instance for SWIM, enabling secure, interoperable, and resilient aviation information exchange and flight operations.

2.86 It was also highlighted that there is a need for States/Administrations to conduct a mapping of their national/organizational certificate policy and information security management policy against the ICAO Aviation Common Certificate Policy (ACCP, Doc 10169) and the Manual on Aviation Information Security (MAIS, Doc 10204), respectively. Singapore informed the Meeting that their mapping activity is currently in progress. In light of Singapore's experience and ongoing efforts in this domain, the Meeting requested Singapore to share an example of their mapping at future SWIM TF meetings, if possible. **ACTION ITEM 10-13**

2.87 As this area is relatively new for the APAC region, [SWIM TF/10 - Flimsy/03](#), prepared by Singapore, provided an overview of the prerequisites for States/Administrations to participate in a Trust Framework Instance (TFI), as being developed by TFP. [SWIM TF/10 - Flimsy/03](#) also outlined how SWIM TF members can begin preparing for participating in the APAC SWIM TFI once it is established.

2.88 The SWIM TF/10 Meeting recalled that New Zealand is leading the drafting of a paper from CRV OG to propose the need for dedicated contributory bodies to implement cybersecurity provisions arising from the Trust Framework Panel and Communication Panel for CNS SG/29 consideration. Considering that the implementation of an information security framework for SWIM would require an authentication approach based on digital certificates, it was proposed that SWIM TF co-author a paper and prepare a joint proposal with CRV OG for consideration by CNS SG/29.
ACTION ITEM 10-14

Using a Self-Signed Certificate for Secure SWIM Communication Exchange – Malaysia (WP/16)

2.89 The paper examined the potential for experimenting with Transport Layer Security (TLS) between SWIM EMS nodes' communications under a situation where a centralised Certificate Authority (CA) for TLS certificates is not feasible. Particularly, the paper reported on the exploration activities on the use of self-signed certificates, which were required in order to establish encrypted TLS transport between SWIM EMSs, and the trials using such certificates to ensure secure information exchange within the APAC SWIM environment.

2.90 It was informed that Europe, with its centralized regulatory bodies, has established a single CA for SWIM. In contrast, the absence of such central governance in APAC necessitates a decentralized approach with no single CA. It was added that the purpose of this task is to study the feasibility of using a self-signed certificate for enabling TLS communication between SWIM EMSs, with the main purpose of enabling encryption at the IP transport layer (TCP).

2.91 The SWIM TF/10 Meeting noted that currently, Hong Kong, New Zealand, Vietnam and Pakistan have expressed their interest in joining the test. After sharing the prerequisites for joining the test with these four states, New Zealand has agreed to participate. The proposed method for certificate generation for neighboring states is via the Certificate Signing Request (CSR) method, where the private key of each state remains secret and never leaves the country. During the preliminary testing, Malaysia and Singapore managed to establish a TLS connection between their SWIM EMSs using self-signed certificates. The other States are still in the discussion stage and experimenting on how the performance metrics should be compared, and what tools are suitable for message simulation testing. Once these matters have been finalized, the full testing can be started.

2.92 It was clarified that the use of a self-signed certificate is an initial step adopted by SIPG to initiate the work on security. Until a dedicated group is established by CNS SG to provide further guidance on cybersecurity implementation within the APAC region, efforts to explore the use of self-signed certificate will continue.

SIPG ACTION WS-1-4, WS-1-5- Improvement of the hierarchical architecture for Regional SWIM implementation and requirements for Gateway EMS – China and Hong Kong China (WP/17)

2.93 This paper presented the modified version of the hierarchical architecture for regional SWIM to address the issues highlighted in SWIM TF/9-WP/10 and promote the implementation of regional SWIM.

2.94 The SWIM TF/10 Meeting was informed about the modified version of the hierarchical architecture, with a limited number of Gateway EMSs, optimized multi-connections between Gateway

EMSs and redundant connections between Gateway EMS and Edge EMS. Based on this architecture, ANSPs will be required to deploy the Gateway EMS on a separate device from their internal EMS. This configuration was presented as an effective model as it effectively transforms the ANSP's internal EMS into an Edge EMS, thereby fundamentally altering its operational dynamics and ensuring the integrity and security of the overall system architecture.

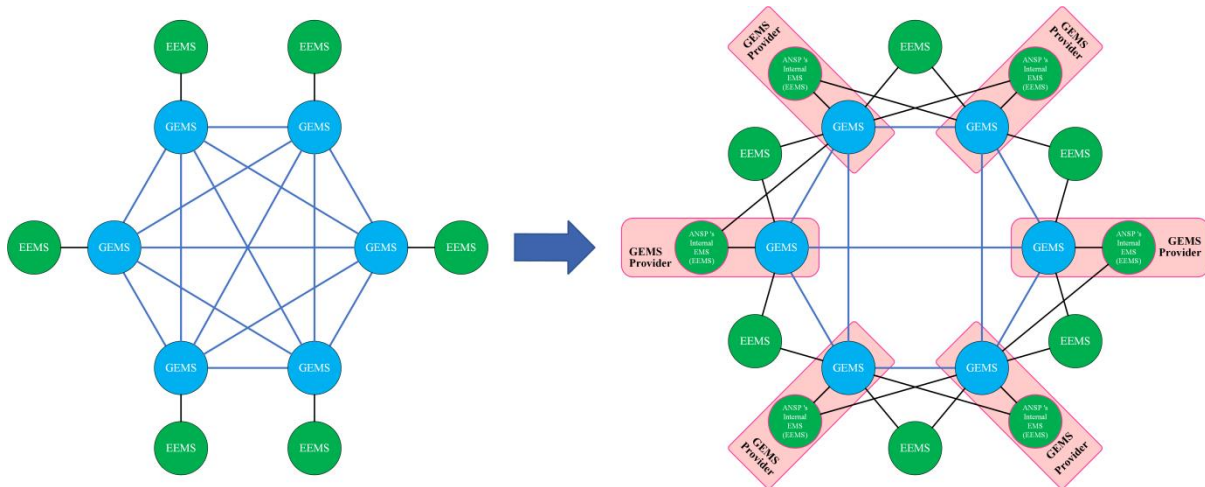


Figure 5- A modified version of the hierarchical architecture

2.95 It was added that the modified version of the hierarchical architecture could address the issue of “Detouring cannot be performed if a failure occurs in the message delivery chain,” highlighted in SWIM TF/9-WP/10. It has the potential to reduce the complexity of the Gateway EMS, the regional SWIM backbone network, and avoid a single point of failure. The potential improvement brought by the modified version of the hierarchical architecture was shared with the meeting.

2.96 A draft of Gateway EMS requirements in the hierarchical architecture, including both functional and non-functional requirements of Gateway EMS was presented at the Meeting.

2.97 The SWIM TF/10 Meeting was informed that, since the Gateway EMS needs to provide services for multiple Edge EMSs, particular attention should be given to QoS metrics such as availability, latency, and throughput. With reference to the metric information of ATM-related services and systems, the Meeting was provided the following suggestions:

Metrics	Recommended values
Availability	≥99.9% (annual allowable unplanned downtime of 8.76 hours)
Latency	For operational use cases: In the order of seconds. For post-operational or non-operational use cases: In the order of minutes.
Throughput	depends on the Edge EMSes connecting to the Gateway EMS, data size, and data update rate, and can be measured in two primary units (KB/unit time or messages/unit time)

Table 6- Suggestions of QoS metrics recommended values for Gateway EMS

- a) The availability metric requires balancing between benefits and costs. Each additional "9" in availability (e.g., from 99.9% to 99.99%) poses exponential challenges across hardware, software, testing, and operations, necessitating higher technical expertise,

more rigorous governance, and substantial resource allocation. The resource investment grows exponentially as the availability level increases.

- b) The latency of Gateway EMS is part of the end-to-end SWIM latency, which includes delays from Gateway EMS, Edge EMS, and CRV. The latency of Gateway EMS is primarily determined by system hardware and software performance. Through a comprehensive analysis of latency in multiple scenarios, such as surveillance data transmission, flight plan updates, and meteorological information sharing, it is recommended to define the individual Gateway EMS processing delay on the order of seconds for operational use cases and on the order of minutes for post-operational or non-operational use cases.
- c) In technical terms, throughput refers to the total volume of data processed or transferred within a specified time frame. The throughput of a Gateway EMS is heavily dependent on operational scenarios, requiring consideration of a number of targets to be updated (related to the Edge EMSes connecting to the Gateway EMS), data size (determined by the data schema) and update rate (dictated by data source characteristics and scenario requirements)

2.98 The SWIM TF/10 Meeting recalled that the availability value agreed at the SIPG WS/1 was 99.0%. Given that it has been agreed that the initial APAC SWIM will support information exchange not for the purpose of providing aircraft separation, the Meeting agreed to set the availability of $\geq 99.0\%$ as a starting point. Moreover, as the functions and requirements of gateway EMS and edge EMS are still under development by SIPG, it was suggested that SIPG further deliberate on the draft requirements, especially with regard to availability, as part of its continued work. **ACTION ITEM 10-15**

2.99 The SWIM TF/10 Meeting discussed the revised hierarchical architecture and considered the appropriate Internet connectivity option presented in WP/18 in the context of this architecture. It was agreed that SIPG would review this revised architecture, along with option 1 for Internet Connectivity for the APAC SWIM, for further deliberation and development. **ACTION ITEM 10-16**

2.100 After detailed discussion on the options for connectivity of Gateway EMS, i.e., using pseudo CRV or the residual bandwidth of the operational CRV, the SWIM TF/10 Meeting agreed to proceed with the latter option. This option will be submitted for further consideration by CRV OG **ACTION ITEM 10-17**. To support the APAC SWIM TI test to be conducted by SIPG using this agreed-upon option, the Meeting requested CRV OG to provide guidance on using the residual bandwidth of the operational CRV for SWIM testing purposes. **ACTION ITEM 10-18**

2.101 It was agreed that various recommendations/options suggested in WP/14 and discussed during the SWIM TF/10 Meeting, such as whether all ATN Backbone Sites can serve as Gateway EMSs, the existing network topology can be reused, a connection policy based on adjacent Flight Information Region (FIR) or air traffic volume priorities can be used to establish connections between Gateway EMSs, as well as the appropriate number of EMS required in the region, etc. will be further explored by SIPG. **ACTION ITEM 10-19**

Approach to a Global API Gateway for Web Services – ROK (WP/18)

2.102 ROK introduced de-facto API Gateway topologies commonly used in the ICT industry – particularly in cloud computing environments, where various heterogeneous systems interact – and proposed an approach for implementing a regional API Gateway as a counterpart to GEMS, in order to support the Request/Reply Message Exchange Pattern (MEP) within the APAC SWIM architecture.

2.103 The SWIM TF/10 Meeting was informed that an API Gateway is a proxy gateway that

routes service requests from endpoints to appropriate backend services based on user-defined routing configurations, and then delivers the processed response back to the requesting endpoint. Several commonly used API Gateway deployment patterns in the ICT industry were introduced, along with approaches that map these cases to the context of the APAC SWIM architecture for the request/reply message exchange pattern.

2.104 The SWIM TF/10 Meeting noted that, to achieve SWIM implementation by 2030, APAC SWIM architecture needs to consider not only the Publish/Subscribe MEP, but also the Request/Reply MEP. Given the current emphasis on the regional SWIM prototype architecture using an EMS being developed by SIPG in the APAC region, the primary issue is to discuss how the Request/Reply MEP should be implemented. If an HTTP (REST) API-based web service to enable Request/Reply MEP is adopted for the regional architecture, the adoption of an API GW would also be essential in a distributed and heterogeneous environment like the APAC region. API GW provides a scalable and flexible mechanism to manage routing and traffic control for the Request/Reply MEPs that are not covered by GEMS, which is primarily designed for Publish/Subscribe MEPs. Additionally, as a two-layered hierarchical architecture is under consideration for GEMS, the deployment of the regional API GW should also align with this topology. Such alignment is critical to ensure consistency in routing policies, message flow, and governance in the region. A misalignment between GEMS and API GW topology may lead to complexity, inefficiency, and potential fragmentation of the APAC SWIM architecture.

2.105 The SWIM TF/10 Meeting was recommended to consider that future implementations of the Request/Reply MEP in APAC SWIM architecture should be strategically planned with API GW topology that reflects and complements the architectural direction of GEMS.

2.106 The SWIM TF/10 Meeting deliberated on various topics presented in the paper and agreed that further information is required for consideration of the proposal. ROK informed that its intention was to initiate a discussion on the gateway API in the SWIM TF. It was agreed that SIPG will further explore this topic. **ACTION ITEM 10-20**

Requirements Specification Template for GEMS and Global SWIM Service – ROK (WP/29)

2.107 The paper presented a structured approach to defining software requirements for SWIM implementation, drawing from internationally recognized standards such as ISO/IEC 12207, ISO/IEC 15288, ISO/IEC 25010, and IEEE STD 830. It was informed that while existing standards provide comprehensive frameworks for system and software life cycle processes, there remains a gap in detailed guidance on specifying individual requirements, especially non-functional ones, within the SWIM context. To address this, ROK informed that it has defined an extended classification and a detailed field structure for software requirement specifications, reflecting best practices and aligning with key quality attributes. Relevant international standards, principles to follow when defining requirements, and templates that can be used as a reference were shared with the Meeting. It was added that these contributions will support the ongoing efforts of regional and global SWIM stakeholders by offering reusable guidelines and templates that ensure clarity, completeness, and consistency in requirement documentation.

2.108 The SWIM TF/10 Meeting discussed the guidelines and examples presented in the paper. It was agreed that SIPG, utilizing the Software Requirement Specification Template designed by ROK, will populate the template with specifications related to SWIM TI. These SWIM TI specifications examples will be included as part of the regional SWIM IGD. **ACTION ITEM 10-21**

Recommended Technical Performance Requirements for EMS – Thailand (WP/31)

2.109 The SWIM TF/10 Meeting recalled that, at the SWIM TF/7 meeting, the SIPG was established with the mandate to implement the first or prototype version of APAC SWIM. It was added that in May 2024, a Joint Event of the SWIM-over-CRV demonstration and surveillance data sharing

in the SWIM environment technical trial was conducted in Hong Kong, China. During this event, relevant performance metrics were measured to gain insights into the characteristics of data exchange over SWIM, especially bandwidth-intensive surveillance data. Bandwidth analysis and latency analysis of participating States were shared with the Meeting.

2.110 It was stated that the data collected from the joint event provided a valuable starting point for developing the recommended technical requirements for EMS. Based on the initial data recorded by Malaysia and Singapore, it may be inferred that an EMS system should support a bandwidth of at least 576.741 kbps and a latency of no more than 235 msec. However, when incorporating data observed by Thailand, the result, particularly regarding latency, exhibited significant variability. This suggests that the current data set is insufficient to form reliable, region-wide recommendations. Therefore, it was suggested that the SWIM TF/SIPG encourage their members to share EMS usage and performance data for further analysis. It was emphasized that the aforementioned bandwidth and latency values were presented solely as indicative minimum technical performance requirements. The actual technical performance requirements will ultimately depend on the specific needs of SWIM users and the service level agreements established between SWIM service providers and consumers.

2.111 The Meeting was informed of the correction of Table 1 in the paper that the peak bandwidth of Malaysia would be 2,562.8 kbps, while that of Singapore would be 938.0 kbps.

2.112 The SWIM TF/10 Meeting noted the issue of insufficient data sets and recognized the need for more data to finalize technical performance requirements. It was also discussed that testing involving the concurrent execution of multiple information services would be essential to simulate an environment close to actual SWIM operations. However, conducting such comprehensive testing would require additional demonstrations. Given the current workload of SIPG, it was agreed that these tests would be deferred to a later stage. Additionally, Japan shared that it had previously conducted performance measurements of current operations using AMHS. While it remains necessary to monitor changes in information exchange orientation under future operations such as FF-ICE, the Meeting requested Japan to share its measurement data, as it would be valuable for further performance studies.

ACTION ITEM 10-22

Updates on the Asia/Pacific FIXM v4.3 Extension – Thailand (WP/30)

2.113 The SWIM TF/10 Meeting was presented with the update on FIXM version 4.3 Extension development to support cross-border ATFM operation, A-CDM, ATFM/A-CDM integration, and traffic synchronization in the Asia/Pacific region. Thailand informed that these efforts aimed to ensure the readiness of the FIXM Extension in alignment with the *Conclusion APANPIRG/35/4*, which agreed on the adoption of FIXM version 4.3 as the standard format for the region.

2.114 The SWIM TF/10 Meeting noted that the Technical Sub-Group (TSG) of AMNAC, together with members of SWIM TF, examined the feasibility of using FIXM version 4.3 Core to support cross-border ATFM operation, A-CDM, ATFM/A-CDM integration, and traffic synchronization. It was found that FIXM version 4.3 Core can support the exchange of certain data attributes originally included in the Asia/Pacific FIXM version 4.1 Extension. Specifically, it was considered that FIXM version 4.3 Core can be used for the exchange of CTOT, Calculated Time Over (CTO), and Calculated Landing Time (CLDT). It was concluded that trajectory and aircraft track data attributes included in the Asia/Pacific FIXM version 4.2 Extension would be removed from the subsequent version of the Extension due to the availability of alternative data formats.

2.115 To facilitate a smooth transition from the use of ADEXP Slot Allocation Message (SAM), Slot Revision Message (SRM), and Slot Cancellation Message (SLC) over AFTN/AMHS to ATFM information exchange over SWIM, mandatory data fields and some optional fields currently in use in SAM/SRM/SLC were identified for inclusion in the FIXM version 4.3 Extension.

2.116 The SWIM TF/10 Meeting noted that TSG members successfully conducted technical validation of the FIXM version 4.3 Extension in April and May 2025. Details of this Extension are

provided in **Appendix C**. Recognizing the need for the timely availability of FIXM version 4.3 Extension to support cross-border ATFM operation, A-CDM, ATFM/A-CDM integration, and traffic synchronization in the Asia/Pacific region in line with *Conclusion APANPIRG/35/4*, it was proposed that this FIXM version 4.3 Extension be adopted as the Asia/Pacific FIXM version 4.3 Extension and be made available for use by the Asia/Pacific Administrations. It was further proposed that the Extension be presented to the FIXM Change Control Board (CCB) for review and publication on the FIXM official website.

2.117 The SWIM TF/10 Meeting noted the use of alternative data formats, e.g., JSON, to be more efficient in terms of the network bandwidth for exchanging such bandwidth-intensive information over SWIM, based on insights from the surveillance data sharing over SWIM technical trial conducted in May 2024. However, it was agreed that this current arrangement is applicable only at the regional level, and there is a need for a global surveillance information exchange format. In response to the suggestion on requesting the Surveillance Panel to develop a globally standardized information exchange model for surveillance data sharing over SWIM, the Meeting was informed that SURSG has already been working on this task as per their ToR as follows:

Review, identify and provide expert views and recommendations to address major issues raised to the SURSG by ICAO APAC in the technical, operational or regulatory aspects of surveillance data sharing to facilitate the implementation of surveillance from “departure to destination” in APAC.

2.118 The SWIM TF/10 Meeting requested the SURICG meeting to share tentative timelines for this task based on the plan shared by SURSG to SURICG. ICAO Secretariat will coordinate with SURICG and SURSG for the required information. **ACTION ITEM 10-23**

2.119 With the abovementioned, the following draft conclusion was proposed, which was endorsed by the SWIM TF/10 Meeting for APANPIRG/36 adoption through CNS SG/29 endorsement.

Draft Conclusion SWIM/TF/10/03 – Asia/Pacific Regional FIXM version 4.3 Extension			
What: The FIXM version 4.3 Extension described in SWIM/TF/10 WP/30 , and provided in Appendix C to the paper be: a) adopted as the Asia/Pacific FIXM version 4.3 Extension; 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 synchronization; and c) presented to the FIXM CCB for review and publication on the FIXM official website.		Expected impact: ☐ Political / Global ☒ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical	
Why: To provide the information exchange model necessary to support cross-border ATFM operation, A-CDM, ATFM/A-CDM integration, and traffic synchronization in the Asia/Pacific Region, in line with <i>Conclusion APANPIRG/35/4</i> .		Follow-up:	☐ Required from States
When:	23-May-25	Status:	Draft to be adopted by PIRG
Who:	☒ Sub groups ☐ APAC States ☒ ICAO APAC RO ☐ ICAO HQ ☐ Other: SWIM TF		

ATFM SG Outcomes – ATFM SG Chair (WP/32- Part 2) – only FIXM related Discussion

2.120 This paper presented outcomes of discussions on SWIM-related working papers and draft conclusions thereof in the ATFM/SG/15 meeting. The Meteorology/Air Traffic Management (MET/ATM) Seminar and the Fifteenth Meeting of Air Traffic Flow Management Steering Group (ATFM/SG/15) were held in Bangkok, Thailand, from 28 April to 2 May 2025. The meeting also included a joint plenary session with the 14th Meeting of Meteorological Requirements Working Group (MET R/WG/14). It was recalled that SWIM TF/9 had requested the ATFM/SG to develop a detailed process for revising a mutually agreed FIXM version for cross-border ATFM-related information exchange during the ATFM/SG/15 meeting and share with the SWIM TF/10 meeting for further discussion.

2.121 Noting the potential necessity to revise the Cross-Border FIXM operating version, the ATFM SG/15 agreed on the following change process as proposed by AMNAC TSG:

- a. Submit the proposed change to the FIXM version, in the form of a Working Paper, to ATFM SG for review and assessment of its operational impacts and suitability in supporting regional operational requirements;
- b. Upon adoption by ATFM SG, submit the proposal to SWIM TF for review and assessment of its technical implications; and
- c. Following agreement by SWIM TF, submit a summary of the change proposal to ATM SG for approval, and subsequently to APANPIRG for endorsement.

2.122 The ATFM SG/15 also agreed to the content of the change proposal as recommended by AMNAC TSG as below:

- a) Name of State(s) or collaboration group, including the specific names of organizations proposing the change;
- b) Proposed FIXM version;
- c) Reason(s) for the proposed change(s);
- d) Testing result of the proposed version; and
- e) Proposed timeframe for the change to take effect (a minimum lead time of 2 years is required)

2.123 Based on the deliberation on the proposed process, the ATFM SG/15 endorsed the **Draft Conclusion ATFM/SG/15-X: Change Process of the FIXM Version used for Asia/Pacific Cross-Border Operational ATFM System-to-System Information Exchange in SWIM** for ATM SG/13 adoption.

2.124 A concern regarding a minimum 2 years lead time identified the proposed change process was raised. Considering that the major change of FIXM version may occur during the 2-year timeframe, further deliberation to explore shortening the timeline was proposed. However, after it was shared that adopting a FIXM version for use in APAC solely in response to the release of a new FIXM version is not recommended, as such an update has implications for resources required to implement the change across the region, the proposed process was agreed upon by SWIM TF/10.

2.125 The SWIM TF/10 Meeting noted the need to discuss the change process for other information exchange model versions, such as AIXM and IWXXM. The ICAO Secretariat was requested to coordinate with other groups to share the requirements for formulating such processes. **ACTION ITEM 10-24** SWIM TF/10 Meeting shared its agreement to the drafted change management process and endorsed the ATFM SG/15 draft conclusion.

Comparison of SWIM Discovery Service (SDS) Implementation Specification Between V1.0 and V2.0 – ROK (WP/21)

2.126 The SWIM TF/10 Meeting recalled that, at the APAC SWIM TF/9, the SWIM TF requested to verify whether differences between SDS implementation specifications v1.0 and v2.0 would result in the update required for the developed SDS Jump Starter Kit and suggested to share findings with the future SWIM TF meeting. ROK shared updates on ACTION ITEM 9-13 and compared the differences between SDS implementation specifications v1.0 and v2.0. The basic comparison of concepts and objectives, and the technical comparison of resources and operations, were shared with the meeting.

2.127 The SWIM TF/10 Meeting was informed that the current SDS schema does not include all information service overview metadata fields identified in PANS-IM (Doc 10199), resulting in a need to modify the SDS schema. However, it was informed that the USA was a key contributor to this task, and there have been recent issues with the USA's participation in the SWIM TF. USA representation in the SWIM TF/10 meeting was requested to coordinate with the subject matter expert from USA to release the SDS schema so that other task members can further modify it. The USA was requested to consider continuing contribution to the SWIM TF, as their expertise is highly valuable for the APAC SWIM Implementation. **ACTION ITEM 10-25**

2.128 In addition, the SWIM TF/10 Meeting discussed the need to explore a common authentication mechanism among SWIM registries implemented with SDS. It was informed that IMP-WG/I-S is currently considering an appropriate approach to address this matter, as recommended by TFP.

Methods for implementing FF-ICE Services using Request/Reply Message Exchange Pattern – ROK (WP/27)

2.129 The SWIM TF/10 Meeting recalled that SWIM TF/9 WP/16 - “*Proposed Business Functionality of APAC Common SWIM Information Services*” proposed the global SWIM services to be implemented in the APAC region and, at the 2nd FF-ICE Ad-hoc Meeting and Workshop, Thailand presented APAC Common SWIM Information Services related to FF-ICE. It was added that in the APAC region, there have been multiple demonstrations and trials related to FF-ICE, most of which were based on the Publish/Subscribe (Pub/Sub) Message Exchange Pattern (MEP). Additionally, the SIPG has been focusing on implementing the regional SWIM prototype architecture, which supports messaging services based on the Pub/Sub MEP. However, regional implementation considerations for the Request/Reply MEP have been limited.

2.130 ROK described scenarios for implementing FF-ICE services using the Request/Reply Message Exchange Pattern (MEP). It also briefly explained Eurocontrol’s implementation case of an FF-ICE service with the Request/Reply MEP using a web service. ROK illustrated web service-based FF-ICE service implementation scenarios with data flow diagrams and highlighted key considerations for each scenario.

2.131 The SWIM TF/10 Meeting noted different methods to implement Request/Reply MEP, including Web Service (synchronous), Message Broker (asynchronous), WebSocket (asynchronous) and gRPC (asynchronous). It was recalled that, at the SWIM/TF 9, Revision of APAC SWIM Technical Infrastructure Profiles (WP/09) was presented, and in the Appendix B “APAC SWIM Technical Infrastructure Profiles”, SOAP was described in the 3.3.3.2 - *As most users have not applied SOAP to current web applications, this standard is not recommended for the development of SWIM services*. Considering this background, the European region has implemented the SOAP-based web services for Request/Reply MEP, whereas the APAC region was expected to adopt a technical profile that does not recommend the use of the SOAP approach. Accordingly, ROK presented an implementation approach for the Request/Reply MEP using HTTP API-based web services, which were widely adopted and commonly used in the ICT industry.

2.132 The paper shared details of methods for implementing FF-ICE services using web service-based Request/Reply MEP. It was shared that given the current emphasis on the regional SWIM prototype architecture using an EMS, which the SIPG is developing in the APAC region, the primary

issue to be discussed is whether the FF-ICE service will be provided solely through the Pub/Sub MEP or whether it will also support the Request/Reply MEP. The Meeting was informed that, if a decision is made to support the Request/Reply MEP, it will also be essential to discuss how the Request/Reply MEP should be implemented. It was also recommended that future trials and implementations explore both MEPs in parallel to assess their operational suitability and technical feasibility. The Meeting noted that collaborative engagement among regional FF-ICE-related implementors (e.g., SWIM TF, SIPG, and FF-ICE Ad-hoc Group) is essential to refine the architecture and messaging strategies for FF-ICE implementation in the APAC region.

2.133 The SWIM TF/10 Meeting was informed that FF-ICE Ad-hoc Group had already shared that, for some APAC Common SWIM Flight information Services related to FF-ICE, both Pub/Sub and Req/Rep MEP will be required. It was agreed that China, Japan, and ROK will study the four cases shared by the paper as methods for implementing FF-ICE services using web service-based Req/Rep MEP and share their recommendations at the next SWIM TF Task Leads meeting. Further information will be shared with the FF-ICE Ad-hoc Group for further consideration at its 3rd meeting, planned to be held in March 2026. **ACTION ITEM 10-26**

Expected Capabilities of CRV for APAC SWIM Implementation – Japan (WP/20)

2.134 The SWIM TF/10 Meeting recalled that to understand the required capabilities of CRV in supporting APAC SWIM construction, the Joint Event of SWIM over CRV Demonstration and Surveillance Data Sharing in SWIM Trial was held on 28 – 29 May 2024, at HKCAD. Japan presented the validation results of message exchange using the hierarchical SWIM architecture built on the pseudo CRV. Additionally, based on the QoE (Quality of Experience) from the demonstration, the expected capabilities and QoS (Quality of Service) parameters required for CRV to meet APAC SWIM requirements were analyzed by Japan and shared with the meeting.

2.135 Japan informed that, according to the analysis of validation results, the following capabilities and QoS parameters for CRV are expected to support SWIM-based applications and operations, as shown in the table below. As surveillance data sharing is a continuous and real-time service, a lower packet delay budget is expected. However, because of its large volume and high frequency, a lower packet error rate and higher priority level are not required. Moreover, it was recommended that to avoid affecting other event-based SWIM messages, including FIXM, AIXM and IWXXM messages, it is better to separate the surveillance data into a different logical network layer and message queue.

Network	Application		Capability
Bandwidth	For SWIM applications		> 10 Mbps
Latency	For SWIM information services		< 200 ms
Packet Loss	For SWIM information sharing		< 0.1%
QoS	Packet Delay Budget	For SWIM message	300 ms
		For surveillance data	200 ms
	Packet Error Rate	For SWIM message	10 ⁻³
		For surveillance data	10 ⁻³
	Priority Level	For SWIM message	High

		For surveillance data	Low
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Table 7- Expected Capabilities and QoS Parameters for CRV

2.136 The SWIM TF/10 Meeting was informed that additional validation and evaluation tests will be conducted in cooperation with SIPG and other working groups, and the results will be reported at upcoming SWIM TF meetings. Moreover, the Meeting noted that the paper was also presented during the joint meeting of CRV and SWIM Experts held in Guam, USA, in September 2024. It was further noted that the information contained in the paper would serve as input for the development of new CRV specifications.

Strategies to SWIM Operationalization in the Aspect of Validation – ROK (WP/28)

2.137 ROK outlined strategic approaches to support the operationalization of SWIM in the APAC region, with a specific focus on the validation aspect. It was informed that the SWIM Implementation (Doc 10203) does not specifically address the validation of the SWIM Technical Infrastructure (TI). However, as described in SWIM TF/1 – WP/06 *"FAA: 10 Years of SWIM Experience – Introductory Best Practices and Lessons Learned, Brief Overview of the SWIM Program"*, there is precedent for classifying the core functions of the SWIM TI – such as messaging, interface management, enterprise service management, and service security – as core services. In terms of service, GEMS validation could also refer to information service validation, as GEMS could be considered a core service of the APAC SWIM architecture. Accordingly, for validation of GEMS, reference could be made to **Section 4.6: Validation of information services of SWIM Implementation (Doc 10203)**. The document defined validation as “the activity whereby an information service is checked for conformance against the objectives and requirements stated in the information service overview. Validation provides assurance of conformance to the information service consumer.”

2.138 From a regional perspective, three possible approaches to developing test cases were shared with the Meeting. It was suggested that to enhance the objectivity of validation, software quality certification conducted by 3rd party in each Member State based on ISO/IEC 25010 can be utilized. It was added that the information exchanged through the global SWIM services currently identified by APAC SWIM TF at the regional level is **non-safety-critical**, and therefore, software safety certifications based on RTCA DO-278A under IEC 61508 – *Electronic Functional Safety Package* are not considered at this moment. However, such certifications may need to be considered in the future if safety-critical information is to be exchanged via the SWIM.

2.139 It was suggested that once the validation process is completed, an appropriate authority must authorize the GEMS for operational use. To prepare materials for authorization, two possible approaches to prove that GEMS meets the specified requirements were shared.

2.140 It was suggested that, given the estimated lead time for the final approval process, it is critical that the validation and preparation activities be initiated well in advance — ideally completed by early 2029 — to ensure the timely submission of materials to SWIM TF and subsequent endorsement by the appropriate higher-level body. It was concluded that the strategy described in this paper helped to ensure that the SWIM services and infrastructure, particularly GEMS, meet the required quality and reliability, enabling safe, consistent, and trusted operational deployment across the region.

2.141 The SWIM TF/10 Meeting shared appreciation with ROK for sharing very useful information. The SIPG lead suggested that the paper should also be considered in future SIPG discussions.

2.142 Regarding the suggestion to establish GEMS providers’ group and a process for the approval of regional SWIM operationalization, including roles and responsibilities of relevant bodies, the meeting agreed that it is a premature stage for the SWIM TF to make a decision on this matter, given the current stage of SWIM development and implementation within the region.

2.143 For the proposed strategy to acquire the condition of operationalization after validation, the meeting agreed that China, Japan, and ROK will develop the SWIM information services validation process and share it with the SWIM TF/11 meeting for further consideration. **ACTION ITEM 10-27**

Updates from IMP – Japan (IP/02)

2.144 Japan presented key information discussed in the third Meeting of the Information Management Panel (IMP/3), held at ICAO HQs in Montreal, CANADA, from 30 September 2024 to 4 October 2024, focusing on updates to various documents, including Annex 15 and PANS-AIM.

2.145 It was informed that the Air Navigation Commission (ANC) designated several Job Cards, and a WG has been established under the IMP to study them (excluding AIM-related Job Cards). The job card details were as follows:

- IMP.011.01 Information Services for Air/Ground SWIM
- IMP.012.01 SWIM Registry Interoperability
- IMP.013.01 Information Service Definition
- IMP.014.01 SWIM Governance enhancements
- IMP.015.01 Information Management Vocabulary

2.146 The details of each job card and associated tasks were shared at the Meeting. It was informed that PANS-IM (Doc 10199) has just become applicable, and while countries are building SWIMs based on it, most regulations and guidance are targeted for review in 3Q, 2028.

Comparison of PANS Information Management (DOC 10199) Requirements and APAC SWIM – Japan (WP/22)

2.147 The SWIM TF/10 Meeting was informed that the requirement for SWIM is defined in the ICAO PANS-IM (Doc 10199), which is applicable to ICAO Contracting States and/or specific ANSPs. On the other hand, for “specific regions” such as APAC, the Regional Supplemental Procedure (Doc 7030) has been established, and a mechanism exists to publish the necessary matters as an ICAO document in case of any differences with the PANS method. Japan compared the PANS-IM requirements with the responses currently being considered by the APAC SWIM and clarified what should be included as a Regional Supplemental Procedure.

2.148 The SWIM TF/10 Meeting was informed that the APAC Regional SWIM Implementation Guidance Document (IGD) is being prepared by the Editorial Ad Hoc Group, and it will include provisions not only for the implementation of the APAC SWIM but also for its operation. The Meeting noted it is necessary to document the mandatory items required of both information service providers and information service users, such as the requirements specified in PANS-IM, as well as the concept of governance for the sound operation of the APAC SWIM, in order to obtain the agreement of the APAC States.

2.149 The Japanese “SWIM Operating Rules” and other documents were shared with the Meeting. The Meeting noted that these documents are arranged based on the SWIM documents in Europe and the USA, but they are the minimum necessary for a small start. If necessary, Japan planned to revise them in conjunction with the establishment of the APAC SWIM implementation guidance documents.

2.150 It was informed that PANS-IM required an audit by the regulatory department (regulator) to confirm the continued viability of the SWIM. Although the concept of auditing the APAC SWIM needs to be clarified, Japan shared that it is appropriate to include the requirements of the APAC SWIM in the audit of the State’s SWIM to be conducted by the regulatory department of each State participating in the APAC SWIM. It was suggested that it would be appropriate for each country to bring the part of the audit results related to the APAC SWIM to the body that manages the APAC SWIM

operation and discuss the necessary actions to be taken.

2.151 The SWIM TF/10 Meeting discussed the need for regional SWIM operating rules and the concept of auditing for the APAC SWIM. It was considered that monitoring of performance requirements would be more appropriate for such a regional technical infrastructure, rather than conducting audits. The Meeting requested Japan to further study this matter and share it at future SWIM TF meetings. **ACTION ITEM 10-28** Regarding the overall SWIM governance framework, including regional SWIM operating rules, Japan agreed to participate in the work of the Editorial Ad-Hoc Group to draft a “Governance Framework” chapter for inclusion in the regional SWIM IGD. **ACTION ITEM 10-29**

Updates from Editorial Task Ad-hoc Group – SP/01

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

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

2.153 The SWIM TF/10 Meeting noted that APAC SWIM Technical Infrastructure Profiles, v1.0, has been published in 2024 and can be accessed by [this link](#). This document fulfills the information required for SWIM TI specifications.

2.154 The SWIM TF/10 Meeting was reminded of *Conclusion APANPIRG/30/12* Asia/Pacific Regional FIXM v4.1 Extension and *Conclusion APANPIRG/34/9* Asia/Pacific Regional FIXM v4.2 Extension. It was acknowledged that the rapid evolution of FIXM versions in recent years had posed challenges in recommending a specific version for the region-wide implementation. However, with the adoption of *Conclusion APANPIRG/35/4* Adoption of FIXM v4.3 in the Asia/Pacific Region as the Standard Format, the FIXM v4.3 is considered stable. Furthermore, the Meeting was informed that WP/30 proposed the adoption of regional FIXM v4.3 Extension, which has been endorsed by SWIM TF/10 for adoption by APANPIRG/36 through the CNS SG/29 meeting. Once formally adopted by APANPIRG/36, details of FIXM version 4.3, including the regional Extension, will be included under the Information Exchange Model chapter of the regional SWIM IGD.

2.155 Moreover, for the Registry model, Service Description Conceptual Model (SDCM) 3.0, SDS Implementation Specification, Version 2.0.0, and Service Description Model for JSON, Version 2.0.0 can be used as references. Lastly, the list of APAC Common SWIM Information Services has been agreed upon by this Meeting to be added as part of the Service Specifications chapter of the IGD. It was agreed that the Editorial Ad-hoc Group would compile all this available information and draft the first version of ICAO APAC SWIM IGD to present at the SWIM TF/11 Meeting for further approval. **ACTION ITEM 10-30**

Review of SWIM TF ToR, SOW, Work Plan, and Outstanding Action Items – Sec (WP/23)

2.156 The paper presented the current SWIM TF's ToR, the revised SWIM TF's work plan, and the Action List to reflect the latest work status achieved. The Meeting reviewed the latest ToR of SWIM TF, which was adopted by CNS SG/26 through **Decision CNS SG/26/07 (SWIM TF/06/05)** – Revised SWIM TF Terms of Reference, and agreed that no revision to the ToR is required.

2.157 To ensure that the objectives set in the ToR can be achieved, the Statement of Work (SOW) of each Task was updated by the Meeting.

2.158 The SWIM TF/10 Meeting was informed of the current Task leads 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), Yasushi Iwasawa (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), Yasushi Iwasawa (Japan) 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	Yasushi Iwasawa (Japan) Yosuke MORO (Japan)
	10	Regional coordination and SWIM-related information sharing	John Moore (IATA)
	11	SWIM implementation education and promotion (New task)	Thomas Green (USA) Vacant

Table 8- The current Task leads

2.159 It was added that Task 3 required a co-lead from the APAC region to be able to suggest better and incorporate the security requirements specific to the APAC region. Similarly, additional support was required for Task 6 and Task 11. As the current ToR of SWIM TF has significantly increased the work of SWIM TF and recognizing the importance of effective communication of SWIM-related understanding with relevant groups, the Meeting encouraged States/Administrations to nominate lead/co-leads for Task 11 on a priority basis.

IWXXM: Latest developments and future plans – Hong Kong China (WP/24)

2.160 Hong Kong China highlighted the latest status on the updating of the ICAO Meteorological Information Exchange Model (IWXXM) and the publication plan in connection with the proposed changes to ICAO Annex 3 from the 5th Meeting of the ICAO Meteorological Panel (METP/5). It also briefly mentions the development direction regarding new Annex 3/PANS-MET requirements brought up for discussion at METP/6.

2.161 The SWIM TF/10 Meeting was informed that the targeted publication date of the approved new IWXXM schemas is November 2025, which is in line with the applicable date of Amendment 82 to ICAO Annex 3. It was added that discussions were made at METP/6 in early March 2025 on the development of new information services, viz the Aerodrome Meteorological Observation, Aerodrome Meteorological Forecast and Hazardous Weather Information Services, for the provision of such information on the SWIM environment. A new IWXXM design is required to establish an overarching framework that will ensure global consistency of information provision.

2.162 It was informed that an object-based approach is taken in the design of IWXXM WAFS Significant Weather Forecast back in IWXXM Version 2021-2 and the concept has been taken forward in the design of VONA and QVACI in IWXXM Version 2025-2. The idea is to use a WxObject (iwxxm: MeteorologicalFeature). Future development will focus on enriching the list of reusable elements as well as WxObjects describing specific phenomena to allow a flexible yet formal way to present "a story" through a WxObject collection.

2.163 While from a phenomena description perspective, defining reusable WxObjects and their associated properties is trivial, the actual representation (e.g., a time series of WxObjects or a WxObject with time series) will depend on use cases, as the cost for consumers to utilise the data will be different. IWXXM designers at this point can only note the existence of possible alternative representations, identify similarities and differences of these representations and determine whether these representations can be used interchangeably under specific situations. Further discussions will have to be made by ICAO METP Working Group on Meteorological Requirements and Development (WG-MRAD) and Working Group on Meteorological Information Exchange (WG-MIE) on the "reporting practices" to be adopted, bearing in mind that if the practices are too restrictive (i.e. only a single representation can be used), it may be limit flexibility and hinder Application Program Interface (API) development. Conversely, if the practices are too permissive (i.e., allowing the use of all equivalent representations), ensuring interoperability will be challenging.

2.164 The SWIM TF/10 Meeting reminded States/Administrations to ensure that systems being developed or procured will work with current and upcoming versions of IWXXM.

Progress update on SWIM Implementation in Malaysia – Malaysia (IP/03)

2.165 Malaysia presented a progress update on the implementation of SWIM. The new update incorporated information regarding work and activities carried out in 2024 up to Q1 of 2025. Malaysia also highlighted future works involving SWIM implementation in the State, which is relevant to the APAC regional implementation plan.

2.166 The SWIM TF/10 Meeting was informed Malaysia's approach to SWIM operationalization is fully aligned with the objectives set forth by the ICAO APAC Office, particularly the updated SWIM Implementation Roadmap (Version 2, issued 2024) which include a **Dual-System Operation Strategy** that is by maintaining operational compatibility with both legacy AMHS/AFTN systems and modern SWIM services, Malaysia supported the ICAO APAC strategy of phased coexistence until 2035, thereby reducing transition risks.

Outcomes of Second APAC Ministerial Conference on Civil Aviation – Sec (WP/25)

2.167 The Second Asia Pacific Ministerial Conference on Civil Aviation was held from 11 - 12 September 2024 in New Delhi, India. In the Conference, the APAC Ministers reviewed commitments

made under the Beijing Declaration and agreed to another set of commitments to high-priority aviation strategic objectives in the form of the Asia Pacific Ministerial Declaration on Civil Aviation (Delhi). The Conference endorsed the Second Asia and Pacific Ministerial Declaration on Civil Aviation (Delhi), also known as the Delhi Declaration.

2.168 The SWIM TF/10 Meeting was invited to collaborate towards achieving the targets of the Delhi Declaration and to share the latest implementation status of commitments with the ICAO APAC Office for accurate progress tracking. It was added that as the ANS commitments in the Delhi Declaration constitute an element related to SWIM, indicators are required to be developed to measure this commitment for 2025-2026.

2.169 The SWIM TF/10 Meeting discussed various potential indicators to assess the progress of SWIM implementation within the APAC region. Suggestions included measuring the level of involvement of APAC States/Administrations in SWIM-related demonstrations or trials, the existence of national SWIM activities, plans, or policies, as well as enhancements in ANS infrastructure aimed at meeting SWIM requirements. Additionally, the Meeting discussed a simplified categorization approach to classify States' SWIM implementation progress into three levels, i.e., "In Preparation/Planning", "Under Development/Implementation" and "In Operation".

2.170 The SWIM TF/10 Meeting agreed that the proposal required more deliberation, and the task was assigned to the SWIM Co-Chair and the ICAO Secretariat. It was agreed that the ICAO Secretariat will inform the DGCA/60 Conference that indicators to measure SWIM implementation in the APAC region are under development, and the latest status of APAC States/Administrations' readiness for SWIM implementation will be shared with the DGCA/61 Conference. **ACTION ITEM 10-31** SWIM TF Co-Chair and ICAO Secretariat will define the first draft of indicators by the end of 2025, and share with SWIM TF Task Leads for review. A survey will then be conducted in Q1 2026 to finalise the preferred indicators for the APAC region. **ACTION ITEM 10-32**

Date and Venue for the Next Meeting

2.171 The Meeting discussed the next SWIM TF meeting dates. It was agreed that the need to conduct one-day SWIM event prior to the SWIM TF/11 meeting would be reviewed. The SWIM TF/11 meeting, along with the one-day SWIM event (if deemed necessary), is tentatively planned to be held from **25 to 29 May 2026**. Interested member states that were to host the Meeting were requested to inform the ICAO Secretariat at least six months before.

2.172 The Meeting shared concerns about the amount of work required during the SWIM TF meetings and four-day meeting timelines were insufficient to complete the required discussion. It was suggested that the meeting should be extended to 5 days. Nonetheless, it was agreed that knowledge sharing sessions are equally important as a separate event creates an additional burden for States/Administrations. It was agreed that the number of days required for next meeting will be discussed further and necessary action will be taken.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) review the outcome of the SWIM TF/10 Meetings and take any necessary follow-up actions;
- b) adopt the draft conclusions/decisions formulated by SWIM TF/10;
- c) discuss any matters as appropriate.

“TERMS OF REFERENCE

SWIM IMPLEMENTATION PIONEER AD-HOC GROUP

Objective

To implement a seed/prototype version of the Asia/Pacific SWIM within 2026 as a means of kick-starting SWIM adoption in the region.

Responsibilities

Deliverables for this group are as follows:

- 1) A regional SWIM Technical Infrastructure (TI) prototype built on the architecture that utilizes the CRV and the Internet. The architecture has been agreed by the SWIM Task Force;
- 2) Evaluation of the capability of the prototype SWIM TI using a selection of representative SWIM Information Services; and
- 3) Provide recommendations to the SWIM Task Force on the viability and performance of the SWIM TI.

Composition

- Experts from ATM, AIM, MET, and CNS Service Providers from at least three Asia/Pacific States having the following desirable characteristics:
 - 1) Having access to or will have access to the Common aeronautical VPN (CRV);
 - 2) Having implemented an EMS or having access or will have access to an EMS;
 - 3) Able to provide some of the common information services agreed by the SWIM Task Force; and
 - 4) Able to provide or have access to a SWIM registry.
- Any other international organizations such as IATA and ICAO and industries

Conduct of the Work

The group will conduct its work through regular web conferences, other electronic means of communications, and face-to-face meetings.

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Business Functionality of APAC Common SWIM Information Services
(Updated by MET SG/28, FF-ICE/2, MET/IE WG/23, SURICG/10, AAITF/19 and ATFM SG/15)

First Version (May 2025)

*(Editorial note – changes arising from MET SG/28, FF-ICE/2, MET/IE WG/23, SURICG/10, AAITF/19 and ATFM SG/15 are indicated with ~~strikethrough~~ and **highlighted** text.)*

Purpose.– This list of APAC Common SWIM Information Services, including associated priorities, provides States/Administrations with guidance on anticipated services to support their planning and implementation of SWIM.

Notes.– **Priority of Recommended Services in Initial APAC Common SWIM Information Service (IS) ((1)/(2)/(3)):**

- **Priority (1):** Recommended for region-wide implementation for region-wide benefits
- **Priority (2):** Recommended for implementation as much as practicable
- **Priority (3):** Additional information services without common regional requirements and not included as a part of common regional information services

Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority of Recommended Service in Initial APAC Common SWIM IS (1) / (2) / (3)
APAC Common SWIM Aeronautical Information Services					
Airspace management service	Exchanges of airspace status information between ASM Support System and Air Traffic Control (ATC) System. The sharing of airspace availability and airspace structure in real-time will contribute to a more efficient execution of the flight as information impacting the trajectory will be exchanged.	Airspace availability, Availability or activation/deactivation or temporarily change of airspace, restricted area, danger area, search and rescue regions	AIXM	Pub/Sub or Req Reply	2

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Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority of Recommended Service in Initial APAC Common SWIM-IS (1) / (2) / (3)
Airspace feature service	Provides the characteristics of the three-dimensional airspace, described as horizontal projection with vertical limits, and their relevance to air traffic.	FIR/UIR boundaries, waypoints, enroute ATS routes, SIDs and STARs, nav aids, procedures, and other airspace not limited to restricted area, prohibited area, danger area, search and rescue regions (Remarks – Other data published in the AIP may be included)	AIXM	Pub/Sub or Req Reply	2
Aerodrome feature service	Provides current and/or planned airport layout features, such as aerodrome mapping data, runway, taxiway, passenger facilities.	Runways, movement areas, aerodrome services, nav aids, instrument landing systems, Aerodrome location, communication facilities (frequencies)	AIXM	Pub/Sub or Req Reply	2
Runway Condition Report service	Provides runway surface conditions and contaminants (least to most slippery) that are directly correlated to aircraft take-off and landing performance.	Global Reporting Format (GRF) for runway surface conditions	AIXM	Pub/Sub or Req/Reply	2
Digital NOTAM distribution service	Provides aeronautical information in accordance with the Digital NOTAM Specification, such as runway closure.	Digital NOTAM (e.g. Special activity airspace (SAA) NOTAMs, or other types of NOTAMs)	AIXM	Pub/Sub or Req Reply	2
APAC Common SWIM Flight Information Services					
GUFU service	GUFU (Globally Unique Flight Identifier) generation and provision	GUFU	FIXM	Req/Reply	1
ATFM/A-CDM integrated service	Allows exchanges of flight plans and A-CDM milestone parameters among different stakeholders (such as arrival/departure ATFM units, airlines and airport operators) to connect A-CDM process to ATFM operations.	CLDT, TOBT, CTOT, CTO, TTOT, TSAT, etc.	FIXM	Pub/Sub Req/Reply	1

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Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority of Recommended Service in Initial APAC Common SWIM-IS (1) / (2) / (3)
FF-ICE filing service	Provides a means to submit, update or cancel flight plans through a SWIM-based interface using FIXM.	Flight plan for registration, update or cancellation	FIXM	Req/Reply Pub/Sub	1
FF-ICE data-publication service	Provides harmonised sharing of flight plan information in a global standard supporting common situation awareness.	Flight plan information for publication	FIXM	Pub/Sub	2
FF-ICE trial service	Allows operators to test the effect of a potential change in a flight plan prior to committing to the change.	Proposed changes in a flight plan	FIXM	Req/Reply	2
FF-ICE flight data request service	Allows an operator to request the current status of a flight plan, or an ANSP can request an operator to submit the latest version of their flight plan.	Current status of a flight plan, a copy of flight plan or supplementary plan	FIXM	Req/Reply	1
FF-ICE notification service	Provides notification of a change in flight state, such as Departure (DEP) and Arrival (ARR) Air Traffic Service (ATS) messages.	ARR, DEP messages	FIXM	Pub/Sub Req/Reply	1
FF-ICE planning service	Allows operators to submit preliminary flight plans for early Air Traffic Flow Management (ATFM) planning and to obtain feedback regarding restrictions/constraints affecting the flight.	Preliminary flight plan for early ATFM planning	FIXM	Req/Reply Pub/Sub	2
Flight-Specific ATFM Measure Service	Supports <i>notification</i> of information related to “flight-specific” ATFM measures, i.e. measures whose control mechanisms apply to a single flight. An example is the Ground Delay Program (GDP), whose control mechanism is a Calculated Take-Off Time (CTOT), or an ATFM measure for airborne flight,	CTOT, CTO, CLDT, and fields currently included in APAC	FIXM	Pub/Sub Req/Reply	1

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Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority of Recommended Service in Initial APAC Common SWIM IS (1) / (2) / (3)
	whose control mechanism is a Calculated Time Over (CTO). Recipients of this information should take actions to comply with the ATFM measure contained herein.	AFTN/AMHS-Based ICD for ATFM¹			
ATFM/A-CDM Integration Service	Supports exchanges of flight-specific ATFM measure information and A-CDM milestone parameters among stakeholders, including arrival/departure ATFM units, airspace users, and airport operators, to integrate A-CDM process with ATFM operations.	ATFM measure information: CTOT A-CDM departure planning information: TOBT, TTOT, TSAT	FIXM	Pub/Sub Req/Reply	1
APAC Common SWIM Meteorological Information Services					
FOR AERODROME					
METAR/SPECI information service	Provides of IWXXM-formatted METAR/SPECI product specified in ICAO Annex 3.	Provision of the existing Annex 3 product via an information service in Annex 3. Information service will be enabled through Amendment 81 to Annex 3 as recommended practice with applicability from Nov 2024.	IWXXM	Pub/Sub Req/Reply	1
TAF information service	Provides of IWXXM-formatted TAF product specified in ICAO Annex 3.		IWXXM	Pub/Sub Req/Reply	1
Aerodrome Meteorological Observation Information Service observation information service	Provides continuous observations of weather parameters at an aerodrome. Advanced meteorological SWIM (MET-SWIM) service being developed by MET Panel.	To be introduced as recommended practice in Annex 3 (Amd 8483) in Nov 2030 ² tentatively (Note: Level of standardisation needs to be considered, as different	IWXXM	Pub/Sub or Req/Reply	2*

¹ Based on the conclusion from ATFM/SG/15, an amendment to this ICD will be proposed in which a more structured use of REGUL and REGCAUSE fields will be introduced. This proposal is expected to be tabled at the upcoming CNS/SG meeting.

* Will become Priority (1) when it is introduced as recommended practice in Annex 3 tentatively in Nov 2030

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Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority of Recommended Service in Initial APAC Common SWIM-IS (1) / (2) / (3)
Aerodrome Meteorological Forecast Information Service forecast information service	Provides information of the expected meteorological conditions, including probability, at an airport during a specified period. Advanced meteorological SWIM (MET-SWIM) service being developed by MET Panel.	aerodrome information services may be required for different use cases.)	IWXXM	Pub/Sub or Req/Reply	2*
FOR ENROUTE					
SIGMET information service	Provides of IWXXM-formatted SIGMET product specified in ICAO Annex 3.	SIGMETs for thunderstorm, tropical cyclone, turbulence, icing, mountain wave, duststorm, sandstorm, volcanic ash and radioactive cloud	IWXXM	Pub/Sub Req/Reply	1
AIRMET information service	Provides of IWXXM-formatted AIRMET product specified in ICAO Annex 3.	Provision of the existing Annex 3 product via an information service	IWXXM	Pub/Sub Req/Reply	1
Tropical Cyclone Advisory information service	Provides of IWXXM-formatted Tropical Cyclone Advisory product specified in ICAO Annex 3. (Designated provider: States with Tropical Cyclone Advisory Centre)		IWXXM	Pub/Sub Req/Reply	1
Volcanic Ash Advisory information service	Provides of IWXXM-formatted Volcanic Ash Advisory product specified in ICAO Annex 3. (Designated provider: States with Volcanic Ash Advisory Centre)		IWXXM	Pub/Sub Req/Reply	1
Space Weather Advisory information service	Provides of IWXXM-formatted Space Weather Advisory product specified in ICAO Annex 3. (Designated provider: States with Space Weather Advisory Centre)		IWXXM	Pub/Sub Req/Reply	1
Volcano Observatory Notice for Aviation	Provides of IWXXM-formatted VONA specified in ICAO Annex 3. Provision of VONA will become the		IWXXM	Pub/Sub Req/Reply	2

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Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority of Recommended Service in Initial APAC Common SWIM-IS (1) / (2) / (3)
(VONA) information service	is a recommended practice in Annex 3 (Amd 82) in 2025. (Designated provider: States with a designated State Volcano Observatory)				
Quantitative volcanic ash (QVA) concentration information (QVA) service	Provides detailed information of significant volcanic ash in the atmosphere, including probabilities of ash concentration thresholds over space and time. Advanced meteorological SWIM (MET-SWIM) service being developed by MET Panel. (Designated provider: States with VAAC Volcanic Ash Advisory Centre (VAAC))	QVA grids grid-point gridded forecasts including probabilities, and IWXXM QVA objects. To be introduced as A recommended practice for significant ash clouds in Annex 3 (Amd 82) in Nov 2025 tentatively for VAACs in a position to do so from Nov 2025, and for all VAACs from Nov 2026.	Gridded data (e.g. NetCDF), IWXXM	Pub/Sub or Req/Reply	12 [#]
WAFS (World Area Forecast Centres) gridded grid-point forecast service	Provides global gridded weather forecasts. (Designated provider: WAFSs (UK and US))	Global gridded forecasts of CB, icing, turbulence, upper winds, upper-air temperatures and humidity, flight level and temperature of tropopause, and direction, speed and flight level of maximum wind	Gridded data in GRIB2	Pub/Sub or Req/Reply	1
WAFS significant weather (SIGWX) forecast service	Provides global WAFS SIGWX data sets with coverage expressed in polygons. (Designated provider: WAFSs (UK and US))	Significant weather forecast such as tropical cyclone, severe squall lines, turbulence, icing, etc.	IWXXM	Pub/Sub or Req/Reply	1
Satellite image service	Provides satellite observational information.	Satellite derived MET information (e.g. significant convection)	Gridded format (e.g. NetCDF) and image format	Req/Reply	2

[#] Will become Priority (1) from Nov 2026

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Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority of Recommended Service in Initial APAC Common SWIM-IS (1) / (2) / (3)
Weather radar image service	Provides two- or three-dimensional radar observational information.	Weather radar reflectivity to visualise the intensity of convection	Gridded format (e.g. NetCDF) and image format	Req/Reply	2
APAC Common SWIM Surveillance Information Services					
Surveillance data only sharing service	Provides surveillance data of aircraft. Provides three-dimensional position, time and identification of aircraft and other data as appropriate.	Position latitude, longitude, altitude, flight level, ground speed (optional), track angle, magnetic heading (optional), call sign, Mode S address, target identification, target address, mode 3/A code (optional), date , time of message reception for position, data quality, quality indicators, Mode S DAP , SAC, SIC	ASTERIX Cat 21 (payload in JSON or RAW format)	Pub/Sub	21
Surveillance data with flight plan information sharing service	Provides surveillance data of aircraft with flight plan information.	globally unique flight identifier, aircraft identification, departure aerodrome, destination aerodrome, aircraft type (optional), wake turbulence category (optional) latitude, longitude, flight level, ground speed (optional), magnetic heading (optional), target identification, target address, mode 3/A code (optional), date, time of message reception for position,	ASTERIX Cat 21+FPL (payload in JSON or RAW format)	Pub/Sub	2

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Business functionality of the information service	Brief description of the service	Type of information to be exchanged	Information exchange model / Message type	Message exchange pattern	Priority of Recommended Service in Initial APAC Common SWIM-IS (1) / (2) / (3)
		quality indicators, SAC, SIC			

Appendix A

FIXM version 4.3 Core Data Attributes to Support Cross-Border ATFM Information Exchange

Data Attribute	FIXM version 4.3 Core
EOBT (Estimated Off-Block Time)	FlightType.departure.estimatedOffBlockTime = (EOBT)
ETO (Estimated Time Over)	FlightType.routeTrajectoryGroup.desired.element.point4D.time = (ETO) FlightType.routeTrajectoryGroup.desired.element.elementStartPoint = (point at which ETO is specified)
ELDT (Estimated Landing Time)	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
EIBT (Estimated In-Block Time)	FlightType.routeTrajectoryGroup.desired.element.point4D.time = (EIBT) FlightType.routeTrajectoryGroup.desired.element.point4D.pointProperty.propertyType = IN_BLOCKS FlightType.routeTrajectoryGroup.desired.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator
CTOT (Calculated Take-Off Time)	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 (Calculated Time Over)	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CTO) FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint = (point at which CTO is specified)
CLDT (Calculated Landing Time)	FlightType.routeTrajectoryGroup.negotiating.element.constraint.time.timeSpecification.timeValue = (CLDT) FlightType.routeTrajectoryGroup.negotiating.element.point4D.pointProperty.propertyType = WHEELS_ON FlightType.routeTrajectoryGroup.negotiating.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator

Appendix B

FIXM version 4.3 Extension Data Attributes

Data Attribute	FIXM version 4.3
EOBT (Estimated Off-Block Time)	Core
ETO (Estimated Time Over)	Core
ELDT (Estimated Landing Time)	Core
EIBT (Estimated In-Block Time)	Core
CTOT (Calculated Take-Off Time)	Core
CTO (Calculated Time Over)	Core
CLDT (Calculated Landing Time)	Core
TOBT (Target Off-Block Time)	Extension
TSAT (Target Start-up Approval Time)	Extension
TTOT (Target Take-Off Time)	Extension
TTO (Target Time Over)	Extension
TIBT (Target In-Block Time)	Extension
AOBT (Actual Off-Block Time)	Extension
ATO (Actual Time Over)	Extension
AIBT (Actual In-Block Time)	Extension
Taxi time*	Extension
REGUL* (designation of the ATFM measure affecting the flight)	Extension
REGCAUSE* (reason for the ATFM measure)	Extension
REASON* (reason to explain an action by ATFM personnel, e.g. rejection, cancellation)	Extension
COMMENT* (additional information for ATFM purpose)	Extension

**For more information, refer to Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0*

Appendix C

APAC XSD Description

Namespace	Description
Apac	FIXM Extension containing data attributes to support cross-border Air Traffic Flow Management (ATFM) operations, the integration between ATFM and Airport-Collaborative Decision Making (A-CDM), and traffic synchronization in accordance with Distributed Multi-Nodal ATFM Network concept and the Airport-Collaborative Decision Making operations in the Asia/Pacific region.

Class	Definition	Reference/Remark
ApacDepartureType	Class containing flight data related to departure aerodrome	This class is to be included in extension field under DepartureType class.
Data Attribute	Definition	Reference/Remark
actualOffBlockTime	A time the aircraft is pushed back / vacates parking position (equivalent to airline/handlers ATD – Actual Time of Departure and ACARS=OUT)	ICAO Doc 9971 Manual on Collaborative ATFM, 3rd Edition, 2018
targetOffBlockTime	A time that an Aircraft Operator or Ground Handler estimates that an aircraft will be ready to receive start-up approval/push-back clearance	ICAO Asia/Pacific Regional Framework for Collaborative ATFM, Version 4, October 2022
targetStartupApprovalTime	A time provided by ATC taking into account TOBT, CTOT, and/or the traffic situation that an aircraft can expect start-up/push back approval	ICAO Asia/Pacific Regional Framework for Collaborative ATFM, Version 4, October 2022
targetedTakeOffTime	A time that an aircraft is targeted to be airborne, taking into account TOBT, TSAT, and other factors such as EXOT, wake turbulence, SID, etc.	- ICAO Asia/Pacific Regional Framework for Collaborative ATFM, Version 4, October 2022 - EUROCONTROL A-CDM Implementation Manual, Version 5.0, March 2017
taxiTime	The difference in time between the ‘off blocks time’ and the ‘take-off time’. The times referred to could be actual or estimated depending upon the context.	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0

Class	Definition	Reference/Remark
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ApacArrivalType	Class containing flight data related to destination aerodrome	This class is to be included in extension field under ArrivalType class.
Data Attribute	Definition	Reference/Remark
actualInBlockTime	The time that an aircraft arrives in-blocks (equivalent to airline/handler ATA – actual time of arrival, ACARS = IN)	ICAO Doc 9971 Manual on Collaborative ATFM, 3rd Edition, 2018
targetInBlockTime	A time, calculated by an automation system, that an aircraft is expected to be at its first parking position	This time value is not EIBT (Estimated In-Block Time) – The estimated time that an aircraft will arrive in blocks (Ref. EUROCONTROL A-CDM Implementation Manual, Version 5.0, March 2017)

Class	Definition	Reference/Remark
ApacRouteTrajectoryElementType	Class containing flight data related to specific element	
Data Attribute	Definition	Reference/Remark
actualTimeOver	An actual time of the aircraft over a fix, waypoint, or particular location	
targetTimeOver	A time, calculated and issued by an ATS unit, that an aircraft is requested to be over a fix, waypoint, or particular location	Use case: a time progressively calculated and issued by arrival management (AMAN) system

Class	Definition	Reference/Remark
ApacRouteTrajectoryGroupContainerType	Class contains actual trajectory information	
Data Attribute	Definition	Reference/Remark
actual	A list of actual trajectory	

Class	Definition	Reference/Remark
ApacAtfmMeasureCodeType	Indication of the cause of the ATFM measure	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0, section 3.2.1.15(a)

Class	Definition	Reference/Remark
ApacAtfmMeasureLocationType	Indication of the constraint location for which the ATFM measure is implemented	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0, section 3.2.1.15(b)
Class	Definition	Reference/Remark
ApacDelayCodeType	Indication of IATA numeric delay code	Asia/Pacific Regional AFTN/AMHS-based Interface

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		Control Documents for Air Traffic Flow Management, version 3.0, section 3.2.1.15(d)
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Class	Definition	Reference/Remark
ApacRegulationConstraintAreaType	Area of constraint. Format: [A-Z]{4}	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0

Class	Definition	Reference/Remark
ApacRegulationConstraintLocationType	Location of constraint. Format: [A-Z0-9]{1,5}	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0

Class	Definition	Reference/Remark
ApacRegulationCauseType	Class contains the cause of the ATFM measure	This is equivalent to REGCAUSE field in the Slot Allocation Message (SAM) as per Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0

Data Attribute	Definition	Reference/Remark
atfmMeasureCode	Indication of the cause of the ATFM measure	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0, section 3.2.1.15(a)
atfmMeasureLocation	Indication of the constraint location for which the ATFM measure is implemented	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0, section 3.2.1.15(b)
iataDelayCode	Indication of IATA numeric delay code	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0, section 3.2.1.15(d)

Class	Definition	Reference/Remark
ApacRegulationIdType	Class contains the designation of the ATFM measure	This is equivalent to REGUL field in the Slot Allocation Message (SAM) as per

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		Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0
Data Attribute	Definition	Reference/Remark
effectiveDate	The date and month when the ATFM measure is effective	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0
version	The version of the designation of the ATFM measure	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0
constraintArea	A constrained area	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0
constraintLocation	A specific constrained location	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0

Class	Definition	Reference/Remark
ApacRouteTrajectoryConstraintType	Class contains the ATFM measure information	
Data Attribute	Definition	Reference/Remark
comment	Additional ATFM measure information	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0
reason	Reason to explain an action by the FMP (e.g. rejection, cancellation, etc.).	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0
regulationCause	The information indicates the reason for the ATFM measure to assist in post-operations analysis.	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic Flow Management, version 3.0
regulationId	The information indicates the designation of the ATFM measure, including the specific location of the	Asia/Pacific Regional AFTN/AMHS-based Interface Control Documents for Air Traffic

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	constraint, affecting the flight.	Flow Management, version 3.0
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```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema targetNamespace="http://www.fixm.aero/ext/apac/4.3"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:apac="http://www.fixm.aero/ext/apac/4.3"
xmlns:fx="http://www.fixm.aero/flight/4.3" xmlns:fb="http://www.fixm.aero/base/4.3"
elementFormDefault="qualified" version="4.3.0">
  <xs:annotation>
    <xs:documentation>The Apac package contains information used in Asia Pacific
region.</xs:documentation>
  </xs:annotation>
  <xs:import namespace="http://www.fixm.aero/flight/4.3"
schemaLocation="../../../core/flight/Flight.xsd"/>
  <xs:import namespace="http://www.fixm.aero/base/4.3"
schemaLocation="../../../core/base/Base.xsd"/>
  <xs:import namespace="http://www.fixm.aero/base/4.3"
schemaLocation="../../../core/base/Types.xsd"/>
  <xs:import namespace="http://www.fixm.aero/base/4.3"
schemaLocation="../../../core/base/Extension.xsd"/>
  <xs:import namespace="http://www.fixm.aero/flight/4.3"
schemaLocation="../../../core/flight/flighttroutetrajectory/RouteTrajectory.xsd"/>
  <xs:simpleType name="ApacAtfmMeasureCodeType">
    <xs:annotation>
      <xs:documentation>Indication of the cause of the ATFM measure, based on
APAC AFTN/AMHS-Based ICD for ATFM v3.0, section 3.2.1.15(a).</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
      <xs:enumeration value="A"/>
      <xs:enumeration value="C"/>
      <xs:enumeration value="E"/>
      <xs:enumeration value="G"/>
      <xs:enumeration value="I"/>
      <xs:enumeration value="M"/>
      <xs:enumeration value="N"/>
      <xs:enumeration value="O"/>
      <xs:enumeration value="P"/>
      <xs:enumeration value="R"/>
      <xs:enumeration value="S"/>
      <xs:enumeration value="T"/>
      <xs:enumeration value="V"/>
      <xs:enumeration value="W"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="ApacAtfmMeasureLocationType">
    <xs:annotation>
      <xs:documentation>Indication of the constraint location for which the ATFM
measure is implemented, based on APAC AFTN/AMHS-Based ICD for ATFM v3.0, section
3.2.1.15(b)</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
      <xs:enumeration value="A"/>
      <xs:enumeration value="D"/>
      <xs:enumeration value="E"/>
    </xs:restriction>
  </xs:simpleType>
  <xs:simpleType name="ApacDelayCodeType">
```

```

<xs:annotation>
  <xs:documentation>Indication of IATA numeric delay code, based on APAC
AFTN/AMHS-Based ICD for ATFM v3.0, section 3.2.1.15(d)</xs:documentation>
</xs:annotation>
<xs:restriction base="xs:string">
  <xs:enumeration value="81"/>
  <xs:enumeration value="82"/>
  <xs:enumeration value="83"/>
  <xs:enumeration value="84"/>
  <xs:enumeration value="85"/>
  <xs:enumeration value="86"/>
  <xs:enumeration value="87"/>
  <xs:enumeration value="88"/>
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  <xs:enumeration value="98"/>
  <xs:enumeration value="99"/>
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="ApacRegulationConstraintAreaType">
  <xs:restriction base="fb:CharacterStringType">
    <xs:pattern value="[A-Z]{4}"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="ApacRegulationConstraintLocationType">
  <xs:restriction base="fb:CharacterStringType">
    <xs:pattern value="[A-Z0-9]{1,5}"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="ApacRegulationCauseType">
  <xs:annotation>
    <xs:documentation>Class contains the cause of the ATFM measure. This is
equivalent to REGCAUSE field in the Slot Allocation Message (SAM) as per the APAC
AFTN/AMHS-Based ICD for ATFM v3.0</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="atfmMeasureCode"
type="apac:ApacAtfmMeasureCodeType" minOccurs="1" maxOccurs="1"/>
    <xs:element name="atfmMeasureLocation"
type="apac:ApacAtfmMeasureLocationType" minOccurs="1" maxOccurs="1"/>
    <xs:element name="iataDelayCode" type="apac:ApacDelayCodeType"
minOccurs="1" maxOccurs="1"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="ApacRegulationIdType">
  <xs:annotation>
    <xs:documentation>Class contains the designation of the ATFM measure.
This is equivalent to REGUL field in the Slot Allocation Message (SAM) as per the APAC
AFTN/AMHS-Based ICD for ATFM v3.0</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="effectiveDate" type="fb:DateUtcType" minOccurs="1"
maxOccurs="1"/>
    <xs:element name="version" type="xs:int" minOccurs="1"
maxOccurs="1"/>

```

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```
<xs:element name="constraintArea"
type="apac:ApacRegulationConstraintAreaType" minOccurs="1" maxOccurs="1"/>
<xs:element name="constraintLocation"
type="apac:ApacRegulationConstraintLocationType" minOccurs="0" maxOccurs="1"/>
</xs:sequence>
</xs:complexType>
<xs:complexType name="ApacRouteTrajectoryConstraintType">
<xs:annotation>
<xs:documentation>Class contains the ATFM measure
information</xs:documentation>
</xs:annotation>
<xs:complexContent>
<xs:extension base="fb:RouteTrajectoryConstraintExtensionType">
<xs:sequence>
<xs:element name="comment"
type="fb:CharacterStringType" minOccurs="0" maxOccurs="1"/>
<xs:element name="reason" type="fb:CharacterStringType"
minOccurs="0" maxOccurs="1"/>
<xs:element name="regulationCause"
type="apac:ApacRegulationCauseType" minOccurs="1" maxOccurs="1"/>
<xs:element name="regulationId"
type="apac:ApacRegulationIdType" minOccurs="0" maxOccurs="2000"/>
</xs:sequence>
</xs:extension>
</xs:complexContent>
</xs:complexType>
<xs:complexType name="ApacArrivalType">
<xs:annotation>
<xs:documentation>Class containing flight data related to destination
aerodrome. This class is to be included in extension field under ArrivalType
class.</xs:documentation>
</xs:annotation>
<xs:complexContent>
<xs:extension base="fb:ArrivalExtensionType">
<xs:sequence>
<xs:element name="actualInBlockTime"
type="fb:DateTimeUtcType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xs:element name="targetInBlockTime"
type="fb:DateTimeUtcType" minOccurs="0" maxOccurs="1" nillable="true"/>
</xs:sequence>
</xs:extension>
</xs:complexContent>
</xs:complexType>
<xs:complexType name="ApacRouteTrajectoryElementType">
<xs:complexContent>
<xs:extension base="fb:RouteTrajectoryElementExtensionType">
<xs:sequence>
<xs:element name="actualTimeOver"
type="fb:DateTimeUtcType" minOccurs="0" maxOccurs="1" nillable="true"/>
<xs:element name="targetTimeOver"
type="fb:DateTimeUtcType" minOccurs="0" maxOccurs="1" nillable="true"/>
</xs:sequence>
</xs:extension>
</xs:complexContent>
```

```
</xs:complexType>
<xs:complexType name="ApacRouteTrajectoryGroupContainerType">
  <xs:annotation>
    <xs:documentation>Class contains actual trajectory
information</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="fb:RouteTrajectoryGroupContainerExtensionType">
      <xs:sequence>
        <xs:element name="actual"
type="fx:RouteTrajectoryGroupType" minOccurs="1" maxOccurs="1"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
<xs:complexType name="ApacDepartureType">
  <xs:annotation>
    <xs:documentation>Class containing flight data related to departure
aerodrome. This class is to be included in extension field under DepartureType
class</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="fb:DepartureExtensionType">
      <xs:sequence>
        <xs:element name="actualOffBlockTime"
type="fb:DateTimeUtcType" minOccurs="0" maxOccurs="1" nillable="true"/>
        <xs:element name="targetOffBlockTime"
type="fb:DateTimeUtcType" minOccurs="0" maxOccurs="1" nillable="true"/>
        <xs:element name="targetStartupApprovalTime"
type="fb:DateTimeUtcType" minOccurs="0" maxOccurs="1" nillable="true"/>
        <xs:element name="targetTakeOffTime"
type="fb:DateTimeUtcType" minOccurs="0" maxOccurs="1" nillable="true"/>
        <xs:element name="taxiTime" type="fb:DurationType"
minOccurs="0" maxOccurs="1"/>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
</xs:schema>
```