INTERNATIONAL CIVIL AVIATION ORGANIZATION

FINAL REPORT OF THE SIXTH MEETING OF THE ASIA-PACIFIC SWIM TASK FORCE (SWIM TF/6)

Video Teleconference (VTC)

17 – 20 May 2022

The views expressed in this Report should be taken as those of the Meeting and not the Organization

Approved by the Meeting and published by the ICAO Asia and Pacific Office, Bangkok

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PART I – HISTORY OF THE MEETING

1. Introduction

1.1. The Sixth Meeting of the APAC SWIM Task Force (SWIM TF/6) was held from *17 – 20 May 2022.* The meeting was organised via Video Tele-Conferencing (VTC) using Microsoft TEAMS.

2. Attendance

2.1 The meeting was attended by **213** participants from **18** States/Administrations, **5** International Organizations and **1** service provider including Australia, China, Hong Kong-China, Fiji, India, Indonesia, Japan, Mongolia, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, USA, Viet Nam, CANSO, IATA, IFALPA, IFATCA, PCCW Global and ICAO. The list of participants is provided at **Attachment 1.**

3. Opening of the Meeting

3.1 The meeting was opened by Dr. Amornrat Jirattigalachote, Strategic Planning Manager (Engineering), Policy and Strategy Management Bureau of AEROTHAI, Co-Chair of SWIM Task Force. Dr. Amornrat Jirattigalachote extended warm welcome to all participants and expressed her thanks to Member States/Administrations and International Organization for the continuous support to ICAO regional activities. She conveyed the optimism that delegates are recovering from COVID-19 situation and informed that in comparison to last year, this year meeting is being organised for four days. As we have high number of papers, the breakout session, a tradition of SWIM TF, will not be conducted. However, in case of need, it can be organised. She also shared gratitude to all Task Leads in supporting SWIM Task Force and doing tremendous work. Dr. Amornrat Jirattigalachote briefly explained the major discussion to be held in the meeting and explained the benefits to enhance the leadership of the task force with regional views to better deal with the challenges and progress the implementation of SWIM.

3.2 Ms. Kristin Cropf, SWIM Program Manager, Federal Aviation Administration (FAA), Co-Chair of SWIM Task Force, also extended her warm welcome to all participants and expressed that the papers to be discussed in the meeting are very interesting. She shared the interest to the outcomes of the ICAO Asia/Pacific SWIM Implementation Plan and Status survey conducted in 2022 to understand the APAC perspective, future requirements of the region, and area of concern for which all can work together to move forward. She shared the hope to meet face-to-face in next year SWIM TF meeting.

4. Officers and Secretariat

4.1 Dr. Amornrat Jirattigalachote, Strategic Planning Manager (Engineering), Policy and Strategy Management Bureau of AEROTHAI and Ms. Kristin Cropf, SWIM Program Manager, Federal Aviation Administration (FAA) co-chaired the meeting.

4.2 Ms. Soniya Nibhani, Regional Officer ANS (CNS) Implementation, ICAO Asia and Pacific Regional Office, acted as the secretary for the meeting with the support of Ms. Zhong Wenhan, Regional Officer, CNS.

5. Organization, Working Arrangements, Language and Documentation

5.1 The SWIM TF/6 met as a single body during the meeting. The working language for the meeting was English inclusive of all documentation and this Report. The meeting considered **Twenty-one (21)** Working Papers and **Six (6)** Information Papers under its eight agenda items. A List of Working Papers, Information Papers, and other resources is provided at **Attachment 3**.

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PART II – REPORT OF AGENDA ITEMS

Agenda Item 1: Adoption of agenda

Adoption of Agenda- Sec (WP/01)

1.1 The tentative agenda items presented in WP/01 were adopted as agenda for the meeting.

Agenda Item 2: Outcomes of relevant meetings on SWIM related matters

Review of Relevant Meetings - Sec (WP/02)

2.1 The paper summarized relevant information and updates with the highlight on the reviewed outcomes of SWIM TF/5, SURSG/1, and relevant discussions of other meetings of CNS SG/25 and APANPIRG/32.

2.2 The CNS SG/25 meeting adopted **Eight** (8) Conclusions and **Five** (5) Decisions. In addition, based on the outcome of discussions on various agenda items, the CNS SG/25 meeting developed **Four** (4) Draft Conclusions for consideration by APANPIRG/32 Meeting, which was adopted by APANPIRG/32. The meeting noted Conclusion/Decision adopted by CNS SG/25 and also reviewed the different Conclusions and Decisions adopted by APANPIRG/32 in December 2021 of interest to the group and discussed the follow-up.

Review Outcomes of ACSICG/9 Meeting - Sec (WP/03)

2.3 The paper presented the discussions and relevant outcomes on the Ninth Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/9) held *from 19 to 21 April 2022*. ACSICG/9 meeting report, working papers, information papers, and other resources can be accessed by following link:
https://www.icao.int/APAC/Meetings/Pages/2022-ACSICG9.aspx

2.4 The meeting reviewed various topics discussed in ACSICG/9, updated the AMHS/ATN implementation status in States, reviewed the outcomes of CRV OG/9 and CRV OG/10 meetings which included discussions on the Upgrade/Downgrade CRV Circuits Subscribed and Contract Extension requirements, discussed and addressed the implementation issues, reviewed ATN Table Tree and AMHS/AFTN Communication Chart, further explored Inter-regional AFS connection, and shared experience on AFS related cybersecurity issue.

2.5 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. **ACTION ITEM 6-1**

Implications of the Revised Terms of Reference as A Result of the CNS SG/25 Decision - China, Japan, Singapore, and Thailand (WP/04)

2.6 The paper presented the impact and implications of the change in the Terms of Reference (ToR) of the SWIM Task Force as a result of the decision by the CNS SG/25 meeting. The paper summarized the revisions on the SWIM Task Force ToR agreed by CNS SG/25, and explained the reasons and impacts for these changes in detail.

2.7 The meeting was informed that with revised ToR, the work of the APAC SWIM Task Force has been increased significantly. The SWIM TF will need to deliberate the impact of these changes on ongoing work. The meeting was invited to review the current deliverables, how to deliver on the items

stated in the new ToR, and consider how the task groups should be structured to produce the required deliverables.

Aviation Support Service Providers Joining CRV - PCCWG (WP/10)

2.8 The paper introduced PCCW Console Connect Aviation Platform for non-ANSP users to exchange SWIM data with CRV members. PCCWG informed that in order to provide an easy, managed, flexible and scalable mechanism for non-ANSP users to exchange SWIM data with those CRV users, PCCW Global planned to extend its EMS node with its own developed software defined interconnection platform - Console Connect for Aviation and purposed built SWIM as Service Platform.

2.9 PCCW Global shared that the Console Connect platform is the Software-Defined Interconnection platform that makes the exchange of the critical SWIM data between ANSPs & non-ANSP users simple, predictable and secure. Comparison among CRV, Console Connect Platform for Aviation, and Internet on Network Options, Information Security, Daily Support, and etc. were explained in the paper and added that Console Connect Platform provides web base user interface for SWIM application. Lastly, PCCWG informed that the SWIM services from ANSPs on CRV can be listed on PCCW SWIM Registry where users can select, subscribe, and concluded that the Console Connect Platform provides an alternative path for non-ANSP users to exchange SWIM data with ANSPs who are on the CRV Network.

2.10 The meeting noted that similar solutions to enable SWIM users to exchange SWIM data with the ones connected to CRV can also be provided by other SWIM service providers and that services can be registered on PCCWG service registry as well.

2.11 The meeting noted that other SWIM service providers can join CRV network by PCCWG service registry.

2.12 The meeting noted that PCCW Console Connect Aviation Platform is in concept stage. ICAO Secretariat queried if the proposed PCCW Console Connect Aviation Platform will be able to support MET data, which required huge bandwidth, on lower cost than CRV package. PCCWG informed that subscription to PCCW Console Connect Aviation Platform will be separate from the CRV package at much lower cost than CRV with more flexibility and the PCCW Console Connect Aviation Platform should not have any impact on CRV Security.

2.13 ROK queried about the certification standard to be followed by PCCWG for Software-Defined Interconnection platform to ensure the integrity and security of the critical SWIM data exchange between ANSPs & non-ANSP users. PCCWG responded that the presented proposal is in initial stage and after deliberation in CRV OG and SWIM TF, eligibility of members to connect to CRV network and other security requirements can be finalized.

2.14 The meeting discussed that 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. **ACTION ITEM 6-2**

Consideration of SWIM Architecture for Efficient Provision of MET Information Services - MET SG nominated experts (WP/19)

2.15 The paper discussed the concerns raised by the members of MET SG with regard to SWIM architecture for efficient and cost-effective provision of MET information services.

2.16 The meeting was informed about the outcomes of discussions on the above issue in previous year MET SG/25, CNS SG/25, and APANPIRG/32 meetings. The paper explained the concerns raised by members of the MET community on the accessibility of Meteorological Service Providers and airlines to CRV, SWIM services for less-sensitive MET data be accommodated in APAC SWIM technical infrastructure, and the cost implication of highly data intensive Meteorological SWIM services to operate

over the CRV when SWIM services are limited to CRV, and discussed the needs of efficient MET information service provision to be supported by SWIM architecture.

2.17 The paper discussed that while MET service providers and airlines currently do not have access to CRV, in future, MET service providers would need to provide SWIM services directly to both local and global users, such as ANSPs, other MET service providers, operators, app developers and pilots. Whether global MET service providers, airline operators and pilots should be included as parts of this CRV "Intranet" would require further discussion and confirmation.

2.18 It was added that a great number of MET services are less critical, such as 4-dimensional gridded data of forecast wind, temperature, turbulence or other significant weather, and image data of satellite, weather radar and various graphical products. Some States shared that they have divided types of SWIM services over closed network and secure public network based on criticality and classification of shared data which should be accommodated in APAC SWIM technical infrastructure.

2.19 The paper informed that MET-SWIM Plan being developed by ICAO Meteorological Panel Working Group on Meteorological Information Exchange (WG-MIE) defines many other datasets to be provided in SWIM, including weather radar, satellite, probabilistic forecast and other high spatial and temporal MET data. With evolving user requirements, exponential growth in data volume and variety is expected and large numbers of users would access these MET SWIM services. The meteorological community requested that the SWIM/TF undertake activities related to the intent of CRV-based regional SWIM architecture.

2.20 Considering the operational needs of efficient MET information service provision mentioned above, a draft Conclusion titled *Activities to explore the use of the Internet for MET information services in Regional SWIM architecture* was proposed for SWIM TF/6 consideration.

2.21 ICAO Secretariat informed that CRV OG/09 held from 25 Janaury-27 January 2022 has already considered the addition of other service providers such as MET and airlines to join the CRV. A specialised group has been created that is devising terms and conditions along with standard operating procedures to join the CRV by other service providers than ANSPs. After devising of necessary procedure, SWIM TF and MET SG would be informed.

2.22 The meeting noted that the MET information services have already been considered as a part of SWIM TF's work and regional SWIM architecture since its establishments. Additionally, the proposed draft conclusion cannot be considered as a draft conclusion as per APANPIRG Procedural Manual. However, it can be considered as a draft decision with some modifications.

2.23 The meeting discussed if proposed draft decision may be considered as a decision by the contributory bodies. MET SG experts informed that decision related to the matter of contributory bodies may be adopted by the contributory bodies itself than to refer to CNS SG for the adoption.

2.24 ICAO Secretariat shared the section 8.1 and 8.5 and **Conclusion** APANPIRG/29/28: *Empowerment to adopt Conclusions and Decisions on purely technical/operational matters by APANPIRG's Sub Groups* of the sixth edition of APANPIRG procedural handbook dated 1 June 2020 and informed that contributory bodies are not empowered to adopt decision/conclusion other than regional guidance material for publication in ICAO APAC website.

2.25 Section 8.1 and 8.5 of APANPIRG procedural handbook states that:

> *8.1 Action proposed by a contributory body of APANPIRG shall be recorded in the report of the contributory body as* ***either draft Conclusions or draft Decisions*** *(of APANPIRG).*
>
> *8.5 Action adopted by the sub groups that does not require the prior agreement of the APANPIRG before it can be implemented or otherwise shall be recorded in the report of the sub groups as Conclusions or Decisions (of the sub groups).*

2.26 Additionally, **Conclusion** APANPIRG/29/28: *Empowerment to adopt Conclusions and Decisions on purely technical/operational matters by APANPIRG's Sub Groups* states:

> That, the empowerment to APANPIRG Sub Groups to adopt Conclusions and Decisions on technical/operational matters has been working effectively and considering its benefit for effectiveness of APANPIRG work:
>
> 1) *APANPIRG Subgroup* should adopt Conclusions/Decisions related to:
> a) any amendment to TOR, including an extension of time of Working Group/Taskforce formed under relevant Subgroup; and
> b) all technical and operational aspects of Subgroup's work within its TOR.
>
> *4)* As per empowerment principle, *APANPIRG Subgroups or Taskforce/Working Groups* are empowered to make Conclusions/Decisions related to **regional guidance material for publication in ICAO APAC website.**

2.27 With aforementioned, following draft decision was endorsed by the meeting for CNS SG/26's consideration:

<table>
<tr><td colspan="3">Draft Decision SWIM TF/06/01 - The Use of the Internet for MET Information Services in Regional SWIM architecture</td></tr>
<tr><td colspan="2">What: That, the use of Internet for meteorological information services will be considered in designing the regional SWIM architecture.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To support cost-effective and efficient meteorological information services for exchange of less-sensitive meteorological information in SWIM.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 20-May-22</td><td colspan="2">Status: Draft to be adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF</td></tr>
</table>

2.28 The meeting agreed that Task 2 group will include the use of Internet for meteorological information services in designing the regional SWIM architecture. **ACTION ITEM 6-3.**

2.29 The meeting discussed the need of participation of MET experts in SWIM TF and requested member states to nominate MET experts to contribute and participate in various tasks of SWIM TF.

Agenda Item 3: Review of SURSG/2 report

Review the report of the Second Meeting of the Surveillance Study Group (SURSG/2) - Sec (WP/05)

3.1 The paper summarized the outcomes of the Second Meeting of the Surveillance Study Group (SURSG/2) held via Video Tele-Conference (VTC) from *15 to 17 March 2022*. The SURSG/2 meeting report, working papers, information papers, and other resources can be accessed by following link: https://www.icao.int/APAC/Meetings/Pages/2022-SURSG2.aspx

3.2 In SURSG/2, PCCWG introduced the Surveillance Data Sharing Proof of Concept (POC) conducted by HKCAD, PCCWG and Frequentis ComSoft and shared the outcomes of a POC conducted on 4 March 2022, which was the collaboration of HKCAD, PCCWG and partner Frequentis ComSoft to demonstrate sharing ADS-B data in a simulated SWIM over CRV environment and the benefits of a Surveillance Central Data Processor (SCDP). The Chair of SURSG shared his appreciation to Hong Kong China and PCCWG for the paper and to conduct the trial and enquired if PCCWG could demonstrate this POC by a video or other media for better illustration. PCCWG informed that they had recorded the POC and would present the video in the upcoming SWIM TF/6 meeting. The video was later presented by PCCWG in the SWIM TF/6 meeting.

3.3 The SWIM TF/6 meeting reviewed the discussions and relevant outcomes on SURSG/2 meeting, including Progress of SURSG Tasks in Feasibility Study Stage, updates on the Study Report on Surveillance Sharing, revised work plan, and the proposal for establishment of the **Surveillance Sharing in SWIM Trial Implementation Group (S3TIG)**.

3.4 The Study Report is provided in **Appendix A** to this report. A list of the high-level recommendations extracted from the Study Report is provided in following **Table 1** titled High-Level Recommendations from the Study Report.

Table 1 – High-Level Recommendations from the Study Report

	Recommendation/Approach	Moving Forward
General	1) Bottom up and starting small and simple approach 2) Commercial participation to accelerate implementation 3) Implementation Sequence Stage 1 – Tier 2 ADS-B data sharing Stage 2 – Tier 1 ADS-B data and other surveillance data sharing	(1) Surveillance data sharing for purposes of ATFM operation (Tier 2)

Technical	1) Hybrid Model with the coexistence of ANSPs operating their own EMSes and ANSP accessing centralized SWIM services. 2) Service level of shared data *(The figure is extracted from the AIGD v13.0 and subject to review the applicability and suitability given the SWIM service level)* **Tier 1** (i) System Availability: Total Service Availability > 99.9% (ii) System Reliability: Total Service MTBF > 50,000 hours (iii) Aircraft Updates: 0.5 second < Interval < 5 seconds (iv) Data Latency: 95%: < 2 seconds **Tier 2** (i) System Availability: Total Service Availability > 90% (ii) System Reliability: Total Service MTBF > 200 hours (iii) Aircraft Updates: 0.5 second < Interval < 60 seconds (iv) Data Latency: 95%: < 60 seconds	(2) ADS-B CAT 21 Version 2.1 to be shared by default. Other standardized protocols may be used if agreeable between the contributors and consumers. (3) To start the surveillance data sharing trial in SWIM as soon as possible

Administrative	**1) Data Contributor** (i) Eligibility – Member States / administrations, aviation stakeholders and industry partners (ii) Data to be shared to all participating users non-exclusively (iii) Share ADS-B data at Tier 2 for ATFM purposes at start. (iv) Responsible for service level sufficiency and data integrity **2) Data Consumer** (i) Eligibility – Member states / administrations, aviation stakeholders and industry partners (ii) At own cost and risks connecting to the sharing platform and utilizing the shared data (iii) Formulating own contingency plan in case of data service interruption **3) All** (i) Operations Group to be established before trial or implementation to manage various issues arising	Establishment of a Surveillance Sharing in SWIM Trial Implementation Group (See ***Notes***) to oversee such a trial with following main responsibility and objective: a) Coordinating with SWIM Task Force, CRV OG to reflect SWIM development in the trial b) Leading and coordinating with interested states, stakeholders (commercial and non-commercial) to conduct the trial: (i) to demonstrate as far as practicable the general, technical and administrative aspects of surveillance sharing in SWIM in the Study Report; and (ii) to serve as a reference model for future surveillance sharing implementation in SWIM. ***Notes****:* *a. Reporting routing subject to discussion* *b. Establishment after endorsement from SURICG and ToR to be discussed at SURSG/3.*

3.5 The SURSG/2 meeting deliberated the necessity for establishment of the **Surveillance Sharing in SWIM Trial Implementation Group (S3TIG)** to oversee such a trial proposed by the recommendation. China, Hong Kong China, IATA, Singapore, and Thailand seconded the proposal. PCCWG also indicated its interest in participating in the trial. The SURSG/2 meeting agreed for PCCWG to participate in the trial and accepted that the recommendations agreed upon would be tabled for SWIM TF/6 and SURICG/7 endorsement. SWIM TF/6 may recommend draft conclusion/decision, if required, for the endorsement of SURICG/7 and CNS SG/26 for above-mentioned agreed recommendations.

3.6 To follow up Action Item 2-1 of SURSG/2 to prepare a draft ToR of S3TIG by mid-April 2022 offline, the draft ToR of S3TIG group was sent to SURSG/2 participants for review and comments on **12 April 2022**. In response, India and PCCWG shared their modifications feedback while other States shared their agreement with the draft ToR. The revised ToR after incorporation and consideration of all comments was presented by the **WP/06** for the meeting review.

3.7 As per SURSG ToR, outcome of its meetings shall be reported to and sought endorsement from the **SURICG** while the progress of the SURSG shall also be shared with SWIM TF and CRV OG via their nominated representatives joining the SURSG. Therefore, the proposal for establishment of S3TIG shall be further discussed in **SURICG/7** to be held from **24 May-27 May 2022**.

3.8 The meeting discussed the potential need to modify the reporting channel of SURSG from SURICG to SWIM TF. Dr. Amornrat Jirattigalachote, Co-Chair, informed that the similar discussion was held in past while forming SURSG. She recalled the previous discussion that the primary part of the work of the SURSG was to find solution for surveillance data sharing. Surveillance data is one of the data being shared on SWIM along with many other data and SWIM is one of the many platforms. Therefore, SURSG reporting to SURICG is agreeable.

Proposed Establishment of Surveillance Sharing in SWIM Trial Implementation Group (S3TIG) - Hong Kong, China (WP/06)

3.9 The paper provided a background of the proposed establishment of S3TIG and solicited SWIM TF's support and its members' participation. In WP/05 of SURSG/2 presented by Hong Kong China, high-level recommendations in the Study Report were extracted for discussion including notably the establishment of Surveillance Sharing in SWIM Trial Implementation Group (S3TIG). The meeting was informed that the SURSG/2 supported establishment of S3TIG to oversee surveillance data sharing trial to demonstrate or implement some of the recommendations and sharing model in the SURSG Study Report. Furthermore, a proposed Terms of Reference (ToR) for S3TIG was prepared and finished its rounds of commenting from SURSG members in April. The updated ToR for S3TIG is provided at **Appendix B** to the report. The meeting was invited to review the ToR, noting in particular the "Composition" Section of the ToR, support the establishment of S3TIG as an ad-hoc group, and participate in S3TIG.

3.10 Japan shared the concern related to surveillance information sharing over SWIM. From SWIM governance and interoperability view, in order to share some information, standard data exchange model should be used and that is not available for surveillance data. Currently, FIXM does not support these requirements. There are also many limitations if ASTERIX 21 will be used to share the ADS-B information. Therefore, for surveillance information, another surveillance data exchange model may be required to support SWIM-based surveillance information services to support ATM operations. It was suggested to share the concern with other surveillance group for action.

3.11 The chair of SURSG shared that the same discussion was done in SURSG/2 and ROK had shared a proposal to create a new format to support surveillance data exchange and the need for establishment of GUFI generator. After S3TIG group establishment and trial commencement, the abovementioned issues will be considered by S3TIG. The trial will demonstrate how data sharing works in SWIM environment.

3.12 The meeting supported the need for establishment of S3TIG. ICAO Secretariat and Co-Chairs shared the need for adding SWIM TF in reporting channel of S3TIG along with SURSG as the task performed by S3TIG required expertise of SWIM TF. The meeting did not get consensus for adding SWIM TF into reporting channel for S3TIG.

3.13 The meeting informed that the formation of proposed group as ICAO contributory body or ad-hoc group shall be deliberated and decided in SURICG which is the reporting body of SURSG.

Agenda Item 4: Updates on the assigned tasks by task leads/contributors including progress report and issues

4.1 Under this agenda item, the meeting reviewed the progress and issue report by each Task Lead based on the task assignments. The Statements of Work and Deliverables were updated based on progress report by the Task Leads during the meeting.

a) Implementation Planning

- Task 1: Regional Implementation Philosophy & Roadmap
  - Outcomes of Asia/Pacific SWIM Implementation Plan and Status Survey

The Asia-Pacific SWIM Implementation Timeline - China, Japan, Singapore, and Thailand (WP/07)

4.2 The paper presented a proposal for a target timeframe for SWIM implementation in the Asia-Pacific Region. Considering a significant amount of work produced by SWIM TF so far, the meeting was suggested to consolidate all these works, experiences, and lessons learnt and to form an actionable implementation plan with a target timeframe for operational SWIM implementation in the Asia-Pacific

region. Referencing to the timeframes of related events and publications, including the publication of the ICAO PANS-Information Management (PANS-IM), which is expected to be published in 2024, and the sunset date of the current flight plan format (FPL2012) in 2032 being considered by ICAO ATMRPP, the paper proposed that the timeframe for SWIM implementation in the Asia-Pacific region to be set at between 2024 and 2030 with a buffer of 2 years before 2032 to conduct FF-ICE related operational trials prior to the planned sunset date for the FPL2012.

4.3 With aforementioned, the meeting formulated the following Draft Conclusion for CNS SG/26 and APANPIRG/33 consideration.

<table>
<tr><td colspan="3">Draft Conclusion SWIM TF/06/02 - The Asia-Pacific SWIM Implementation Timeframe</td></tr>
<tr><td colspan="2">What: To set the timeframe for the implementation of SWIM in the Asia-Pacific region to be between 2024 and 2030, with 2030 being the target timeline for implementation completion</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☒ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: This is to set the concrete target implementation of the Asia-Pacific regional SWIM to assist States in harmonizing their implementation plans in order to achieve the seamless information exchange across the region in time for future operations, e.g. FF-ICE.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 20-May-22</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF</td></tr>
</table>

4.4 The meeting agreed that the scope of SWIM implementation depends on each State's strategies and the set of common information services, which States shall consider providing, needs to be agreed on by SWIM TF. The meeting proposed that States may consider implementing SWIM technical infrastructure and participating in regional SWIM by developing their own or acquiring services provided by SWIM service provider. Moreover, States may consider implementing information service provision, information service consumption, or both, or subscribing to SWIM service provider to enable their information provision and/or consumption.

4.5 The other matter that may impact the SWIM implementation timeframe was the different schedules set out by the different ICAO Air Navigation Commission Technical Panels which were not aligned with each other was also discussed, including IWXXM dissemination date, the starting date of FF-ICE/R1 implementation, and publication date of the PANS-IM.

4.6 Considering to align all the timelines which will definitely assist States in planning their investment and transition, the meeting adopted the following Draft Decision for CNS SG/26 and APANPIRG/33 consideration.

<table>
<tr><td colspan="2">Draft Decision SWIM TF/06/03 - Harmonization of Timelines for SWIM-related Initiatives</td></tr>
<tr><td>What: To feedback to the ICAO Air Navigation Commission Technical Panels for a need to harmonize the implementation timelines of SWIM-related initiatives.</td><td>Expected impact:
☒ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
</table>

Why: There exists different timelines for the implementation of SWIM-related initiatives identified by various ICAO ANC Technical Panels. This creates confusion within States on their corresponding implementation sequences and as to how these different timelines are to be met.	Follow-up: ☐Required from States
When: 20-May-22	Status: Draft to be adopted by PIRG
Who: ☒Sub groups ☐APAC States ☒ICAO APAC RO ☒ICAO HQ ☒Other: SWIM TF	

SWIM Implementation and the Asia-Pacific Seamless ANS Plan - China, Japan, Singapore, and Thailand (WP/08)

4.7 The paper examined the relationship between SWIM implementation in Asia/Pacific and the Asia/Pacific Seamless ANS Plan. In the current edition of the Asia/Pacific Seamless ANS Plan, version 3.0, published in November 2019, SWIM is only mentioned once in Appendix C Seamless ANS Principles under the Technology and Information section, Aeronautical Data sub-section stating about the cooperative development of SWIM to support interoperable operations. As SWIM is a key piece of infrastructure required to support other initiatives currently included in the Plan and the future operational concept, it was proposed that CNS SG and SWIM TF consider including SWIM implementation as part of Performance Improvement Plan in the next edition the Asia/Pacific Seamless ANS Plan aligned with SWIM implementation timeframe.

4.8 With aforementioned, the following Draft Conclusion was adopted by SWIM TF/6 for CNS SG/26 and APANPIRG/33 consideration:

Draft Conclusion SWIM TF/06/04 Inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan		
What: CNS SG and SWIM TF to consider including SWIM implementation in the next edition of the Asia/Pacific Seamless ANS Plan.		Expected impact: ☐ Political / Global ☐ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical
Why: To ensure that SWIM, a key building block to achieve the vision outlined in ICAO Doc 9854 Global ATM Operational Concept (GATMOC), is captured in the Asia/Pacific Seamless ANS Plan, providing an overall framework for Asia/Pacific States to plan their implementations to meet the future performance requirements.	Follow-up: ☐Required from States	
When: 20-May-22	Status: Draft to be adopted by PIRG	
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF		

4.9 ICAO secretariat informed that SWIM ASBUs were not included into current version of the Seamless ANS Plan v3.0, also known as *the plan*, because the plan included elements of Block 0 and Block 1, which should be implemented by States by 2024. SWIM ASBUs are starting from Block 2, which would start from 2025. Therefore, SWIM ASBUs were planned to incorporate into the Seamless ANS Plan v5.0, which will be published in 2025. However, as the APAC SWIM Timeline is proposed to be started from 2024, the next revision of the Seamless ANS Plan,v4.0, which will be done in this year, may

add SWIM ASBUs elements required for the year 2024. The elements required to be added from 2025 would be added in the fifth amendments of the plan in 2025.

4.10 The meeting agreed to add **SWIM-B2/1**- Information Service Provision and **SWIM-B2/2-** Information Service Consumption under **Priority Two** in the Seamless ANS Plan v4.0 to be published in 2022. The content to be added in the plan was discussed, prepared, and finalized, which is provided in **Appendix C** to the report.

Result of Asia/Pacific SWIM Implementation Plan and Status Survey- Task 1 Leads (WP/17)

4.11 This paper presents the results of the ICAO Asia/Pacific SWIM Implementation Plan and Status survey conducted between March and April 2022. Based on the survey results obtained, recommendations are provided for the consideration of SWIM TF/6.

4.12 Following the **Conclusion CNS SG/25/03**, the ICAO Asia/Pacific SWIM Implementation Plan and Status Survey was prepared by China, Japan, Singapore, and Thailand in consultation with Task leads under SWIM TF, and later disseminated to all Asia/Pacific States/Administrations by State Letter on 1 March 2022.

4.13 Throughout March and April 2022, 49 responses in total were received from 26 States/Administrations, including Australia, Bhutan, Cambodia, China, Fiji, France, Hong Kong China, India, Indonesia, Japan, Lao PDR, Macau China, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, the Philippines, Papua New Guinea, Republic of Korea, Sri Lanka, Singapore, Thailand, USA, and Vietnam. The majority of the responses was from civil aviation regulators, AIS/AIM providers, ANSPs or ATM service providers, and MET service providers. Only one response was from airport operator, while none was obtained from airspace user.

4.14 The paper elaborated on the survey results received from States, including scope of SWIM implementation, status of SWIM technical infrastructure implementation, approach to participate in regional SWIM, status of SWIM information services implementation, information exchange models supported, status of SWIM-enabled applications implementation, and suggestions/comments.

4.15 Based on the survey results obtained, the paper also provided some recommendations, which included

1) Timeframe for completion date/expected completion date of the three SWIM key components, which was identified to be between 2022 and 2030, can be in lined with the proposal stated in SWIM TF/6 WP/07.

2) With the list of common SWIM information services and SWIM-enabled applications indicated in the majority of the responses, it is suggested to adopt a phased approach in the Asia/Pacific SWIM implementation roadmap to be further devised, to ensure the harmonized implementation of this common list among stakeholders, in turn leading to the region-wide operational benefits.

3) Based on the feedback received and considering a significant amount of work done by SWIM TF so far, SWIM TF is recommended to consider consolidating (*i*) the Asia/Pacific SWIM Concept of Operations and (*ii*) the Asia/Pacific regional SWIM Implementation Guidance documents to assist States/Administration/Organizations in their SWIM planning and implementation. Moreover, in the case where the inclusion of SWIM in the new version of the Asia/Pacific Seamless ANS Plan, as proposed in SWIM TF/6 WP/08, is adopted by APANPIRG, these two documents can then be used as supplements to the Asia/Pacific Seamless ANS Plan in the future.

4.16 The meeting noted that Recommendation-1 was already agreed by the **Draft Decision SWIM TF/06/03** of WP/07. Recommendation-2 can be added in the Task 1 once detailed SWIM Roadmap is prepared. Recommendation-3 was discussed in WP/21 of SWIM TF/6.

4.17 Task 1 will consider phased approach and a common set of SWIM information services while developing APAC SWIM Implementation Roadmap. **ACTION ITEM 6-4.**

b) SWIM Infrastructure

- Task 2: Regional SWIM Infrastructure

SWIM-TI Interface Binding to Achieve Interoperability – Japan (WP/09)

4.18 Japan informed that 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.

4.19 As the legacy AFTN/AMHS is used by nearly all member states, it is necessary for the SWIM Technical Infrastructure (TI) to support the message transport between the SWIM-enabled systems and AFTN/AMHS using legacy systems.

4.20 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 the high-capacity IP-based network is needed. 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.

4.21 The required indicators for IP-based network that should be considered to construct the regional SWIM and the current capabilities of CRV that can be provided to support the regional SWIM implementation were also presented.

4.22 To satisfy different requirements, the paper presented an interface binding approach for SWIM Technical Infrastructure to achieve both operational interoperability and applicational flexibility by considering the CRV based regional SWIM implementation. Task 2 lead further explained the technical perspective for the implementation and evolution of SWIM TI interface bindings on a global scale and identified relevant approaches for achieving interoperability at the SWIM TI level as described in the ICAO SWIM Manual in details through this paper.

4.23 The paper presented two approaches taking examples of the case where there is a need of Enabled Airspace Users (AUs) to access a service in the different network segments. One approach is called user-based access that means a service consumer can connect to different network segments and on one of which the Service Producer (SP) provides its information services not only to internal users connecting on the same network segment but also external ones. The other approach is called SWIM-based access that means the infrastructure bindings specifying the definition and implementation of service interface between different SWIM TI systems in different network segments would be required.

4.24 As the regional and global ATM is a highly federated environment, based on the number of stakeholders, new entrants and complexity of airspace services, multiple users participating through multiple network segments could become unmanageable. Therefore, the user-based access should be a temporary solution during the transition period. To achieve technical interoperability, it requires solutions that can scale to support the demand of seamless information exchange between service producers and consumers. Therefore, Task 2 lead clarified the infrastructure bindings of SWIM TI, which is a possible

approach for CRV based regional SWIM implementation to satisfy the information exchange between different infrastructure systems both in a same network segment and different network segments, can be considered as a preferred solution.

4.25 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. **ACTION ITEM 6-5**.

d) Governance

- Task 5: Registry and Other Related Governance Policies

APAC SWIM Service Level Agreement (SLA): Introduction - Task 5 (WP/11)

4.26 The paper introduced the general Service Level Agreement (SLA) template intended for use as the basis for negotiating SLAs between APAC SWIM service providers and consumers. Considering the growing use of integrating SWIM-enabled services and any instance in which a SWIM service fails to meet consumer expectations will pose a significant risk, SWIM users demand reliable guarantees in service provisioning and qualities of service. Common causes of a disconnection between consumer expectations and actual service offerings were listed in this paper. To provide a uniform and standardized format for an APAC SLA document, the SLA template, which was introduced in detail in WP/12, should be considered as a baseline SLA to be modified by APAC SWIM service providers and consumers. It is expected that users will extend the SLA template as required to fit their specific organizational and technological needs. The meeting was informed that it is already foreseen that the SLA template will be revised once per year following feedback from the APAC SWIM practitioners. The Basic Concepts, Purpose, Goal, and Objectives of the SLA template were shared in details. The meeting was invited to provide feedback on the proposed approach, advise on the way forward, and in particular set priorities for future developments and implementers of APAC SWIM SLA.

APAC SWIM Service Level Agreement (SLA): Template - Task 5 (WP/12)

4.27 The paper contained the Service Level Agreement (SLA) template, which was provided in **Appendix D** to the report, intended for use as the basis for negotiating SLAs between APAC SWIM service providers and consumers. Task 5 elaborated on the format and information needed in the Service Level Agreement (SLA) template, including its parties (service provider and service consumer), obligations (service performance and problem reporting), service maintenance, etc. The meeting was informed that it is expected that this SLA template will be modified in the future to reflect the organizational and technological constraints of the APAC SWIM - both at the regional and State levels - as well as to address emerging business requirements.

4.28 The meeting agreed that SLA template should 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. **ACTION ITEM 6-6** The SLA template will be reviewed and updated annually. **ACTION ITEM 6-7** 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. **ACTION ITEM 6-8**.

SWIM Discovery Service (SDS) Update and Next Steps - USA, ROK, China, Japan (WP/13)

4.29 The paper described the status and plans of a growing collaborative effort to deploy a network of SWIM Discovery Services (SDS) in the Asia Pacific Region (APAC). The effort aims to support federated service discovery among independently developed and autonomously managed SWIM domains.

4.30 It was informed that the SDS specification was developed by FAA in 2020 to address the need for SWIM users to discover and leverage services developed by other SWIM programs by defining a standard mechanism for exchanging service description information, or metadata, between independently managed SWIM programs. The paper recalled a demonstration of a cross-registry search module to illustrate how SDS can facilitate discovery of services published in different SWIM registries by FAA and KAC at SWIM TF/5. The meeting was informed that in April 2022, ATMB (China) and ENRI (Japan) had joined the SDS development effort, and the progress, data model, and architecture of their systems which included SWIM service registry were explained in details. Additionally, following the SDS specification, KAC and FAA had both developed own SWIM Metadata Exchange Service (SMXS) that exposes service metadata from their SWIM registry.

4.31 The meeting noted that the development of SDS will encourage the adoption of SWIM in the APAC region by allowing SWIM services to be discovered and used by aviation partners. The partners will work together to enhance service discoverability in the region by considering SDS use cases for multi-party environments and supporting for advanced data filtering in SDS.

4.32 The meeting encouraged member states to join for the collaboration for SDS.

e) Information Services

- Task 6: Information Services

APAC Service Overview Specification - Optional Fields- Hong Kong China (WP/14)

4.33 Hong Kong China proposed the optional descriptive elements to be added to the initial version of the APAC Service Overview Specification. It was informed that Australia and Hong Kong China conducted a detailed comparison of the PANS-IM Service Overview fields to the existing SWIM Registries operated by the FAA and EUROCONTROL and a proposal was presented in the APAC SWIM TF/3. Additionally, the comparison results and recommendations regarding additional metadata fields for initial version of APAC Service Overview Specification were presented in the SWIM TF/5.

4.34 The proposed additional fields for initial version of APAC Service Overview Specification was provided in SWIM TF/5 – WP/14 and suggestions on further addition of some fields were received afterwards.

4.35 It was noted that the additional descriptive elements in para. 2.1 and 2.2 of this paper can provide additional details of the information service but not currently covered by the SWIM Service Overview specified in PANS-IM. To ensure interoperability while at the same time to enhance the description of information services provided in the APAC Region, it was recommended to use the additional descriptive elements together with the SWIM Service Overview Specification approved by IMP which was provided in the Appendix.

4.36 The Appendix provided recommended descriptive elements to be filled in the SWIM Service Overview. It was also informed that this APAC Service Overview Specification would be a living reference for regular review and update as necessary when new needs are identified in future. APAC service providers may make reference to these optional descriptive elements as necessary based on the users' operational needs when designing new information services. It was added that other recommended descriptive elements may be identified through table-top exercises or demonstrations for use case of common Flight, Aeronautical and MET information services in coordination with other related SWIM TF task groups.

4.37 The paper added that in case the identified needs for the descriptive capability could not be included under any existing fields in the Service Overview, such as Approval Authority, Re-distribution and Cost Recovery information mentioned in para. 2.2 of the paper, further discussions at the global level might be required for IMP to consider developing new metadata fields in PANS-IM.

4.38 The meeting agreed that for the next steps, as Task 5 has been working on exchanging service metadata for APAC SWIM using a mature service description, Task 6 will join the ongoing registries effort of Task 5 to continue the work on the APAC SWIM service metadata model, and coordinate with Task 5 to study whether the descriptive capabilities suggested by States in the previous meetings could be accommodated as optional elements in the existing implementations of service description fields

g) Coordination and Promotion

- Task 9: Monitoring of Panels' Work

IMP and Related Panel Updates – Japan (WP/18)

4.39 The paper reviewed the report of the Second Meeting of the Information Management Panel (IMP/2) held virtually from September 27 to October 1, 2021, and the status of the Air Traffic Management Requirements and Performance Panel (ATMRPP), which is developing SARPs and Guidance Materials to implement FF-ICE operations under the SWIM environment. The meeting was informed that the IMP/2 reviewed the latest draft Procedures for Air Navigation Services –Information Management (PANS-IM) and accepted all the modifications. Furthermore, the applicability of the proposed information security framework, maintenance of the information security provisions, and the mandatory use of specific IPv6 addresses (aviation block) and domain names were also discussed in the IMP/2 meeting. The meeting also reviewed the latest version of SWIM Manual Volume II – Implementation Guidance, and the first edition of the Guidance Material - Manual on SWIM Implementation has been ready for publication. The IMP/2 meeting reviewed the ATM Information Reference Model (AIRM), endorsed the release of the AIRM v1.0.0, and supported the AIRM work/release plan.

4.40 Additionally, the meeting was informed that ATMRPP has completed most of the work on FF-ICE/R1 focusing on pre-departure phase Trajectory Negotiation with ATMRPP/4, and the focus has shifted to post-departure phase, FF-ICE Release 2 (FF-ICE/R2) and noted that plans to draft the provisions on FF-ICE/R2 by 2028 are being considered in the ATMRPP.

4.41 Considering the FF-ICE implementation is not something that can be completed by the SWIM TF alone and collaboration with other groups such as ATM and CNS is important, the meeting formulated the following Draft Decision for CNS SG/26 and APANPIRG consideration.

<table>
<tr><td colspan="3">Draft Decision SWIM TF/06/05 - Establish a Joint Work Group between the ATM SG and CNS SG to Create the FF-ICE Implementation Strategy.</td></tr>
<tr><td colspan="2">What: To establish a joint work group between the ATM SG and CNS SG to create an FF-ICE implementation strategy that is consistent with the SWIM implementation in the APAC region</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: FF-ICE is the first application developed to operate in the SWIM environment, and the State-letter process is expected to proceed almost simultaneously with the SWIM provisions. Therefore, it is necessary to comprehensively consider the mixed operation of FPL2012 and FF-ICE while ensuring consistency between FF-ICE and SWIM implementation in the region to support ICAO Member States decision-making.</td><td>Follow-up:</td><td>☐Required from States</td></tr>
<tr><td>When: 20-May-22</td><td>Status:</td><td>Draft to be adopted by PIRG</td></tr>
</table>

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

4.42 The meeting noted that similar activity is being carried out by the Inter-Panel task force consisting of ATMRPP, IMP, and CP members to ensure the consistency among ICAO provisions related to FF-ICE.

Agenda Item 5: Development of APAC SWIM Implementation Materials

Update on APAC SWIM Implementation Materials – Sec (WP/21)

5.1 The Third Meeting of the APAC SWIM Task Force (SWIM TF/3) agreed that the title of the Regional Implementation documents would be "**APAC SWIM Implementation Materials**". In the same meeting, one ACTION ITEM was developed as **ACTION ITEM SWIM TF/3/1**- *The Task Leads will address the Table of Contents at the next quarterly Task Force Lead Teleconference and provide input of the implementation materials by SWIM TF/4.*

5.2 The Fourth Meeting of the APAC SWIM Task Force (SWIM TF/4) was held via Video Tele-Conferencing (VTC), from 03 to 06 November 2020. During the meeting, Table of Contents (ToC) of **APAC SWIM Implementation Guidance Document (IGD)** was proposed through Working Paper (WP)/03.

5.3 The SWIM TF/5 suspended the ACTION ITEM SWIM TF/3/1 and decided to reactivate it upon further updates during the future Task Lead meetings or SWIM TF/6.

5.4 The SWIM Repository has been created in the **ICAO APAC-SWIM** Secure Portal to keep useful materials to facilitate SWIM implementation at regional level. ICAO APAC-SWIM Secure Portal is also being updated and modified with uploading of available information and documentation. States/Administrations are encouraged to provide and share SWIM related video, training material, and other useful information to SWIM TF and ICAO Secretariat for future compilation on **ICAO APAC-SWIM** Secure Portal. Task Leads and the associated contributors are also requested to prepare their consolidated input to the APAC SWIM Implementation Materials based on their presentations and studies on subject/tasks assigned.

5.5 The Information Management Panel (IMP) delivered to the Secretariat a draft of the Manual on SWM Implementation during its Second meeting held from September 27 to October 1, 2021 via VTC. The goal of this Manual is to support, at a global level, the implementation of the draft provision proposed as a new Procedures for Air Navigation Services - Information Management (PANS-IM). The manual is being processed by the Secretariat, who aims its publication at the **beginning of 2023.**

5.6 The meeting was invited to review the draft ToC of the APAC SWIM Implementation Guidance Document and requested that SWIM TF may consider to consolidate the work, completed by SWIM TF and aligning with global guidance documents, into the APAC regional guidance material. The draft ToC of the APAC SWIM Implementation Guidance Document is provided in **Appendix E** to the report.

5.7 The meeting noted that one recommendation from WP/17 is aligned with this paper objectives. Additionally, ICAO APAC Member States through the survey responses are requesting to get ICAO APAC Regional SWIM Implementation Guidance Document. Therefore, the **ACTION ITEM SWIM TF/3/1** should be restarted.

5.8 The meeting noted that while reviewing ToC in the past meetings, no feedback was received. Moreover, the way forward to work on this IGD was not clear. 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 prior to presenting the draft to SWIM TF. **ACTION ITEM 6-9** ICAO Secretariat informed that proposed ToC may be reviewed by ICAO Secretariat, however, preparing the

first draft of IGD is a difficult task due to limited resources. Though, ICAO Secretariat will take the action and inform to SWIM TF in case of difficulties in completion of this task.

5.9 The meeting agreed to add the catalogue being prepared by Task 11 as a supplement material in the first draft of IGD.

Agenda Item 6: **Review SWIM Task Force ToR, Programme, Work Plan, and Action Items**

Review of SWIM TF ToR- Sec (WP/15)

6.1 The SWIM TF/5 meeting revised the ToR of SWIM TF considering the progress made since the establishment of SWIM TF, the update of ICAO global and regional air navigation plans, and the revised task groups adopted at SWIM TF/4. The Meeting endorsed Draft Decision SWIM TF/05/02-*Revised SWIM TF ToR* for adoption by CNS SG/25, which was further adopted by CNS SG/25 by **Decision CNS SG/25/04**

6.2 Australia proposed some amendments via Flimsy/02 of CNS SG/25 to the draft ToR of SWIM TF. The USA also shared its concern about using SWIM to transport time-critical information as detailed in WP/32 in CNS SG/25. The SWIM TF Co-Chairs advised the CNS SG/25 meeting that the draft ToR had been thoroughly discussed and agreed upon during the SWIM TF/5 meeting. After some deliberations and considering CNS SG's views, the proposal on further modifying the term from "over CRV" to "principally over CRV" in the ToR was supported by China, Hong Kong China, Japan, Singapore, Thailand, USA, and IATA.

6.3 The Meeting noted that the subject on amendment to ToR of SWIM TF was also discussed by the MET SG/25 held from 18 to 22 October 2021, which was conducted in the same period with CNS SG/25, with a relevant **Draft Conclusion MET SG/25-07** *SWIM architecture to enable the cost-effective and efficient provision and consumption of MET information services* for consideration in APANPIRG/32. As the MET SG's draft conclusion will be captured in the ongoing review of SWIM TF ToR and considering no further comments from members, the Meeting concluded that there was no need to further consider Draft Conclusion MET SG/25-07.

6.4 The MET SG/25 noted that MET service provision was not well represented in the APAC SWIM TF and, therefore, strongly recommended that the MET community increase participation in the SWIM TF meetings.

6.5 APANPIRG/32 adopted the Decision APANPIRG/32/12: *Meteorological expert contribution to SWIM/TF* based on Draft Decision MET SG/25-08. ICAO Secretariat shared the State Letter Ref.: T 4/3.2.9 - AP070/22 (MET) dated 9 May 2022 on subject: *Decision APANPIRG/32/12: Meteorological expert contribution to SWIM/TF* to encourage MET representatives of member states to participate in the SWIM TF.

6.6 As an established effective practice in progressing various tasks of the SWIM TF, online Task Leads (TLs) coordination meetings have been organized from time to time between Task Force meetings. The latest TLs coordination meeting (video teleconference) was held on 8 February 2022**.** The above mentioned action items were discussed in various SWIM TF Task Leads meeting after SWIM TF/5 and all concerns raised by Australia were taken into consideration. Based on the detailed deliberations, the SWIM TF ToR has been modified and all concerns raised by Flimsy 02 and MET SG have been addressed.

6.7 Considering the progress made since the SWIM TF/5 to deliberate the concerns raised in CNS SG/25 and MET SG/25, SWIM TF's Terms of Reference (ToR) amended in SWIM TF Task Leads meetings was presented to the meeting for further review.

6.8 The meeting reviewed and updated the draft ToR and endorsed following draft decision for CNS SG/26 adoption.

Draft Decision SWIM TF/06/06 – Revised SWIM TF Terms of Reference	
What: That, the revised SWIM TF Terms of Reference (ToR) as shown in **Appendix F** be adopted.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To align with the progress made since the SWIM TF/5 and outcomes of Action item 25-1 from CNS SG/25.	Follow-up: ☐Required from States
When: 20 May 2022	Status: Draft to be adopted by Subgroup
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF	

6.9 To ensure that the objectives set in the ToR can be achieved, the Statement of Work (SOW) of each Tasks was already updated in SWIM TF/5 meeting. 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. **ACTION ITEM 6-10**

Review SWIM TF Work Plan and Action Items- Sec (WP/20)

6.10 The SWIM TF/1 meeting agreed on the Work Plan for the task force, which outlined the phased approach for SWIM implementation in the APAC region, and assigned various tasks to Task Leads and contributors. The SWIM TF/5 meeting updated the Action Items List to reflect the progress in the past year and the plan for the near future.

6.11 As an established effective practice in progressing various tasks of the SWIM TF, online Task Leads (TLs) coordination meetings have been organized from time to time between Task Force meetings. The latest TLs coordination meeting (video teleconference) was held on 8 February 2022 and resulted in the proposed modifications of Task scope naming originally agreed by SWIM TF/5.

6.12 The revised Task description adopted by the meeting is 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), Henry Chan (Hong Kong, China)
	3	Security service	Mr. Jim Laymon (USA)
Technical Architecture	4	Development and maintenance of regional information exchange models	Amornrat Jirattigalachote (Thailand) Wen Zhu (USA)
Governance	5	~~Registry and Other Related Governance Policies~~ **Regional SWIM Governance Framework** (New approved name)	Dongkie Park (ROK) Mark Kaplun (USA), Yukinobu Ryu (Japan), Xiaodong Lu (Japan), Honglei Gao (China)

Groups	Task No.	Subject/Task	Task Leads
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), Xiaodong Lu (Japan), Honglei Gao (China), Mr. Dongkie Park (ROK)
Coordination and Promotion	9	Monitoring of Panels' work	Yukinobu Ryu (Japan)
	10	Regional coordination and SWIM-related information sharing	Vacant
	11	SWIM implementation education and promotion (New task)	Thomas Green (USA)

6.13 To gather as much as possible the different viewpoints from Asia/Pacific Member States and international organizations facing diverse challenges, the Meeting is requested to nominate experts from Member States and organizations to support various activities of Task 1 to 11.

6.14 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. Similar need is required for Task 6 and Task 11. The importance of Task 10, which Task Lead is currently vacant, in coordinating between SWIM TF and other contributory body under APANPIRG was highlighted, taking the example on the increased need for coordination regarding FF-ICE implementation as raised in WP/18. As the revised ToR of SWIM TF has significantly increased the work of SWIM TF, the Member States were encouraged to nominate Task Leads of Task 10, Task co-leads of Task 3, Task 6, and Task 11 on priority basis. Additionally, more contributors were requested for Task 1 to Task 11.

6.15 Australia informed that the nomination of representatives at the place of Mr. Renato Iannella is in progress and ICAO Secretariat will be informed by Australia about the nominated representative in due course.

6.16 The meeting reviewed and updated the SWIM TF Work Plan and the revised SWIM TF Work Plan was adopted by the meeting. The revised SWIM TF Work Plan is provided in **Appendix G** to the report.

6.17 The meeting updated the action item list. The updated action item list is provided in **Appendix H** to the report.

Agenda Item 7: State, Regional and Global SWIM Updates

Status of Proof-of-Concept Based SWIM Project for Exchanging Aeronautical, Flight and Weather Data – India (WP/16)

7.1 India presented the Status and accomplishments of the Proof- of- Concept (POC) based SWIM project undertaken by India. The project scope covers building SWIM technical infrastructure, generating digital datasets for Digital NOTAM, OPMET & flight related ATS messages, which help INDIA to prepare a roadmap for the implementation of ground to ground SWIM infrastructure.

7.2 The meeting was informed that the POC based SWIM project design supports Hybrid Operational Models and leverages the existing AMHS/AFTN networks to communicate with non-SWIM users, which is capable of distributing the aeronautical, flight and weather data through multiple channels subjected to operational rules and conditions. India further elaborated the design philosophy of prototype SWIM system, SWIM Infrastructure Developed for POC based SWM system, and SWIM Technical Infrastructure in India. The paper also introduced the services been included in the SWIM architecture, and shared that the project has entered into the final stage and was planned to be interfaced with AEROTHAI SWIM system for testing and validation of the project deliverables. The meeting was informed that Member States were invited to interface their SWIM system with Indian POC SWIM system.

7.3 The meeting appreciated the work being done by India and encouraged Member States to support the POC test of India by interfacing their SWIM system with Indian POC SWIM system to validate the final outcomes.

The SWIM Service Management Center Demo Design and Implementation – China (IP/03)

7.4 The paper presented the research and implementation of the SWIM services registry in China. The meeting was informed that the research and demonstration of SWIM service registry has been started by Air Traffic Management Bureau (ATMB) in 2020 and a demonstrative platform of SWIM service registry which is named ***SWIM service management center*** has been designed and developed in a regional ATMB as experimental unit. China introduced that at present, the basic functions such as Service Registration function, Service Approval function, Service Publication function, and Service Display function have been realized by SWIM service management center. China also shared the comparison of data formats between service overview metadata specified in SWIM Implementation Guidance and the ones used for SWIM Service Management Center, and the next step of the development of SWIM service management center which will focus on realization of service search, filtering, and notification.

UAM Demonstration over SWIM in the Republic of Korea (IP/04)

7.5 The paper presented UAM demonstration over SWIM in the Republic of Korea (ROK) that was held at Gimpo International Airport, Seoul, in 2021. Urban Air Mobility (UAM) is emerging as a 3-dimensional means of transportation flying above the ground, which is expected to solve urban transportation issues. The meeting was informed that to move forward with ROK's vision to communalize UAM by 2025, ROK has established UAM Team Korea (K-UAM) in 2020, built the domestic UAM Concept of Operations (ConOps) in 2021, and held an open UAM demonstration at Gimpo International Airport in November 2021. The SWIM Testbed operated in Gimpo International Airport consists of SWIM Bridge, Mediation Service, and Information Service. For the demonstration, SWIM Testbed Configuration was introduced that SWIM-enabled application can receive all information required from the SWIM without directly connect to any ATM systems, and display ATM/UTM information and geo-spatial information in the three-dimensional map. Furthermore, the lessons learned from the demonstration and future plan to conduct R&D projects to obtain fundamental technologies for UAM were shared in detail in this paper.

7.6 The meeting appreciated the work being done in ROK and requested ROK to share further updates about the UAM use case at the future meeting.

IATA Aircraft Equipage and Capability Survey – SWIM – IATA (IP/05)

7.7 IATA presented preliminary analysis of airline responses to the SWIM section of IATA's Aircraft Equipage and Capability Survey for Asia-Pacific and North Asia conducted in Quarter 1 of 2022. The IATA's Aircraft Equipage and Capability Survey specifically asked for aircraft fleet capabilities and operating approvals in the domains of PBCS, PBN, GNSS Augmentations, Mode S and SWIM. The airlines were asked to provide indications on future intentions where current capabilities were planned to

be enhanced by the end of the 2022 calendar year considering the impact of COVID-19. IATA covered a preliminary analysis of the responses received from 22 airlines for SWIM, which looked at current levels of understanding and development of SWIM components as well as overall awareness and future plans to adopt SWIM concepts, and summarized that the progress of airlines to become SWIM enabled is broadly spread but more so on the lower scale of awareness. The meeting was informed that IATA will continue to collect data from the survey and produce summaries, and more specific analyses will be conducted once all data is fully filtered and collated.

7.8 The meeting appreciated IATA sharing the preliminary survey results and requested IATA to further share the outcomes at the future meeting, once the response processing is finished and more specific analyses are produced. The meeting also expressed that it would be useful if IATA would conduct a survey on FF-ICE, as its implementation is well connected with SWIM.

Latest Development of IWXXM - Hong Kong, China (IP/06)

7.9 The paper presented the publication of the latest version of IWXXM and the further development of IWXXM since 2021. Approved via the WMO Fast Track Process, IWXXM Version 2021-2, which supports the information and reporting requirements in Amendments 79 and 80 to ICAO Annex 3, was published on 15 November 2021 with one of the major changes to adopt a new versioning scheme where IWXXM and individual report packages no longer shared the same version number. A compatibility table showing the versions of IWXXM and its individual packages (e.g. METAR/SPECI) and their relationships to ICAO Annex 3 requirements was introduced. Additionally, IWXXM Version 2021-2 uses a new approach (Weather Object or WxObject) in development of the IWXXM World Area Forecast System (WAFS) Significant Weather Forecast to describe meteorological phenomena that can better support the exchange of meteorological information over SWIM.

7.10 After the publication of IWXXM Version 2021-2, WMO Task Team on Aviation Data (TT-AvData) had adopted a more proactive approach to start development of IWXXM schemas based on the requirements in proposed amendment to ICAO Annex 3 endorsed by ICAO MET Panel but yet to be approved by the ICAO ANC. Development work for changes to IWXXM in relation to the proposed Amendment 81 has already been started.

Agenda Item 8: Next Meetings and Any Other Business

ICAO APAC Webinars: Implementation of CRV – Sec (IP/02)

8.1 The meeting reviewed the outcomes of the ICAO APAC Webinar on Implementation of CRV in APAC region which was successfully conducted on 20 July 2021 with 100% positive responses. Furthermore, the meeting was informed about a series of 14 ICAO APAC Webinars on various topics planned in 2022 through the State Letter. The information about the webinar on Implementation of CRV on 29th June 2022 with its detailed agenda and program was also shared.

Date and Venue for the Next Meeting

8.2 The meeting agreed to tentatively schedule **SWIM TF/7** as a **Face-to-Face** meeting in **the third or the last week of May 2023**, with the assumption that by that time the business conduct will be back to normal with no travel restriction. The meeting arranged that the SWIM TF/7 would be conducted for **Four** (4) days.

8.3 The meeting agreed to follow-up the exact mode and date for SWIM TF/7 in the future while monitoring the pandemic situation. The States/Administration will be informed before 3 months of scheduled date by ICAO APAC Regional Office about exact mode and date of the meeting.

8.4 The meeting suggested that if a Member State wishes to host the next meeting, they should inform ICAO Secretariat at least 3-4 months in advance in order to issue the meeting invitation package accordingly.

8.5 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 next TF meeting.

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Tentative Programme of SWIM TF/6

Sixth Meeting of System Wide Information Management Task Force (SWIM TF/6)				
Video Tele-Conference, 17 – 20 May 2022 (UTC+7)				
	09:00 -09:30	***09:30-11:00***		***11:15 - 13:00***
Tue. **17 May** **(Day-1)**	***Session 1 (Opening Session):*** **30 min** ➢ *Opening Remarks by Dr. Amornrat Jirattigalachote, Co-Chair of the SWIM TF* ➢ *Opening Remarks by Ms. Kristin Cropf, Co-Chair of the SWIM TF* ➢ *Opening Remarks by Ms. Soniya Nibhani, Secretary of the SWIM TF* ➢ *Introduction of participants* ➢ *Administrative information* **Note:** 1) *Please use IP/01- VIDEO TELE-CONFERENCE BULLETIN for guidance to join the meeting.* 2) *Download meeting documents from here.*	***Session 2:*** **90 min** **Agenda Item 1: Adoption of the Agenda** ➢ *WP/01 - Provisional Agenda - Sec* **Agenda Item 2: Outcomes of relevant meetings on SWIM related matters** ➢ *WP/02 - Outcomes of Relevant Meetings - Sec* ➢ *WP/03 – Outcomes of ACSICG/9 Meeting – Sec* ➢ *WP/10- Aviation Support Service Providers Joining CRV - PCCWG* ➢ *WP/19 - Consideration of SWIM architecture for efficient provision of MET information services - MET SG*		***Session 3:*** **105 min** **Agenda Item 4: Updates on the assigned tasks by task leads/contributors including progress report and issues** **b) SWIM Infrastructure** **Task 2**: Regional SWIM Infrastructure ➢ *WP/09 - SWIM-TI Interface Binding to Achieve Interoperability - Task 2 Leads* **Agenda Item 6**: **Review SWIM Task Force ToR, Programme, Work Plan, and Action Items** ➢ *WP/04 - Implications of the Revised Terms of Reference as a result of the CNS SG/25 Decision - China, Japan, Singapore, and Thailand* ➢ *WP/15 - Review ToR of SWIM – Sec*

Sixth Meeting of System Wide Information Management Task Force (SWIM TF/6)			
Video Tele-Conference, 17 – 20 May 2022 (UTC+7)			
	09:00- 11:00		***11:15- 13:00***
Wed. **18 May** **(Day-2)**	***Session 4:*** **120 min** **Agenda Item 3**: **Review of SURSG/2 report** ➢ *WP/05 - Review Report of the Second Meeting of the Surveillance Study Group (SURSG/2) – Sec* ➢ *WP/06 - Establishment of S3TIG – Hong Kong, China* **Agenda Item 4: Updates on the assigned tasks by task leads/contributors including progress report and issues** **a) Implementation Planning** **Task 1**: Regional Implementation Philosophy & Roadmap ➢ *WP/07 - APAC SWIM Implementation Timeframe - China, Japan, Singapore, and Thailand* ➢ *WP/08 – SWIM Implementation and the Asia-Pacific seamless ANS plan – China, Japan, Singapore, and Thailand* ➢ *WP/17- Outcomes of Asia/Pacific SWIM Implementation Plan and Status Survey- Task 1 Leads* **d) Governance** **Task 5:** Registry and Other Related Governance Policies ➢ *WP/11- APAC SWIM Service Level Agreement (SLA): Introduction- Task 5 Leads* ➢ *WP/12- APAC SWIM Service Level Agreement (SLA): Template*		***Session 5:*** **105 min** **Agenda Item 4: Updates on the assigned tasks by task leads/contributors including progress report and issues** **d) Governance** **Task 5:** Registry and Other Related Governance Policies ➢ *WP/13- SWIM Discovery Service (SDS) Update and Next Steps- China, Japan, ROK, and USA* **e) Information Services** **Task 6:** Information Services ➢ *WP/14- APAC Service Overview Specification - Optional Fields- Hong Kong China*

Sixth Meeting of System Wide Information Management Task Force (SWIM TF/6)			
Video Tele-Conference, 17 – 20 May 2022 (UTC+7)			
	09:00- 10:30		***10:45- 13:00***
Thurs. 19 May **(Day-3)**	***Session 6:*** **90 min** **Agenda Item 4: Updates on the assigned tasks by task leads/contributors including progress report and issues** **g) Coordination and Promotion** **Task 9:** Monitoring of Panels' Work ➢ *WP/18- IMP and Related Panel Updates- Task 9 Lead* **Agenda Item 5: Development of APAC SWIM Implementation Materials** ➢ *WP/21 - Development of APAC SWIM Implementation Materials - Sec* **Agenda Item 7: State, Regional and Global SWIM Updates** ➢ *WP/16- Status of Proof -Of -Concept Based SWIM Project For Exchanging Aeronautical, Flight And Weather Data- India*		***Session 7:*** **135 min** **Agenda Item 7: State, Regional and Global SWIM Updates** ➢ *IP/03 - The SWIM Service Management Center Demo Design and Implementation - China* ➢ *IP/04 - UAM Demonstration over SWIM in the Republic of Korea – Republic of Korea* ➢ *IP/05- IATA Aircraft Equipage And Capability Survey – SWIM- IATA* ➢ *IP/06- Latest Development of IWXXM- Hong Kong China* **Agenda Item 6: Review SWIM Task Force ToR, Programme, Work Plan, and Action Items** ➢ *WP/20 - Review SWIM TF Work Plan and Action Items - Sec* **Agenda Item 8: Next meeting date and any other business** ➢ *IP/02 - Update on ICAO APAC Regional Webinars – Sec* ➢ *Next Meeting Date*

Sixth Meeting of System Wide Information Management Task Force (SWIM TF/6)	
Video Tele-Conference, 17 – 20 May 2022 (UTC+7)	
	***09:00- 11:00***
Fri. **20 May** **(Day-4)**	***Session 8:*** **120 min** **Agenda Item 8: Next meeting date and any other business** ➢ *Meeting Report* ➢ *Closing Remarks by Chairs* ➢ *Closing Remarks by Secretariat*

LIST OF WORKING AND INFORMATION PAPERS

WP/IP/ No.	Agenda Item	Subject	Presented by
		WORKING PAPERS	
WP/01	1	Provisional Agenda	Secretariat
WP/02	2	Outcomes of relevant meetings	Secretariat
WP/03	2	Outcomes of ACSICG9 Meeting	Secretariat
WP/04	2	Implications of the revised terms of reference as a result of the CNS SG/25 decision	China, Japan, Singapore, and Thailand
WP/05	3	Review Report of SURSG2 Meeting	Secretariat
WP/06	3	Establishment of S3TIG	Hong Kong China
WP/07	4(a)	The Asia-Pacific SWIM Implementation timeline	China, Japan, Singapore, and Thailand
WP/08	4(a)	SWIM Implementation and the Asia-Pacific seamless ANS plan	China, Japan, Singapore, and Thailand
WP/09	4(b)	SWIM-TI Interface Binding to Achieve Interoperability	Task 2 Leads
WP/10	2	Aviation Support Service Providers Joining CRV	PCCWG
WP/11	4(d)	APAC SWIM Service Level Agreement (SLA): Introduction	Task 5 Governance
WP/12	4(d)	APAC SWIM Service Level Agreement (SLA): Template	Task 5 Governance
WP/13	4(d)	SWIM Discovery Service (SDS) Update and Next Steps	USA, ROK, China, Japan
WP/14	4(e)	APAC Service Overview Specification - Optional Fields	Hong Kong China
WP/15	6	Review ToR of SWIM TF	Secretariat

WP/IP/ No.	Agenda Item	Subject	Presented by
WP/16	7	Status of Proof -Of -Concept Based SWIM Project For Exchanging Aeronautical, Flight and Weather Data	India
WP/17	4(a)	Outcomes of Asia/Pacific SWIM Implementation Plan and Status Survey	Task 1 Lead
WP/18	4(g)	IMP and related panel updates_v1.0	Task 9 Lead
WP/19	2	Consideration of SWIM architecture for efficient provision of MET information services	MET SG
WP/20	6	Review SWIM TF Work Plan and Action Items	Secretariat
WP/21	5	Development of APAC SWIM Implementation Materials	Secretariat
INFORMATION PAPERS			
IP/01	-	Video Teleconference Bulletin	Secretariat
IP/02	10	Update on ICAO APAC Regional Webinars	Secretariat
IP/03	7	The SWIM Service Management Center Demo Design and Implementation	China
IP/04	7	UAM Demonstration over SWIM in the Republic of Korea	ROK
IP/05	7	IATA Aircraft Equipage And Capability Survey – SWIM	IATA
IP/06	7	Latest Development of IWXXM	Hong Kong, China

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA AND PACIFIC (APAC) OFFICE

Surveillance Study Group (SURSG)

STUDY REPORT

Surveillance Data Sharing - Feasibility Study Stage

- Implementation Model
- Infrastructure Model
- Business Model
- Participation Model
- Implementation Roadmap

China
Hong Kong, China
Republic of Korea
Singapore
Thailand
Viet Nam

Table of Contents

ACRONYMS AND ABBREVIATIONS

A-CDM	Airport Collaborative Decision Making
ADS-B	Automatic Dependent Surveillance - Broadcast
AIXM	Aeronautical Information Exchange Model
ANSP	Air Navigation Service Provider
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ASEAN	Association of Southeast Asian Nations
ASBU	Aviation System Block Upgrades
ASTERIX	All Purpose Structured Euro control Surveillance Information Exchange
ATFM	Air Traffic Flow Management
CONOPS	Concept of Operations
CRV	Common aeRonautical Virtual Private Network
CRV OG	CRV Operations Group
CTOT	Calculated Take Off Time
EMS	Enterprise Messaging Service
FIXM	Flight Information Exchange Model
GANP	Global Air Navigation Plan
IWXXM	ICAO Meteorological Information Exchange Model
MET	Meteorological
MLAT	Multilateration
MQ	Message Queue
NUC/NIC	Navigation Uncertainty Category/Navigation Integrity Category
POC	Proof of Concept

SAC	System Area Code
SCDP	Surveillance Central Data Processor
SDDS-NG	Surveillance Data Distribution Solution Networking Group
SIC	System Identification Code
SLA	Service Level Agreement
SURICG	Surveillance Implementation Coordination Group
SURSG	Surveillance Study Group
SWIM	System Wide Information Management
SWIM TF	SWIM Task Force

Chapter 1: IMPLEMENTATION MODEL (TASK 2-2)

1.1 Introduction

1.1.1 SWIM could be the key driver to the implementation of surveillance data sharing as the SWIM platform can be adapted to realize data sharing across different States, in addition to the exchange of expected SWIM data traffic such as FIXM, AIXM, and IWXXM messages. Working papers in relation to collaboration in sharing of surveillance data in SWIM presented to SWIM TF/4 (WP/13) and CNS SG/24 (WP/22) are highly relevant to this chapter.

This chapter focuses on the implementation approach and practical implementation models with particular air traffic control operation identified and infrastructure services required to realize surveillance data sharing. This chapter also considers the system design and collaboration model expected for implementation of surveillance data sharing.

1.2 Implementation Philosophy

1.2.1 "Bottom up" and "Starting small and simple" – ADS-B data to be shared

a) To align with the philosophy and roadmap for implementation of SWIM in APAC, the same incremental approach (i.e. starting small and simple) will be leveraged for surveillance data sharing in SWIM. With focus on one operation selected to benefit from surveillance data sharing, the infrastructure and associated information service would be identified and implemented to efficiently support the operation. Where the first implementation of surveillance data sharing of ADS-B data proves feasible and beneficial, sharing of other types of surveillance data may take reference from and be leveraged on the mechanism and infrastructure established for the previous case.

b) Given data ownership, concerns and considerations of potential contributors of other surveillance data types, a one-size-fits-all model capable of catering to multiple surveillance data types would be too complex and with too many considerations to render this Study Report easily readable and its proposed sharing model implementable since an all-encompassing model would imply elaborate and extensive ground works, infrastructure, papers, documentation and agreements to be sorted out first. Unless most other surveillance data types, ADS-B data is self-initiated and broadcast to all by aircraft and is easier to be shared with well-established data format standard. Therefore the scope of this study is devoted to the sharing of ADS-B data.

c) Currently, ADS-B CAT 21 Version 2.1 format has been the common standard in the aviation community since its publishing in 2011. While for the sake of compatibility it may be tempting to specify the upcoming or a list of legacy versions in this Study Report, such a comprehensive approach would be discouraging to potential data contributors and could complicate matters with extra version conversion efforts, which would add to data latency and lead to potential query of data integrity due to extra processing and conversion. It is best to aim for one standard version of ADS-B data in the implementation. Where a data contributor's data is of a different version, such data should not be rejected however, since in the publish-n-subscribe mechanism of SWIM and its service registry, a data recipient should be fully aware of the data version although it is desirable that a single standard prevails in the surveillance data sharing scheme without an intervening version conversion service to be provided by a the data contributor or a 3rd party.

1.2.2 Start with Particular Operational Application - ATFM

Air Traffic Flow Management (ATFM) is an application that could benefit from surveillance data sharing to facilitate air traffic planning, particularly as its demand on target update rate is much relaxed (as far apart as in minutes) than, say, ATC (normally within 8 seconds), which otherwise could have called for strong commitments from data contributors on data reliability and timeliness, which could dissuade a potential data contributor from participating. Even if it is not expected that at start of the surveillance data sharing initiative with contiguous coverage from departure to destination across FIRs, surveillance data showing nearly real-time take-off time would be of strong interest to the ANSPs of the concerned arrival/en-route flights.

1.3 Required Infrastructure and Information Service – SWIM over CRV

1.3.1 ToR of SURSG – a part of the ToR is the study on the "Sharing of Surveillance Data in SWIM", for which CRV has been endorsed as the carrier of SWIM data at CRV OG/5 and SWIM TF/3 meeting, it is therefore assumed that SWIM over CRV is the platform on which this Study is based considering that the CRV is a flexible, trusted, secure, well-governed (by CRV OG) and well-maintained network infrastructure, which is **already existent** with a user base of 16 subscribers (as at 23 December 2021) and growing.

1.3.2 Assumptions:

a) No assumption is made that CRV is the sole network capable of supporting the sharing of surveillance data but a practical assumption is made that the establishment of a separate, trusted and secure network for surveillance data sharing, even if built upon the Internet, would still require heavy commitments (costs and resources), involvement by active participants and guidance from ICAO APAC to ensure a reliable, well governed and well maintained network system and adequate bandwidth, which are already available under CRV.

b) While SWIM information services such as service discovery, governance, Certificate Authority (CA) services and applications are yet to be realized, a reasonable assumption is made that a somewhat rudimentary implementation of surveillance data sharing is possible at start without SWIM and the implementation could be assimilated into the SWIM environment as the SWIM services and applications become available over time.

c) An assumption is also made that the sharing of surveillance data (not just ADS-B data) in SWIM over CRV would secure the endorsement at a suitable time. It is envisaged that SWIM over the readily accessible CRV be the means to share the surveillance data such that States could benefit from SWIM initiatives without high initial investment cost for a new platform and development expense of traditional systems.

d) The readiness of the infrastructure and information service for implementation of surveillance data sharing is highly dependent on the implementation of SWIM. Insofar as this Study Report covers the various facets of sharing of ADS-B data in SWIM over CRV, no assumption is made that ADS-B data sharing could only commence when the supporting infrastructure and services are mostly available given the developing status of SWIM in APAC. It is also possible that sharing of ADS-B data could be migrated to SWIM as SWIM takes onto a substantial status of development.

1.4 Consideration of System Design – Hybrid SWIM Model

1.4.1 The SWIM infrastructure for surveillance data sharing could be implemented in either Distributed Model, Centralized Model and/or Hybrid Model (details in Chapter 2). By taking into account the efficiency and effectiveness of the implementation (again "starting small and simple" philosophy), Hybrid Model, representing the coexistence of ANSPs operating their own EMSes (Distributed Model) and ANSPs accessing centralized SWIM services provided by

government or commercial concerns (Centralized Model) is considered a suitable model. In gist, the Hybrid Model:

a) can cater to States with different levels of commitment to SWIM from operating their own EMSes (Distributed Model) to accessing SWIM services via centralized services provided by a 3rd party (Centralized Model); and

b) more importantly, allows for potential participation from commercial party(ies), which are expected to accelerate SWIM implementation and therefore sharing of surveillance data.

1.4.2 While States may subscribe to CRV if they choose to, the Hybrid Model could serve as the gateway for interested parties who are not subscribers of CRV to be able to share/receive surveillance data through connecting to a 3rd party(ies) that hosts the EMS and centralized services, subject of course to the endorsement from CRV OG. SWIM TF, CNS SG in future in accepting such a scheme.

1.5 Collaboration Model

1.5.1 Data Contributor – Eligibility

1.5.1.1 On the eligibility to share, member states/administrations are most welcome to share their data.

1.5.2 Data Contributor - Service Level of Shared Surveillance Data

1.5.2.1 Reliability and availability of the shared surveillance data are determinative factors on the success of implementation and degree of participation. It is essential that the shared data service reaches certain performance levels. In Appendix 6 "*Baseline ADS-B Service Performance Parameters*" of ICAO'S *ADS-B Implementation and Operations Guidance Document Edition 13.0 – September 2020*, there are some major performance requirements of ADS-B which are relevant to surveillance data sharing from potential data contributors: [See Chapter 3]

Service Parameters	**Tier 1[1]**	**Tier 2[2]**
System Availability	Total Service Availability > 99.9%	Total Service Availability > 90%
System Reliability	Total Service MTBF > 50,000 hours	Total Service MTBF> 200 hours
Aircraft Updates	0.5 second < Interval < 5 seconds	0.5 second < Interval < 60 seconds
Data Latency	95%: < 2 seconds	95%: < 60 seconds

1.5.2.2 It is justifiable to follow the above requirements for the sharing of surveillance data. Yet, practically, the requirements, particularly for Tier 1 service level, can present themselves as obstacles for a potential data contributor unless:

a) the potential contributor is already providing such data via another channel with the required service performance level and the shared data represents simply data duplication into another channel for sharing;

b) the service level is non-binding; and/or

c) such service is provided "as is".

[1] Tier 1 standards are for a high performance traffic separation service.
[2] Tier 2 standards are for a traffic situational awareness service with procedural separation.

1.5.2.3 There exists a dilemma where a potential data contributor may be discouraged because of demands of required service level performance imposed on the contributor whereas a use-at-your-own-risk approach with no service guarantee would lessen the appeal/trust of the shared data for operational use not that this would necessarily discourage interested parties from participating as such data might still serve "for reference" and considered "nice-to-have". Such consideration might argue for the case of a trial implementation by pioneering members to showcase the benefits of the surveillance data scheming. [See Chapter 3]

1.5.2.4 Para. 1.5.2.3 also echoes the Implementation Philosophy in para. 1.2 to start small and simple and to start with an application, i.e. ATFM, where the less stringent service parameters of Tier 2 (compared to those of Tier 1) would still serve the purpose. At the same time, it also highlights an expected advantage of centralized services by a 3rd party to shoulder such service performance parameters (subject always to external factors beyond control). [See Chapter 3]

1.5.3 Data Consumer – Eligibility

1.5.3.1 On the eligibility to receive shared data, there are various options proposed in the CONOPS (SURICG/7-IP/17):

a) Option 1: The data to be shared among all participating users, be they data contributors or pure consumers

b) Option 2: A data contributor to decide which user(s) to receive the data and the volume of surveillance coverage

c) Option 3: By default, only data contributors can be consumers

In order to support the ATFM operation identified in para. 1.2.2 above, Option 1 is highly recommended as it resonates with the spirit of surveillance data sharing. Non-targeting data sharing would help speed up the collaborative sharing of surveillance data with a faster growth of the community, given the benefits derived from shared surveillance data and active States wishing to contribute and play an active part in this initiative, perhaps as a reference model or implementation experience for exchange of aviation data in an increasingly connected aviation community.

Options 2 and 3 may be implemented as the data sharing scheme further develops over time. Both options likely would involve complex and extensive multi-lateral discussions and agreements to reach detailed arrangements of data sharing. Options 2 and 3, clearly with some implied exclusivity, does not align well with ICAO's ASBU initiatives – global connectivity and is not recommended to avoid the scheme ending up a few participants with localized interests sharing data among themselves. For practical consideration, it is therefore desirable consider lessening or shifting the "burden" on a data contributor to a 3rd party providing centralized services to promote participation in the sharing scheme. [See Chapter 3 and Chapter 4]

1.6 Implementation Sequence

1.6.1 Stage 1 –Tier 2 ADS-B data sharing

The data services are classified into two tiers based on the nature of ATS applications:

a) Tier 1 Data Service
For supporting ATS applications which make use of shared surveillance data for aircraft separation.

b) Tier 2 Data Service
For supporting ATS applications which do not use the shared surveillance data for aircraft separation.

Given the idea of starting small and simple, it is recommended to start with Tier 2 data service considering the stringent service performance requirements for Tier 1 data service (for ATC) and the expected non-contiguous surveillance data coverage at start.

1.6.2 Stage 2– Tier 1 ADS-B data and other surveillance data sharing

Stage 2 would be at a much later stage, after lessons learned and experience gained from ADS-B data sharing in Stage 1. The implementation of stage 2 would be highly dependent on the success of Stage 1 implementation given the considerations stated in para. 1.2.1. It may be worth focusing efforts on technical implementation of data sharing by opting for a surveillance data to be shared and a sharing scheme with the least (but sometimes unavoidable) diversions to other non-technical aspects. If and when sharing of other surveillance data such as radar data is ready in future, a dedicated study group would be called for to work on the implementation details and arrangement of sharing of such and other surveillance data.

Chapter 2: INFRASTRUCTURE MODEL (TASK 2-3)

2.1 Introduction

2.1.1 The CRV is a common network infrastructure in the APAC initiated by the ICAO with a view to overcoming the existing limitations in the communications of legacy civil aviation technologies and to constructing a centralized IP-based private network infrastructure by adopting modern technology. One of its purposes is to support future high-speed aviation applications. During feasibility study stage, CRV was already identified as the SWIM-enabler under ASBU framework.

2.1.2 Since the commencement of CRV operations in 2018 for voice and AMHS applications, for its performance and reliability, it has been endorsed by States/Administrations at different meetings/forums (e.g. CRV OG and SWIM TF) that CRV as the underlying infrastructure to support SWIM. And throughout a series of studies and discussions, both CRV OG and SWIM TF agreed and concluded that CRV would be used to support SWIM.

2.1.3 The SWIM TF TOR was updated in SWIM TF/5 (2021) and endorsed by CNS SG/25 (2021) that the SWIM should be implemented **principally** over CRV.

2.2 SWIM Technical Infrastructure

2.2.1 The SWIM Infrastructure has been discussed at various ICAO meetings and conferences aiming to unify the design and implementation. In these discussions, three models of infrastructure have been identified, which are Distributed, Centralized and Hybrid.

2.2.2 A typical Distributed Model is made up of active APAC SWIM participants who host their EMS servers and services to form Global Enterprise Messaging Services (GEMS) on the CRV network while supporting local access by specific systems to publish or subscribe to SWIM data. Such a Distributed Model is illustrated in Figure 1 below. The local stakeholders, such as ANSPs, airports, airlines and MET offices will then be able to publish and subscribe SWIM data through its locally connected EMS to reach other States by the GEMS.

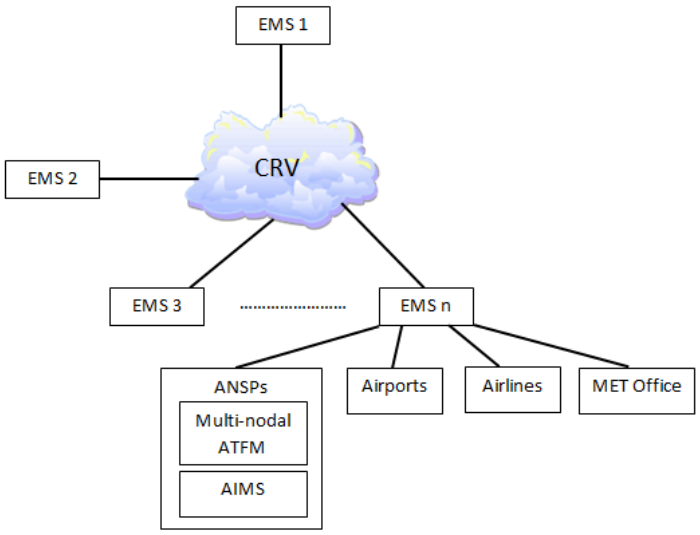


Figure 1 – "Distributed Model" of EMS services

2.2.3 In the Centralized Model, a third party may host EMS services in the CRV available to subscribers such that qualified States/Administrations/Stakeholders may subscribe or publish

SWIM data irrespective of their geographical locations but insofar as they can access to the CRV. Such a model is illustrated in Figure 2 below. Simplistically, the hosted EMS services are inside the CRV cloud.

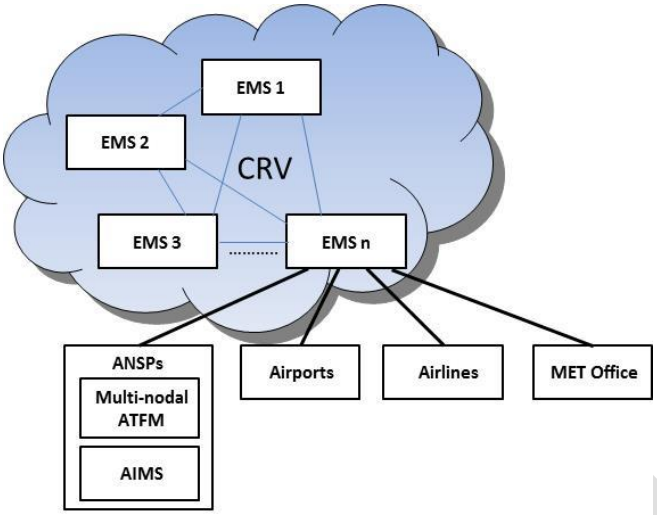


Figure 2 – "Centralized Model" of EMS services

2.2.4 In the Hybrid Model, the Distributed Model and the Centralized Model coexist, as illustrated in Figure 3 below. Simplistically, there are EMSes inside the CRV cloud (Centralized Model) and EMSes outside of the cloud (Distributed Model).

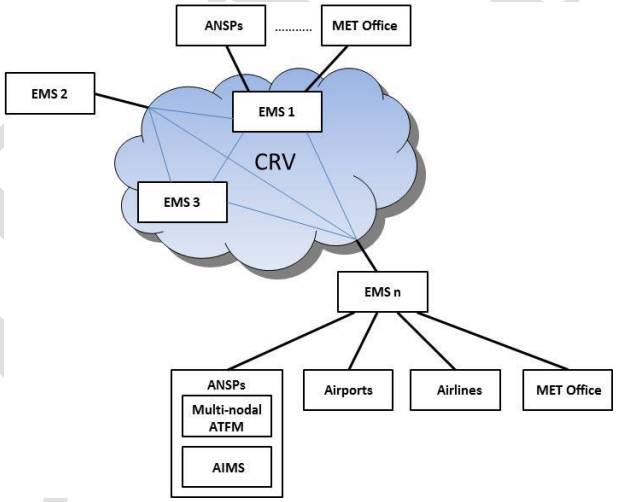


Figure 3 – "Hybrid Model"

2.3 Suggested Model for Surveillance Data Exchange

2.3.1 It is worth noting that the Hybrid Model was showcased in the ASEAN SWIM demonstration conducted in November in 2019 with successful outcome. In the demonstration, various operational information, including trajectory updates for situational awareness, aircraft turnaround for A-CDM and CTOT for ATFM Ground Delay Program was exchanged.

2.3.2 The table extracted from the report of the ASEAN SWIM Demonstration deliberating the pros and cons of different models is given as follows.

Pros	Cons
Option 1 Single EMS Architecture	
• Efficient implementation – Each participant only needs to connect once • Less metadata needed to ensure proper message routing • Faster to integrate	• Hard to get consensus on who to implement the EMS • If EMS is implemented by third party, no participant has control over how messages are routed
Option 2 Every Participant Implementing Interconnected EMS Architecture	
• Every participant is responsible for their own EMS implementation • Each participant has full control over how their EMS routes messages	• Every participant needs to establish EMS-EMS connection to every other participant, leading to point-to-point connection • Message routing is complex and less efficient, compared to Option 1
Option 3 Combined Public and Private EMS Architecture	
• Participants can decide how they wish to connect to regional SWIM, either through their own EMS or through the commercial EMS • The number of EMS being implemented is small	• Although all EMS are required to be interconnected, the complexity is still less than Option 2 • Message routing has to be agreed upon by the group that is implementing the EMSs

Note: Option 1 is considered as Centralized Model
Option 2 is considered as Distributed Model
Option 3 is considered as Hybrid Model

2.3.3 Considering that APAC members could opt for subscribing to the EMS services in CRV (if existent then) or hosting EMS servers of the own, having regard to factors such as cost, time and efforts of setup, role of data contributor/consumer, etc. as well as the successful outcome of the ASEAN SWIM Demonstration, it is suggested to also adopt the Hybrid Model in the surveillance data exchange in SWIM over CRV.

2.4 Other Elements in SWIM

2.4.1 The scope of this Study is on the sharing of surveillance data in SWIM. Implementation of information services (which includes shared surveillance data) and other elements in SWIM framework such as governance, service registry and security are under the purview of SWIM TF. Yet, the sharing of surveillance data over can be realized as a non-SWIM service and migrate to SWIM as more SWIM elements and services available as an assumption stated in para. 1.3.2.

2.5 CRV Requirements

2.5.1 The CRV service providers already provide different packages for the States/Administrations to access CRV. In particular, package D offers a flexibility for the States/Administrations to access CRV via the Internet (IP-SEC VPN), though its serviceability relies on the unpredictable reliability of the Internet connection. For both data contributors and consumers, network bandwidth should be evaluated based on their own requirements according to which tier of data planned to be carried.

2.5.2 On bandwidth requirements, the bandwidth required of a data contributor depends on the number of data consumers who are directly served the data from the contributor Vs the case of centralized service which would serve the surveillance data to the subscribed data consumers, thereby reducing the bandwidth requirements of the original data contributor. An implementation of centralized service tailored for surveillance data sharing (with data repository service, processing service, conversion service and other value-added services)

would be via a Surveillance Central Data Processor (SCDP) as further elaborated in para. 2.6. At a proof-of-concept event conducted in Hong Kong in October 2018 [WP/20 of SWIM TF/3], the capability of CRV to carry SWIM data was successfully demonstrated and it was concluded that bandwidth requirement was a matter of the CRV data package subscribed. At a recent proof-of-concept exercise conducted in Hong Kong in February 2022, to demonstrate and simulate the sharing of surveillance data in SWIM over CRV, some reference figures have been obtained and tabled at Appendix X to this study report. *[Note: Appendix X currently in WIP status, to be provided once available.]*

2.6 EMS and SCDP

2.6.1 A 3rd party wishing to provide centralized surveillance data sharing service may do so by way of an SCDP, which filters and collates surveillance data feeds from data contributors and outputs user-selectable data streams as a SWIM service.

2.6.2 Whereas a centralized registry for all SWIM services might not be available in the near future, this SCDP could host the service registry and exercise any governance rules if they exist.

2.6.3 From system perspective, the SCDP will be designed with redundancy and resilience in mind to achieve high availability. And the SCDP would also be served with high-bandwidth CRV links to be able to receive and serve surveillance data to other ANSPs.

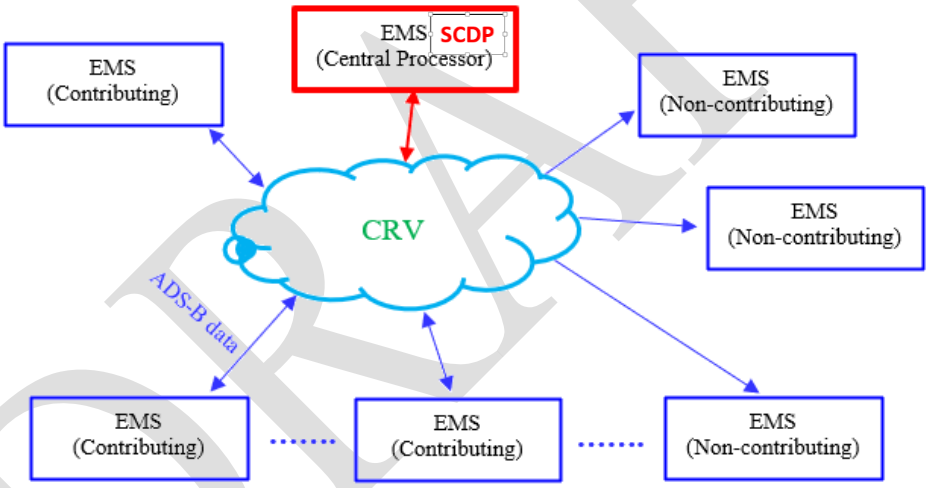


Figure 4 – Proposed Model of SCDP

2.6.4 The EMS and SCDP are to be tightly coupled regardless if they are provisioned by single service provider or not with expected advantages as follows:

a) With expected low latency and throughput in the local connection between EMS and SCDP, potential bottlenecks in data flows and processing could be eliminated, which is important and necessary since a high volume surveillance data traffic would be exchanged between EMS and SCDP internally and between EMS and other EMSes externally.

b) A closely coupled EMS and SCDP would be more reliable and clearly cost-effective services with the need for remote connection, network equipment and link costs.

c) An SCDP will also greatly alleviate the bandwidth requirements of individual data contributors who need to cater for a large number of data consumers by providing a single stream of surveillance data to the SCDP for its onward distribution to data subscribers.

Chapter 3: BUSINESS MODEL (TASK 2-4)

3.1 Responsibilities of Data Contributors

3.1.1 Service Availability & Reliability

To provide reliable data sharing service to participating users, data contributors should maintain a certain level of system availability and reliability in their surveillance data sharing service. In the initial stage, the implementation focuses on the sharing of ADS-B data. By referring to Appendix 6 "*Baseline ADS-B Service Performance Parameters*" of ICAO'S *ADS-B Implementation and Operations Guidance Document Edition 13.0 – September 2020*, ("Ref 1"), the following service parameters are recommended to be delivered by surveillance data sharing systems to support the corresponding operation mode of the data services.

Service Parameters	**Tier 1 Data Services [Equivalent to Category 1 (Tier 1) under "Ref 1" to support aircraft separation]**	**Tier 2 Data Services [Equivalent to Category 3 (Tier 3) under "Ref 1" to support enhanced flight operation]**
System Availability	Total Service Availability > 99.9%	Total Service Availability > 90%
System Reliability	Total Service MTBF > 50,000 hours	Total Service MTBF> 200 hours

3.1.2 Integrity of ADS-B Data

a) The Data Contributors should not modify the content of the surveillance data except for the following purposes:

   i. ASTERIX Edition upgrading or downgrading;

   ii. Format conversion to meet the agreed data format for sharing;

   iii. SAC/SIC amendment; and

   iv. Fusion of data from multiple sensors such as removal of duplicated ADS-B position reports. Any extrapolation of position reports shall not be shared.

b) Time stamp of the surveillance data report shall be based on a reliable time source without any modification by the data contributors.

3.1.3 Report Filtering

a) Screening out special or non-civilian flights (e.g. State aircraft) is allowed with the filters being agreed upon prior to implementation. The filtering mechanism shall be detailed in the data services provided.

b) For ADS-B data, the data contributors shall not perform any data filtering based on ADS-B quality indicators or blacklist. All the ADS-B data shall be shared with users as far as possible.

c) Considering that States will be making the assessment of data usability, and that lower NUC/NIC can still support lower tier operations, all data should be sent without filtering based on NUC/NIC.

3.1.4 Update Intervals / Data Latency

a) With the same reference to "Ref 1" in para. 3.1.1, the following service parameters are recommended on the timeliness and data latency of the surveillance data sharing systems.

Service Parameters	**Tier 1 Data Services [Equivalent to Category 1 (Tier 1) under "Ref 1" to support aircraft separation]**	**Tier 2 Data Services [Equivalent to Category 3 (Tier 3) under "Ref 1" to support enhanced flight operation]**
Aircraft Updates	0.5 second < Interval < 5 seconds	0.5 second < Interval < 60 seconds
Data Latency	95%: < 2 seconds	95%: < 60 seconds

3.1.5 Format of the data

a) ASTERIX CAT 21 Edition 2.1 is recommended for the initial implementation, as most of the States are able to support without additional data conversion efforts.

b) The SCDP would be able to provide data conversion services between different ASTERIX CAT 21 editions, to support legacy system if required.

3.2 Collaboration Model

3.2.1 Participating as Data contributors

a) Due to the varying degrees of SWIM implementation status of States, data contributors should offer flexibility to allow surveillance data sharing to the data consumers either by direct interfacing or by centralized SCDP services provided by a 3rd party.

b) Direct interfacing between data contributor and data consumer can be established regardless if there exists an SCDP. However, an SCDP is expected to greatly accelerate the implementation of surveillance data sharing and popularize its utilization in accordance with the "starting small and simple" philosophy. SWIM-enabled States can choose this collaboration model for an initial trial with a "local SCDP" and then populate the SCDP services through further collaboration in a later stage by expanding their capabilities or by way of 3rd-party SCDP centralized services.

c) Surveillance data sharing services (Tier 1 and Tier 2), if offered via SCDP, require the collaboration between States (as data contributors) and the SCDP service provider for the data provision mechanism, including data format, data update rate, etc., to ensure the SCDP can deliver the ultimate surveillance data sharing services, meeting the service parameters mentioned in para.3.1.4.

d) Data charging scheme or incentives provided to States who are data contributors to the SCDP should be explored to encourage data contribution to the SCDP.

e) With the presence of SCDP, States without SWIM infrastructure can also contribute their data by legacy means and in legacy data formats (if it is the case) to the SCDP, which will

then take care of data conversion and onward data surveillance sharing service for dissemination.

3.2.2 Participating as Data consumers

a) States, based on their own SWIM implementation status, can choose between direct interfacing with the data contributor or use the surveillance data sharing service provided by SCDP.

b) States with SWIM infrastructure may participate in the initial trial by direct interfacing between data contributors, in respect to para. 3.2.1(b).

c) Data consumer without SWIM infrastructure can subscribe to the surveillance data sharing services from the SCDP to benefit from shared surveillance data.

3.2.3 Eligibility to be a data consumer

a) In para. 1.5.3, three options of participating as data consumers were explored, repeated below:

i. Option 1 - data will be shared among all the participating users;

ii. Option 2 - data contributor gets to decide who can receive its shared data;

iii. Option 3 – only data contributors can be consumers.

b) In para. 1.5.3, it was recommended that Option 1 be adopted in the spirit of sharing and benefitting the aviation community as a whole. Option 2 may be considered for some data contributors if there are specific circumstances. Option 2 nevertheless would not be conducive to quick implementation of data sharing due to a lack of across-the-board "free to use" approach which would necessitate multi-lateral agreements, more elaborate technical implementation and service governance and controls.

c) Options 1 and 2 are not mutually exclusive however. Technically, there should be no issue in implementation either or both options in the SWIM environment. Option 3 is not preferred since by nature it would require an ensemble of interested parties, all of whom necessarily data contributors, to participate. This by itself becomes a hurdle to quick implementation of surveillance data sharing and, like Option 2, goes against the spirt of data sharing.

3.3 Data Coverage

3.3.1 Considering the benefits from shared surveillance data, some possible choices on the extent and geographical coverage of data to be shared are listed below:

a) Choice 1: Data contributor to share data from all its ADS-B stations (maybe difficult for States with large FIRs);

b) Choice 2: Data contributor to share data from at least one of its ADS-B stations (the data from the chosen station may not be useful to all other States);

c) Choice 3: Data contributor to share data from all its international flights (useful for ATFM);

d) Choice 4: Data contributor to share ADS-B data from stations that are near the FIR boundaries (useful to cover surveillance gaps);

e) Choice 5: Data contributor to share data from ADS-B stations that are near airports for international flights (useful for ATFM).

3.3.2 Among the above five choices, choice 4 can support Tier 1 data service as a minimum while choice 5 can support Tier 2 service as a minimum. Therefore, it is recommended that combination of choices 4 and/or 5 be selected as a minimum for a data contributor.

3.3.3 As mentioned in para. 3.2.1(d), data contributor could be offered some incentives in using SCDP. States are thus encouraged to contribute data as much as they could, which can help build up a rich and more comprehensive set of data via the SCDP.

3.4 Operational Arrangement and Governance by an Operations Group

3.4.1 An Operations Group, such as CRV OG, might be necessary to administer and supervise the data exchange system, which would be subjected to extent of participation, commitment and 3rd party/commercial participation.

3.4.2 Preferably, the Operations Group can be established before implementation or a trial implementation to consider and manage the various issues arising.

3.4.3 The Operations Group should oversee the following:

a) Membership;
b) Administration of the agreement with 3rd party/commercial participations (if any);
c) Maintenance of the technical specifications of the surveillance data sharing platform;
d) Management of the performance of the surveillance data sharing platform, such as SLA management; and
e) Facilitation of communications among member States for the deployment and implementation status update from the States.

3.4.4 To shorten the implementation time and minimize operating costs, a bottom-up, agile approach to exchange surveillance data by leveraging CRV and adopting ASTERIX surveillance data format via some centralized and dedicated EMS and SCDP services provided by business entities and/or pioneering participants running their own EMSes to provide dedicated surveillance data sharing services should be adopted. The comprehensive governance framework under SWIM is not a necessity in the beginning of the implementation or its trial.

3.5 Financial

3.5.1 As a default, data consumers should be responsible for the cost to connect to the main sharing platform (which could be the SWIM network or SCDP). Data contributors should keep track of the user base to ensure their CRV connections are provisioned with sufficient bandwidth for uploading the data for sharing through direct connections to data consumers and/or to the SCDP. Given the expected surveillance data of other airspaces in return of the contributed

surveillance data of own airspaces, they should be able to justify the additional bandwidth requirements on the CRV connections for both contributing own and receiving other surveillance data. The States can choose to setup its own EMS for data sharing and be responsible for the cost in the initial setup and the on-going maintenance and support. Alternatively, ANSP can choose to subscribe to the commercial centralized EMSes and be responsible for the service subscription fee instead.

3.5.2 In general, there are two approaches in setting up the surveillance data sharing platform, namely On-Premise Approach and Cloud Based Approach. A comparison, including financial implication, between the two approaches are given below for States' consideration.

	On-Premise Approach		**Cloud Based Approach**	
Cost	Contributor	Consumer	Contributor	Consumer
One Time Cost (System Setup)	High	-	Low	-
System Operation & Maintenance	High	-	Nil	-
Recurrent Cost - Service Subscription	Nil	depends on Contributor	OPEX	OPEX
Network Connection for data sharing	Need to upgrade	Need to upgrade	Handled by service provider	Handled by service provider
Network Resilience	Need to upgrade	Need to upgrade	Handled by service provider	Handled by service provider
Development Efforts (Service upgrade, Security etc.)	Handled by Contributor	-	Handled by service provider	-
Control	Handled by Contributor	-	Handled by service provider based on the instructions from Contributor	-
Compliance	Handled by Contributor	-	Handled by service provider	-
Delivery Lead Time	Long	-	Short	-
Flexibility	Low	-	High	-
24x7 Trouble Shooting	Handled by Contributor	-	Handled by service provider	-

Chapter 4: PARTICIPATION MODEL (TASK 2-5)

4.1 Introduction

4.1.1 As the availability of shared surveillance data is fundamental to the successful implementation of the surveillance data sharing, this part explores and identifies a participation model to encourage participation from States and non-ANSP stakeholders as well as to promote surveillance data sharing for the good of the aviation community.

4.1.2 This part is to define obligations/eligibility of the participating users and develop a set of requirements and guidelines for participation.

4.2 Rights of Data Consumers

4.2.1 Rights to receive shared data

There are various options of eligibility to receive shared data:

a) Option 1 - data will be shared among all the participating users;

b) Option 2 - data contributor gets to decide who can receive its shared data;

c) Option 3 – only data contributors can be consumers.

Option 1 is the preferred approached as described in para. 3.2.3 and not repeated here.

4.3 Responsibility of Data Consumers

4.3.1 While data consumers benefit from the shared surveillance data, they should be encouraged to contribute surveillance data by relaying and/or providing their own as the case may be, increasing the appeal of the sharing scheme with a broader set of data and therefore greater geographical coverage. However, imposing such an obligation for sharing may not be practicable at the early stage due to the implementation complexity. It will also raise hurdles for and discourage participation initially. To be consistent with the agile approach for surveillance data sharing, it is suggested to allow more flexibility in enforcing the obligation at the early stage.

4.3.2 The obligation and eligibility should be limited to ANSPs who have data to be shared. Other members, who may not have data to share can be admitted through multilateral agreement(s) or other participation schemes with contribution in other forms, such as subscription or bearing cost of surveillance data sharing.

4.4 Safety Related Requirements

4.4.1 Despite reasonable steps taken by the data contributors to ensure the service availability and reliability, the data consumers, being the users of the shared data, shall be responsible for:

a) assessing the surveillance data received to decide whether it is suitable for use; and

b) provision of contingency plan(s) in case of interruption of data sharing service.

4.5 Memberships

4.5.1 Members could comprise ANSPs of ICAO APAC States, airlines, airport operators and aviation service providers. It is beneficial to include as many members in the industry as possible to build up a user base for sharing, support and collaboration.

4.5.2 For members who may not be able to contribute surveillance data (such as airlines), they could either be provided with secure connections to their respective ANSPs' EMSes or directly subscribe to the services from SWIM surveillance data service providers for accessing the surveillance data shared. They could contribute by subscription or other forms.

4.5.3 Requirements/Guidelines for Qualification of Membership

To support the fundamental consideration of encouraging participation, it is recommended that membership be simple and straightforward. By default, all ICAO APAC States/Administrations qualify as members subject to signing a multilateral agreement to demonstrate and commit to:

a) the compliance with the membership obligations; and

b) adherence to the rules, standards and guidance.

For other stakeholders, membership is to be determined by the Operations Group. Regular review/renewal of membership is recommended to ensure the continuous compliance with the obligations and rules that might be adjusted over time.

Chapter 5: IMPLEMENTATION ROADMAP AND TIMEFRAME (TASK 2-6)

5.1 Introduction

5.1.1 This paper presents a proposed implementation roadmap and time frames for surveillance data sharing in SWIM over CRV, with consideration of approach, types of surveillance data and information exchange model.

5.1.2 This study report is to be delivered as a deliverable in the feasibility study stage for SURSG's consideration and facilitate the preparation in later recommendation stage.

5.2 Implementation Roadmap

5.2.1 Development of CONOPS

A proposed concept of operations (CONOPS) for surveillance data sharing in SWIM has been developed by Singapore, Hong Kong China, Thailand and Vietnam. A comprehensive discussion has been included, ranging from practical models for collaboration and operation to business models by taking into account available platform(s) and other technical considerations.

5.2.2 Development of different models

Based on the CONOPS, it is required to study, identify and recommend practical models for specific subject matters including implementation model, infrastructure model, business model and participation model. In order to facilitate the sharing of surveillance data, it is essential to have a certain level of details recommended in the developing models. The models covered in Chapter 1 – 4 foresee the potential issues/concerns to be encountered and suggest way forward.

5.2.3 Preparation of guidance material and multilateral agreement

a) With reference to the models and recommendations advised in this Study Report to be adopted by SURSG/2 meeting, guidance material, specified system requirements, performance requirements, operation and maintenance practice and so forth, should be developed to facilitate and harmonize the implementation of surveillance data sharing. The guidance material should also provide guidance for design, testing and commissioning of the system for surveillance data sharing to ensure coherent system development.

b) Multilateral agreement may involve a lengthy negotiation process, depending on size of participant group and agendas. Despite considerable time it may take, multilateral agreement is considered a more suitable option over bilateral agreement in order to attain non-discrimination data sharing with transparent, fair and equitable treatment.

5.2.4 Implementation of infrastructure – SWIM, CRV and EMS

SWIM over CRV is the default means to share surveillance data. Different SWIM infrastructure models may be adopted by different States and members, namely Distributed (with locally connected EMS), Centralized (with centralized EMS in CRV) and Hybrid. The Hybrid Model is considered the most suitable one with maximum efficiency and minimal geopolitical concerns. The members are suggested to evaluate and determine which infrastructure models to adopt based on their own context. The infrastructure should be implemented according to the requirements set out with considerations of latency, throughput, network security, system reliability and cost effectiveness.

5.2.5 Implementation of information service – software development, functional test and functional validation

It is envisaged that information service developed based on the functional and performance requirements, such as message format and data filtering, will be properly tested and validated locally or with the adjacent regions so as to ensure a reliable system for surveillance data sharing.

5.2.6 Operational test, validation user acceptance and operation deployment

Upon the completion of the implementation of infrastructure and information service, the overall functions of sharing of surveillance data could be verified through operational test and user acceptance test. Member's involvement in this stage is important to identify system deficiencies or interface issues, if any, for further investigation and improvement before putting into operation.

With the comprehensive testing and review over the system, it would be ready to deploy for operation. Regular meetings across the States should be held with an operations group to review the performance and examine issues found, if any. Collaborative review process and cooperative system fine-tune will be crucial for the continuous improvement and further development of surveillance data sharing.

5.3 Approach

5.3.1 As advised by SURSG/1 – WP05, the bottom-up, agile-like approach adopted for APAC SWIM implementation should be adopted for surveillance data sharing in SWIM to align the philosophy and roadmap for both. It is easier to deploy multiple and incremental approaches to build up capabilities to share the data.

5.3.2 The incremental approach is to start small and simple, identifying and selecting one particular operation for implementation of surveillance data sharing, followed by identification and implementation of information services and infrastructure services required to support the operation.

5.3.3 This bottom-up approach will help to justify the implementation of the infrastructure needed to efficiently support the operations. Once the advantages of the surveillance data service are revealed after the first operation, the same process can be applied to other operations considered suitable.

5.4 Type of Surveillance Data Shared

5.4.1 Considering the mature experience of States in sharing ADS-B data and little concern over data ownership, it is proposed that the sharing of ADS-B data should be focused in the initial implementation stage.

5.4.2 However, the sharing of surveillance data is not limited to ADS-B. With the experience obtained from ADS-B data sharing, adjustment/fine-tine could be made, where considered necessary, on various aspects including the implementation platform, exchange model, business model and so forth to accommodate the sharing of other types of surveillance data.

5.5 Information Exchange Model

5.5.1 It is envisaged that the data will be used by the existing surveillance data processors. Unified data format ASTERIX CAT 21 edition 2.1 is recommended to facilitate the use of surveillance data shared.

5.5.2 While SWIM over CRV is the default means to share surveillance data, there are three SWIM infrastructure models recommended: Distributed Model, Centralized Model and Hybrid Model. To align with the principle, starting small and simple, Hybrid Model is considered the best suitable solution as it makes a good balance between maximum efficiency and geopolitical concerns.

5.6 Collaboration Agreement

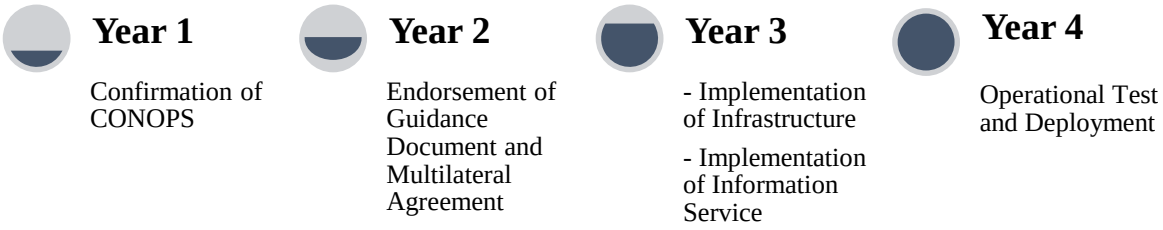
5.6.1 Bilateral agreement is relatively easy to go into effect as only two countries are involved in the negotiation. Nevertheless, it may result in exclusive deals which are against the vision of surveillance data sharing. Some willing participating ANSPs with less data may be unfavorable compared to those possessing key surveillance data.

5.6.2 In contrast, despite the complex negotiation and significant effort required, multilateral agreement allows for an equal and transparent arrangement for surveillance data sharing, which definitely encourages active participation and promotes collaborative surveillance data sharing. The value of the sharing could be recognized with a certain extent of participation.

5.6.3 With the above considerations, multilateral agreement, rather than bilateral agreement, is recommended to standardize the terms and conditions among the participating States/parties and achieve an equal playing field.

5.7 Timeframe

5.7.1 The implementation timeline places the tasks identified in the implementation roadmap proposed in para. 5.1 in chronological order. The implementation timeline may differ to certain extent, depending on the actual deployment model and approach. The implementation of SWIM platform is definitely a key contributing factor to the timeline of surveillance data sharing.



5.8 Trial Implementation of Surveillance Data Sharing in SWIM

5.8.1 It is known that some states are already sharing surveillance data through direct peer-to-peer connections. There does not appear to be technical issues in the sharing surveillance data in the SWIM environment. It is also known that status of SWIM implementation among states/administrations varies. There could be mismatched resources where those with data to contribute or to receive might not have ready access to a SWIM platform to participate in the

trial. To quickly build up a sizable participant base with reasonable breadth of shared surveillance data, some participant(s) with EMSes would need to share their data to quite a number of data consumers, with cost implication of bandwidth and system management even if service performance levels need not apply in the trial as mentioned in para. 1.5.2.3.

5.8.2 Pioneering participant(s) with EMS(es) might not be willing to take up the efforts of establishing, shouldering responsibilities and costs of such a trial, whereas a 3rd party/commercial concern might be willing to and with SCDP and value-added services provided as well except that commercial considerations would be its paramount consideration. Yet 3rd party/commercial participation has the clear advantage in its ability to significant accelerate the trial implementation.

5.8.3 It is therefore worth considering that the trial implementation of surveillance data sharing over SWIM a rudimentary one with the minimal SWIM services, regardless if there is 3rd party/commercial participation instead of a full-fledge implementation in line with the starting simple and small principle and to minimize participants' financial commitment.

5.8.4 By the two POCs in October 2018 and February 2022, there is not much doubt of the feasibility of surveillance data sharing in SWIM over CRV. The trial, if implemented, is not to demonstrate such feasibility in a one-off event, but to showcase, as an ongoing effort, the user benefits and to form the model on which continuous enhancements are to be applied as lessons are learned and experience gained. Whether a trial implementation would precede the implementation proper would be a subject of discussion at CRV OG and SWIM TF meetings.

Chapter 6: High-Level Summary of Recommendations

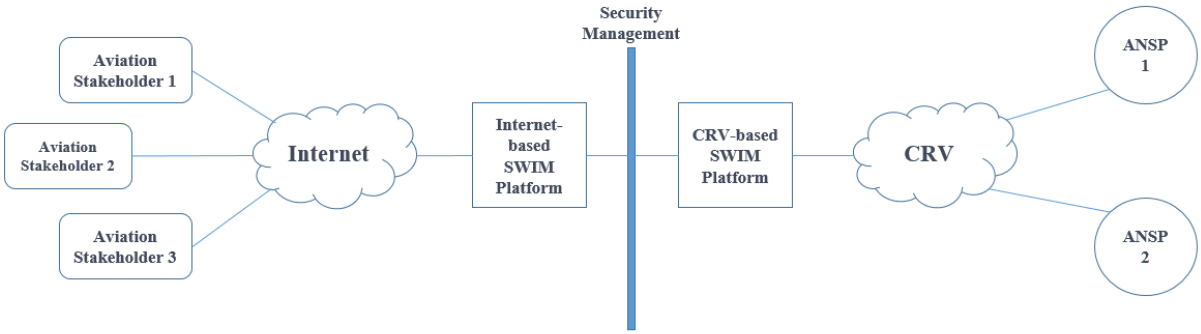


Figure 5 – Different Connectivity Options

6.1 A proposed and full implementation of surveillance data sharing using SWIM platform is depicted in Figure 5 showing one 3rd party/commercial interest providing the centralized services. The core network to be used will be riding on the CRV (right side of the diagram), which surveillance data exchange among ANSPs takes place under a secured and SLA guaranteed environment, to ensure necessary performance parameters can be achieved, to fulfil the required operational needs (i.e. Tier 1 Data Service).

6.2 Stakeholders that are currently not under the coverage of CRV can subscribe to the surveillance data sharing service (whether it is under the CRV network or not) through the internet-based platform (left side of the diagram), by various connection means. With proper security management, the internet-based platform will be able to communicate with the CRV network and allow surveillance data exchange between the two platforms. This type of connection will be feasible for applications that are not time critical (i.e. Tier 2 Data Service), as the SLA brought by the internet-based platform is not guaranteed.

6.3 With the analysis over different models in this Study Report, it has been repeatedly suggested that the principle of starting small and simple is the fundamental principle for the implementation of surveillance data sharing. For quick implementation of surveillance data sharing, it is highly recommend to have the following engagement as far as possible:

a) 3rd party/commercial participation to provide centralized SCDP services;

b) Start off the implementation with a trial; and

c) Early establishment of Operations Group.

TERMS OF REFERENCE

Surveillance Sharing in SWIM (System Wide Information Management) Trial Implementation Group (S3TIG)

Objectives:

The Surveillance Sharing in SWIM (System Wide Information Management) Trial Implementation Group (S3TIG) is established to:

1. support and promote the trial implementation of surveillance data sharing based on System Wide Information Management (SWIM) concept; and
2. demonstrate technically, operationally, and economically viable model options for surveillance data sharing in SWIM environment for reference through implementation trial(s).

Responsibilities:

The S3TIG shall:

1. Promote collaboration between States, international organisations, aviation stakeholders and service providers to:
   a. quickly build up a sizable participant base with reasonable breadth of shared surveillance data, and
   b. cooperatively conduct demonstrations and operate trials.

2. Through collaboration of trial participants, propose governance arrangements, protocols as well as performance measures and objectives necessary to achieve efficient sharing of surveillance data in support of flight operation safety.

3. Produce a safety assessment for surveillance data sharing in SWIM environment based on the outcome of trial implementation.

4. Produce an economic assessment for the establishment and operation of surveillance data sharing through SWIM based on the outcome of trial implementation.

5. In undertaking its activities, the S3TIG shall consider diversity of States in the Asia Pacific Region in terms of complexity and volume of air operations, sophistication of air traffic management services and economic capacity.

Composition:

Group Lead - One Group Lead and One Deputy Group Lead to be elected at first meeting of S3TIG from members who are States/Administrations of ICAO APAC.

Members - S3TIG members can be:

1. States/Administrations of ICAO APAC
2. International organizations recognized by ICAO.

Liaison:

SWIM TF, CRV OG

Conduct of the work:

The S3TIG will conduct its work through web conferences, teleconferences, other electronic means of communications, and Face-to-Face meetings.

Reporting:

The group will report at least annually to SURSG.

Seamless ANS Plan v4.0

With reference to the expected publication of the ICAO PANS-Information Management (PANS-IM) in 2024 and the expected sunset date of the current flight plan format (FPL2012) of 2032 being considered by ICAO ATMRPP, the timeframe for SWIM implementation in Asia-Pacific region was set at between 2024 and 2030. The expectation is that Asia-Pacific States will be SWIM ready by 2030 and the intervening 2 years till the expected sunset date of 2032 of the FPL2012 format can be used to conduct FF-ICE related operational trials. The timeframe **was adopted** by APANPIRG/33 by the **Conclusion APANPIRG/33/ xx** (SWIM TF/06/02) - *The Asia-Pacific SWIM Implementation Timeframe*.

APANPIRG/33 also considered including SWIM implementation as part of Performance Improvement Plan in the next edition the Asia/Pacific Seamless ANS Plan aligned with SWIM implementation timeframe which was adopted by the **Conclusion APANPIRG/33/ xx** (SWIM TF/06/04): *Inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan*.

Therefore, in order to ensure that SWIM, a key building block to achieve the vision outlined in the Global ATM Operational Concept (Doc 9854), is properly captured in the Asia/Pacific Seamless ANS Plan, following SWIM ASBUs are included for the year 2024. The elements required to be added from 2025 would be added in the fifth amendments of the plan in 2025.

Functional Category	Element	Priority
Information	SWIM-B2/1- Information service provision: Requirements for an information service provider to make aviation-related information available as an information service.	2
	SWIM-B2/1- Information service consumption: Requirements for an information service consumer to discover and access aviation-related information provided via information services	2

Service Level Agreement (SLA)

for consumption of *[insert service name]*

by *[insert service consumer name]*

Document Identifier: *[insert SLA URI]*

Version: *[insert SLA version number]*

Effective Date: *[insert SLA effective date]*

1. PURPOSE

This Service Level Agreement (SLA), hereinafter referred to as Agreement, governs the specific terms and conditions in support of the provision and consumption of the *[insert service name]*. It identifies the rights and obligations of the service provider *[insert service provider name*], hereinafter referred to as Provider, and service consumer *[insert service consumer name]*, hereinafter referred to as Consumer.

The purpose of this Agreement is to ensure that the proper parameters and obligations necessary to provide consistent service delivery to the Consumer by the Provider are unambiguously stated and agreed upon by all parties involved.

2. TERMS AND CONDITIONS

This Agreement is valid from the Effective Date outlined herein for a maximum period of *[insert time period, e.g., 5 years]*. This Agreement should be reviewed at a minimum once per year; however, in lieu of a review during any period specified, the current Agreement will remain in effect.

Changes, as necessary, will be made through subsequent agreements or amendments to this document.

3. PARTIES

The following list of organizational entities will be used as the basis of the Agreement and represents the primary stakeholders associated with it:

3.1. SERVICE PROVIDER

Name	*[insert the Provider's organization name]*
Description	*[insert a brief description of the Provider's organization]*

3.1.1. PROVIDER POINTS OF CONTACT

The following represent individuals or groups of individuals who can be contacted for the purpose of obtaining information and/or technical support from the Provider.

Name	*[insert the PoC's full name, e.g., "John J. Doe" or "Help Desk"]*
Work Functions	*[insert the PoC's job title or a brief description of the PoC's responsibilities, e.g., "Program Manager" or "Provides technical support to users"]*

E-mail	*[insert the PoC's e-mail]*
Phone Number	*[insert the PoC's phone number]*

[Insert another table for each additional Provider Point of Contact]

3.2. SERVICE CONSUMER

Name	*[insert the Consumer's organization name]*
Description	*[insert a brief description of the Consumer's organization]*

3.1.2. CONSUMER POINTS OF CONTACT

The following represent individuals or groups of individuals who can be contacted for the purpose of obtaining information and/or technical support from the Consumer.

Name	*[insert the PoC's full name, e.g., "John J. Doe" or "Help Desk"]*
Work Functions	*[insert the PoC's job title or a brief description of the PoC's responsibilities, e.g., "Program Manager" or "Provides technical support to users"]*
E-mail	*[insert the PoC's e-mail]*
Phone Number	*[insert the PoC's phone number]*

[Insert another table for each additional Consumer Point of Contact]

4. SERVICE INFORMATION

The following service is covered by this Agreement:

ID	*[insert the service's identifier]*
Name	*[insert the service's full name and acronym, if any, by which it is commonly recognized]*
Version	*[insert the service's version]*
Description	*[insert a brief description of the service]*

The *[insert service name and/or acronym]* service referenced in this Agreement is defined by the service description document entitled *[insert service description document name or title]*. The service description document is governed by *[insert regulating standard name or title]* and is accessible at *[insert online location when the service description document can be accessed]*.

5. OBLIGATIONS

5.1. SERVICE PERFORMANCE

5.1.1. Availability

In the context of this Agreement, *availability* is understood as the probability that the service will be operational during an identified period of time.

Provider agrees to ensure service availability as follows:

a. The service is offered *[insert value(s), e.g., 24 hours a day, 7 days a week, 365 days a year (24x7x365), etc.]*.
b. The service has a maintenance window described in section 5.3.
c. Provider agrees to maintain an availability value [*insert the value, e.g., "0.999"]* or greater.

The Availability value is measured as follows:

Measurement Method	(24 – Total Outage Time in Hours) / 24. Measurements are taken daily and apply to the preceding 24-hour period.
Unit of Measure	Probability expressed to 3 decimal places.

5.1.2. Capacity

In the context of this Agreement, *capacity* is understood as the number of service requests that the service can accommodate within a given time period.

Provider agrees to support *[insert the value, e.g., "1200 requests per hour"]*. Beyond this capacity, all users may see degraded performance in the return of identification information.

The *capacity* value is measured as follows:

Measurement Method	Simple count.
Unit of Measure	Whole positive number, per period of time.

5.1.3. Response Time

In the context of this Agreement, *response time* is understood as the maximum time required to complete a service request.

Provider agrees not to exceed *[insert the value, e.g., "10"]* seconds to return a requested message. This response time is limited by the volume capacity described in section 5.1.2.

The *response time* value is measured as follows:

Measurement Method	Measured from the time the provider agent receives the request to the time the service provider transmits the response.
Unit of Measure	Seconds.

5.1.3. Mean Time to Restore (MTTR)

In the context of this Agreement, *Mean Time to Restore (MTTR)* is understood as the average time required to return the service to a pre-determined (available) state after a failure.

Provider agrees to maintain MTTR value *[insert the value, e.g., "120"]* minutes or less.

The *MTTR* value is measured as follows:

Measurement Method	The sum of the times to restore service after failures divided by the number of times the service was restored.
Unit of Measure	Minutes.

5.2. PROBLEM REPORTING

In the event of a service problem or disruption:

Provider agrees to:

a. Send an acknowledgement of receipt of the problem to the Help Desk and the Consumer within 30 minutes.

b. Categorize the problem as *Critical* or *Noncritical*.

- *Critical* problems are defined as disruptions of service where the Consumer no longer has access to the service.
- *Noncritical* problems are all other problems that impede or degrade service delivery but do not result in a service disruption.

c. Generate a problem report with corresponding problem category and resolution parameters and provide it to the Consumer.

Consumer agrees to:

a. Report the problem to the Provider and/or Help Desk at the contact points identified in section 3.1 of this Agreement.

5.3. SERVICE MAINTENANCE

Provider agrees to:

a. Perform planned maintenance during regularly scheduled periods of time ("maintenance windows"). During the following times, the service will be unavailable for normal interactions: *[insert UTC, e.g., "13:00:00Z" or local time, e.g.,"9pm EDT" in the table below]*

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Begin time							
End time							

b. Notify the Consumer at least *[insert value, e.g., "48"]* hours ahead of time about all non-scheduled and emergency maintenance by using the contact information provided in section 3.2 of this Agreement.

5.4. CHANGE CONTROL

Provider agrees to:

a. Notify the Consumer about planned changes to the service at the beginning of the planning stage or six (6) months prior to the target date on which the new version will become operational, whichever comes first.

b. Maintain an active version of the service for at least twelve (12) months after release of the new version.

Consumer agrees to:

a. Utilize the most recent release within twelve (12) months of general availability.

5.5. VERSIONING

Provider agrees to:

a. Version each release of the service according to the guidance set forth in *[insert name or title of regulating standard, e.g., "SWIM-005, Artifacts Versioning for SWIM-enabled Services"]*.
b. Maintain each version of the service description(s) in a registry and/or repository that is also accessible to the Consumer.

Consumer agrees to:

a. Utilize the most recent release within six months of general availability.

b. Utilize only versions of the service that are actively maintained by the Provider. Consumers using versions no longer maintained by the Provider are subject to loss of access to the service.

5.6. DOCUMENTING

Provider agrees to:

a. Document, maintain, and publish the description of the service and service-related documentation as prescribed by *[insert name or title of regulating standard]*.

5.7. SECURITY

Consumer agrees to:

a. Conform to the following security policies:

[Insert name and online location of one or more security policies as defined by a governing and/or security organization]

b. If any action by the Consumer or Consumer agent takes place that adversely impacts the service's ability to operate, e.g., security policy infraction, misuse of service capacity, etc., the Provider has the right to terminate use of the service until the impacting conditions are remedied.

6. SIGNATORIES

<Organization Name>	*<Organization Name>*
<Signatory Name>	*<Signatory Name>*
<Date>	<Date>

APAC SWIM IMPLEMENTATION GUIDANCE DOCUMENT

(v0.1)

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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	SWIM governance	**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.
	1-5	Design Regional SWIM Registry and architecture for phase 2								
	2-1-2 2-1-4	Implement SWIM registry and architecture Guidance and Requirements for Publishers and Consumers								
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.	

SWIM TF/6 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
1-2		1.1	All	Confirm their interest in ASEAN SWIM demonstration	30-Apr-2018	Closed	~~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,	
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	Closed		
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	

SWIM TF/6 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
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. Propsoe 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	Closed	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.
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	Closed	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	Closed		
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	Closed	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 t	1-Nov-2017	Closed		

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Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
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	On-Going	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	Closed		
1-20		1.4	Mark Kaplun	Provide Goverernence and Registry lessons learned out to Task 1.5	30-Jan-2018	Closed		
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	
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.

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Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
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	

SWIM TF/6 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
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	
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	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)
2-15			All	Commence drafting an APAC Regional SWIM Implementation guidance document		Closed	~~oThis action is the para 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.

SWIM TF/6 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
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		
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	On-going	Longer time action.	task leads to provide WP or IP on how ASEAN Demo can be leveraged in task areas
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)

SWIM TF/6 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
4-5			TF chair and Task Leads	Review the ToR and consolidate the action items in this list	SWIM TF/5	Closed	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**	On-going	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**
4-9	10	Task 10	John Moore, Secretariat	List of SWIM relevant meetings in APAC	SWIM TF/6	On-going	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.	On-Going	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	Open	ICAO Secretariat will revise IGD ToC Consolidate the first draft of IGD	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	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**
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	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	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.

SWIM TF/6 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
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	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	Closed	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 other 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	Closed		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

SWIM TF/6 Action Items List

Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
5-7	NA	NA	Secretariat	Share the IP/05 with SURSG for further deliberations	SURSG/2	Closed		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	Open		
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	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	Open	For Draft Decision SWIM TF/06/01 - The Use of the Internet for MET Information Services in Regional SWIM architecture	
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	Open	Result of Asia/Pacific SWIM Implementation Plan and Status Survey- Task 1 Leads (WP/17)	
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	Open		

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Action ID	Task No	Reference	Who	What	Due date	Status	Comment	Additional Notes
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	Open		
6-7	5		Task 5 Group	The SLA template will be reviewed and updated annually	SWIM TF/7	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	Open		
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	Open		
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	Open	To be discussed in TL Meeting September 2022	