CNS SG/27– **WP/08**
Agenda Item 4
28/08-01/09/23

International Civil Aviation Organization

Twenty Seventh Meeting of the Communications/ Navigation and Surveillance Sub-group (CNS SG/27) of APANPIRG

Bangkok, Thailand, 28 August - 1 September 2023

Agenda Item 4: Information Management (IM)

4.1 Review Report of the Seventh Meeting of System Wide Information Management Task Force (SWIM TF/7)

REVIEW REPORT OF THE SEVENTH MEETING OF SYSTEM WIDE INFORMATION MANAGEMENT TASK FORCE (SWIM TF/7)

(Presented by the Secretariat)

SUMMARY

This paper presents the report of the Seventh Meeting of System Wide Information Management Task Force (SWIM TF/7), held from 09-12 May 2023, for review and action.

1. INTRODUCTION

1.1 The Seventh Meeting of System Wide Information Management Task Force (SWIM TF/7) was held from **9 to 12 May 2023** in ICAO Asia and Pacific Regional Office, Bangkok, Thailand. The Meeting was attended by **73** participants from **16** States/Administrations, **2** International Organizations and **1** telecommunication service provider, including Australia, Cambodia, China, Hong Kong-China, India, Japan, Lao People's Democratic Republic, Malaysia, New Zealand, the Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, USA, Vietnam, IATA, ICAO and PCCW Global. The SWIM TF/7 meeting report, working papers, information papers, and other resources can be accessed by this link.

1.2 The Eleventh Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/11) was held from *1 to 3 February, 2023* in ICAO Asia and Pacific Regional Office, Bangkok, Thailand. The Meeting was attended by 65 participants from 19 Member States/Administration. The meeting report, working papers, information papers, and other resources can be accessed by this link.

1.2 This paper summarized the report of SWIM TF/7 for review and action by CNS SG/27.

2. DISCUSSION

Review of Relevant Meetings - Sec (WP/02)

2.1 The paper summarized relevant information and updates highlighting the outcomes of the Thirty-Third Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/33), the Twenty-Sixth Meeting of Communication, Navigation, and Surveillance Sub Group (CNS SG/26), the Second Meeting of the Surveillance Study Group (SURSG/2), the Sixth Meeting of the APAC SWIM Task Force (SWIM TF/6) and the Seventh Meeting of the Surveillance Implementation Coordination Group (SURICG/7).

Outcomes of CRV OG/11 Meeting – Sec (WP/03)

2.2 The paper summarized relevant information and updates on the outcomes of the Eleventh Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/11), held *from 1 to 3 February 2023* in ICAO Asia and Pacific Regional Office, Bangkok, Thailand. It was noted that the APANPIRG/33 had recommended that all APAC States should join CRV by 31 December 2023. The CRV OG/11 Meeting report, Working Papers, Information Papers, and other resources can be accessed by the link: https://www.icao.int/APAC/Meetings/Pages/2023-CRV-OG11-.aspx

2.3 In response to a question regarding the definition of CRV users, ICAO Secretariat informed that ***MET Service Providers*** would fall under **CRV Users- States/Administrations** category. It was added that **Annex 3** *Meteorological Service for International Air Navigation* defined Meteorological authority as the authority providing or arranging for the provision of meteorological service for international air navigation on behalf of a Contracting State. Therefore, MET Service Provider is an entity officially designated by the State to provide the air traffic or air navigation services the State is obligated to provide according to the ICAO provisions. Moreover, a query on a cost model of different CRV user categories was raised. On this matter, PCCWG, as CRV service provider, informed that there is currently only one CRV User-Industry and the service cost was bilaterally agreed by PCCWG and CRV User-Industry.

Review the Report of the Third Meeting of the Surveillance Study Group (SURSG/3) - Sec (WP/04)

2.4 The Third Meeting of the Surveillance Study Group (SURSG/3) was held in Hong Kong, China, with the hybrid option (In-Person and Virtual Participation) from *22 to 24 March 2023*. The Meeting Report, Working Papers, Information Papers, and other resources can be accessed by following the link: https://www.icao.int/APAC/Meetings/Pages/2023-SURSG-3.aspx

2.5 The SURSG/3 Meeting endorsed that the *Surveillance data sharing in the SWIM Trial under S3TIG* and *SWIM over CRV Demonstration* should be conducted as **a Joint Event**. However, the proposal needs to be agreed upon by SWIM TF Meeting.

2.6 PCCWG presented, at the SURSG/3 Meeting, proposals on how ANSPs can participate in the upcoming S3TIG Trial, including the CRV connectivity requirements, surveillance data sharing demonstration, and scenario-based demonstration. The SURSG/3 Meeting noted that it would benefit the aviation community if more ATM stakeholders participated in the SWIM Data Exchange. The SURSG/3 Meeting was invited to share the number of Member States which will participate in the Trial and discuss the scope of the Trial for the commercial and technical arrangement. The SURSG/3 Meeting shared the need to explore other options to join the Trial/Demo by States/Administrations without CRV connectivity. Additionally, further deliberations were required about the cost implication for States having CRV connectivity but no spare bandwidth to share for the Trial/Demo. It was agreed that S3TIG would incorporate this discussion into the agenda item while preparing the Survey questionnaire.

2.7 The SURSG/3 Meeting deliberated the proposed questions for Expression of Interest (EOI) in participating in the Joint Event of S3TIG and reviewed the S3TIG Joint Event Tentative Timelines. It was agreed that the S3TIG would amend the questionnaire and prepare supporting documents containing useful information, such as definitions of various terms used in the questionnaire, to clear potential doubts of Member States/Administrations responding to the Survey and any other necessary modifications. The questionnaire will be a composite survey with ideally two separate sets of questions respective for the Trial and SWIM over CRV Demonstration (Demo). The S3TIG will share the part of the questionnaire mainly related to the Demo and the endorsement of the proposal for the Joint Event by SURSG/3 in a joint working paper or a paper by a lead of S3TIG to SWIM TF/7 to be held from 9-12 May 2023 in Bangkok, Thailand for SWIM TF/7's agreement. The SURSG/3 Meeting also agreed that the Survey would be shared with States/Administrations only, not involving other parties.

2.8 The SURSG/3 Meeting agreed that the Survey would be shared, after the endorsement of SWIM TF/7, with Member States/Administrations by ICAO Secretariat. The S3TIG will draft a formal package/agreement to participate in the Joint Event by Member States/Administrations to be shared with interested States/Administrations after the outcomes of the Survey are processed, analyzed, and interested Members to participate in the Demo/Trial are identified. The abovementioned Joint Working Paper was presented in WP/13 to the SWIM TF/7.

2.9 The SURSG/3 Meeting discussed the pros and cons of different data formats proposed in the SURSG/3 WP/06 and concurred that ASTERIX and JSON both might be considered as potential data formats for conducting the Trial and SWIM over CRV demonstration. Another proposal was to add a question related to the preferred data format, with ASTERIX and JSON data format as potential answers, in the Survey questionnaire to be prepared by S3TIG to better understand the readiness of interested demo/Trial parties. S3TIG will discuss the requirements of the proposed question to add to the Survey questionnaire. S3TIG will further deliberate on this topic of interest and priority and suggest data format(s) for the Trial and Demo.

Outcomes of SWIM TF Task Leads (TLs) Meetings and Joint CRV OG Ad-hoc Expert Group and SWIM TF TLs Meetings after SWIM TF/6 – Sec (WP/05)

2.10 The paper presented outcomes of SWIM TF TLs Meetings and Joint CRV OG Ad hoc Expert Group and SWIM TF TLs Meetings after SWIM TF/6.

Outcomes of the MET SG and Its Contributory WGs on SWIM-Related Matters – Sec (WP/14)

2.11 The paper presented recent SWIM-related discussions and outcomes from the MET SG and its contributory bodies and invited the Meeting to further discuss any relevant matters as appropriate. The Meeting noted the discussions on the use of the Internet for meteorological information services when designing the regional SWIM architecture and the consideration on organizing and conducting a MET-focused workshop on SWIM in MET SG/26, the addition of a new agenda item on SWIM and the updated terms of reference related to the SWIM/TF in MET/IE WG/21, and development of APAC Use Case and User Requirements for SWIM-based MET Information Services Supporting ATFM in MET/R WG/12.

2.12 Furthermore, the conjoint Meeting session of MET/IE WG/21 and MET/S WG/13 (27-29 March 2023) reviewed the ICAO State letter, Ref.: AN 2/36-23/6, dated 13 February 2023, which presented the details of the proposals for the amendment of Annex 3 concerning SWIM and a first edition of PANS-IM concerning aeronautical information management, SWIM and information security. The proposed amendment recommends States should ensure that the meteorological information supplied to the users is provided through "information services". Therefore, the conjoint

Meeting session noted that, according to the proposed amendment, by November 2024, States, operators and service providers in the aviation system may need to implement significant changes to ensure the meteorological information is provided to users through information services (SWIM).

2.13 The Meeting noted that ICAO METP is considering removing the (legacy) Annex 3 requirements for the global exchange of MET information in the traditional alpha-numeric code (TAC) form in 2029.

2.14 The Meeting also noted the compatibility table showing IWXXM versions, associated report packages, and relevant ICAO Annex 3 requirements. MET/IE WG/21 (27-29 March 2023) formulated Draft Conclusion MET/IE WG/21-01: IWXXM version compatibility, for consideration by the upcoming MET SG/27, requesting States to ensure systems are upgraded to support the IWXXM version which complies with the latest amendment to Annex 3 (as stated in the IWXXM compatibility table) and prepare for future system upgrades to support future IWXXM versions. Hong Kong China suggested that if States have not yet implemented IWXXM version 2021-2, they should implement IWXXM version 2023-1. It was added that proposed amendments of Annex 3 (Amendment 81) are envisaged for applicability in Nov 2024, and an updated IWXXM version will be released accordingly. However, updates to the existing MET products in future IWXXM versions are expected to be less frequent.

2.15 The Meeting requested information about tentative timelines for the organization of a MET-focused workshop on SWIM. The ICAO Secretariat informed that the workshop is in early stages of planning. SWIM TF Co-Chair suggested adopting a coordinated approach with various groups while conducting the workshop, as MET Service Providers will probably require support from Air Navigation Service Providers (ANSPs) to implement MET information services on SWIM.

SWIM Task Force Work Programme Timeline- China, Japan, Singapore, and Thailand (WP/11)

2.1 The Thirty-Third Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/33), which was held on 22 – 24 November 2022, adopted the Asia/Pacific SWIM Implementation Timeframe to be between 2024 and 2030 with 2030 being the target timeline for implementation completion through Conclusion APANPIRG/33/9. The SWIM TF Task Leads Meeting held on 2 December 2022 agreed on the target to have a set of regional implementation guidance materials ready for adoption by the SWIM TF Meeting to be held in 2024 and that these regional implementation guidance materials will be based on the various deliverables of the Task groups that are relevant to the implementation of SWIM.

2.2 At the SWIM TF Task Leads Meeting, it was discussed that to ensure the readiness of the regional implementation guidance materials at the next SWIM TF Meeting timeframe as agreed, a collation of the various deliverables from different Task groups together with the associated deadlines for each deliverable was necessary. The job of collating these deliverables to create the SWIM TF work programme timeline was assigned to Task 1.

2.3 The updated deliverables and timelines reviewed by the Meeting are provided in **Appendix A**. Based on updates and records of different task deliverables and associated timelines by different task leads, a SWIM TF work programme timeline was reviewed by the Meeting, which is provided in **Appendix B**.

2.4 The Meeting noted that Task 3 deliverables and timelines are not updated because of the lack of Asian contributor(s) to this Task group. Without the views from the Asia side, it would be challenging to conclude the security services specifications, i.e. Task 3 deliverables and timelines, for implementing SWIM in the Asia/Pacific region.

2.5 The Meeting was informed that there are no deliverables focused on producing and editing the consolidated regional SWIM Implementation Guidance Material in the updated deliverables and timelines. It was added that currently, this task is being handled by the ICAO Secretariat alone and not a specific Task group. This is not considered a tenable position. Therefore, a group responsible for gathering the guidance materials produced by all the related Task groups and consolidating/editing them into a coherent document for review and adoption by the SWIM TF Meeting in 2024 with the support of the ICAO Secretariat was needed.

2.6 The Meeting also noted that the group proposed to be established will only be the ad-hoc group and it will be dissolved once the first version of Asia/Pacific regional SWIM implementation guidance is adopted by the SWIM TF.

2.7 In response to a question, SWIM TF Co-Chair informed that the proposed Asia/Pacific regional SWIM implementation guidance would focus on SWIM implementation roadmap, SWIM Technical Infrastructure specifications, registry model, security framework, service specifications, information exchange model, and governance framework.

2.8 The following Decision for the *Formation of an editorial Task group for the APAC SWIM Implementation Guidance document* was proposed for the consideration of SWIM TF, which was adopted by the Meeting.

<table>
<tr><td colspan="3">Decision SWIM/TF/07/01 – Formation of an Editorial Task Ad-Hoc Group for the Asia/Pacific SWIM Implementation Guidance Documentation</td></tr>
<tr><td colspan="2">What: To establish an Editorial Task ad-hoc group under SWIM TF, through coordination with other Task groups, to create the consolidated Asia/Pacific regional SWIM implementation guidance with the support of the ICAO Secretariat.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To ensure the readiness of the Asia/Pacific regional SWIM implementation guidance in time for review and adoption by the SWIM TF/9 in 2024.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 12-May-23</td><td colspan="2">Status: Adopted by SWIM TF</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF</td></tr>
</table>

2.9 A Breakout Session was organised to get willingness to participate in the group from delegates, discuss potential content for guidance document, and finalize a way forward to execute this task along with timelines. **China, Hong Kong China, India, Singapore, Thailand, and USA** volunteered to participate in the Task group. It was agreed that the editorial task ad-hoc group, led by Thailand, would complete the task in ***one-year*** timeline. Other group discussion outcomes are provided in **Appendix C**. The following Point of Contact was established for Ad-hoc Editorial Task group for the APAC SWIM Implementation Guidance document:

SN	Member States	Point of Contact (PoC)
1.	China	Ms. Honglei Gao, Senior Engineer CNS Division of Air Traffic Management Bureau, CAAC

2.	Hong Kong China	Mr. Marco Mang-hin KOK, Acting Senior Scientific Officer, HKO
3.	India	Mr. Lalit Kumar Pawar, Assistant General Manager, AAI
4.	Singapore	Mr. Wei Xiong Elvin Liow Principal Engineer, CAAS
5.	Thailand **(Lead)**	Ms. Amornrat Jirattigalachote, Strategic Planning Manager (Engineering), AEROTHAI
6.	USA	Ms. Diana Liang, Enterprise Portfolio Manager, Office of NextGen, FAA

2.10 The Meeting conferred that SWIM TF should review the draft guidance materials prepared by the Editorial Task Ad-Hoc Group and provide immediate feedback before presenting final draft materials for the review and adoption of the SWIM TF Meeting in 2024. Therefore, an additional SWIM TF plenary session was proposed to be held in the 2nd half of 2023 by a draft decision for SWIM TF adoption.

2.11 The Meeting agreed that an additional plenary session would provide a better chance for the adoption of these materials at the SWIM TF plenary in 2024. Therefore, the Meeting adopted the following Decision for the proposal to conduct the next SWIM TF/8 Meeting in November 2023.

Decision SWIM/TF/07/02 - Additional SWIM TF Plenary Meeting in the 2nd Half of 2023	
What: To arrange the additional SWIM TF plenary Meeting in the 2nd half of 2023 to review the draft Asia/Pacific regional SWIM implementation guidance.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To provide an opportunity for the SWIM TF to review and provide immediate feedback on the draft regional SWIM implementation guidance materials developed by Task groups.	Follow-up: ☐Required from States
When: 12-May-23	Status: Adopted by SWIM TF
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF	

2.12 The Meeting arranged that **the SWIM TF/8** would be conducted for **Three (3)** days instead of full plenary with restricted agenda items focused on the drafting of Asia/Pacific regional SWIM implementation guidance documents in continuation to **SWIM Business Requirement Brainstorming Working Session** for **Two (2)** days in November 2023. The agreed dates of the Meeting were **6-10 November 2023.**

2.13 As many members of SWIM TF are members of the ICAO Information Management Panel (IMP), it was requested by the Meeting to inform IMP Secretary in ICAO HQ not to conduct the

next Meeting of IMP during 6-10 November 2023. ICAO Secretariat will share this information with IMP Secretary. **ACTION ITEM 7-1**

SWIM Implementation Pioneer Group - China, Japan, Singapore, and Thailand (WP/12)

2.14 This paper proposed establishing a **SWIM Implementation Pioneer Group under the SWIM TF** to kick-start the Asia/Pacific regional SWIM implementation based on the SWIM architecture discussed at the SWIM TF/2 Meeting. The Meeting was informed that while developing the Asia/Pacific Regional SWIM Roadmap, Task 1 recognized that, besides the regional guidance material being developed by the SWIM TF, there is a need for other mechanisms to help kick-start the SWIM implementation in the region. Considering the progress made by some ANSPs within the Asia/Pacific region, Task 1 concluded that one possible approach to accelerate SWIM implementation in the Asia/Pacific region is establishing a SWIM Implementation Pioneer Group.

2.15 The Meeting was informed that the role of the SWIM Implementation Pioneer Group would be to start building the initial version/prototype of the regional SWIM following the SWIM architecture previously discussed and agreed upon at the former SWIM TF Meetings, using the Common aeRonautical Virtual Private Network (CRV) as the baseline IP infrastructure. This proposal also ties in with the goals and objectives of the Surveillance Sharing in SWIM Trial Implementation Group (S3TIG). As such, this group is also proposed to be working closely with S3TIG. It was proposed that group members may consist of ANS stakeholders, including ANSPs, MET service providers, interested international organizations, and commercial vendors.

2.16 It was added that the lessons learned during the construction of this regional SWIM prototype could be used as input for developing the Asia/Pacific regional SWIM Guidance document. Importantly, the regional SWIM prototype, once created, can then serve as a seed for further SWIM development and better information exchange supporting regional operations. Eventually, this prototype can be extended and become the full-fledged Asia/Pacific SWIM with all the necessary features and governance applied to it. Task 1 proposed the formation of a SWIM Implementation Pioneer Group under the SWIM TF to establish a prototype SWIM for the Asia/Pacific region by a draft decision for consideration of SWIM TF.

2.17 The Meeting was informed that the group proposed to be established will only be the ad-hoc group and it will be dissolved once the deliverables outlined in its Terms of Reference (TOR) are reviewed and adopted by the SWIM TF. The ToR of the proposed SWIM Implementation Pioneer Ad-hoc Group were presented to the Meeting by Flimsy/02. The Meeting reviewed, modified and agreed to the ToR. The Meeting adopted the proposed draft decision to form SWIM Implementation Pioneer Ad-hoc Group by following Decision.

<table>
<tr><td colspan="3">Decision SWIM/TF/07/03 – Formation of the SWIM Implementation Pioneer Ad-hoc Group</td></tr>
<tr><td colspan="2">What: To establish a SWIM Implementation Pioneer Ad-hoc Group to develop an initial version (prototype) of the Asia/Pacific regional SWIM with ToR provided in Appendix D.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To kick-start the SWIM implementation for the Asia/Pacific region in accordance with Conclusion APANPIRG/33/9 The Asia/Pacific</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
</table>

SWIM Implementation Timeframe.	
When: 12-May-23	Status: Adopted by SWIM TF
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF	

2.18 Australia shared the importance of this group to achieve the 2024-2030 target SWIM implementation timeline for the APAC Region. **Hong Kong China, Japan, Malaysia, Republic of Korea, Singapore, Thailand, and IATA** volunteered to join the group. **Australia** shared its willingness to join the group and will provide confirmation in due course. The following Point of Contact was established for SWIM Implementation Pioneer Ad-hoc Group:

SN	**Member States**	**Point of Contact (PoC)**
1.	Australia	To be Decided
2.	Hong Kong China	Mr. Henry Chan, Electronics Engineer, Civil Aviation Department, Hong Kong, China
3.	Japan	Mr. Yasushi Iwasawa, Special Assistant to the Director, Japan Civil Aviation Bureau (JCAB) Mr. Xiaodong Lu Principal Researcher, Electronic Navigation Research Institute
4.	Malaysia	Mr. Anwar Awang Man, Senior Solution Consultant, Telekom Malaysia
5.	Republic of Korea	Mr. Sehwan Han, Senior Research Engineer, Korea Airports Corporation Mr. Meong-Jun Cho Deputy Director, Ministry of Land, Infrastructure and Transport of the Republic of Korea (MOLIT)
6.	Singapore **(Lead)**	Mr. David Shin Hwah Leow, Head (Air Traffic Management Software Engineering), Civil Aviation Authority of Singapore
7.	Sri Lanka	To be decided
8.	Thailand	Ms. Amornrat Jirattigalachote, Strategic Planning Manager (Engineering), AEROTHAI Mr. Arthit Tosukolvan, Executive Air Traffic Systems Engineer, AEROTHAI Mr. Thanathorn Dechasawatwong, Executive Air Traffic Systems Engineer, AEROTHAI
9.	IATA	Mr. John Moore, Assistant Director, Safety & Flight Operations, ASPAC, International Air Transport Association (IATA)

2.19 In the Breakout Session, an initial scope of work and a way forward of the Ad-hoc Group were discussed by volunteered Member States. The outcomes of discussion of this Breakout Session is provided in **Appendix E** of the report.

2.20 SWIM TF Co-Chair requested more Member States to join the group as it will be an excellent opportunity to learn from other group members. That, in turn, will contribute to the implementation of SWIM in their respective States. Moreover, increased participation will allow for a broader range of views within the region to be obtained and addressed early on while the group builds a regional SWIM prototype. Given the importance of the task and strict timelines for completion of this task, the Meeting suggested that ICAO Secretariat should share information about ***the formation of the SWIM Implementation Pioneer Ad-hoc Group*** with APAC Member States by **a State Letter by 17 May 2023** and Member States should be requested to respond for their willingness to join the group and nominate experts **by 31 May 2023**. **ACTION ITEM 7-2** Additionally, Singapore proposed to organize a kick-off Meeting of the group through web conference in the last week of May 2023.

Overview of APAC SWIM-TI Profiles- Japan (WP/07)

2.21 Japan presented overviews of the content list of the draft APAC SWIM Technical Infrastructure Profiles document. The SWIM Technical Infrastructure (TI) is a collection of software and hardware used to enable the provision and consumption of information services over an IP-based network. The information service provider and the consumer are responsible for implementing their own infrastructure.

2.22 In the APAC region, a Common aeRonautical Virtual Private Network (CRV) is an IP-based VPN using a private commercial network to provide service for exchanging AMHS data and potentially other data types. In addition, as a strong candidate to provide the network connectivity service for supporting the transition from AMHS to SWIM, how to construct the CRV-based regional SWIM and achieve interoperability during the transition period has been discussed between the CRV OG and SWIM TF.

2.23 In the APAC region, due to the different levels of operational needs and the limited capabilities of current CRV, various options can be contemplated for the transition period regarding interoperability. Some Member States and third-party SWIM service providers have developed some information services on their local SWIM-enabled systems that cannot currently connect directly to the CRV. In addition, to support cost-effective and efficient utilization, some non-safety critical information services, such as less-sensitive meteorological information services, have been made accessible on the Internet. Therefore, during the transition period, the different design models for the SWIM TI are required for the different services and implementation levels.

2.24 To eliminate technical barriers to the realization of regional SWIM, the APAC SWIM Technical Infrastructure Profiles contain basic requirements for the implementation of SWIM TI, optional system design models for the integration of the CRV, and common technical standards for the specification of interface bindings to implement the regional SWIM during the transition period.

2.25 The structure of APAC SWIM Technical Infrastructure Profiles and details about User-based Access without AMHS/SWIM Gateway and Infrastructure Bindings and User-based Access with AMHS/SWIM Gateway and Infrastructure Bindings were presented at the Meeting.

2.26 The Meeting requested Member States and Task 3, 5, and 6 leads to review the *APAC SWIM Technical Infrastructure Profiles- Draft Version* attached in **Appendix F** to the Report and provide comments/feedback to the Task 2 lead **by 31 August 2023**. **ACTION ITEM 7-3** The Task 2

lead will compile and review all comments and feedback and submit the revised draft document to **SWIM TF/8** Meeting to be held from 8-10 November 2023. **ACTION ITEM 7-4**

2.27 ICAO Secretariat will share *APAC SWIM Technical Infrastructure Profiles- Draft Version* with CRV OG and ACSICG for their feedback and provide feedback to the Task 2 Lead. **ACTION ITEM 7-5**

Draft AMHS/SWIM Gateway Technical Specification - SWAMWAY Study Group (WP/17)

2.28 AMHS/SWIM Gateway Study Group (SWAMWAY SG) presented a draft of AMHS/SWIM Gateway technical specifications. SWANWAY SG informed that it is a joint initiative undertaken by a group of organizations, including several ANSPs and industries with deep expertise in both AMHS and SWIM. The paper introduced the work done by SWAMWAY SG to develop a draft of the technical specifications for the AMHS/SWIM Gateway, providing a minimum set of requirements ensuring the exchange of information during the transition to SWIM as well as ensuring the interoperability with AMHS and with SWIM.

2.29 The Meeting noted that the draft of the AMHS/SWIM Gateway technical specification encompasses four chapters, including Introduction, System Level Provisions, Configuration and Parameters, and AMHS/SWIM Gateway Specification. It was added that Chapter 4 - AMHS/SWIM Gateway Specification is the most critical chapter describing the different functions that the AMHS/SWIM Gateway shall perform and gathers all the requirements for converting messages from AMHS to SWIM and from SWIM to AMHS.

2.30 SWAMWAY SG informed that the target of the study group is to get the endorsement of ICAO EUR/NAT AFS to the SWIM Transition Task Force (AST TF) Meeting, to be held from 14-16 June 2023, for the proposed AMHS/SWIM Gateway technical specification as a previous step to be recognized by ICAO and considered as an international standard.

2.31 Therefore, the Meeting was requested to provide comments on the draft version of the AMHS/SWIM Gateway technical specification by the end of May 2023.

2.32 The Meeting requested all delegates to provide feedback on the AMHS/SWIM Gateway technical specification draft **by 31 May 2023**.

Update on Information Exchange Model Development to Support ATFM Operations, ATFM/A-CDM Integration, and FF-ICE/TBO in Asia/Pacific Region – Thailand (WP/16)

2.33 The paper presented the update on Flight Information Exchange Model (FIXM) version 4.2 Extension development to support the Air Traffic Flow Management (ATFM) information exchange required for cross-border ATFM operations, ATFM/A-CDM (Airport-Collaborative Decision Making) integration and FF-ICE/TBO (Flight and Flow Information for a Collaborative Environment / Trajectory Based Operation) in the Asia/Pacific Region. It also provided the details of FIXM version 4.2 Extension developed and tested and the update on the possible usage of the Flow Information Exchange Model (FLXM) to support the exchange of ATFM Daily Plan (ADP).

2.34 The Meeting noted that FIXM version 4.2 Core, released in February 2021, can support the exchange of some data attributes originally included in the Asia/Pacific FIXM version 4.1 Extension. The system-to-system interconnection test among Japan, Singapore, and Thailand was successfully conducted in May 2022 to validate the exchange of developed FIXM version 4.2

Extension. Following the test, the FIXM version 4.2 Extension has been further developed to include more alternatives to exchange aircraft position to support the exchange of aircraft track information.

2.35 Noting the need for system-to-system ATFM information exchange between enabled ATFM Nodes as well as for ATFM/A-CDM integration as described in the Asia/Pacific Regional Framework for Collaborative ATFM, version 4 (October 2022) and discussion at the ATFM SG/13 held in April 2023 of the need to identify the specific FIXM version to support the harmonized implementation across the Asia/Pacific region in the future, it was proposed that this FIXM version 4.2 Extension be adopted as the Asia/Pacific FIXM version 4.2 Extension and be made available for immediate use by Asia/Pacific Administrations. It was further proposed that this FIXM Extension be presented to the FIXM Change Control Board (CCB) for review and publication on the FIXM official website.

2.36 Thailand presented Flimsy/01 sharing the details of specific FIXM version 4.2 Core data attributes proposed to be used for supporting cross-border ATFM information exchange in the Asia/Pacific region together with parts of sample messages containing these data attributes.

2.37 With the aforementioned, the Meeting formulated the following Draft Conclusion for CNS SG/27 and APANPIRG/34 consideration.

<table>
<tr><td colspan="3">Draft Conclusion SWIM/TF/07/04 – Asia/Pacific Regional FIXM version 4.2 Extension</td></tr>
<tr><td colspan="2">What: The FIXM version 4.2 Extension provided in Appendix G be:
a) adopted as the Asia/Pacific FIXM version 4.2 Extension;
b) uploaded to the ICAO Asia/Pacific Regional Office website for immediate use by Asia/Pacific Administrations, where capability to do so exists, for cross-border ATFM information exchange and to support ATFM/A-CDM integration; and
c) presented to the FIXM CCB for review and publication on the FIXM official website.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To provide the information exchange model necessary to support cross-border ATFM and ATFM/A-CDM integration in the Asia/Pacific Region, in order to support the implementation of performance objectives of the Asia/Pacific Regional Framework for Collaborative ATFM</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 12-May-23</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF, ATFM SG</td></tr>
</table>

2.38 India questioned about the FIXM version used by other regions and shared opinion on a need to harmonize the implementation of FIXM version to ensure interoperability between regions. On a query regarding the FIXM version used by other regions, ICAO Secretariat will provide this information after coordination with other regional offices.

2.39 ICAO Secretariat will take necessary action to upload FIXM version 4.2 Extension on ICAO Asia/Pacific Regional Office website for immediate use by Asia/Pacific Administrations after proposed draft conclusion adoption, if adopted by CNS SG/27 and APANPIRG/34.

2.40 USA shared support to coordinate and present FIXM version 4.2 Extension to the FIXM CCB for review and publication on the FIXM official website after proposed draft conclusion adoption, if adopted by CNS SG/27 and APANPIRG/34.

Proposal of Regional Interoperable SWIM Registry- China, Japan, Republic of Korea, and USA (WP/08)

2.41 The paper proposed the SWIM Discovery Service (SDS) specification as the regional specification to enable the regional interoperable SWIM Registry. The Meeting was informed that service discovery had been a major point of interest for APAC SWIM professionals. Since 2017, ICAO APAC SWIM TF has been working on the SWIM governance task, covering the SWIM registry and service discovery. It was recalled that at the SWIM TF/3 in 2019, Conclusion CNS SG/23/5 (SWIMTF/3/3): *Interoperable Registry Model for SWIM Registry in APAC Region* was adopted.

2.42 The first version of the SDS implementation specification and Service Description Model for JavaScript Object Notation (JSON) (SDM-J) was developed by the FAA SWIM program. At the SWIM TF/5 in 2021, ROK and USA conducted a demonstration using respective SDS instances developed by ROK and USA. In 2023, Japan and China joined the collaboration and developed their registries and SDS instances. Brazil was considering the development of an SDS instance.

2.43 To facilitate the collaboration in the SDS community, a common repository was created in the GitHub (faa-swim/swim-discovery-service) in 2022. Also in 2022, the virtual teleconference was held to discuss the development of the second version of the SDS specification. The development of the second version of the SDS specification is in progress to provide additional capability (e.g., caching or nested environment). In addition, the third version of the Service Description Conceptual Model (SDCM), which reflects the governance needs in the global aspect, is currently under review.

2.44 It was proposed that to facilitate information exchange in the interoperable service-driven environment without problems, there should be a regional framework enabling service metadata exchange to facilitate the discoverability and understanding of a SWIM service or information delivered. The paper recommended that, as the first version of the SDS specification proved its maturity and benefit, the SWIM TF should consider adopting the SDS specification as the regional specification and proposed *Draft Decision SWIM TF/7/xx: SDS specification to enable interoperable SWIM registry in the APAC Region* for the Meeting's consideration.

2.45 The Meeting noted that the proposed SDS implementation specification document belongs to FAA. Therefore, a review and a reproduction of the document is required to accommodate the purpose and requirements of the APAC Region. After the document is modified to accommodate all key requirements of the APAC region, it can be presented to SWIM TF Meeting for adoption as a regional guidance. Therefore, Task 5 will work to prepare SDS specification for the APAC Region.

Enabling SWIM Service Composition with REST-based API- USA (WP/10)

2.46 USA shared experiences using Representational State Transfer (REST) APIs in SWIM to deliver context-driven information, improve developer productivity, and streamline service deployment, including data fusion, service composability, and filtering mechanisms. It also shared key lessons learned from these experiences, including the importance of REST APIs for interoperability, scalability, security, and developer-friendliness.

2.47 Service Oriented Architecture (SOA) is a design principle that has been widely adopted in the development of SWIM infrastructures. By following the SOA principle, SWIM services can be used across different systems, independent of the underlying technologies, programming languages, or platforms. Representational State Transfer (REST) is an architectural style for building web services that is consistent with the design principles of the World Wide Web. By using standardized protocols and operations, RESTful web services can achieve interoperability across different systems and platforms, further reducing communication and collaboration barriers across different regions, languages, and platforms.

2.48 SWIM Discovery Service (SDS) is a joint effort to facilitate the exchange of service metadata among independently developed and autonomously managed SWIM programs and leveraged standard-based REST API extensively. Further details of SDS and Open Geospatial Consortium (OGC) testbed initiatives and lessons learned from testbed initiatives were shared with the Meeting.

SWIM Discovery Service Demonstration – Republic of Korea, USA, China, Japan (WP/09)

2.49 The paper described SWIM Discovery Service (SDS) demonstration between ROK, USA, and Japan. It provided capabilities of SDS, SDS instances used for demonstration, service registry used, topologies between SDS instances, and test-case for the demonstration.

2.50 The Meeting noted that the demonstration conducted in 2021 used two respective SDS instances developed by the KAC and FAA, while the demonstration, which was conducted at the SWIM TF/7, used three respective SDS instances developed by the KAC, FAA, and ENRI. Detailed steps, presented in the form of Data Flow Diagram, of the executed test scenario, were also shared with the Meeting.

2.51 Following the paper, the demonstration was done to the Meeting. The Meeting appreciated the joint paper and demonstration.

Information to be exchanged through APAC Common Information Services- Hong Kong China (WP/18)

2.52 Hong Kong China presented the updates on the work of Task 6 to identify the catalog of basic data elements to be shared and exchanged via APAC Common SWIM Information Services based on operational needs in APAC. The Meeting noted that to support the development of a list of the common set of SWIM information services for APAC as recommended based on the outcome of the SWIM survey conducted in 2022, SWIM TF Task 6 team undertook the work to identify the basic information to be exchanged via APAC Common SWIM Information Services.

2.53 The proposed list of information to be exchanged via Common Flight Information Services, Common Aeronautical Information Services, Common Meteorological Information Services, and Common Surveillance Information Services in APAC was shared with the Meeting. The Meeting deliberated in length about additional potential list of information, such as surveillance quality data, DAPs, Space Weather, Search and Rescue region, etc., that could be incorporated into various categories of information services provided in the paper. Therefore, it was recommended to have coordination and involvement of various domain experts to list all potential information for APAC Common Information Services. Moreover, the Meeting suggested that the study on the proposed data catalog to be continued in coordination with the relevant groups and subject matter experts should also include determining whether the data element to be exchanged in APAC Common Information Services are mandatory or optional, which would depend on the user group concerned and their use cases or

operational scenarios. Additionally, it was advised that the naming of APAC Common Information Services should be identified based on the data elements to be shared/exchanged as well as the functions they will support.

2.54 The Meeting noted that the terminology used in the paper to define different types of information services is not formulated by any ICAO panels. It was therefore recommended to name them **Common SWIM Flight Information Services, Common SWIM Aeronautical Information Services, Common SWIM Meteorological Information Services, and Common SWIM Surveillance Information Services**, to emphasize the fact that these are SWIM services.

2.55 The Meeting was requested to review the proposed data catalog and provide suggestions on additional information that should be exchanged through APAC Common Information Services.

2.56 ICAO Secretariat will coordinate with the Secretary of Metrology Sub Group (MET SG), Aerodromes Operations and Planning Sub-Group (AOP SG) and the ICAO Aeronautical Information Services- Aeronautical Information Management Implementation Task Force (AAITF) to request to nominate ATM, MET, and AGA Experts to prepare a comprehensive list of information for Common SWIM Flight Information Services, Common SWIM Aeronautical Information Services, Common SWIM Meteorological Information Services, and a Common SWIM Surveillance Information Services.

2.57 The Meeting discussed the utilization of Mode S DAPs in developing an integrated SWIM service incorporating MET information derived from Mode S DAPs. It was informed that the detailed consideration on exchanging MET information derived from Mode S DAPs through IWXXM should be done in consultation with MET SG (MET/IE WG). ICAO Secretariat will coordinate with the Secretariat of MET SG (MET/IE) to explore options on this matter.

A Joint Event for SWIM over CRV Demonstration and Surveillance Data Sharing in SWIM Trial - Hong Kong China, Singapore and Thailand (WP/13)

2.58 The paper presented the proposal to combine the SWIM Demonstration over CRV ("the Demo") and the surveillance data sharing in the SWIM trial ("the Trial") as a joint event for States' consideration. It was informed that the proposal on combing the two events would save effort in preparing similar network and system infrastructure for the Trial, demonstrate data exchange of different throughput and examine such bandwidth requirements on CRV, and enhance user experience with more types of SWIM services and data demonstrated. The Meeting was invited to support the combing of the Demo and Trial and participate in the joint event.

2.59 The Meeting noted that pseudo CRV will be used as the network infrastructure for the Demo/Trial and the ATFM scenario, based on the ASEAN Demonstration, will be refined and enriched to be used in the Demo, which is considered a suitable use case to demonstrate the operational benefits brought by SWIM. The Meeting also noted that S3TIG is conducting a survey to gauge States' interest in participating in the joint event. A questionnaire for the Survey was shared with the Meeting for further deliberation.

2.60 The Meeting reviewed and modified the questionnaire that is provided in **Appendix H** of the Report. ICAO Secretariat will share the Survey questionnaire with APAC Member States **by 19 May 2023 as agreed at the SURSG/3 Meeting**. **ACTION ITEM 7-13.** Once received, Member States were requested to expedite the response to the Survey due to tight timelines to conduct the Trial/Demo by Q4 of 2023 or Q1 of 2024.

Introducing Use Cases of A SWIM Service for Surveillance Data in the Republic of Korea (IP/03)

2.61 Through ROK SWIM testbed able to support two message exchange patterns, i.e. request/response and publish/subscribe, the paper shared use cases of the SWIM information service for surveillance data provided in various formats in ROK. It described how SWIM could improve the usability of surveillance data for stakeholders, who couldn't receive surveillance data before, and can improve their work efficiency. It was concluded that local or regional governance and technical group should be established to define a topology as well as an information model to convey surveillance information (e.g. ASTERIX or high level representation format such as JSON)) and discuss any other considerations.

2.62 Task 10 Lead shared the objectives and key activities of Task 10. It was explained that this task required to identify SWIM related activities as well as their interdependencies in planning or development within other Working Groups (WGs)/Task Forces (TFs) and liaise with relevant regional WG/TF to refine operational and communications requirements, including ATFM SG, MET IE, AAITF, ACSICG, CRV OG, etc. Additionally, the scope of this task is also to provide guidance to APANPIRG WG/TF using SWIM, and to influence outcomes from other WGs and TFs that will support successful expansion of SWIM. Due to importance of this task, Task 10 lead alerted all Task Leads to share information about SWIM-related discussions in other forums such as ICAO, CANSO, APEC etc., when IATA SWIM TF Members are not participating. Moreover, support from Task Leads is requested to identify as well as share key outcomes of SWIM-related activities and project initiatives that are not currently covered in current SWIM TF discussions, and advise discoveries of any newly published SWIM training material or courses.

Review of SWIM TF ToR, Programme, Work Plan, and Outstanding Action Items – Sec (WP/06)

2.63 The paper presented the current SWIM TF's ToR, the revised SWIM TF's work plan, and a proposal to amend 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 there is no need to revise the ToR. The latest ToR of SWIM TF is provided in **Appendix I** to the report.

2.64 To ensure that the objectives set in the ToR can be achieved, the Statement of Work (SOW) of each Task needs to be further reviewed to be consistent with revised SWIM TF ToR. It was agreed that all Task Leads will review and modify the SOW to accommodate latest requirements from SWIM TF ToR and share it with ICAO Secretariat before SWIM TF/8 Meeting. **ACTION ITEM 7-14**

2.65 The Meeting updated Task leads information 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), ~~Yukinobu Ryu (Japan),~~ Yasushi Iwasawa (Japan) Henry Chan (Hong Kong, China)
	3	Security service	Jim Laymon (USA)

Groups	Task No.	Subject/Task	Task Leads
Technical Architecture	4	Development and maintenance of regional information exchange models	Amornrat Jirattigalachote (Thailand) Wen Zhu (USA)
Governance	5	Regional SWIM Governance Framework	Dongkie Park (ROK) Mark Kaplun (USA), ~~Yukinobu Ryu (Japan),~~ Yasushi Iwasawa (Japan) Xiaodong Lu (Japan), Honglei Gao (China)
Information Services	6	Information services	Marco Kok (Hong Kong, China) Vacant
Validation & Demonstration	7	SWIM Demonstration	David Leow (Singapore) Amornrat Jirattigalachote (Thailand)
	8	SWIM services and application validation	~~Yukinobu Ryu (Japan),~~ Yasushi Iwasawa (Japan) Xiaodong Lu (Japan), Honglei Gao (China), Mr. Dongkie Park (ROK)
Coordination and Promotion	9	Monitoring of Panels' work	~~Yukinobu Ryu (Japan),~~ Yasushi Iwasawa (Japan)
	10	Regional coordination and SWIM-related information sharing	~~Vacant~~ John Moore (IATA)
	11	SWIM implementation education and promotion (New task)	Thomas Green (USA)

2.66 The Meeting was informed that Task 3 required a co-lead from the APAC region in order to be able to better suggest and incorporate the security requirements specific to APAC region. Similarly, additional support is required for Task 6 and Task 11. The importance of Task 10 in coordinating between SWIM TF and other contributory body under APANPIRG was also highlighted. As the revised ToR of SWIM TF has significantly increased the work of SWIM TF, the Meeting were encouraged to nominate Task Leads of Task 10, co-leads of Task 3, Task 6, and Task 11 on priority basis. Mr. John Moore from IATA agreed to lead Task 10 as done in the past. The Meeting appreciated IATA to take the responsibility. Moreover, more contributors were requested for Task 1 to Task 11.

2.67 The Meeting reviewed the SWIM TF Work Plan and there was no updates to the Work Plan. The latest version of SWIM TF Work Plan is provided in **Appendix J** to the Report. The Meeting also updated the action item list. The updated action item list is provided in **Appendix K** of the Report.

APAC Use Cases and User Requirements for SWIM-Based MET Information Services Supporting ATFM - MET/R WG Ad-hoc Group (WP/15)

2.68 The paper presented the recent updates on the work to identify and document use cases and user requirements for SWIM-based MET information services supporting ATFM in the APAC region in coordination with other working groups and provided an updated draft version of the regional document for consultation.

2.69 The Meeting noted that MET/R WG/11 adopted the updated version of the draft reference document, which included comments from MET/R WG/10 and an addition of a use case on volcanic ash avoidance and diversion due to fog, and the proposed updates to its ToR to reflect key deliverables identified in the MET/R WG Work plan. To promote further development of ATFM-specific use cases and user requirements, ATFM/SG/13 held on 3-7 April 2023 reviewed the updated draft reference document and agreed to add an action item on contributing to the MET/R WG on further refining SWIM-based MET information service scenarios and developing other scenarios. It was also proposed to further update the draft reference document to add two use cases that demonstrate the potential benefits of MET information services to APAC ATFM operations in SWIM. The follow-up activities that would be carried out as outlined in the MET/R WG Work plan by the ad hoc group through consultation with ATFM experts were shared. The Meeting was invited to review the draft reference document and provide comments, in particular suggestions on additional use cases, if any, for further analysis.

2.70 The Meeting appreciated the paper and shared that used cases could be potentially included in the Asia/Pacific regional SWIM implementation guidance material which is being drafted by the Editorial Task Ad-hoc Group.

2.71 India shared the importance of India to join MET/R WG Ad-hoc Group as a vast oceanic airspace, which may have different MET conditions from a continental airspace, is controlled by India. MET/R WG Ad-hoc Group rapporteur informed that any Member States can join the group on volunteer basis and requested volunteer Member States to contact ICAO Secretariat.

Update on SWIM Service Registry Design & Development of ATMB – China (IP/02)

2.72 The paper presented the design and development progress of the SWIM Service Registry of ATMB in China, including information service lifecycle design, information service description metadata extension, SWIM Service Registry functional framework design, and SWIM Service Registry demo development. The Meeting noted that testing and verification work on the SWIM Service Registry demo would be carried out, and the *SWIM Service Registry Functional Configuration Guidance* of ATMB will be compiled and released, which will be the technical foundation to carry out SWIM Service Registry planning and construction of ATMB afterward.

Date and Venue for the Next Meeting

2.73 The Meeting agreed to schedule another plenary of SWIM TF, i.e. **SWIM TF/8**, as an **In-Person Meeting** in **Bangkok, Thailand** in **November 2023** to ensure that the SWIM TF would achieve the target date of regional guidance document development in 2024. The Meeting arranged that the SWIM TF/8 would be conducted for **Three (3)** days in continuation to **SWIM Business Requirement Brainstorming Working Session** for **Two (2)** days. The finalized tentative dates for **SWIM Business Requirement Brainstorming Working Session** are **6-7 November 2023, and SWIM TF/8** are **8-10 November 2023**. ICAO Secretariat issued invitation letter Ref.: T 8/2.10 & T 8/2.11 – AP116/23 (CNS) on subject *Invitation to the Successive events on SWIM: Working Session on SWIM Business Requirements Brainstorming and the Eighth Meeting of System Wide Information Management Task Force (SWIM TF/8) (Bangkok, Thailand, 06 – 10 November 2023)* on 3 August 2023.

2.74 The Meeting agreed to conduct the full plenary (Four (4) days) of **SWIM TF/9 Meeting** along with **another SWIM activity for one day**. The tentative agreed dates of the SWIM TF/9 and SWIM activity are **13-17 May 2024**. The Meeting suggested that, if a Member State wishes to host SWIM TF/9 Meeting, they should inform the ICAO Secretariat at least 4-6 months in advance to issue the invitation package accordingly.

2.75 In closing the Meeting, the Co-Chairs and ICAO Secretariat thanked all participants for their active participation in the Meeting and valuable contributions to the work programme of the SWIM TF and extended their invitation to the next SWIM TF Meeting.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;
b) adopt the draft conclusion mentioned in **Section 2.37;**
c) note the decision/conclusion adopted by SWIM TF/7; and
d) discuss any relevant matter as appropriate.

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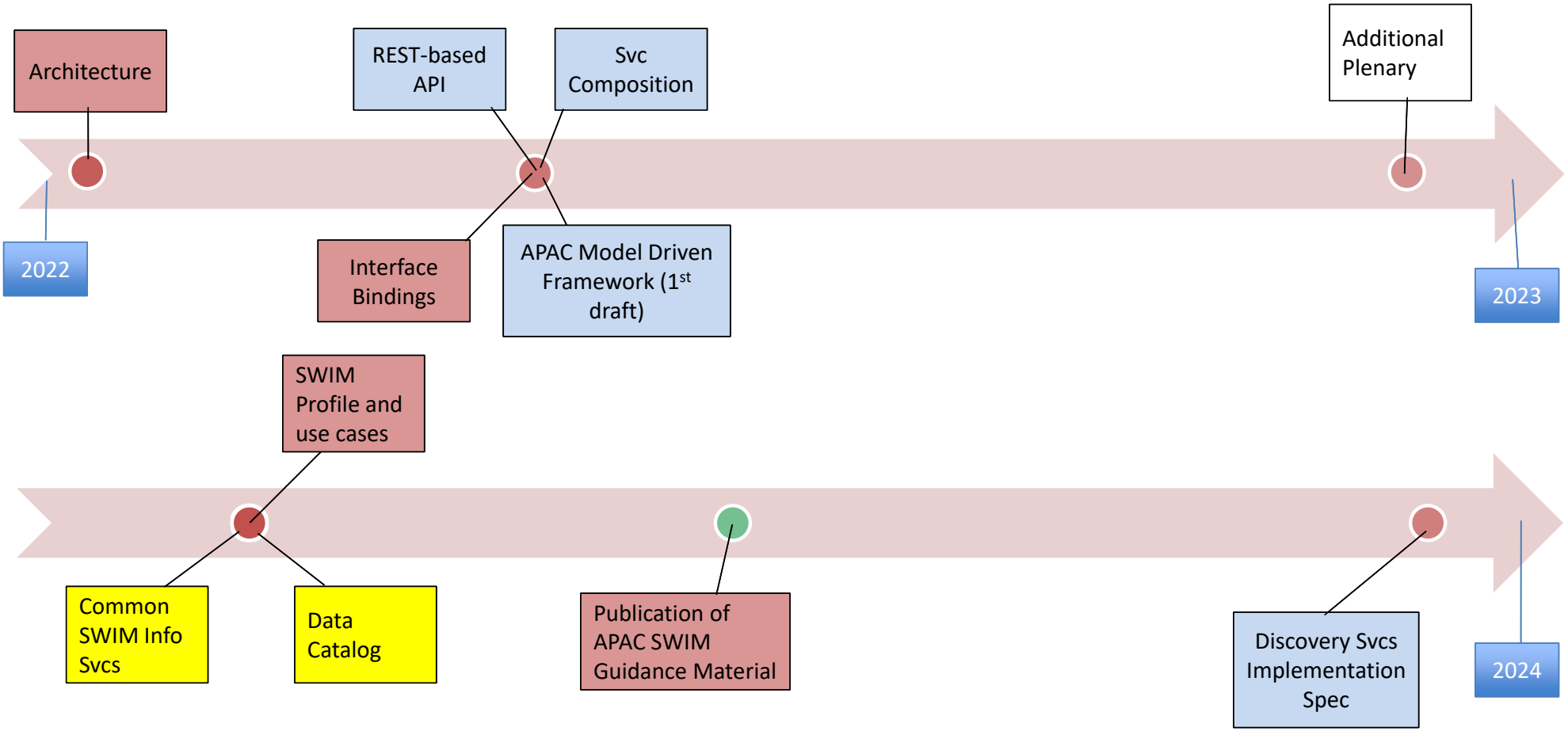
Task Group	Objective and Scope	Deliverable Description	Proposed Deadline
Task 1: Regional Implementation Roadmap	Develop and maintain the Asia/Pacific regional roadmap for SWIM implementation, including SWIM technical infrastructure, SWIM governance, aeronautical information service, flight information service, and weather information service	SWIM Implementation Roadmap (Final)	2024
Task 2: Regional SWIM Infrastructure	• Define the high-level APAC SWIM Architecture including policies on implementation and distribution of SWIM services • Define the requirements for the APAC SWIM Infrastructure with the goal of ensuring technical interoperability • Outline policy to ensure backwards compatibility with non-SWIM capable entities • Develop a roadmap for the implementation of APAC SWIM Infrastructure	Regional SWIM Architecture Design Model and Technical Infrastructure Profile	2018~2020: SWIM Architecture Options 2021~2022: SWIM Interface Bindings 2023~2024: Profile and Usecase
Task 3: Security Service	• Advises TF Chair and Task Leads in the area of cybersecurity for APAC. Specific objectives include: • Determining the scope of security responsibility of SWIM, consistent with SWIM technical infrastructures envisioned by the ICAO Information Management Panel (IMP) and the APAC regional network infrastructures including the CRV. • Proposing a trust framework to ensure that the correct information is sent to the correct users, considering identity and access management initiatives (IAM) from member states. • Ensures interoperability of trust frameworks within APAC region and with other ICAO regions. • Developing SWIM Cyber Security Architecture Framework and SWIM security strategy for the Asia-Pacific Region. Analyses and capture SWIM security risks. • Provide security guidelines and best practices to be incorporated in SWIM APAC Governance activities.	•APAC SWIM Security Scope and Context (Working Paper) •APAC SWIM PKI Trust Framework (Working Paper) •Cyber Security Architecture Framework for SWIM in ICAO Asia-Pacific Region (Final, working Paper)	

Task 4: Regional Information Exchange Models	Support APANPIRG WG/TF regarding information exchange models and examine if any extension to the existing information exchange models, i.e. AIXM, FIXM, and IWXXM, and/or the new information exchange model(s) are required to support the Asia/Pacific regional operational requirements	A list of common set of SWIM information services with data catalog.	2024
Task 5: Registry and Governance Policies	I. Establish a robust and sustainable Governance model to ensure that a common set of policies, rules, and standards for identifying, designing, implementing, discovering, and operating SWIM-enabling components is consistently applied and enforced throughout the APAC. II. Develop or adopt standards, policies, and procedural guidelines to support the functional requirements for implementing all aspects of service-oriented development in the context of APAC SWIM. III. Facilitate visibility and control for insight into all APAC SWIM-enabled services by supporting developments of flexible mechanisms for service discovery, including, but not limited to, service registries	1. WP SWIM Discovery Services: Status, Plans, Demo (Timeline: May 2023) 2. Enabling SWIM Service Composition with REST-based API (Timeline: May 2023). 3. WP APAC SWIM Model-driven Framework: First Draft (Timeline: May 2023) 4. SWIM Discovery Service Implementation Specification version 2.0 (Timeline: May 2024) 5. Prototype of SDS network based on SDS 2.0 (Timeline: May 2024) Note: this item is dependent on item 6. APAC SWIM Model-driven Framework: Prototype (Timeline: December 2024)	
Task 6: Information Services	To develop and define the APAC version of the SWIM information service overview specifications and APAC version of data catalogue for information services based on operational needs in APAC.	2. WP Enabling SWIM Service Composition with REST-based API (Timeline: May 2023	
Task 8: SWIM Services and Application Validation	• Construct a platform for SWIM service and application validation • Support the implementation of SWIM service and applications • Support the demonstration of SWIM based operations	Report on SWIM Service and Application Validation	2019~2020: FF-ICE/R1 2022~2023: SWIM Registry

Appendix II

Proposed SWIM Task Force Timeline



SWIM TF/7 Breakout Session Editorial Group

ICAO

SWIM TF/7, 11 May 2023

Wishlist

- Implementation roadmap
- Technical specifications
  1. SWIM TI profiles, including performance metrics
  2. Regional governance framework
  3. Regional security framework
     - Authentication
     - Authorization
  4. Information exchange models
  5. APAC specifications for
     (a) service metadata (mandatory/optional)
     (b) data catalog (mandatory/optional)
  6. Registry model, including SDS specification, service lifecycle process (regional SOP)
  7. Common SWIM information services, including performance metrics
  8. Onboard approach/guidance
  9. Common mediation/interface framework
  10. Use cases (local, international)
  11. AMHS/SWIM transition framework/policy

Priority

Different stages of implementation

Target Timeline	Finalize	Speed Up	Proposal
SWIM TF/8 Nov 2023	• Governance • Info Ex Models • Registry	• SWIM TI • Common SWIM info services	• Security
SWIM TF/9 May 2024	• Security • APAC service metadata		• APAC data catalog

- Use cases – After SWIM TF/9, depending on the outcomes of SWIM implementation pioneer group, ~end of 2024

Member

- Thailand: Amornrat Jirattigalachote
- USA: Diana Liang
- Singapore: Elvin Liow
- India: Lalit Pawar
- China: Honglei Gao
- Hong Kong China: Marco Kok
- ICAO Secretariate

Thank You!

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TERMS OF REFERENCE

SWIM IMPLEMENTATION PIONEER AD-HOC GROUP

Objective

To implement a seed/prototype version of the Asia/Pacific SWIM within 2024 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 prototype built based on the architecture decided by the SWIM Task Force and using the CRV as the IP-based network;

2) Provision of Flight Information Services by each group members; and

3) Lessons learnt and recommendations from the construction of the seed/prototype SWIM for reporting to the SWIM Task Force.

Composition

- Experts from ATM, AIM, MET, and CNS Service Providers from at least three Asia/Pacific States having following 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 ICCAIA 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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RECONNECTINGTHEWORLD

An Initial Scope of Work and a Way Forward of the SWIM Implementation Pioneer Ad-hoc Group

Objective

- To Implement seed / prototype APAC SWIM by Jun 2024
  - Leverage on the SWIM over CRV demonstration
  - Leverage on the S3TIG surveillance sharing trial
  - Use the architecture as agreed in the SWIM TF.
  - This is a technical exercise
  - The objective is to build the SWIM TI and verify it with message exchanges
  - Will not be any operational demonstration with operational use-cases

Work Items and Implementation Stages (1)

- **Step 1**
  - Determine how many EMS will be put up in the initial prototype
- **Step 2**
  - Form the interconnection between all the different EMSs
  - Discuss and agree with CRV provider on the IP interconnection between EMS
  - Try and leverage on the infrastructure setup for SWIM on CRV demo and SUR sharing ops trial

Work Items and Implementation Stages (2)

- **Step 3**
  - Put up SWIM Registries and implement the SWIM Discovery Services (SDS) and SWIM Metadata Exchange Services (SMXS)\
- **Step 4**
  - Put up information services from various domains
  - Flight Plan services
  - Weather services
  - Conversion from AMHS to SWIM

Expected Outcomes

- **Base Goals**
  - Lessons learnt of EMS provision
  - Lessons learnt on the construction of the SWIM TI
  - Lessons learnt on Registry interconnection
  - Lessons learnt on Information Service Provision
- **Stretch Goal**
  - Validation process of the declared Quality of Service of an Information Service.

Thank You!

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APAC SWIM Technical Infrastructure Profiles - Draft Version 0.1

May 2023

Record of Revisions

Date	Revision	Submitter
May 2023	Version 0.1 – Initial Draft for SWIM TF/7	Xiaodong Lu, JAPAN/ENRI

Table of Contents

1. INTRODUCTION

1.1 Purpose

In order to achieve technical interoperability between different implementations, it is essential that systems use standardised interfaces and have technical infrastructure capabilities to enable reliable, secure and efficient exchange of ATM related information. It is expected that these standards enable to eliminate technical barriers from the realization of regional SWIM.

This document contains basic requirements for the implementation of SWIM Technical Infrastructure (TI), optional system design models for the integration of the Common arRonautical Virtual Private Network (CRV), and common Information and Communication Technology (ICT) standards for the specification of interface bindings to implement the regional SWIM during the transition period.

1.2 Scopes

This document focuses on the following scopes for SWIM TI implementation by considering the integration of CRV to achieve technical interoperability during the transition period in the APAC region.

- SWIM TI system design
- SWIM TI interface bindings
- SWIM TI capabilities

1.3 Requirements

The main objective of SWIM is not only to enable seamless information sharing among the multiple stakeholders in the ATM domain but also to achieve interoperability and harmonization of global operation in the air transportation field. Therefore, as the backbone for ATM modernization by delivering the right information to the right decision-maker at the right time and location, the high-capacity IP-based network is required. Moreover, the implementation of SWIM has also opened the door for a variety of new, non-traditional aviation information sharing partners, seeking to introduce innovative solutions using data and information that became available after applying SWIM. Therefore, both operational interoperability and applicational flexibility should be considered for the development and implementation of regional SWIM. The required indicators for IP-based network that should be considered to construct the SWIM TI are shown in Table 1.

Table 1. SWIM TI Requirements

Indicator	SWIM TI Requirement
Performance	High-speed IP network connection with large bandwidth and low latency for various kinds and a large mass of information exchange among SWIM-enabled systems
Accessibility	Open and easy connected platform not only for traditional aviation partners but also for multiple non-aviation enterprises for the initial development of SWIM

Connectivity	Cross-border network connections not only for other SWIM-enabled systems in the APAC region but also to other SWIM platforms that have been deployed in other ICAO regions
Cost	Reduced cost for conventional message exchange, and low cost or free of cost for SWIM information exchange and sharing

1.4 Principles

The SWIM TI contributes to achieving the SWIM benefits described in the Manual on SWIM (Doc 10039), by respecting the following principles shown in Table 2.

Table 2. SWIM TI Principles

Principle	Description
Managed technical diversity	Technical diversity is managed to minimize the significant costs to maintain expertise while allowing flexibility to accommodate new technologies and select technologies that best meet ATM needs.
Standards based TI	SWIM TI implementation is based on open standards that promote technical interoperability.
Established ICT standards	SWIM TI implementation is based on widely deployed and supported ICT standards that enable economical and efficient information services implementation and operation.
Modularity	SWIM TI implementation is modular, enabling progressive deployment of SWIM TI functional capabilities and bindings, which will allow a fit for purpose, flexible and agile implementation and evolution.
Platform independent interfaces	Interfaces between systems do not create dependencies imposed by implementation platforms, such as operating system or programming language.

1.5 Structure

Chapter 1 introduces the purpose and scope of this document, the requirements and principles for regional SWIM TI implementation.

Chapter 2 provides a high-level architecture and several optional system design models to construct the SWIM TI taking into account the integration of CRV for achieving interoperability.

Chapter 3 specifies common ICT standards for Interface Bindings, providing specifications for the implementation of service, network and infrastructure interfaces.

Chapter 4 specifies SWIM TI Capabilities, providing functional and non-functional requirements for the implementation of regional SWIM TI to ensure the reliable, secure and efficient information exchange between different stakeholders.

Appendix A provides system structure and functional building blocks of AMHS/SWIM Gateway.

Appendix B provides high-level architecture and package diagram of Service Description Conceptual Model (SDCM).

Appendix C provides an example of message headers to explain message capabilities for achieving interoperability between different SWIM TIs in separate IP network segments.

1.6 Maintenance

This document has been developed by the Task 2 group under the APAC SWIM TF. It will be updated and maintained by the APAC SWIM TF.

1.7 References

[1] Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocols, ICAO Doc 9896.

[2] Manual on System Wide Information Management, ICAO Doc 10039.

[3] Procedures for Air Navigation Services – Information Management (PANS-IM), Final Draft, ICAO Doc 100xx.

[4] EUROCONTROL Specification for SWIM Technical Infrastructure, EUROCONTROL-SPEC-170.

[5] Service Description Conceptual Model (SDCM), Version 3.0.0 DRAFT, FAA, February 2023.

[6] AMHS/SWIM Gateway Specification, Version 1.0 Draft, AMHS/SWIM Gateway Study Group (SWAMWAY SG), 2022.

2. SYSTEM DESIGN

2.1 Requirements

During the transition to a global SWIM environment, legacy systems and SWIM-enabled systems will have to coexist for a longer period of time. To assure the interoperability, SWIM-enabled system is required to implement information services not only according to SWIM but also supporting the legacy systems. This is especially important during the transition period, because a legacy system may not have the capability to adapt to the new approaches introduced by SWIM. As the legacy AFTN/AMHS is used by nearly all member states, it is necessary for the SWIM TI to support the message transport between the SWIM-enabled systems and AFTN/AMHS using legacy systems.

In the APAC region, a CRV that is IP-based VPN using a private commercial network to provide service for the exchange of AMHS data and potentially other types of data has been constructed. Additionally, to facilitate the transition from AMHS to SWIM, the AMHS/SWIM Gateway Specification has been proposed and discussed by other working groups. To clarify the appropriate approach for regional SWIM implementation while considering these requirements, the joint meeting between the CRV OG and SWIM TF was held, and several optional approaches were discussed.

Due to the different levels of operational needs and limited capability of current CRV, different options can be contemplated for the transition period regarding interoperability. Some member states and third-party SWIM service providers have developed some information services on their local SWIM-enabled systems that cannot directly connect to the CRV at current stage. In addition, to support cost-effective and efficient utilization, some non-safety critical information services, such as less-sensitive meteorological information services, have been accessible on the Internet. Therefore, during the transition period, the different design models of the SWIM TI are required for the different services and implementation levels.

2.2 Service Description

From the perspective viewpoint of Service Oriented Architecture (SOA), the TI is one of SWIM services that provide the reliable, secure and efficient information exchange service to SWIM users. As the service description is integral to establishing interoperability among SOA components and critical to supporting various aspects of SOA governance, a common and consistent service description model is also required for SWIM TI. The Service Description Conceptual Model (SDCM) developed by the FAA SWIM Program is an appropriate template and can consist of the application of basic principles, common standards, methodologies, and best practices for regional SWIM TI implementation. For example, as shown in Table 3, the elements included in the profile package of SDCM should be considered for each SWIM TI service provider.

Table 3. Profile Package of SDCM Version 3.0.0

Name	Definition
Provider	An organizational entity responsible for making the service available.
Consumer	An organizational entity that uses the service.
Function	A type of activity describing the functionality of a service.
Security Mechanism	A process (or a device incorporating such a process) that is used by or within a service to prevent unauthorized or accidental access, change, destruction, or loss of data.

Policy	A statement that defines constraints on the behavior of a managed resource, a user or an organization.
Quality of Service	A parameter that specifies and measures the value of the provided service.
Geographical Extent	A specified geographic area to which the service applies.
Environmental Constraint	A characteristic of the environment or larger system within which the service operates.

2.3 Interface Bindings

The SWIM TI enables the implementation of interfaces between systems, providing technical capabilities for secure, high performing and reliable information exchange. Based on the functional position of SWIM TI, not only network bindings and service bindings but also infrastructure bindings are required to achieve interoperability between different internal and external infrastructure systems.

- Network Bindings: Specify what is expected by the SWIM TI to communicate over the IP network, including protocols from the network and transport layers;

- Service Bindings: Specify the service interface technical interoperability, including protocols to interface with the ATM applications;

- Infrastructure Bindings: Specify the interface used by a SWIM TI to communicate with other infrastructure systems, including protocols for communication with internal and external services.

2.4 Architecture

The regional SWIM will be progressively implemented by the integration of different SWIM-enabled systems and aligned with the implementation of the services it supports. Additionally, to facilitate the transition from AMHS to SWIM, the AMHS/SWIM Gateway Specification has been proposed and discussed by other working groups. To clarify the appropriate approach for regional SWIM implementation while considering these requirements, the CRV-based interoperable architecture is required for regional SWIM implementation during the transition period.

According to different sophistication and implementation levels, Figure 1 shows an interoperable architecture, which is a possible approach for CRV based regional SWIM implementation to satisfy information exchange between legacy and SWIM-enabled applications. Some stakeholders (ANSPs, ASPs, AUs or third-party partners) will have the capacity to become SWIM service providers by establishing common agreements and creating a collaborative environment at the regional level or between different regions. In this approach, it is important for all SWIM service providers to agree on using a common set of standards to ensure information exchange between different systems. The Local Router provides the function of connectivity between CRV and SWIM TI for local legacy systems and SWIM-enabled systems. SWIM service providers may be connected by CRV or other secure connection methods on IP-based network. As a SWIM service provider, it will be able to provide the SWIM TI service to SWIM-enabled ASPs and AUs.

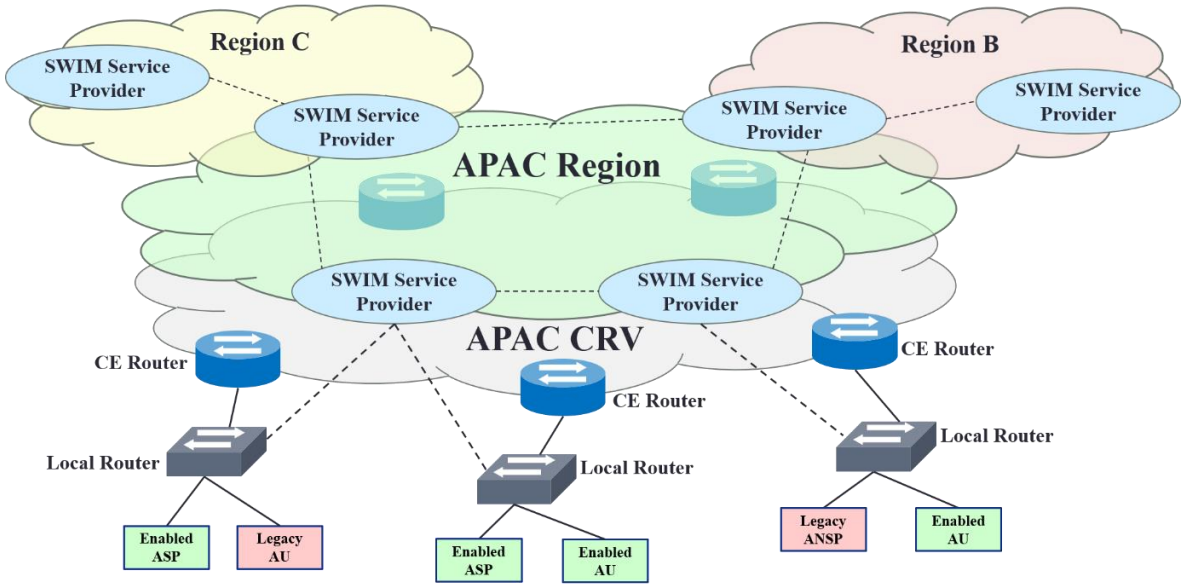

Figure 1. Interoperable Architecture

2.5 Design Models

According to the discussion of joint meetings between the CRV OG and SWIM TF, the implementation of the initial regional SWIM at the current stage can be accomplished through user-based access model and application-level integration. This approach ensures interoperability between the different SWIM-enabled systems developed by various stakeholders in different IP network segments.

Based on the availability of AMHS/SWIM Gateway and the infrastructure bindings between different systems, there are several connection ways to deal with a need of service consumers to access different services through AMHS, SWIM and the Internet. The following use cases are described for different requirements and capabilities.

2.5.1 Use Case 1

In this use case, as shown in Figure 2, due to the AMHS/SWIM Gateway and the infrastructure bindings are not available for the CRV-based SWIM TI, users must connect to each access point in separate IP network segments, such as AMHS, SWIM and the Internet using a broker or gateway. The SWIM-enabled ATM applications support users to transform messages and integrate information at the application level.

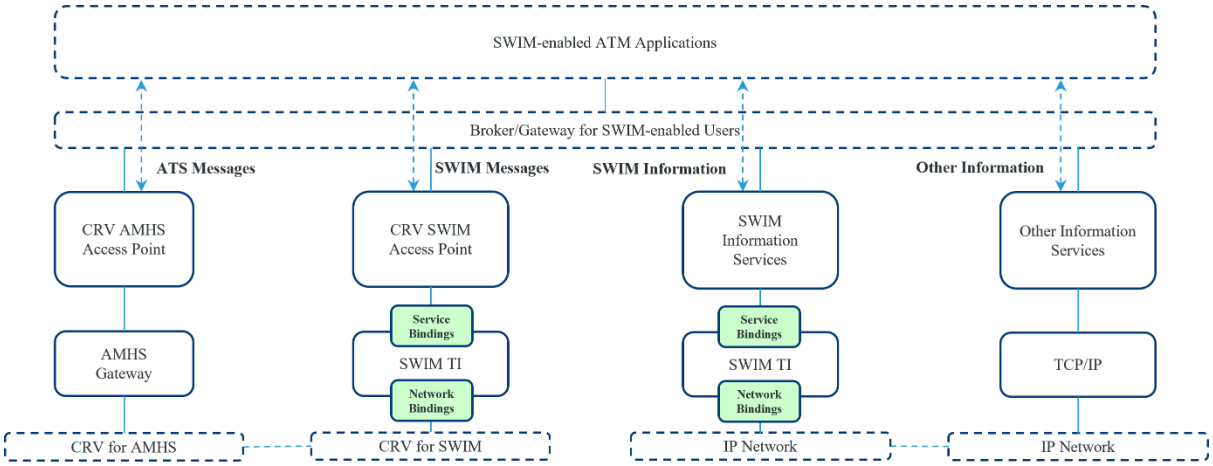

Figure 2. Use Case 1: Without AMHS/SWIM Gateway and Infrastructure Bindings

2.5.2 Use Case 2

The main difference between use case 2 (Figure 3) and use case 1 (Figure 2) is that infrastructure bindings are available between CRV-based SWIM TI and the user's local SWIM TI. This enables information exchange between different SWIM TIs in separate IP network segments when users connect to one SWIM access point. The SWIM-enabled ATM applications support users in message transformation and information integration at the application level.

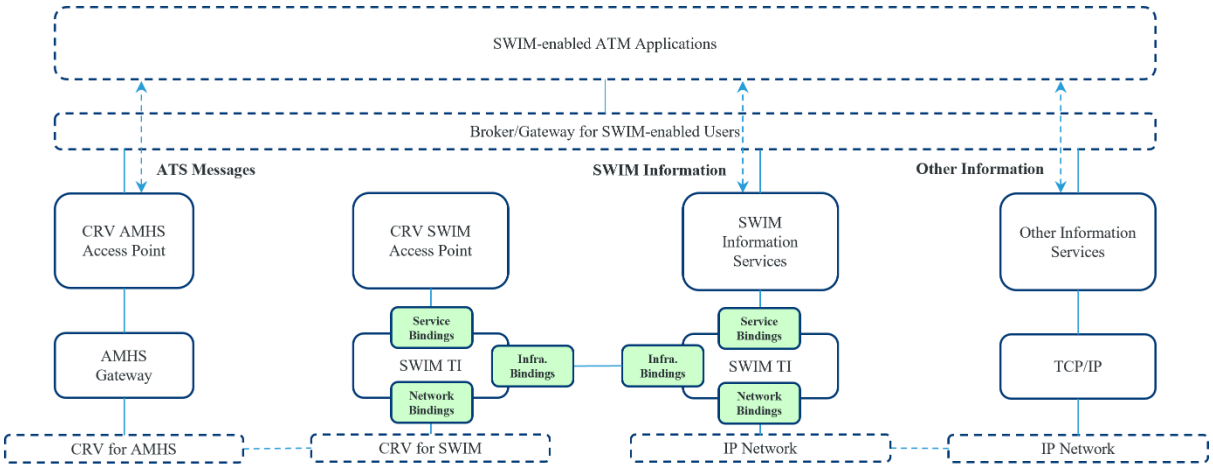

Figure 3. Use Case 2: With Infrastructure Bindings between SWIM TIs

2.5.3 Use Case 3

In this use case (Figure 4), as the AMHS/SWIM Gateway and the infrastructure bindings are available for the CRV-based SWIM TI, users would not need to connect to the CRV AMHS access point. The AMHS/SWIM Gateway will handle the exchange of information and the transformation of message between AMHS users and SWIM users. The SWIM-enabled ATM applications will be able to integrate SWIM information with other aviation-related information that is available on the Internet.

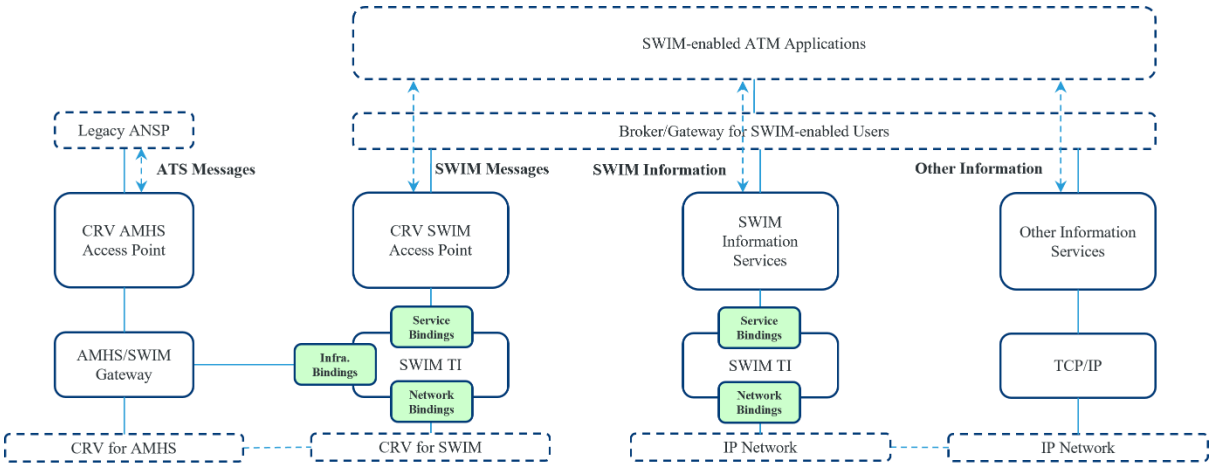

Figure 4. Use Case 3: With AMHS/SWIM Gateway and Infrastructure Bindings on CRV

2.5.4 Use Case 4

In this use case (Figure 5), as the infrastructure bindings are also available between different SWIM TIs in separate IP network segments, users only need to connect to one SWIM access point. The infrastructure bindings of SWIM TIs will cooperate with each other to achieve information exchange among SWIM users and support AMHS/SWIM Gateway to handle the massage exchange between AMHS users and SWIM users.

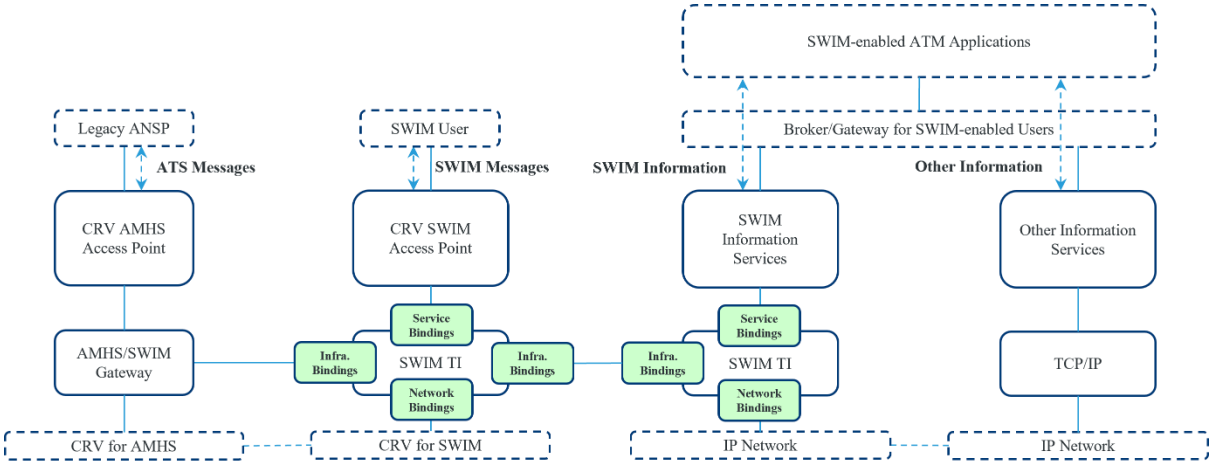

Figure 5. Use Case 4: With Infrastructure Bindings between Different Systems

To ensure interoperability, SWIM TI service providers should consider establishing common governance policies based on the trust framework discussed by ICAO TFP.

3. STANDARDS FOR INTERFACE BINDINGS

3.1 Introduction

The SWIM TI enables technical interoperability based on interface that use common ICT standards. The SWIM TI interface bindings specify the protocols for information exchange between systems. Interface bindings play a critical role in enabling technical interoperability in SWIM and are highlighted as specific TI components. This chapter specifies common technology standards for Interface Bindings, providing specifications for the implementation of service, network and infrastructure interfaces.

3.2 Interface Type

Interface type is a classification of services based on the type of technological solution that they deploy. According to the requirement of SWIM TI interface bindings, three interface types are defined to indicate the method by which the underlying capabilities of the service are accessed.

- Message-oriented: An interface that exposes service capabilities through creating, sending, receiving, and reading messages exchanged by distributed systems. The common technology standards that support this interface type include TCP/IP and AMQP.

- Resource-oriented: An interface that supports the Representational State Transfer (REST) architectural style of interactions, that is, manipulation of XML representations of Web resources using a uniform set of stateless operations, usually a set of HTTP methods.

- Method-oriented: An interface that exposes service capabilities through a set of operations. Technologies that support this interface type are Web Service framework (WS) and Open Geospatial Consortium (OGC) Web Common Services.

3.2.1 Standards for Message-oriented Interface

3.2.1.1 TCP/IP

The Table 4 makes reference to TCP/IP related technology standards required for supporting the following network bindings of SWIM TI.

- IPv4 Unicast
- IPv4 Secure Unicast
- IPv6 Unicast
- IPv6 Secure Unicast

Table 4. Standards and Specifications for TCP/IP

Standard and Specification	Description	Reference
IP (Internet Protocol)	This standard defines the format and behavior of the IPv4 protocol, which is used for transmitting packets of data over the internet.	IETF RFC 791
TCP (Transmission Control Protocol)	This standard defines the format and behavior of the TCP protocol, which is used to provide reliable, connection-oriented data transmission over the internet.	IETF RFC 793
Internet Standard Subnetting Procedure	This standard defines the procedures for subnetting IPv4 networks, which allows for more efficient use of IP addresses.	IETF RFC 950
ICMP (Internet Control Message Protocol)	This standard defines the format and behavior of the ICMP protocol, which is used for error reporting and diagnostic messages related to IPv4.	IETF RFC 792
Security Architecture for the Internet Protocol	This standard defines the overall architecture for IPsec, including the components and protocols used to provide security for IP traffic.	IETF RFC 2401
IPv6 (Internet Protocol, Version 6)	This standard defines the next generation of the IP protocol, which uses a larger address space and includes other improvements over IPv4.	IETF RFC 2460
Security Architecture for the Internet Protocol Version 6	This standard extends the IPsec security architecture to support IPv6.	IETF RFC 4301
Internet Standard, Requirements for Internet Hosts-Communication Layers	This standard describes the requirements for Internet hosts and communication protocols, such as requirements for TCP/IP protocol implementations, network interface cards, host software, and Internet applications.	IETF RFC 1122

Guidelines for Specifying the Use of IPsec Version 2	This document provides guidance to developers and administrators on how to specify the use of IPsec version 2 in different contexts, such as network architecture, service level agreements, and security policies.	IETF RFC 5406

3.2.1.2 AMQP

The following table makes reference to AMQP related specifications required for supporting service and infrastructure bindings of SWIM TI.

Table 5. Standards and Specifications for AMQP

Standard and Specification	Description	Reference
AMQP (Advanced Message Queuing Protocol)	The latest version is AMQP 1.0, which includes a secure profile that uses TLS for message encryption and authentication. It defines the messaging protocol, message format, and message exchange patterns.	https://www.oasis-open.org/standards#amqpv1.0 ISO/IEC 19464:2014 Information technology - Advanced Message Queuing Protocol (AMQP) v1.0 specification
AMQP Management	This is a standard extension to AMQP that provides a way for administrators to manage AMQP-based messaging systems securely. It includes support for authentication, authorization, and encryption.	https://www.oasis-open.org/standards#amqpmanagementv1.0
AMQP WebSocket	This is an extension to AMQP that allows AMQP messages to be exchanged over WebSocket connections.	https://www.oasis-open.org/standards#amqpwebsocketv1.0
TLS (Transport Layer Security)	This is a security protocol that provides encryption, authentication, and integrity protection for network communications. It is commonly used as the underlying security protocol for AMQPS.	IETF RFC 5246
SASL (Simple Authentication and Security Layer)	This is a framework for authentication and authorization used in AMQP and other network protocols. It provides a standardized way for clients and servers to authenticate each other and to negotiate security parameters.	IETF RFC 4422

3.2.2 Standards for Resource-oriented Interface

3.2.2.1 RESTful API

The following table makes reference to RESTful API related standards and specifications required for supporting the service or infrastructure bindings of SWIM TI.

Table 6. Standards and Specifications for RESTful API

Standard and Specification	Description	Reference
HTTP (Hyper Text Transfer Protocol)	This is the primary protocol used for communication between clients and servers in RESTful APIs. It defines a set of request and response methods (e.g., GET, POST, PUT, DELETE), as well as rules for message framing and authentication.	IETF RFC 7230-7235
HTTPS (Hyper Text Transfer Protocol Secure)	This is a standard that provides secure communication over the internet. It is a combination of the standard HTTP protocol and the security protocol SSL/TLS (Secure Sockets Layer/Transport Layer Security).	IETF RFC 2818, RFC 5246, and RFC 7540
URI (Uniform Resource Identifier)	URIs are used to identify resources in RESTful APIs. They provide a consistent, standardized way to reference resources across different systems.	IETF RFC 3986
OAuth (Open Authorization)	This is a standard protocol for authentication and authorization, which is used to control access to resources in RESTful APIs. It defines a set of roles, grant types, and endpoints that enable third-party applications to access protected resources on behalf of resource owners.	IETF RFC 6749
JSON (JavaScript Object Notation)	It is a lightweight data format used in RESTful APIs to represent structured data. It is widely used because of its simplicity and flexibility.	IETF RFC 7159
XML (Extensible Markup Language)	It is a data format commonly used in RESTful APIs. It provides a more structured and standardized way to represent data than JSON.	https://www.w3.org/XML/
OpenAPI	This is the primary standard for defining RESTful APIs using the OpenAPI specification format. It defines a set of rules and guidelines for creating, documenting, and sharing RESTful APIs.	https://spec.openapis.org/

3.2.3 Standards for Method-oriented Interface

3.2.3.1 OGC WCS

The Open Geospatial Consortium (OGC) has developed a number of Web Common Service (WCS) standards that define services for accessing and manipulating geospatial data in a web environment, such as aeronautical information and meteorologic information. The following table makes reference to some of the key WCS standards and specifications required for supporting the service or infrastructure bindings of SWIM TI.

Table 7. Standards for OGC WCS

Standard and Specification	Description	Reference
WCS (Web Coverage Service)	This standard defines a service interface for accessing and manipulating geospatial raster data, including satellite imagery, digital elevation models, and other types of gridded data.	https://www.ogc.org/standards/wcs
WFS (Web Feature Service)	This standard defines a service interface for accessing and manipulating geospatial vector data, including points, lines, and polygons.	https://www.ogc.org/standards/wfs
WMS (Web Map Service)	This standard defines a service interface for accessing and delivering geospatial map images over the web.	https://www.ogc.org/standards/wms
WMTS (Web Map Tile Service)	This standard defines a service interface for accessing pre-rendered geospatial map tiles over the web, which are small image files that make up a larger map.	https://www.ogc.org/standards/wmts
WPS (Web Processing Service)	This standard defines a service interface for accessing and executing geospatial processing algorithms over the web.	https://www.ogc.org/standards/wps

3.2.3.2 SOAP

As most users have not applied SOAP to current web applications, this standard is not recommended for the development of SWIM services. The following table makes reference to SOAP related standards and specifications required for supporting the service bindings of SOAP applications.

Table 7. Standards and Specifications for SOAP

Standard and Specification	Description	Reference
SOAP (Simple Object Access Protocol)	This is a technology standard that defines a messaging protocol for exchanging structured data over the internet. It defines the basic structure and syntax of SOAP messages, including the use of XML to encode data and the use of HTTP or other protocols for message transport.	https://www.w3.org/TR/soap/
WSDL (Web Services Description Language)	This is a technology standard that is used to describe the structure and interface of a web service. It defines the types of data that can be exchanged, the methods that can be called, and the protocols and formats used for communication.	https://www.w3.org/TR/wsdl
WS-Security	This is a technology standard that provides a set of extensions to SOAP for securing web services. It defines a framework for adding digital signatures, encryption, and other security features to SOAP messages.	https://www.oasis-open.org/committees/ws-sx/ws-security-200702/
XML Signature	This standard provides a way to digitally sign an XML document.	https://www.w3.org/TR/xmldsig-core/
XML Encryption	This standard provides a way to encrypt and decrypt portions of the XML document.	https://www.w3.org/TR/xmlenc-core/

4. TI CAPABILITIES

SWIM TI capabilities are divided into functional and non-functional capabilities. While the TI functional capabilities can be conceptualized as functions that can be invoked or executed by a system and have inputs and outputs, the non-functional capabilities are derived characteristics of a system as a result of implementing functional capabilities or other contributing elements.

- SWIM TI functional capabilities are infrastructure functions (e.g., protocol transformation, encryption), not specific to a business area or information domain, that enable information exchange between systems.

- SWIM TI non-functional capabilities are SWIM TI characteristics that contribute to the quality of services (e.g., the availability of the SWIM TI has direct impact on the availability of the service it supports).

4.1 Functional Capabilities

The SWIM TI functional capabilities described in this section are common features widely supported by mainstream Commercial Off The Shelf (COTS) systems and services. Implementing a SWIM TI that supports all these capabilities is recommended. The SWIM TI functional capabilities can be grouped into three categories as follows:

Table 8. SWIM TI Functional Capabilities

Capability	Description	Related Technology
Messaging	This capability employs technologies that enable information exchange using various access methods (e.g., publish/subscribe, request/reply).	- Message brokers: such as Apache Kafka, RabbitMQ, ActiveMQ.
Security	This capability provides infrastructure security technologies that enable secured information exchange, including, but not limited to, identity access management, digital certificates, encryption.	- Trust Framework - Information Security Framework
TI Management	This capability monitors technical infrastructure for fault and performance, ensuring reliable and compliant information exchange.	- Configuration management tools - Monitoring and observability tools - Performance optimization tools - Backup and disaster recovery tools

4.1.1 Messaging

In SWIM TI, a service interface, or an infrastructure interface defines operations and related input and output messages for those operations that consumers and providers exchange to implement the functionality offered by a service. The following table presents a list of currently defined messaging capabilities of the SWIM TI.

Table 9. Message Capabilities

Capability	Description
Connectivity	This capability enables message exchange according to well-defined protocols. The transport function will instantiate interface binding specifications (set of protocols) into adaptors or connectors to exchange information with other systems.
Message Distribution	This capability enables synchronous or asynchronous message processing. It uses information exchange resources (e.g., queues, topics) to decouple TI functions involved in message processing (connectivity, validation, etc.) based on configurable distribution rules (e.g., content/context-based routing). The components that provide this kind of functionality are message brokers.
Message Validation	This capability enables message validation to ensure they are syntactically well formed.
Policy Enforcement	This capability enforces messaging policy (e.g., routing and filtering policies, reliability policy) application.
Orchestration	This capability enables coordination between SWIM TI capabilities.

4.1.2 Security

The SWIM TI security capabilities are of high importance as they enable a trusted information exchange. The following table presents a list of currently defined security capabilities of the SWIM TI.

Table 10. Security Capabilities

Capability	Description
Identity Management	This capability enables identity management (e.g., identity creation, identity validation, federated identity retrieval).
Authentication	This capability enables credential verification and validity and their correspondence with an identity.
Authorization	This capability enables permission management associated to identities and, based on these, enforcing access control to SWIM TI services and resources.
Cryptography	This capability provides secure functions for encryption, decryption and hashing.
Key Management	This capability enables cryptographic keys' secure management.
Audit	This capability records contextual information related to security events.
Security Monitoring	This capability enables security related event monitoring, event handling and reporting.
Policy Enforcement	This capability enforces security policy application.
Boundary Protection	This capability provides functions to ensure infrastructure protection against external threats (e.g., firewall, rate limit management).

As the trust framework has been discussed at the ICAO Trust Frame Panel (TFP), SWIM TI security capabilities should align with the outputs of ICAO TFP.

4.1.3 TI Management

As supporting functions to messaging, the TI management capabilities ensure reliable and performant information exchange. The following table presents a list of currently defined TI management capabilities of the SWIM TI.

Table 11. TI Management Capabilities

Capability	Description
Resource Monitoring	This capability enables TI resources (e.g., processors, memory) monitoring.
Service Monitoring	This capability enables the TI service (e.g., status, uptime, and response times) monitoring.
Alerting	This capability enables management alerts regarding infrastructure-related events (e.g., threshold management) monitoring.
Logging	This capability enables the system event recording with the relevant contextual information.
Key Management	This capability enables cryptographic keys' secure management.
Audit	This capability records contextual information related to security events.
Replication	This capability enables system and data replication management, enabling different degrees of fault tolerance and failover.
Persistence	This capability enables data persistence management in the SWIM TI.
Load Balancing /Clustering	This capability enables load distribution management across SWIM TI resources, enabling horizontal scaling and high availability.
Common Time Reference	This capability provides a common time reference for time synchronization between different systems and services.

4.2 Non-Functional Capabilities

The SWIM TI non-functional capabilities directly contribute to the quality of SWIM services that use the SWIM TI. The SWIM TI non-functional capabilities addressed in this section are a consequence of using functional capabilities. The non-functional capabilities of the SWIM TI are based on ISO 25010 and are described in the following table.

Table 12. SWIM TI Non-Functional Capabilities

Quality	Characteristic	Related Capability
Performance Efficiency Qualities	- Time behavior, including response time and latency, can be directly correlated to the functional capability execution time of the TI. - Capacity (e.g., messages per second) is directly correlated to the functional capability execution time of the TI.	- Replication - Load balancing
Reliability Qualities	- Availability enables the SWIM TI to remain operational and accessible when required for use. - Recoverability enables the SWIM TI to recover the data directly affected by an interruption or a failure and re-establish the desired system state. - Fault tolerance enables the SWIM TI to operate as intended despite the presence of hardware or software faults.	- Replication - Load balancing
Security Non-Functional Qualities	- Confidentiality ensures that data is accessible only to those authorized to have access. - Integrity prevents unauthorized access to, or modification of data. - Non-repudiation ensures actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later. - Accountability ensures actions of an entity can be traced uniquely to the entity. - Authenticity ensures the identity of a subject or resource can be verified.	- Authentication - Authorization - Cryptography - Logging - Message Validation

APPENDIX A

STRUCTURE OF AMHS/SWIM GATEWAY

To be developed

APPENDIX B

ARCHITECTURE OF SDCM

To be developed

APPENDIX C

EXAPLE OF MESSAGE HEADERS

To be developed

FIXM version 4.2 Extension Data Attributes

Data Attribute	FIXM version 4.2
Originally included in the Asia/Pacific FIXM version 4.1 Extension	
ETO (Estimated Time Over)	Core
ELDT (Estimated Landing 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
AOBT (Actual Off-Block Time)	Extension
ATO (Actual Time Over)	Extension
Trajectory • ATO • Flight level or Altitude • Position (Designator or Latitude/Longitude or Relative point)	Extension
Aircraft Track • Ground speed • Flight level or Altitude • Heading • Position (Designator or Latitude/Longitude or Relative point or NAVAID or Aerodrome) • Time over position (Report time)	Extension
Newly identified	
EIBT (Estimated In-Block Time)	Core
TIBT (Target In-Block Time)	Extension
TTO (Target Time Over)	Extension

APAC XSD Description

Namespace	Description
Apac	FIXM Extension containing data attributes to support cross-border Air Traffic Flow Management (ATFM) operations and the integration between ATFM and Airport-Collaborative Decision Making (A-CDM), 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 ATFM data related to departure aerodrome	This class is to be included in extension field under Departure Type 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

Class	Definition	Reference/Remark
ApacArrivalType	Class containing ATFM data related to destination aerodrome	This class is to be included in extension field under Arrival Type class.
Data Attribute	Definition	Reference/Remark
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
ApacAircraftTrackType	Class containing aircraft track data	This class is to be included in extension field under Flight Type class.
Data Attribute	Definition	Reference/Remark
speed	Current aircraft speed	speed can be in the following forms, • Ground speed; and/or • Indicated airspeed
level	Current flight level	level can be in the following forms, • Flight level; or • Altitude.
heading	Current aircraft heading	
position	Current aircraft position	position can be in the following forms, • Designator; • Latitude/Longitude; • Relative point; • NAVAID; or • Aerodrome.
time	Time when all data in this class is reported	

Class	Definition	Reference/Remark
ApacActualTrajectoryType	Class containing all trajectory elements of a flight	This class is to be included in extension field under Flight Type class.
Data Attribute	Definition	Reference/Remark
element	A list of trajectory elements	

Class	Definition	Reference/Remark
ApacActualTrajectoryElementType	Class containing composition of each trajectory element(s) specified in ApacTrajectoryType	
Data Attribute	Definition	Reference/Remark

level	An estimated flight level of the aircraft at this trajectory element	level can be in the following forms, ● Flight level; or ● Altitude.
point	A specified position of this trajectory element	point can be in the following forms, ● Designator; ● Latitude/Longitude; or ● Relative point.
actualTimeOver	An actual time of the aircraft over routePoint	

Class	Definition	Reference/Remark
ApacRouteTrajectoryElementType	Class containing traffic synchronous information	
Data Attribute	Definition	Reference/Remark
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

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FIXM version 4.2 Core Data Attributes to Support Cross-Border ATFM Information Exchange

Data Attribute	FIXM version 4.2 Core
ETO (Estimated Time Over)	FlightType.routeTrajectoryGroup.filed.element.point4D.time = (ETO) FlightType.routeTrajectoryGroup.filed.element.elementStartPoint = (point at which ETO is specified)
ELDT (Estimated Landing Time)	FlightType.routeTrajectoryGroup.filed.element.point4D.time = (ELDT) FlightType.routeTrajectoryGroup.filed.element.point4D.pointProperty.propertyType = WHEELS_ON FlightType.routeTrajectoryGroup.filed.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
EIBT (Estimated In-Block Time)	FlightType.routeTrajectoryGroup.filed.element.point4D.time = (EIBT) FlightType.routeTrajectoryGroup.filed.element.point4D.pointProperty.propertyType = END_STAY FlightType.routeTrajectoryGroup.filed.element.elementStartPoint.aerodromReferencePoint.locationIndicator = FlightType.arrival.destinationAerodrome.locationIndicator

Part of FIXM version 4.2 Core Sample Messages

Data Attribute	Part of FIXM version 4.2 Core Sample Messages
ETO (Estimated Time Over)	<fx:element seqNum="0"> <fx:elementStartPoint> <fb:designatedPoint> <fb:designator>KIGOB</fb:designator> </fb:designatedPoint> </fx:elementStartPoint> <fx:point4D> <fx:time> <fx:absoluteTime>2023-05-10T01:11:00Z</fx:absoluteTime> </fx:time> </fx:point4D> <fx:routeDesignatorToNextElement> <fx:routeDesignator>Y11</fx:routeDesignator> </fx:routeDesignatorToNextElement> </fx:element>
ELDT (Estimated Landing Time)	<fx:element seqNum="5"> <fx:elementStartPoint> <fb:aerodromeReferencePoint> <fb:locationIndicator>WSSS</fb:locationIndicator> </fb:aerodromeReferencePoint> </fx:elementStartPoint> <fx:point4D> <fx:pointProperty> <fx:propertyType>WHEELS_ON</fx:propertyType> </fx:pointProperty> <fx:time> <fx:absoluteTime>2023-05-10T02:54:00Z</fx:absoluteTime> </fx:time> </fx:point4D> </fx:element>

Data Attribute	Part of FIXM version 4.2 Core Sample Messages
CTOT (Calculated Take-Off Time)	<fx:element seqNum="0"> <fx:constraint> <fx:time> <fx:timeSpecification> <fb:timeValue>2023-05-10T01:15:00Z</fb:timeValue> </fx:timeSpecification> </fx:time> </fx:constraint> <fx:elementStartPoint> <fb:aerodromeReferencePoint> <fb:locationIndicator>VTBS</fb:locationIndicator> </fb:aerodromeReferencePoint> </fx:elementStartPoint> <fx:point4D> <fx:pointProperty> <fx:propertyType>WHEELS_OFF</fx:propertyType> </fx:pointProperty> </fx:point4D> </fx:element>
CTO (Calculated Time Over)	<fx:element seqNum="1"> <fx:constraint> <fx:time> <fx:timeSpecification>

	<fb:timeValue>2023-05-10T01:21:00Z</fb:timeValue> </fx:timeSpecification> </fx:time> </fx:constraint> <fx:elementStartPoint> <fb:designatedPoint> <fb:designator>KIGOB</fb:designator> </fb:designatedPoint> </fx:elementStartPoint> </fx:element>

Data Attribute	Part of FIXM version 4.2 Core Sample Messages
CLDT (Calculated Landing Time)	<fx:element seqNum="2"> <fx:constraint> <fx:time> <fx:timeSpecification> <fb:timeValue>2023-05-10T03:04:00Z</fb:timeValue> </fx:timeSpecification> </fx:time> </fx:constraint> <fx:elementStartPoint> <fb:aerodromeReferencePoint> <fb:locationIndicator>WSSS</fb:locationIndicator> </fb:aerodromeReferencePoint> </fx:elementStartPoint> <fx:point4D> <fx:pointProperty> <fx:propertyType>WHEELS_ON</fx:propertyType> </fx:pointProperty> </fx:point4D> </fx:element>
EIBT (Estimated In-Block Time)	<fx:element seqNum="6"> <fx:elementStartPoint> <fb:aerodromeReferencePoint> <fb:locationIndicator>WSSS</fb:locationIndicator> </fb:aerodromeReferencePoint> </fx:elementStartPoint> <fx:point4D> <fx:pointProperty> <fx:propertyType>END_STAY</fx:propertyType> </fx:pointProperty> <fx:time> <fx:absoluteTime>2023-05-10T03:09:00Z</fx:absoluteTime> </fx:time> </fx:point4D> </fx:element>

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema targetNamespace="http://www.fixm.aero/ext/apac/4.2"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:apac="http://www.fixm.aero/ext/apac/4.2" xmlns:fb="http://www.fixm.aero/base/4.2"
xmlns:fx="http://www.fixm.aero/flight/4.2" elementFormDefault="qualified"
version="4.2.0">
	<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/base/4.2"
schemaLocation="..\..\core\base\AeronauticalReference.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\Base.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\Extension.xsd"/>
	<xs:import namespace="http://www.fixm.aero/flight/4.2"
schemaLocation="..\..\core\flight\Flight.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\Measures.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\RangesAndChoices.xsd"/>
	<xs:import namespace="http://www.fixm.aero/base/4.2"
schemaLocation="..\..\core\base\Types.xsd"/>

	<xs:complexType name="ApacRouteTrajectoryElementType">
		<xs:annotation>
			<xs:documentation>Class containing traffic synchronous
information</xs:documentation>
		</xs:annotation>
		<xs:complexContent>
			<xs:extension base="fb:RouteTrajectoryElementExtensionType">
				<xs:sequence>
					<xs:element name="targetTimeOver"
type="fb:TimeType" minOccurs="0" maxOccurs="1" nillable="true">
						<xs:annotation>
							<xs:documentation>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 calculated by arrival management (AMAN)
system]</xs:documentation>
						</xs:annotation>
					</xs:element>
				</xs:sequence>
			</xs:extension>
		</xs:complexContent>
	</xs:complexType>

	<xs:complexType name="ApacDepartureType">
		<xs:annotation>
```

```
                <xs:documentation>Class containing ATFM 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:TimeType" minOccurs="0" maxOccurs="1">
                            <xs:annotation>
                                <xs:documentation>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]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="targetOffBlockTime" type="fb:TimeType" minOccurs="0" maxOccurs="1" nillable="true">
                            <xs:annotation>
                                <xs:documentation>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]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="targetStartupApprovalTime" type="fb:TimeType" minOccurs="0" maxOccurs="1" nillable="true">
                            <xs:annotation>
                                <xs:documentation>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]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="targetTakeOffTime" type="fb:TimeType" minOccurs="0" maxOccurs="1" nillable="true">
                            <xs:annotation>
                                <xs:documentation>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]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                    </xs:sequence>
                </xs:extension>
            </xs:complexContent>
        </xs:complexType>

        <xs:complexType name="ApacArrivalType">
```

```
		<xs:annotation>
			<xs:documentation>Class containing ATFM 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="targetInBlockTime" type="fb:TimeType" minOccurs="0" maxOccurs="1">
						<xs:annotation>
							<xs:documentation>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)]</xs:documentation>
						</xs:annotation>
					</xs:element>
				</xs:sequence>
			</xs:extension>
		</xs:complexContent>
	</xs:complexType>

	<xs:complexType name="ApacActualTrajectoryType">
		<xs:annotation>
			<xs:documentation>Class containing all trajectory elements of a flight. This class is to be included in extension field under FlightType class.</xs:documentation>
		</xs:annotation>
		<xs:complexContent>
			<xs:extension base="fb:RouteTrajectoryGroupContainerExtensionType">
				<xs:sequence>
					<xs:element name="element" type="apac:ApacActualTrajectoryElementType" minOccurs="0" maxOccurs="2000"/>
				</xs:sequence>
			</xs:extension>
		</xs:complexContent>
	</xs:complexType>
	<xs:complexType name="ApacActualTrajectoryElementType">
		<xs:annotation>
			<xs:documentation>Class containing composition of each trajectory element(s) specified in ApacTrajectoryType</xs:documentation>
		</xs:annotation>
		<xs:sequence>
			<xs:element name="actualTimeOver" type="fb:TimeType" minOccurs="1" maxOccurs="1">
				<xs:annotation>
					<xs:documentation>An actual time of the aircraft over routePoint</xs:documentation>
				</xs:annotation>
```

```
                </xs:element>
                <xs:element name="level"
type="fb:FlightLevelOrAltitudeChoiceType" minOccurs="1" maxOccurs="1">
                    <xs:annotation>
                        <xs:documentation>An estimated flight level of the
aircraft at this trajectory element [level can be in the following forms, Flight level; or
Altitude.]</xs:documentation>
                    </xs:annotation>
                </xs:element>
                <xs:element name="point" type="fb:SignificantPointChoiceType"
minOccurs="1" maxOccurs="1">
                    <xs:annotation>
                        <xs:documentation>A specified position of this
trajectory element [point can be in the following forms, Designator; Latitude/Longitude; or
Relative point.]</xs:documentation>
                    </xs:annotation>
                </xs:element>
            </xs:sequence>
        </xs:complexType>

        <xs:complexType name="ApacAircraftTrackType">
            <xs:annotation>
                <xs:documentation>Class containing aircraft track data. This class is
to be included in extension field under FlightType class.</xs:documentation>
            </xs:annotation>
            <xs:complexContent>
                <xs:extension base="fb:FlightExtensionType">
                    <xs:sequence>
                        <xs:element name="heading" type="fb:BearingType"
minOccurs="1" maxOccurs="1">
                            <xs:annotation>
                                <xs:documentation>Current aircraft
heading</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="level"
type="fb:FlightLevelOrAltitudeChoiceType" minOccurs="1" maxOccurs="1">
                            <xs:annotation>
                                <xs:documentation>Current flight level
[level can be in the following forms, Flight level; or Altitude]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="position"
type="fb:SignificantPointChoiceType" minOccurs="1" maxOccurs="1">
                            <xs:annotation>
                                <xs:documentation>Current aircraft
position [position can be in the following forms, Designator; Latitude/Longitude; or Relative
point.]</xs:documentation>
                            </xs:annotation>
                        </xs:element>
```

```
                                        <xs:element name="time" type="fb:TimeType"
minOccurs="1" maxOccurs="1">
                                                <xs:annotation>
                                                        <xs:documentation>Time when all data
in this class is reported</xs:documentation>
                                                </xs:annotation>
                                        </xs:element>
                                        <xs:element name="speed"
type="apac:ApacAircraftTrackSpeedChoiceType" minOccurs="1" maxOccurs="1"/>
                                </xs:sequence>
                        </xs:extension>
                </xs:complexContent>
        </xs:complexType>
        <xs:complexType name="ApacAircraftTrackSpeedChoiceType">
                <xs:choice>
                        <xs:element name="groundspeed" type="fb:GroundSpeedType"
minOccurs="1" maxOccurs="1"/>
                        <xs:sequence minOccurs="1" maxOccurs="1">
                                <xs:element name="airspeed"
type="fb:IndicatedAirspeedType" minOccurs="1" maxOccurs="1"/>
                                <xs:element name="groundspeed"
type="fb:GroundSpeedType" minOccurs="0" maxOccurs="1"/>
                        </xs:sequence>
                </xs:choice>
        </xs:complexType>

</xs:schema>
```

Survey on Attending and Participating in the SWIM Demonstration over CRV cum Surveillance Sharing in SWIM Trial Joint Event

Background:

A SWIM Demonstration over CRV ("the **Demo**") was planned to be hosted in Hong Kong China back in 2020 under SWIM TF, to demonstrate the operational benefits of using CRV to carry SWIM data, and the corresponding services envisaged as necessary or complementary to support implementation of SWIM in APAC region. Due to the COVID-19 pandemic, the demonstration had been postponed.

On the other hand, the Surveillance Sharing in SWIM Trial Implementation Group (S3TIG) was established under Surveillance Study Group (SURSG) with the objective to support and promote the trial implementation of surveillance data sharing based on SWIM ("the **Trial**") under the SURSG.

Given substantial commonality between the two events, both events would take place as a **Joint Event** (tentatively lasting 2 days) to be hosted by Hong Kong China with attendance in Hong Kong and participants taking part in the Joint Event. The Joint Event is scheduled to take place in end 2023 or Q1 2024.

Moreover, subject to your feedbacks, the set-up would be accessed after the Joint Event for participants to appreciate the operation of the SWIM environment and potential SWIM applications ("the **Post-Event Appreciation**") in order for further evaluation.

To gauge your organization's interest in the Joint Event and level of participation for planning and implementation purposes, a questionnaire has been prepared for your kind response by xxxx xxxx 2023. **Kindly circle your response, cross out inapplicable entries or provide your input** depending on the structures of the questions.

We look forward to your support for the event and promoting the implementation of SWIM in the Asia Pacific region together.

Questionnaire[1]

Respondent Information

State/Administration	
Organization	
Post title	
Phone	
Email	

Joint Event

1) Would your organization send delegates to attend the 2-day Joint Event hosted by Hong Kong China in Q4 2023 or Q1 2024?

   a. Yes
   b. No

Demo

2) Would your organization like to participate in the **Demo**?
   a. Yes
   b. No

   If Yes:

   (i) Will your organization operate a trial or operational SWIM Enterprise Messaging Service (EMS) for exchange of SWIM data? **Yes/No**

   (ii) Regardless of the reply to (i) above, would your organization participate in the exchange of flight, surveillance, MET information or ATFM information? **Yes/No**

   (iii) If Yes to (ii), would your organization be willing to share its:
   a. Flight data (**Yes/No**)? If Yes, **Real-time/Recorded/Simulated data**?
   b. Surveillance data (**Yes/No**)? If Yes, **Real-time/Recorded/Simulated data**?
   c. MET data (**Yes/No**)? If Yes, **Real-time/Recorded/Simulated data**?
   d. ATFM data (**Yes/No**)? If Yes, **Real-time/Recorded/Simulated data**?

[1] Any response in this questionnaire is not to be taken as commitment by the respondent or the surveyor.

3) Are there SWIM services you would like demonstrated?

(select all that applies)

a. Flight Information Service
b. Surveillance Information Service
c. MET Information Service
d. ATFM Information Service
e. Aeronautical Information Service
f. SWIM Registry
g. Surveillance Central Data Processor (SCDP)
h. Others, please specify:

Trial

4) Would your organization like to participate in the **Trial**?

a. Yes
b. No

If Yes, would your organization participate in the **Trial** as

a. **as Contributor** of surveillance data? If Yes, **ADS-B data/Radar**?
b. **as Consumer** of surveillance data? If Yes, **ADS-B data/Radar**?
c. **as Contributor & Consumer** of surveillance data? If yes, **ADS-B data/Radar**?
d. **as Observer** *See Note*

Note:

(i) A Contributor should at least contribute ADS-B CAT 21 Version 2.1 data. It is recommended that State should have a trial or operational SWIM EMS to route surveillance information using AMQP 1.0, with payload data generated in ASTERIX or JSON format from the original surveillance data source. State without a trial or operational SWIM EMS would further coordinate with PCCWG on the technical feasibility in providing network-based SWIM EMS.

(ii) No specific prerequisite for a Consumer. It is recommended that State should have a trial or operational SWIM EMS to subscribe to surveillance information service using AMQP 1.0. State without a trial or operational SWIM EMS would further coordinate with PCCWG on the technical feasibility in providing network-based SWIM EMS.

(iii) An Observer may interact with the HMI of the SWIM services in the Post-Event Appreciation.

If your organization would participate as a Contributor of surveillance data at the Trial, your organization would share:

Real-time data/Recorded data/Simulated data?

5) Other than ADS-B data, are there other types of data or SWIM features your organization would like to be included in the **Trial**?

(select all that applies)

a. Radar data
b. SWIM Registry
c. SCDP
d. Others, please specify:

6) What would be the preferred mode of access of the **Trial**?

a. Pseudo CRV

Our organization **is interested/not interested** in obtaining free CRV Package D CRV connection to participate in the Joint Event and Post-Event Appreciation *See Note*.

[*Note:*

*(i) S3TIG considered that the option to use operational CRV for the **Trial** is not recommended after revisiting the nature of the operational CRV. Operational CRV is a safety critical environment that testing or trial on it was not preferred. Any testing or trial may raise potential risks to the services running within the operational environment. Therefore, S3TIG suggested to remove this option from the **Trial**.*

(ii) *PCCWG may provide up to 5 pseudo CRV Package D connections for free (priority will be given to data contributor operated with a trial or operational SWIM EMS) for participating in the Joint Event and Post-Event Appreciation period for interested participants for the **Trial** but subject to consideration of a participant's geographical location, ease of installation (such as whether participant is an existing CRV subscriber) as well as available communication infrastructures that could support CRV Package D connections.*

(iii) *Pseudo-CRV operates exactly the same as operational CRV as it is a dedicated and segregated CRV-network with the same hardware setup. Therefore, similar to operational CRV, dedicated Network Interface Device would be installed at participant's site.*]

b. Console Connect - PCCWG may provide up to 10 free SIM cards for mobile connection (primarily for Aviation Support Service Providers (i.e. non-ANSPs) and support ANSP as Observer via mobile or desktop devices).

Our organization **is/is NOT** interested in participating in the Joint Event and Post-Event Appreciation by accessing Console Connect services provided by PCCWG *See Note*.

[*Note: Console Connect service is PCCWG's services that allow users to gain access to the simulated SWIM environment in the Trial to publish/subscribe data services, among other SWIM services for participation in the* ***Trial*** *and in the Post-Event Appreciation.*]

c. Others, please specify:

7) If there will be a Post-Event Appreciation [2] accessible for a period of time for participants and interested parties to appreciate the SWIM environment and system HMI:

   a. If your organization is a data contributor, would your organization continue to provide the data? **Yes/No**.

   If Yes, for _____ **weeks** after the Joint Event

   b. Regardless if your organization is a data Contributor, data Consumer or Observer of the Joint Event, would your organization be interested in accessing the demonstration set-up after the event? **Yes/No**?

   If Yes, for _____ **weeks** after the Joint Event

8) What types of SWIM data payload for carrying the surveillance data would you like to be included?

   a. ASTERIX only
   b. JSON only
   c. ASTERIX and JSON
   d. Others, please specify:

[*Note: ASTERIX will be the native binary format of the surveillance data. JSON will be in a tailored text-based format to be determined by S3TIG during the preparation of the* ***Trial***.]

[2] Some services or data might be available after the Joint Event.

TERMS OF REFERENCE

SWIM Task Force

Objectives: In order to achieve the SWIM thread as specified in the Aviation System Block Upgrade (ASBU) of the Global Air Navigation Plan (GANP), the Asia/Pacific Seamless ANS Plan objectives, and the air navigation systems that are in compliance with ICAO global standards for the conceptualisation and exchange of aeronautical, flight and meteorological information, the SWIM Task Force will:

a) Benchmark the various successful implementations of SWIM in States and regions to promote best practices;

b) Develop and maintain the Asia/Pacific regional roadmap for SWIM implementation, including SWIM technical infrastructure, SWIM governance, SWIM information services;

c) ~~Define~~ Propose a high-level Asia/Pacific regional SWIM architecture, the corresponding SWIM technical infrastructure requirements, and the implementation approach to construct such architecture principally over CRV and other IP based networks to ensure interoperability among regional SWIM ~~participants and to~~participants, to support transition for non-SWIM capable entities;

d) Develop the Asia/Pacific regional SWIM cyber security architecture framework and SWIM security strategy in line with ICAO International Aviation Trust Framework (IATF);

e) Support APANPIRG WGs/TFs regarding information exchange models and examine if any extension to the existing information exchange models, i.e. AIXM, FIXM, and IWXXM, and/or the new information exchange model(s) are required to support the Asia/Pacific regional operational requirements;

f) Establish a robust and sustainable governance model to ensure that a common set of policies, rules, and standards for identifying, designing, implementing, discovering, and operating SWIM-enabling components, including SWIM registries, is consistently applied and enforced throughout the Asia/Pacific region;

g) Develop and define the Asia/Pacific version of the SWIM information service overview specifications and the Asia/Pacific version of data catalogue for information services based on the regional operational needs;

h) Track and observe SWIM demonstrations and trials within the Asia/Pacific region as well as provide, if required, support for regional SWIM demonstrations;

i) Encourage and support interested APAC Member States to ~~C~~construct a platform for SWIM services and applications validation and to support the implementation of SWIM services and applications;

j) Monitor developments by the IMP and escalate the regional issues as required;

k) Identify, communicate, and liaise with relevant APANPIRG WGs/TFs in regard to SWIM-related activities, including providing support to refine SWIM operational and communications requirements~~.~~;

l) Develop an educational and promotional materials required to support the regional SWIM implementation to ensure cohesiveness among regional SWIM participants;

m) Assist APAC Member States to implement the Asia/Pacific regional SWIM, as appropriate;~~Implement the Asia/Pacific regional SWIM~~; and

n) Undertake any other approved tasks related to SWIM implementation that may arise in the future.

Composition:

The SWIM TF will consist of experts from ATM, AIM, MET, and CNS from Asia/Pacific States and international organizations such as IATA and ICCAIA.

Conduct of the work:

The task force will conduct its work through web conferences, teleconferences, other electronic means of communications, and Face-to-Face meetings.

Reporting:

The group will report to CNS SG.

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SWIM TF Work Plan

Project Group	Old Task number	Old Task Description	New Task No	New Task Description	Objective and scope	Task Lead(s)	Planned Start	Planned completion	Dependencies	Guidance for SOW
Implementation Planning	1-1	Benchmarking of best practices	**1**	Regional implementation philosophy & roadmap	Develop and maintain the Asia/Pacific regional roadmap for SWIM implementation, including SWIM technical infrastructure, SWIM governance, aeronautical information service, flight information service, and weather information service	David Leow (Singapore) Dr. Amornrat Jirattigalachote (Thailand)	2017	2018	SWIM Task Force created, resources available Panels deliver as expected Task 1.7 (common vocabulary)	benchmark existing governance models (FAA, Europe), existing catalogues, existing arrangements for quality of service/SLA (availability/reliability), existing registries if any Benchmark mediation of legacy users Benchmark available existing SWIM and industry models for service descriptions ICCAIA IP13 to be included
		Guidance To States: Interregional workshop Develop SWIM implementation Guidance for phase 1 Develop SWIM implementation Guidance for phase 2 (dual operations) Regional workshops					2017 2017 2017 2019 As needed	2022 2017 2018 2020	SWIM iKit (if confirmed by IMP)	From the task 1-3 APANPIRG WG/TF planning to use or using SWIM may need guidance (ad hoc basis) Guidance to States Mediation of legacy users Lessons learnt from ASEAN SWIM demonstration
		Guidance for publishers/consumers;					2017	2018	Task 1.1 Task 1-5 and 1-6 Task 1-4 (service descriptions)	Common vocabulary requirement on publishers and suscribers to use the common controlled vocabulary Should include developing a guide for the preparation of service descriptions (dependency = 1.4) Could include guidance for developers/publishers on a set of protocols/formats to use
	1-2	SWIM Regional roadmap					2019	2022	SWIM Manual 10039 and Technical Manual	Roadmap needs to be updated to reflect the changes and developments that have occured in the last SWIM TF meetings. It needs to be more granular and help direct the work of the other task groups for APAC regional SWIM implementation.
							2022	2024	New implementation Roadmap	1st Set the timeframe for implementation 2nd Discuss with the TF and decide on the elements for impelementation 3rd Develop new roadmap for SWIM implementation.
	1-8	Regional SWIM Architecture	**2**	Regional SWIM infrastructure	• Define the high-level APAC SWIM Architecture including policies on implementation and distribution of SWIM services • Define the requirements for the APAC SWIM Infrastructure with the goal of ensuring technical interoperability • Outline policy to ensure backwards compatibility with non-SWIM capable entities • Develop a roadmap for the implementation of APAC SWIM Infrastructure	Mr. Xiaodong Lu (Japan) Mr. Yukinobu Ryu (Japan) Mr. Henry Chan (Hong Kong, China)	2017 2021	2020 2023	• Manual on SWIM, SARPS, PANS and Guidance material from IMP, CP or ATMRPP • Availability and capability of CRV implementation • Task 5 – Governance • Task 6 – Information Services • Task 8 – SWIM Service and Application Validation	Define a CRV-based APAC SWIM Architecture to assure interoperability during the transition period Develop APAC SWIM Infrastructure requirements based on the related ICAO documents Propose an approach to implement secure APAC SWIM Infrastructure by cooperating with Task 3 Security Services

Project Group	Old Task number	Old Task Description	New Task No	New Task Description	Objective and scope	Task Lead(s)	Planned Start	Planned completion	Dependencies	Guidance for SOW
SWIM infrastructure	New	NA	**3**	Security service	• Advises TF Chair and Task Leads in the area of cybersecurity for APAC. Specific objectives include: • Determining the scope of security responsibility of SWIM, consistent with SWIM technical infrastructures envisioned by the ICAO Information Management Panel (IMP) and the APAC regional network infrastructures including the CRV. • Proposing a trust framework to ensure that the correct information is sent to the correct users, considering identity and access management initiatives (IAM) from member states. • Ensures interoperability of trust frameworks within APAC region and with other ICAO regions. • Developing SWIM Cyber Security Architecture Framework and SWIM security strategy for the Asia-Pacific Region. Analyses and capture SWIM security risks. • Provide security guidelines and best practices to be incorporated in SWIM APAC Governance activities.	Mr. Jim Laymon (USA)	2023	2025	ICAO 2022 approval of: 1. X.509 Certificate Policy for the International Aviation Trust Framework (IATF) Certification Authority 2. IATF CP Criteria and Methodology for Cross Certification Identity Management 3. IATF CP Life Cycle Management (CPLCM) Operating Rules, 4. International Aviation Trust Framework Bylaws 5. IATF Criteria and Methodology for Global Resilient Aviation Interoperable Network (GRAIN)	Objective: Proposing a trust framework to ensure that the correct information is sent to the correct users, considering identity and access management initiatives (IAM) from member states. Proposed Guidance: APAC establishment of a Regional SWIM PKI Policy Management Authority in alignment with ICAO IATF SARPS Objective: Ensures interoperability of trust frameworks within APAC region and with other ICAO regions. Proposed Guidance: APAC establishment of a Regional SWIM DT&E environment to conduct Interoperability testing with US FAA, EUROCONTROL and other Regional ANSPs. (MRTBO example) Objective: Developing SWIM Cyber Security Architecture Framework and SWIM security strategy for the Asia-Pacific Region. Analyses and capture SWIM security risks. Provide security guidelines and best practices to be incorporated in SWIM APAC Governance activities Proposed Guidance: FAA provide Technical interchange of SWIM IAM Phase 2 and SWIM IAM segment 3 planned investments that align with ICAO IATF requirements to include establishment of the FAA PKI Policy Management Authority to assist APAC development of SWIM Cyber Security Architecture Framework and PKI use governance.
Technical Architecture	1-6	Regional SWIM models	**4**	Development and maintenance of regional information exchange models	Support APANPIRG WG/TF regarding information exchange models and examine if any extension to the existing information exchange models, i.e. AIXM, FIXM, and IWXXM, and/or the new information exchange model(s) are required to support the Asia/Pacific regional operational requirements	Dr. Amornrat Jirattigalachote (Thailand) Mr. Wen Zhu (USA)	2016	~~2017~~ TBD (Regional Extension will need to be maintained/updated to accommodate (i) new operational use cases and (ii) the release of new version of information exchange model(s))	Global model definitions available	~~From the task 1-3 models may need extension /refinements - there is already a case for ATFM~~ ~~Interaction with "light" approach discussed by IMP, coordination with 1-7~~ ~~Relation with CCB - coordination with task 1-4~~ Regional Extension may need refinement - There is already a case for ATFM and ATFM/A-CDM integration; Interaction with "light" approach discussed by IMP - Coordiantion with Task 9 Relation with CCB - Coordination with Task 5
Governance	1-4 1-5 2-1-2 2-1-4	SWIM governance Design Regional SWIM Registry and architecture for phase 2 Implement SWIM registry and architecture Guidance and Requirements for Publishers and Consumers	**5**	Regional SWIM Governance Framework	I. Establish a robust and sustainable Governance model to ensure that a common set of policies, rules, and standards for identifying, designing, implementing, discovering, and operating SWIM-enabling components is consistently applied and enforced throughout the APAC. II. Develop or adopt standards, policies, and procedural guidelines to support the functional requirements for implementing all aspects of service-oriented development in the context of APAC SWIM. III. Facilitate visibility and control for insight into all APAC SWIM-enabled services by supporting developments of flexible mechanisms for service discovery, including, but not limited to, service registries.	Mr. Dongkie Park (ROK) Mr. Mark Kaplun (USA), Mr. Yukinobu Ryu (Japan) Mr. Xiaodong Lu (Japan), Ms. Honglei Gao (China)	2016	TBD (Note: SWIM Governance will be implemented throughout the SWIM lifecycle.)	I. Procedures for Air Navigation Services (PANS) Information Management (IM), Volume I System Wide Information Management II. Manual on System Wide Information Management (SWIM), Doc 10039, VOLUME I: SWIM Concept III. SWIM Discovery Service Implementation Specfication Service Description Conceptual Model (SDCM) IV. APAC SWIM Roadmap	I. Effective governance will result in more consistent decision-making and reduce risk and uncertainty. II. Identify new areas for policy development based on collected input and present them to the APAC SWIM TF. III. Further update the SDS solution to reflect user experience, lessons learned, and emerging technological solutions. IV. Facilitate ongoing engagement with SDS implementers through regular feedback and reviews. V. Concentrate on what really needs to be delivered to SWIM consumers. VI. Ensure that consumers' and providers' needs are met by developing a comprehensive SLA-management solution that can be adapted to multiple states' SWIM deployment scenarios.
Information Services	2-1-2	Promote new needs and new services and maintain database of publishers (ID/access points/services/interface/format..) pending registry implementation	**6**	Information services	To develop and define the APAC version of the SWIM information service overview specifications and APAC version of data catalogue for information services based on operational needs in APAC.	Mr. Marco Kok (Hong Kong, China)	2017	2023	Dependent on new use cases and operational needs identiifed in APAC.	•Develop the APAC version of the required and optional information services for ANSP to prioritize the implementation of services •Develop the APAC version of data catalogue for information services •Identify any additional optional fields required for SWIM service overviews in APAC in addition to those as defined in PANS-IM

Project Group	Old Task number	Old Task Description	New Task No	New Task Description	Objective and scope	Task Lead(s)	Planned Start	Planned completion	Dependencies	Guidance for SOW
Validation & Demonstration	~~1/2/2001~~	~~Promote new needs and new services and maintain database of publishers (ID/access points/services/interface/format..) pending registry implementation~~	7	SWIM Demonstration	• Report on the SWIM in ASEAN demonstration, particularly the lessons learnt • Track and observe SWIM demonstrations and trials within the Asia/Pacific region and ensure that reports of those demonstrations and trails are presented to the SWIM Task Force • Provide, if requested, support for regional SWIM demonstrations	Mr. David Leow (Singapore) Dr. Amornrat Jirattigalachote (Thailand)	2017	2019		An "Excel" file? Include service descirptions etc Assume registry services can be available on CRV from 2019 onwards 70 FAA applications are available for use and should be referenced in the catalogue
	2-2-1	SWIM generalization					2021	TBD (Depening on the demonstration/trial to be conducted in APAC)	Demonstration/Trial to be conducted within APAC	
	2-1-3	Support validation and publication of SWIM based applications	8	SWIM services and application validation	• Construct a platform for SWIM service and application validation • Support the implementation of SWIM service and applications • Support the demonstration of SWIM based operations	Mr. Yukinobu Ryu (Japan) Mr. Xiaodong Lu (Japan) Ms. Honglei Gao (China) Mr. Dongkie Park (ROK)	2017 2020	2019 2023	• Manual on SWIM, SARPS, PANS and Guidance material from IMP, CP or ATMRPP • The status of SWIM TI implementation in APAC Region • Task 2 – Regional SWIM Infrastructure • Task 3 – Security Services • Task 5 – Governance • Task 6 – Information Services	Support the validation of FF-ICE/R1 service Develop validation requirements for Regional SWIM Infrastructure Support the validation of Regional SWIM Infrastructure with Security Services via the joint demonstration Support the validation of required SWIM services and applications for different operation levels
Coordination and Promotion	1-7	Monitoring of panels work	9	Monitoring of panels work	Monitor developments by IMP and escalate issues/inputs as required	Mr. Yukinobu Ryu (Japan)	2016	2022	SWIM Manual and Technical Manual	Escalate issues to the panels Report back from panels 2 IMP meetings per year, monthly conferences A need for a Discussion paper at IMP (deliverable of the task) Focal point for common controlled vocabulary, in coordination with 1-4 Version management should be coordinated regarding backward compatibility and the content of models (FIXm, AIXM) Focal pint to trigger change requests to the models
	1-3	Regional coordination within APAC and guidance and training to APANPIRG bodies	10	Regional coordination and SWIM-related information sharing	• Identify SWIM related activities (and their interdependencies) in planning or development within other WGs and TFs. • Liaise with relevant regional TF/WG to refine operational and communications requirements (ATFM SG, MET IE, AAITF, ACSICG, CRV OG, etc). • Provide guidance to APANPIRG WG/TF using SWIM. • Influence outcomes from other WGs and TFs that will support successful expansion of SWIM (eg: development of SWIM compatible CRV). • This involves confirming inclusion on agendas and appropriate discussions ensuing	Vacant	2016	2022	SWIM Manual and Technical Manual Guidance on IWXXM	Use APANPIRG organizational chart Revise on an annual basis Establish simple "MOU" between concerned APANPIRG bodies
		Guidance and training to APANPIRG WG/TF : - Provide guidance to APANPIRG WG/TF using SWIM					2017 2017 2017 2019 As needed	2022 2017 2018 2020	SWIM iKit (if confirmed by IMP)	From the task 1-3 APANPIRG WG/TF planning to use or using SWIM may need guidance (ad hoc basis) Guidance to States Mediation of legacy users Lessons learnt from ASEAN SWIM demonstration

Project Group	Old Task number	Old Task Description	New Task No	New Task Description	Objective and scope	Task Lead(s)	Planned Start	Planned completion	Dependencies	Guidance for SOW
	New	NA	**11**	SWIM implementation education and promotion (New task)	● Creation of an educational and promotional program needed to support SWIM implementation, operations, and facilitate cooperation among stakeholders within the region. ● Collaboration with other APAC SWIM TF task to ensure cohesiveness between the guidance materials and educational material deliverable from the APAC SWIM TF. ● Management, organization, and dissemination of all APAC SWIM educational material ● Creation of an APAC SWIM education and promotional catalog	Mr. Thomas Green (USA)	2022	TBD (See dependancies)	Completion of this task is reliant on the work completed in Task 1-10. As the task are completed and guidance is created, the catelog can be populated.	

Project	Old Task number	New Task No	Old Task Description	New Task Description	Planned Start	Planned completion	Dependencies	Guidance for SOW	SOW (reference)	Task Lead(s)
SWIM - Definition phase	1-1		Benchmarking of best practices		2017	2018	SWIM Task Force created, resources available Panels deliver as expected Task 1.7 (common vocabulary)	benchmark existing governance models (FAA, Europe), existing catalogues, existing arrangements for quality of service/SLA (availability/reliability), existing registries if any Benchmark mediation of legacy users Benchmark available existing SWIM and industry models for service descriptions ICCAIA IP13 to be included	1-1 Benchmarking - SOW	David J. Almeida (USA)
			Guidance To States: Interregional workshop Develop SWIM implementation guidance for phase 1 Develop SWIM implementation guidance for phase 2 (dual operations) Regional workshops		2017 2017 2017 2019 As needed	2022 2017 2018 2020	SWIM iKit (if confirmed by IMP)	From the task 1-3 APANPIRG WG/TF planning to use or using SWIM may need guidance (ad hoc basis) Guidance to States Mediation of legacy users Lessons learnt from ASEAN SWIM demonstration		
			Guidance for publishers/consumers;		2017	2018	Task 1.1 Task 1-5 and 1-6 Task 1-4 (service descriptions)	Common vocabulary requirement on publishers and suscribers to use the common controlled vocabulary Should include developing a guide for the preparation of service descriptions (dependency = 1.4) Could include guidance for developers/publishers on a set of protocols/formats to use See WP/5 appendices b and c for FAA guidance Analyse which guidnace is necessary from IP/6 and WP/6		
	1-2		SWIM Regional roadmap	Task 1 - Implementation Planning	2019	2022	SWIM Manual 10039 and Technical Manual	Roadmap needs to be updated to reflect the changes and developments that have occured in the last SWIM TF meetings. It needs to be more granular and help direct the work of the other task groups for APAC regional SWIM implementation. To decide and agree on the target architecture for APAC SWIM that will address all the members' concerns. To Include target timelines for the production of regional requirements and guidelines. To include plan for the actual implementation of the regional SWIM technical infrastructure, regional governance framework, registry(s), and information services.	1-2 Regional Roadmaps - SOW_TF1_AJv1	David Leow (Singapore) and Amornrat Jirattigalachote (Thailand)
	1-3		Regional coordination within APAC and guidance and training to APANPIRG bodies		2016	2022	SWIM Manual and Technical Manual Guidance on IWXXM	Use APANPIRG organizational chart Revise on an annual basis Establish simple "MOU" between concerned APANPIRG bodies	1-3 Regional Coordination - SOW_v0.1	John Moore (IATA)
			Guidance and training to APANPIRG WG/TF : - Provide guidance to APANPIRG WG/TF using SWIM		2017 2017 2017 2019 As needed	2022 2017 2018 2020	SWIM iKit (if confirmed by IMP)	From the task 1-3 APANPIRG WG/TF planning to use or using SWIM may need guidance (ad hoc basis) Guidance to States Mediation of legacy users Lessons learnt from ASEAN SWIM demonstration		
	1-4		SWIM governance		2018	2022	SWIM Manual and Technical Manual draft SARPS (stable and mature) lessons learnt from existing governance models (FAA, Europe)	Should include all stakeholders in APAC Should identify SARPS and guidance issued by IMP/ATMRPP/METP Strong coordination required with 1-5 WP04 recommends two service Description models - task 1.4 to study options Version management should address backward compatibility and the content of models (FIXm, AIXM) possibility to operate PKI through the CRV service provider to be further explored	1-4 SWIM Goverance - SOW_updated_fri	David Wills (New Zealand) for SWIM TF/1 and Mark Kaplun (USA) from SWIM TF/2
	1-5		Design Regional SWIM Registry and architecture for phase 2		2017	2019	SWIM ConOPs and Technical Manual Overall requirements: Refer 2.5.4 of DOC 10039	Should take into account how to efficiently implement 2.5.4 of DOC 10039. Search, access, discovery features Should include access control and search functionalities. Chapter 3.5 SWIM Registry For architecture should take into account CRV and that there is no central operational entity in APAC to run common services Input= paper about service description (FAA) Strong coordination required with 1-4 3 approaches proposed in WP07, not exclusive Not forget access to registries outside APAC Confirm if the option of PKI is suitable If yes coordinate with CRV OG to seek if PKI services provided by CRV provider would be a suitable option possibility to operate PKI through the CRV service provider to be further explored Consider SWIM architecture principles from IP02	1-5 SWIM Registry - SOW	Kang Jiseok (ROK) and David Leow (Singapore)
	1-6		Regional SWIM models		2016	2017	Global model definitions available	From the task 1-3 models may need extension /refinements - there is already a case for ATFM Interaction with "light" approach discussed by IMP, coordination with 1-7 Relation with CCB - coordination with task 1-4	1-6 SWIM Regional Models - SOW_TF1_AJv2	Amornrat Jirattigalochote (Thailand)
	1-7		Monitoring of panels work		2016	2022	SWIM Manual and Technical Manual	Escalate issues to the panels Report back from panels 2 IMP meetings per year, monthly conferences A need for a Discussion paper at IMP (deliverable of the task) Focal point for common controlled vocabulary, in coordination with 1-4 Version management should be coordinated regarding backward compatibility and the content of models (FIXm, AIXM) Focal pint to trigger change requests to the models	1.7 Monitoring Panels - SOW	Yukinobu Ryu (Japan)
SWIM Implementation Phase 1 - initial expansion of services and preparation of phase 2	2-1-1		Promote new needs and new services and maintain database of publishers (ID/access points/services/interface/format..) pe		2017	2019		An "Excel" file? Include service descirptions etc Assume registry services can be available on CRV from 2019 onwards 70 FAA applications are available for use and should be referenced in the catalogue	2-1-1 SWIM IMP Phase 1 - SOW_v1	Marco Mang Hin Kok (Hong Kong China)
	2-1-2		Implement SWIM registry and architecture		2019	2022	Task 1-5 completed CRV implemented	Assume registry services can be available on CRV from 2019 onwards Design and implement a mediation service (see SWIM TF-1, WP05)	2-1-2 SWIM Registry - SOW	David Leow (Singapore)
	2-1-3		Support validation and publication of SWIM based applications		2017	2019	Availability of SWIM applications (task 2-1-2) SWIM registry and architecture (DNS service, security, etc) (task 2-1-4) Procedures/SLA: Task 1-4 Models: 1-6	SARPS and guidance Envisage a regional validation as a final step - see report of SWIM TF-1 for large scale tabletop exercise	2-1-3 SWIM IMP Phase 1 - SOW v1	Xiaodong Lu (Japan), Gao Honglei (China) and Jiseok Kang (Republic of Korea)
SWIM Implementation Phase 2 -generalization	2-2-1		SWIM generalization		2022	2025	SWIM Manual and Technical Manual National transition roadmaps Task 2-1-2 Task 2-1-3 Task 2-1-1	Populate registry (2-1-2) using catalogue (2-1-1), and maintain it Make systematic cross-validation of new services using testbeds from 2-1-3 Optimize architecture on CRV (DNS, proxies) Assist States in their transition to full SWIM Assist States with LOA and guidance (1-1)	*SOW to be drafted later on*	*TBD later on*
	2-2-2		Facilitate dual operations		2022	2025		Operate a mediation service (see SWIM TF-1, WP05) until all states have transitioned to SWIM (2-2-1)	*SOW to be drafted later on*	*TBD later on*

SWIM TF/7 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
1-1		2.2.1 & 2.2.2	~~Jeri Groce (Chair)~~, Task 1, Secretariat	Introduce the mediation principle in the design of the SWIM transition	TBD	Open	This will be assigned to the eventual lead of 2.2.1. Should be in SWIM Planning. Assigned to Task 1. (SWIM TF/6)	See attached TF-1 Paper and Mediation Paper **Work can be assist by Imp Pioneer Ad-hoc Group. Seed can support for transition from AHMS…**
1-2		1.1	All	Confirm their interest in ASEAN SWIM demonstration	30-Apr-2018	Completed	• The participation package for the ASEAN demo has be out since October, but have had limited responses. • Awaiting feedback from China, Korea, and Japan. • A new due date of 31st of March has been requested. There are several confirmed partners, and an airline is helping with the coding and messaging in the scenarios. David Leow and Amo are involved with the demo, this task is moving forward on its own, perhaps David and Amo can provide update at next coordination meeting Australia, Hong Kong, Indonesia, Japan, Laos, Malaysia, Myanmar, New Zealand, Philippines, Singapore, Thailand, VietNam, USA	
1-3		1.7 & 2.1.1	Yukinobu Ryu-san, (David Almeida)	Confirm terms used to designate the APAC SWIM “catalogue” are in compliance per controlled vocabulary	8-May-2018	Completed		
1-4		Thomas Green	Le Thi Phuong, (David Almeida)	Contribute to Task 1-1 regarding the benchmarking of quality and verification process, Service Level Agreements (SLA)	TBD	Closed	Dependent on Task 1.1 Work Plan. David Almeida will reach out to Member of Viet Nam to establish schedule.	Suggest we close this action, based on aging of the topic. Viet Nam and all members are invited to provide working papers and information papers for future discussion.
1-5		New conversation	Jiseok Kang	Define the minimum set of imformation and basic function of APAC SWIM registry	30-Nov-2018	Completed	This activity must be aligned to the SARPS, PANS and guidance defined by the IMP. This acivity needs a coordination with Task 2-1-1 to define service description elemenets for APAC SWIM servicies 1.While we are looking forward to getting more guidance from IMP PANS, SARPS, the IMP is also wish to get more input on SWIM implementation from regional office while they are developing these two documents. So I suggest APAC SWIM TF should work in parallel, working on researching the policy of registry, in the meantime paying attention to the progress of IMP's developing PANS and SARPS of. I think it will be helpful to IMP and APAC SWIM implementation. 2.The core editorial team of PANS-IM has invited” Yukinobu Ryu, David Leow and Han Hong (Hannah) to join the Vol.II editorial team with the objective to use their insights for verifying whether current draft Vol.II fulfills the requirements of the users,	
1-6	3;5	1.4	Mark Kaplun ~~and David Wills~~ Task 3 Lead (SWIM TF/6)	Embark requirements laid out in ICAO provisions and FAA best practices and other practices as available to define the SWIM security governance	30-Apr-2019	Open	There is interest in establishing a security task to discuss the crosscutting SWIM issues, perhaps this should be a separate task as ICAO moving toward global trust security networks The due date will be pushed to April 2019 for the next plenary meeting The secretariat will add an agenda item to the next plenary for “splitting out security from governance into its own task”	Security is part of new task structure. Propose to transfer to Task 3. (SWIM TF/6)
1-7	1	1.1	David Almeida and Edward Curtis	Introduce lessons learnt from ICCAIA in the benchmark	27-May-2018	Completed	Dependent on Task 1.1 Work Plan. To be addressed after TF/3	Task 1.1 has been completed. Various documents were provided. Request ICCAIA member take action to introduce additional lessons learned as Information Papers in future plenary's.

SWIM TF/7 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
1-8	8	2.1.3	Xiaodong Lu	Plan a large scale tabletop exercise and message exchange demonstration in the mid-term (2019 or 2020)	30-Nov-2018	Closed	There are currently two tasks – the ASEAN SWIM demo and FF-ICE/2 validation task. This task is reliant upon coordination with those 2 tasks. The due date will be pushed to November 2018 to allow time for FAA and ASEAN to make decisions Working on tabletop between Japan, Korea, and China. Will discuss this issue at TF/3	
1-9		Work Plan	Jeri Groce	Consolidate the SOW and update the work plan accordingly	22-May-2017	Completed	A residual action includes to setup webconference for the Task Leads.	
1-10		Work Plan	Frederic Lecat	Create a SWIM TF space under ICAO secure portal		Closed		
1-11		1.2	Amo, Stuart Wilson, David Almeida	Define the purpose of scope of "Outreach to Aviation Partners" deliverable	5-Oct-2017	Completed		
1-12	1	1.2 & 2.1.1	Amo, David Leow, Marco Kok	Align interdepedencies between Task 1.2 and 2.1.1.	30-Apr-2018	Completed	Artifacts of 2.1.1 can support 1.2. Will discuss at the October Brussels meeting.	Recommend this item be closed due to the re-planning activity performed in 2020.
1-13		1.5	Jiseok Kang	Develop Working Paper for APAC SWIM registry approach	31-Dec-2018	Completed	This action is dependent on action item **ID# 1-5** to finish before work can begin	
1-14		1.1	Ryu-San, David Leow, and David Almeida	Need to create a WP for presentation to the IMP, letting them know which artifacts the APAC TF is dependent on, and by what date we need the artifacts by.	1-Nov-2017	Closed		
1-15		Work Plan	Frederic Lecat	Send out ICAO Regional Martial out to team	1-Nov-2017	Closed		
1-16	1	1.2	Marco Kok, and John Moore	Develop plan for development of a data catalog for Aeronautical, Flight, and Weather data	30-Nov-2018	Closed	A request for assistance from subject matter experts in the domain areas of Aeronautical, Flight, and Weather data has been made by action owner Marco Kok. Work still ongoing, coordinating with Amo, referring to data catalogue prepared by Aerothai. Working on finalizing flight data catalogue	
1-17		1.1 & 1.4	Stuart Wilson, and Mark Kaplun	Need to coordinate development of SWIM Governance Framework for coordination between Task 1.1 and Task 1.4	30-Jan-2018	Closed		
1-18		Work Plan	Mark Kaplun	Coordinate with Stephan Dubet who is developing the ICAO IMP SWIM Governance document		Closed	• Mark Kaplun will coordinate and prepare a paper. • Deliverable date is on-going. • Initial deliverable date will be the week of the plenary. *Next delivery date will be SWIM T/F 5 (AUG 2021)	Recommend forwarding this action to the current Governance task leads to update and resolve, as required by the TF team.
1-19		1.5	David Leow	Provide detailed Task 1.5 SOW to Stuart	10-Jan-2018	Completed		
1-20		1.4	Mark Kaplun	Provide Goverernence and Registry lessons learned out to Task 1.5	30-Jan-2018	Completed		
1-21		1.6	Frederic Lecat	Send ED-133 documentation to Amo and Amo to take this into consideration for requirements development for Task 1.6		Closed		
1-22		1.8	Jeri Groce	Determine who will be the leader of Architecture Task (Task 1.8)		Closed		
1-23		Work Plan	Stuart Wilson	Coordinate possible dates for next meeting and send out a poll.		Closed		
1-24		Action Item 1-16	APAC Task Force Leadership	APAC Task Force Leadership to support Marco Kok, and John More on Action Item 1-16.	9-Apr-2018	Closed	Amo: The AeroThai group have already developed an initial data catalogue and will provide to Mr. Kok. Shane: May be able to provide input into this activity as well.	
1-25		1.8	Yunkinobu Ryu	Provide proposal on structure of Task 1.8 by the end of January.	30-Jan-2018	Closed	WP 1-8 closed this task.	
2-1		2.1.3	Yunkinobu Ryu, Xiaodong Lu, Gao Honglei, Jiseok Kang	Plan Regional message exchange demonstration	30-Nov-2018	Closed	This action is related to action 1-8 and the due date will be scheduled for November 2018. This action was included in action 1-8 and has been closed as a result	

SWIM TF/7 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
2-3	1	1.1	David Almeida, Thomas Green	Establish contact with any SWIM-related working groups in other ICAO Regions	30-Apr-2019	Closed	The main effort in Europe working on identity access management and security. Some policies that are evolving and service lifecycle management activities.	The FAA has several international coordination projects. As has been done in previous Leadership & Plenary sessions, as relevant topics come up, FAA SWIM Program will engage those other international partners to support information needs, etc.
2-4	1	1.1	David Almeida, Thomas Green	Make recommendations on the APAC Region applicability of items in SWIM TF/2 WP/4	30-Apr-2019	Closed	XM recommendations will continue to be addressed as needed	This action should be covered under Action 3-3.
2-5	10	1.3	John Moore	Coordinate SWIM TF and MET IE/WG outcomes and activities This action is really about broader coordination of SWIM activities in APAC (not solely MET) and raising awareness of the work of the SWIM Task Force.	31-Dec-2019	Closed	WP09 SWIM in ASEAN Demonstration presented at ICAO APA-CDM TF/3	Closed because it is an ongoing activity (6/29)
2-6	10	1.3	John Moore More appropriate lead would be Amo or David Leow as the leads of the demonstration.	Coordinate minutes of SWIM in ASEAN Demonstration with SWIM TF	30-Nov-2018	Closed	David shared the minutes of ASEAN TIM #1, #2 on 18/11/2018	
2-7	5	1.4	David Willis, Mark Kaplun; Xiaodong Lu	Examine CRV OG to determine what structure may be used to form an APAC Regional SWIM Governance Review Board	Closed in SWIM TF/5	Closed	Task will be left as is until more clarification from Wen Zhu Closed in SWIM TF/5	Propose this is included in governance task (6/29); We need help from SWIM expert to come up with proposal Regional SWIM Governance to Discuss with CRV OG; Xiaodong and Wen to follow up **It has been discussed earlier. Mark will submit clarifications to close in SWIM TF/5** **3 September 2021:** The action item has been reexamined. Considering the ongoing actions taken by several task groups, it has been determined that it is still immature to clearly derive the appropriate structure of APAC regional SWIM governance body.
2-8	5	1.4	David Willis, Mark Kaplun	SWIM in ASEAN Demonstration participant Administrations to share any lessons learned or other insights relating to SWIM governance	30-Nov-2019	Closed	This task's due date will be scheduled for a few months after the ASEAN SWIM demo to obtain their lessons learned, demo date 27/6/19.	
2-9		1.4	David Willis, Mark Kaplun	Develop a draft APAC Governance Framework		Closed	Group decided this was a duplicate of task 1.4 and closed the action as it will be addressed by that task	
2-10		1.6	Amornrat Jirattigalochote	Coordinate SWIM in ASEAN Demonstration findings on A-CDM data attributes with APA-CDM/TF		Closed	WP09 SWIM in ASEAN Demonstration presented at ICAO APA-CDM TF/3	
2-11	2	1.8	Yunkinobu Ryu, Xiaodong Lu	Investigate the role of CRV in APAC SWIM and make recommendations on how APAC SWIM will interconnect with the CRV	30-Apr-2019	Closed	There are two options to establish SWIM platform on CRV. Confirms details of CRV and IMP to consider how to implement this method of the regional CRV. Xiaodong Lu will give a report about this in next SWIM TF meeting in 2019	Japan presented a paper on topic in SWIM T/F 4. Will be included in the Task 2 Deliverables (6/29)
2-12		2.1.1	Marco Mang Hin Kok	Re-Draft SWIM survey, together with educational material to also inform survey participants on SWIM	30-Apr-2019	Closed	Survey results presented at SWIM TF/3	

SWIM TF/7 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
2-14	1	1.1	~~David Almeida,~~ Thomas Green,	Develop an APAC SWIM education implementation plan and high level education materials	SWIM TF/6 SWIM TF/7 SWIM TF/9	Open	_The SWIM education video for those with technical background has been finished which will be published on APAC website in March. (DONE) _The SWIM brochure has been in the final stage for design and will be completed in April. (will review comments) _The SWIM education implementation plan draft was presented at TF/3 wil continue to be developed	Need to start from scratch due to unavailablity of SWIM Brochure.(SWIM TF/5) **Require participation from region and difficult to complete task. Inputs from APAC is missing (TF/7)** **Requested experts to share material for SWIM education with Task leads**
2-15			All	Commence drafting an APAC Regional SWIM Implementation guidance document		Closed	oThis action is the pure output of the APAC TF to serve as a repository of output of the TF. oShane Sumner took an action to discuss the due date for the APAC Regional SWIM Implementation guidance document and report back to the group oThe Secretariat and David Almeida took an action to create a skeleton structure of this document Discuss the due date for the APAC Regional SWIM Implementation Guidance document and report back to the group This action was merged with 3-1	
2-16		Action Item 2-8	John Moore	Confirm the dates of the ASEAN SWIM Demo with David Leow and Amo		Closed	Demo June 27, 2019	
2-17		Action Item 2-15	Shane Sumner	Discuss the due date for the APAC Regional SWIM Implementation Guidance document and report back to the group		Closed	Action merged with 2-15	
2-18		Action Item 2-15	Secretariat and David Almeida	Create a skeleton structure of APAC Regional SWIM Implementation guidance document		Closed	Action merged with 2-15	
2-19		Action Item 2-14	All	All states are encouraged to provide more SWIM education materials		Closed		
2-20	5	1.4	Wen Zhu, Mark Kaplun, David Leow, and David Almeida	Discuss and draft a proposal to the chair and try to get clarification on deliverables 1.4		Closed		Close. Overcome by events with modification of the task plan into new tasking.
2-21	2	1.8	David Leow and Amornrat Jirattigalochote	Provide all ASEAN SWIM Demo lessons learned and each subtask can absorb the lessons applicable to that group.	30-Nov-2019	Closed	To be addressed after demonstration	
2-22	5	2.1.4	Xiaodong Lu	Send an email to **Jiseok Kang** and Shane Sumner to resolve the discussion if task 2.1.4 should be included in the SWIM Registry/Architecture task		Closed		Included in task 5 (Governance)
2-23			Jay Zimmer	follow up with Shane Sumner to coordinate how APAC TF can interface with the CRV during Plenary 3. Need CRV points of contact to get on the agenda and brief out as well as attend this meeting		Closed	Shane Sumner: We'll coordinate any necessary changes to the provisional agendas internally within the Secretariat, in consultation with the Chairs. Our current plan has SWIM TF/3 scheduled for 06 to 10 May 2019, and CRV OG/6 for 08 to 10 May. FYI the CRV OG/5 meeting will be held in early January.	
3-1			Task leads	The Task Leads will address the APAC SWIM Implementation Materials Table of Contents of the at the next quarterly Task Force Lead Teleconference and provide input of supplementary materials by SWIM TF/4	30-Apr-2020	Closed		
3-2	2;3	1.3	Wen Zhu	Set up dedicated working group to covers other areas of cybersecurity	30-Apr-2020	Closed		Believe this on is complete, with establishment of Security efforts within Technical Infrastructure Services.
3-3	4	1.6	Amornrat Jirattigalochote	The APAC SWIM FIXM Extension be forwarded to the FIXM Change Control Board (CCB) for validation and publication on the FIXM official website	30-Apr-2020	Closed		

SWIM TF/7 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
3-4	9	1.7	Task Force members	SWIMTF members to submit comments to Japanese IMP member,Yukinobu Ryu	20-May-2019	Closed		
			Tasf Force members	SWIMTF to review Table of Contents for APAC SWIM Eductation programme (Appendix F to the SWIMTF/3 meeting report)	30-Jun-2019	Closed		
4-1	1,10	Task 1&10	Secretariat	Enhance communication with ICAO EUR/NAT Office on SWIM PT activities	On-Going	Closed		Routine task for the secretariat (6/29)
4-2	7		Task Leads	Further exploit and deliberate the outcomes of SWIM in ASEAN Demonstration to benefit States/Administration	SWIM TF/6 SWIM TF/7	Closed	Longer time action. Closed in SWIM TF/7	task leads to provide WP or IP on how ASEAN Demo can be leveraged in task areas **Report is tranferred to all Task leads and reviewed**
4-4			Task Leads of Task 2, Task 5 and Task 6	To join the sudy group proposed by SURICG to explore the initiative on surveillance data sharing over SWIM	SWIM TF/5	Closed		A number of members have joined this SG (6/29)
4-5			TF chair and Task Leads	Review the ToR and consolidate the action items in this list	SWIM TF/5	Completed	To align with GANP edition 6, APAC Seamless ANS Plan 3.0 and aim to enhance the interaction with other relevant contributory bodies of APANPIRG	More feedback from TL on TOR for TF/5 needed (6/29) **Closed after CNS SG/25**
4-6			Amornrat Jirattigalochote, Secretariat	Plan another SWIM workshop	1st TL meeting in 2021	Closed		
4-7			TF chair and Task Leads	Follow up the Task 3 and Task 11	1st TL meeting in 2021	Closed		
4-8	9	Task 9	Yukinobu Ryu, Secretariat	List of SWIM relevant ICAO Panels and representatives from APAC	Need to provide list before removing from Action Items List provided	Closed	To better monitor the Panels Work relevant to SWIM on the available resources and representation in APAC As ongoing, need to remove from Action List and will manage by Secretariat	Open till list then closed. Added AI into next task lead meeting- SWIM TF/5 **SWIM TF TL meeting on 28 Oct 2021 reviewed list and changed status to on-going** **To be removed from the list after SWIM TF/6** **Removed**
4-9	10	Task 10	John Moore, Secretariat	List of SWIM relevant meetings in APAC	SWIM TF/6	Closed	To better support the regional coordination and SWIM related information sharing	Same as 4-8, Need list before closing. Secretariat will provide in next TL. **SWIM TF TL meeting on 28 Oct 2021 reviewed list and changed status to on-going**
4-10	11	Task 11	Task Leads, Secretariat	Seek information on SWIM education and promotion for consolidation by Task 10.		Closed		To be completed as a part of Task 11 activities
4-11	11	Task 11	Task Leads, Secretariat	Share SWIM related material for future compilation of the APAC SWIM Implementation Materials	SWIM TF/6 SWIM TF/7	Closed	ICAO Secretariat will revise IGD ToC Consolidate the first draft of IGD **Done and closed in SWIM TF/7**	SWIM TF/5- Premature to develop SWIM Implementation material as global doc is not ready.
4-13	2	Task 2	Task 2 Group	Develop APAC SWIM TI Profile	SWIM TF/6 SWIM TF/7 SWIM TF/8	Open	Proposed by Australia, needs further consideration Australia presented WP/19 in SWIM TF/5 Next action from Task group-2 Infrastrure binding can be considered as a part of TI profile. Each country has different TI profile. Australia can provide some mateiral? Australia is in process to hire a person. Note taken by Jeff.	Renato to provide a roadmap to develop the TI Profile **SWIM TF/5- Progress may be slow because APAC SWIM Implementation is initial stage**

SWIM TF/7 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
5-1	Task 2, Task 5, 4,6 and Task 7	NA	Task Leads of Task 2, Task 5, Task 4 and Task 6, SURSG, **S3TIG**	Start study of surveillance data being carried via SWIM on CRV; Study to include exploration of updated exchange model	SWIM TF/6 SWIM TF/7 **SWIM TF/9**	On-going	Action resulted from TL meeting Approved by the plenary	Ongoing work in SWIM TF/6 If S3TIG estab, trial will go on longer time.
5-2	Task 7	NA	Task 7 TLs, Secretariat	Conduct SWIM over CRV demo; Present lesson learned and findings to the group	SWIM TF/6 SWIM TF/7 **SWIM TF/9**	Open	Action resulted from TL meeting Approved by the plenary S3TIG demo may embed the demo. (SURSG chair) Demo required more types of data e.g. ATFM…	Demo delayed due to COVID-19. Report may not be possible in SWIM TF/6
5-3	Task 1	NA	Task 1 TLs, Secretariat	Survey on SWIM implementation plan and status of Asia/Pacific Member States for Draft Conclusion SWIM TF/5/01 – Asia/Pacific SWIM Implementation Plan and Status Survey	SWIM TF/6	Completed	Ref.: T 8/13.1: AP042/22 (CNS) 01 March 2022 Subject: ICAO Asia/Pacific SWIM Implementation Plan and Status Survey sent. Reply by 1 April 2022 Propose to close Presented as WP/17 in SWIM TF/6	Draft questionnaire will be prepared by Task-1 members with the consultation of other Task leads along with the support of other core TF members. Draft questionnaire should be supported by an attachment, which explained the technical terms used in the survey for easy reference of Member States Add an introduction into the survey, mentioning that the Member States should respond to the survey in consultation with MET, ATM, and othe service providers, who may be potential users of the SWIM
5-4	Task 2,3,5,6	NA	TLs, Secretariat	Share and further delibrate the information contained in the WP21 of SWIM TF/5 to Task-2, Task-3, Task-5 and Task-6 groups of SWIM TF along with Common Aeronautical Virtual Private Network Operations Group (CRV OG) and Aeronautical Communication Services Implementation Coordination Group (ACSICG)	SWIM TF/6	Completed		Share to ACSICG and CRV Email sent to Task leads as specified in task and CRV OG/ACSICG Chairs on 12 November 2021. **Propose to close**
5-5	Task 5	NA	TLs, Secretariat	Propose a way forward on SLA in the context of APAC SWIM	SWIM TF/6	Closed	SLA Template provided by WP/11 and 12 in SWIM TF/6. Template will be part of supplement to IGD to be developed. SLA approach will be continued to study.	To be discussed in next TLs meeting Inputs may be shared with Chairs and Secretariat Discussed in speciased meeting on 24 Jan 2022. Further discussed in TL meeting on 08 Feb 2022
5-6	Task 5	NA	Task 5 Leads, Secretariat	Task-5 group may provide a common SLA template, proposal on SLA management approach, and their validation methodologies	SWIM TF/6	Closed	SLA Template provided by WP/11 and 12 in SWIM TF/6. Template will be part of supplement to IGD to be developed. SLA approach will be continued to study.	To be discussed in next TLs meeting Inputs may be shared with Chairs and Secretariat Discussed in speciased meeting on 24 Jan 2022. Further discussed in TL meeting on 08 Feb 2022
5-7	NA	NA	Secretariat	Share the IP/05 with SURSG for further deliberations	SURSG/2	Completed		Email sent on 12 November 2021. Propose to close
6-1	NA	NA	CRV OG, Secretariat	MET Experts from Australia shared the concern of mentioning MET service providers as a non-aviation service providers or aviation support service providers. The meeting requested CRV OG to deliberate the concern and finalize appropriate name for CRV users/subscribers other than ANSP	SWIM TF/7	Completed	**CRV User definition was finalized and shared with meeting**	

SWIM TF/7 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
6-2	NA	NA	CRV OG, Secretariat	There is the need to deliberate in CRV OG the security impact of mixed operational environment, i.e. connecting more SWIM technical infrastructure service providers and users using internet/other network based services with CRV through a gateway	SWIM TF/7 **SWIM TF/9**	Open		
6-3	2		Task 2 Group	Task 2 group will include the use of Internet for meteorological information services in designing the regional SWIM architecture	SWIM TF/7	Closed	For Draft Decision SWIM TF/06/01 - The Use of the Internet for MET Information Services in Regional SWIM architecture	WP/07 presented other network than CRV in use cases. So closed.
6-4	1		Task 1 Group	Task 1 will consider phased approach and a common set of SWIM information services while developing APAC SWIM Implementation Roadmap	SWIM TF/7	Closed	Result of Asia/Pacific SWIM Implementation Plan and Status Survey- Task 1 Leads (WP/17)	WP/11 shared roadmap in TF/7
6-5	2		Task 2 Group	The Draft Decision titled Infrastructure Bindings of SWIM TI in APAC Region was proposed for the meeting consideration. The meeting agreed to accept the proposed action as a recommendation than draft decision and requested Task 2 to further detail infrastructure bindings of SWIM TI in APAC Region and also to study the details of both user-based access and SWIM-based access options for actual use-cases, including MET use cases, to identify potential issues to be solved.	SWIM TF/7	Closed	Draft APAC SWIM TI profile presented to TF/7	
6-6	5		ICAO Secretariat	SLA template to be included in ICAO APAC SWIM Implementation Guidance Material, which is being developed, so that States can use it when they will develop their information services and provide information to their consumers.	SWIM TF/7 **SWIM TF/9**	Open	Task transferred to editorial Group formed in SWIM TF/7	
6-7	5		Task 5 Group	The SLA template will be reviewed and updated annually	SWIM TF/7 **SWIM TF/9**	On-going		
6-8	5		Task 5 Group	The meeting also discussed the SLA management approach and suggested Task 5 group to prioritize and further study the details of SLA management method appropriate for APAC	SWIM TF/7 **SWIM TF/9**	Open	SLA Meeting was done in 2022. However, not updates provided in SWIM TF/7. Request to present draft in TF/9	
6-9	NA	NA	ICAO Secretariat	The meeting requested ICAO Secretariat to compile all work done by the SWIM TF and consolidate the first draft of IGD for consideration by Task Leads	SWIM TF/7	Closed		
6-10	All Task Leads	NA	ICAO Secretariat, Task Leads	The SOW will be reviewed in further Task Leads Meeting to be in consistent with revised SWIM TF ToR after adoption by CNS SG/26	SWIM TF/7 **SWIM TF/8**	Open	To be discussed in TL Meeting September 2022 Discussed in the Meeting	Should be done before Nov 2023 Meeting
7-1			ICAO Secretariat	ICAO Secretariat will inform IMP Secretary in ICAO HQ not to conduct the next Meeting of IMP during 6-10 November 2023.	17-May-2023	Open		

SWIM TF/7 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
7-2			ICAO Secretariat	ICAO Secretariat should share information about ***the formation of the SWIM Implementation Pioneer Ad-hoc Group*** with APAC Member States by **a State Letter by 17 May 2023** and Member States should be requested to respond for their willingness to join the group and nominate experts **by 31 May 2023**.	17-May-2023	Open		
7-3			Task 3, 5, and 6 leads, SWIM TF/7 participants	The Meeting requested Member States and Task 3, 5, and 6 leads to review the *APAC SWIM Technical Infrastructure Profiles- Draft Version* attached in **Appendix F** to the Report and provide comments/feedback to the Task 2 lead **by 31 August 2023**.	31-Aug-2023	Open		
7-4			Task 2 lead	The Task 2 lead will compile and review all comments and feedback and submit the revised draft document to **SWIM TF/8** Meeting to be held from 8-10 November 2023.	SWIM TF/8	Open		
7-5			ICAO Secretariat	ICAO Secretariat will share*APAC SWIM Technical Infrastructure Profiles- Draft Version* with CRV OG and ACSICG for their feedback and provide feedback to the Task 2 Lead.	SWIM TF/8	Open		
7-6			SWIM TF7 Participants	The Meeting requested all delegates to provide feedback on the AMHS/SWIM Gateway technical specification draft**by 31 May 2023**	31-May-2023	Open		
7-7			ICAO Secretariat	On a query regarding the FIXM version used by other regions, ICAO Secretariat will provide this information after coordination with other regional offices.	31-May-2023	Open		
7-8			ICAO Secretariat	ICAO Secretariat will take necessary action to upload FIXM version 4.2 Extension on ICAO Asia/Pacific Regional Office website for immediate use by Asia/Pacific Administrations after proposed draft conclusion adoption, if adopted by CNS SG/27 and APANPIRG/34	After APANPIRG/34	Open		
7-9			ICAO Secretariat, USA	USA shared support to coordinate and present FIXM version 4.2 Extension to the FIXM CCB for review and publication on the FIXM official website after proposed draft conclusion adoption, if adopted by CNS SG/27 and APANPIRG/34	After APANPIRG/34	Open		
7-10			Task 5 Group	The proposed SDS implementation specification document belongs to FAA. Therefore, a review and a reproduction of the document is required to accommodate the purpose and requirements of the APAC Region. Task 5 will work to prepare SDS specification for the APAC Region	SWIM TF/8	Open		

SWIM TF/7 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
7-11			ICAO Secretariat, Task 6 Group, nominated ATM, MET, and AGA Experts	ICAO Secretariat will coordinate with the Secretary of Metrology Sub Group (MET SG), Aerodromes Operations and Planning Sub-Group (AOP SG) and the ICAO Aeronautical Information Services-Aeronautical Information Management Implementation Task Force (AAITF) to request to nominate ATM, MET, and AGA Experts **to prepare a comprehensive list of information for Common SWIM Flight Information Services, Common SWIM Aeronautical Information Services, Common SWIM Meteorological Information Services, and a Common SWIM Surveillance Information Services**	SWIM TF/9	Open		
7-12			ICAO Secretariat	The Meeting discussed the utilization of Mode S DAPs in developing an integrated SWIM service incorporating MET information derived from Mode S DAPs. It was informed that the detailed consideration on exchanging MET information derived from Mode S DAPs through IWXXM should be done in consultation with MET SG (MET/IE WG). ICAO Secretariat will coordinate with the Secretariat of MET SG (MET/IE) to explore options on this matter.	SWIM TF/9	Open		
7-13			ICAO Secretariat	ICAO Secretariat will share the Survey questionnaire with APAC Member States by 19 May 2023 as agreed at the SURSG/3 Meeting.	19-May-2023	Open		
7-14			All Task Leads	All Task Leads will review and modify the SOW to accommodate latest requirements from SWIM TF ToR and share it with ICAO Secretariat before SWIM TF/8 Meeting	SWIM TF8	Open		

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
4-3	3,5	Task 3&5	Task Governance and Task Security Management	Further cooperation on the security and trust in the context of SWIM service discovery		**Ongoing**	**SWIM TF/5**- As ongoing, need to remove from Action List and will manage by Secretariat	Wen and Jim to cordinate on this action (6/29)
4-12			Task Leads, Secretariat	Monitor GUFI issue and share reference materials in using GUFI	On-Going	**Ongoing**	Besides ICAO DOC 9965, EUROCAE ED-133 is good information. FAA will share its guidance to APAC.	Kristin to reach out to Diana Liang for materials on this subject