International Civil Aviation Organization

The Tenth Meeting of System Wide Information Management Task Force (SWIM TF/10)

Bangkok, Thailand, 20 – 23 May 2025

Agenda Item 3: Outcomes of relevant meetings on SWIM-related matters
- ICAO APAC CNS/other relevant Meetings

REVIEW OF RELEVANT CNS MEETINGS- 2024

(Presented by the Secretariat)

SUMMARY

The paper presents the relevant outcomes of the meetings held in 2024 including the Thirty-Fifth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/35), the Twenty Eighth Meeting of Communication, Navigation, and Surveillance (CNS SG/28) and the Ninth meeting of SWIM TF (SWIM TF/9) along with relevant discussions in other

1. INTRODUCTION

1.1 The Thirty-Fifth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/35) was held at the ICAO APAC Regional Office, Bangkok, Thailand, from 25 to 27 November 2024. The Meeting was attended by 163 participants from 24 Member States, 2 Special Administrative Regions of China, and 6 International Organizations. The APANPIRG/35 meeting report, working papers, information papers, and other resources can be accessed by the following link:

https://www.icao.int/APAC/Meetings/Pages/2024-APANPIRG-35.aspx

1.2 The Twenty-Eighth Meeting of the Communications, Navigation and Surveillance Sub-group (CNS SG/28) of APAC Air Navigation Planning and Implementation Regional Group (APANPIRG) was held at the ICAO APAC Regional Office, Bangkok, Thailand, from 1 to 5 July 2024. The Meeting was attended by 120 participants from 25 States/Administrations, 3 International Organizations, and 6 participants from industry partners. The Meeting report and other documents of the meeting can be accessed at the ICAO APAC Meeting webpage at:

https://www.icao.int/APAC/Meetings/Pages/2024-CNS-SG-28.aspx

1.3 The Eleventh Meeting of the Aeronautical Communication Services (ACS) Implementation Coordination Group (ACSICG/11) was held at the ICAO APAC Regional Office, Bangkok, Thailand, from 19 to 22 March 2024. The Meeting was attended by 82 participants from 20 States/Administrations, 2 International Organizations, and 1 industry partner. The ACSICG/11 meeting report, working papers, information papers, and other resources can be accessed by the following link:

https://www.icao.int/APAC/Meetings/Pages/2024-ACSICG11.aspx

1.4 The Twelfth Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/12) was held from 23 to 26 January 2024 in Denarau Island, Fiji. The Meeting was attended by 66 participants from 18 Member States/Administrations and 1 telecommunication provider. The meeting report, working papers, information papers, and other resources can be accessed by the following link:

https://www.icao.int/APAC/Meetings/Pages/2024-CRV-Seminar-and-CRV-OG-12.aspx

1.5 The Ninth Meeting of the System Wide Information Management Task Force (SWIM TF/9) was held from 14 to 17 May 2024 in the ICAO Asia and Pacific Regional Office, Bangkok, Thailand. The Meeting was attended by 110 participants from 18 States/Administrations, 4 International Organizations and 2 industry partners. The meeting report, working papers, information papers, and other resources can be accessed by the following link:

https://www.icao.int/APAC/Meetings/Pages/2024-SWIM-Seminar-and-SWIM-TF9.aspx

1.6 The Fourth Meeting of the Surveillance Study Group (SURSG/4) was held in Hong Kong, China, from 30 to 31 May 2024. The Meeting was attended by 63 participants from 12 States/Administrations, 1 International Organization, and 4 industry partners. The Meeting Report, Working Papers, Information Papers, and other resources can be accessed by following the link:

https://www.icao.int/APAC/Meetings/Pages/2024-SURSG-4.aspx

1.7 The APANPIRG/35 Meeting reviewed the outcomes of CNS SG/28 and noted with appreciation the following work done and achievements by the CNS SG and the contributory bodies reporting to APANPIRG through the CNS SG. APANPIRG/35 also discussed CNS-related matters and acted on the Report of the CNS SG/28 meeting and other papers presented under Agenda Item 3.4.

1.8 This paper summarized relevant information and updates with the highlight on the reviewed outcomes of CRV OG/12, ACSICG/11, SWIM TF/9, SURSG/4, and relevant discussions of other meetings of CNS SG/28 and APANPIRG/35.

2. DISCUSSION

The actions taken by APANPIRG/35 & CNS SG/28 meetings on CNS related matters are highlighted below:

2.1 The CNS SG/28 meeting adopted the following **4 Conclusions and 2 Decisions**:

Reference		Subject
Conclusion CNS SG/28/01 *(ACSICG/11/02)*	-	Review of APAC Region IWXXM Implementation Status/ Readiness
Decision CNS SG/28/03 *(Decision SWIM TF/08/02)*	-	Candidate Baseline SWIM Discovery Service Standard for APAC
Decision CNS SG/28/04 *(Decision SWIM TF/09/01)*	-	APAC SWIM Technical Infrastructure Profiles v1.0
Conclusion CNS SG/28/08 *(GBAS-SBAS ITF 06/01)*	-	Guidance Document for Implementation of GBAS in the APAC Region
Conclusion CNS SG/28/09	-	Update of Flight Inspection Guidance Material (FIGM)

Conclusion CNS SG/28/11 *(SURICG/9/2)*	-	Guideline on addressing inconsistencies of Aircraft Address (AD) and Target Identification (ID) between Surveillance Data and Flight Plan

2.2 The contents of the above Conclusions/Decisions adopted by the CNS SG/28 are provided in **Attachment A** to this paper.

2.3 Based on the outcome of discussions on various agenda items, the CNS SG/28 meeting developed 4 Draft Conclusions and 1 draft Decision for consideration by APANPIRG/35 Meeting, which were further adopted by APANPIRG/35. The Conclusions/Decisions adopted by APANPIRG/35 are as follows:

Reference		Subject
Decision APANPIRG/35/6 *(CNS SG/28/02 (SWIM TF/08/01))*	-	Information Management Panel to Consider adoption of SWIM Discovery Service as a Global Standard for Globally Interoperable Service Discovery
Conclusion APANPIRG/35/7 *(CNS SG/28/05 (SRWG/8/1))*	-	Preparation for World Radiocommunication Conference - 2027 (WRC-27)
Conclusion APANPIRG/35/8 *(CNS SG/28/06 (SRWG/8/2))*	-	VHF COM Frequency Allotment Plan for APAC Region
Conclusion APANPIRG/35/9 *(CNS SG/28/07 (SRWG/8/4))*	-	Transition from the regular publication of Frequency List 2 to the global database of frequencies included in the Frequency Finder
Conclusion APANPIRG/35/10 *(CNS SG/28/10 (SURICG/9/1))*	-	Update of the General Strategy on Assignment of and Migration to SI Code in the APAC Region

2.4 All APANPIRG/35 Conclusions related to CNS are provided in **Attachment B** to this paper.

Eleventh Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/11) and Twelfth Meeting of the Common aeRonautical Virtual Private Network Operations Group (CRV OG/12)

2.5 The CRV OG/12 Meeting requested that States/Administrations exchanging IWXXM data and/or FIXM data on CRV share their experience with bandwidth utilisation to understand potential bandwidth requirements. Singapore informed that bandwidth utilisation is not high based on their experience sharing IWXXM data on CRV Package A, 2 Mbps. Hong Kong China reported that their bandwidth utilisation for IWXXM data is also moderate. The CRV OG/12 Meeting agreed that PCCWG will provide quarterly bandwidth utilisation reports to the CRV OG Ad-hoc expert group as a periodic update.

58th APAC DGCA Conference Action Items on CRV

2.6 The CRV OG/12 Meeting noted the Air Navigation Services (ANS) related Action Items of the 58th Conference of Directors General of Civil Aviation Asia and Pacific Regions (DGCA/58) held in Dhaka, Bangladesh from 15 to 19 October 2023. The Meeting noted that the Conference formulated 51 Action Items and one action item, 58/23, related to CRV. By action item 58/23, the Conference urged States/Administrations to implement CRV by December 2023 and encouraged Pacific States to work with their partner States to facilitate CRV connectivity.

The Twelfth Meeting of Common aeRonautical VPN Operations Group (CRV OG/12)

Outcomes of CRV Seminar for the Pacific States

2.7 In the CRV Seminar, PCCWG shared a new offer and technical equipment details to encourage Pacific States to join CRV. Cook Island, Samoa, and Tonga shared their strong intention to join CRV and that they should be able to sign service orders with PCCWG before 30 April 2024. The offer has been extended to 31 December 2024.

ICAO ATN/AMHS Guidance Document Tree

2.8 The CRV OG/12 Meeting noted the progress on the ICAO ATN/AMHS Guidance Document Tree update. The CRV OG/12 Meeting agreed that the CRV OG Ad-hoc Expert group would review and present the revised Tree to the next CRV OG meeting for review and endorsement. The CRV OG/12 Meeting advised sharing the Tree with ACSICG for further review and modifications for AMHS and other relevant AFS sections. Additionally, it was suggested that Tree be kept on the ICAO Secure portal or New Zealand-hosted CRV portal.

CRV New Service Implementation Process

2.9 The CRV OG/12 Meeting noted the process for members with CRV services in operation and plans to add more connections/services to other new or existing CRV users. USA informed that as an action item owner for the task resulting from the CRV OG Ad-Hoc Expert Group, USA prepared the list of processes based on its experience in implementing new services with Indonesia and Papua New Guinea. The CRV OG/12 Meeting discussed and reviewed the process for implementing new services in CRV for AMHS and VoIP services, incorporating them in the CRV OG Operations Manual, and developing the process for new service connections in CRV.

2.10 The CRV OG/12 Meeting suggested that the CRV OG Ad-hoc Expert group develop the process for testing new SWIM services. Singapore suggested incorporating standard compression methods while adding the process into the CRV OG Operations Manual's design section, along with additional guidance for VoIP compression, such as the standards recommended by CRV OG.

Outcomes of Ad-hoc Group Meetings

2.11 The CRV OG/12 Meeting noted the outcomes of the three CRV OG Ad-Hoc Expert Group meetings held between CRV OG/11 and CRV OG/12 via Microsoft TEAMS. In addition, the Ad-hoc group also met with SWIM TF TLs quarterly. The CRV OG/12 Meeting noted the work of the Ad Hoc Expert Group continues to be extremely valuable, appreciated the ongoing contribution, and invited participation to the Ad-hoc group meetings.

Adding A New Service to CRV

2.12 The CRV OG/12 Meeting discussed the steps required to add a new service to the CRV Network. The first draft of the procedure prepared by the CRV OG Ad-hoc Expert group was presented to the CRV OG/12 Meeting to review the process of adding a new service to the CRV Network. The

CRV OG/12 Meeting deliberated the process and observed that the process required further modifications. The CRV OG/12 Meeting requested that the CRV OG Ad-hoc Expert group modify the process to incorporate various discussions and suggestions shared during the CRV OG/12 Meeting.

Publish the updated APAC CRV Operations Manual

2.13 The CNS SG/28 Meeting noted the **Decision CRV OG/12/01 -** *Publish the updated APAC CRV Operations Manual*. The latest version of the documents has been published on ICAO APAC e-docs under CNS, ICAO APAC CRV Secure portal, and on the CRV portal hosted by Airways New Zealand.

CRV Implementation Plan – IP Address Block Allocated to CRV Users

2.14 Singapore updated the latest status of the Internet Protocol (IP) address block allocated to CRV Users -Industry. To better manage and forecast if the existing IP address blocks are sufficient, the CRV OG/12 Meeting was requested to update CRV OG if there are new CRV Users - Industries intending to provide services over the CRV that need to be assigned IP address blocks. The CRV OG/12 Meeting also requested that all Air Navigation Service Providers (ANSPs) monitor and inform if the allocated IP address block is sufficient. The CRV OG/12 Meeting noted that as of today, no additional industries have requested to join CRV and there are no issues with the number of IP addresses in any ANSP.

National and Local CRV Points of Contacts

2.15 Singapore suggested modifying the local and national point of contact responsibilities mentioned in CRV OG OM to accommodate the new CRV user's definition. Accordingly, the CRV implementation plan may need further modifications to accommodate the definition of new CRV users. The CRV OG/12 Meeting requested that the CRV OG Ad-hoc Expert group incorporate this task into their agenda items.

Outcomes of Ad-Hoc Governance Meetings

2.16 New Zealand presented outcomes of the CRV OG Ad Hoc Governance meetings, held twice since its creation from the 2023 CRV Governance Workshop held in ICAO APAC Office, Bangkok on 31 January 2023. The CRV OG/12 Meeting noted that in the last two meetings, the Ad Hoc Governance group had adopted its Terms of Reference, discussed the Governance Models of REDDIG II and New PENS to understand other regional network's governance models, and resolved the problem, a problem Statement is being drafted.

Outcomes of Third Ad-Hoc Governance Meetings

2.17 The third Meeting of the CRV OG Ad-hoc governance group was conducted on 24 January 2024. The CRV OG/12 Meeting observed that after the second Ad-hoc Governance meeting, States/Administrations were requested to share a list of daily, weekly, monthly, annual, or any other periodic tasks related to CRV performed in their States/Administrations. Only five states/administrations shared their responses. Based on the response analysis, the problem statement has been revised. However, information from other States/Administrations must be taken into consideration for further analysis. The CRV OG/12 Meeting requested that all States/Administrations that have not submitted the response should submit the response on priority. The fourth CRV OG Ad-hoc governance group meeting conducted on 3 May 2024 further reviewed the responses and the problem statement.

Number of Subscribers to the New Zealand Hosted CRV Portal

2.18 New Zealand shared information about the New Zealand hosted CRV Portal access. The CRV OG/12 Meeting noted future access to the portal would be limited to **three per State** for **the National CRV Point of Contact, the Nominated deputy to the National CRV Point of Contact, and the person responsible for updating the Asia-Pac Telecommunication Infrastructure Routing Plan**. The CRV OG/12 Meeting requested that the States/Administration share information about the latest CRV focal point to access the portal to CRV OG Co-chairs/ICAO Secretariat in a timely manner.

Update the APAC CRV Implementation Table

2.19 The CRV OG/12 meeting reviewed and updated the APAC CRV Implementation Table. The latest updates presented on the planning and implementation status of CRV were as follows:

- **Under Operation**
  Australia, Bhutan, China, Hong Kong China, Fiji, India, Indonesia, Japan, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Philippines, PNG, Republic of Korea, Singapore, Thailand, the USA and Vietnam.

- **Under Provisioning**
  Cambodia, French Polynesia, Macao China, New Caledonia, Myanmar, Sri Lanka

- **Hot Prospects in 2024**
  Bangladesh, Brunei, Lao PDR, and Maldives

- **Not joined yet**
  Afghanistan, DPRK, Kiribati, Marshal Islands, Micronesia, Nauru, Palau, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu, Vanuatu, Russia, ICAO MID States

CRV contract management

2.20 Due to the confidentiality of the CRV contract management process, the report under agenda item 7 is published on the ICAO APAC CRV Secure portal under the CRV group.

CRV Network Yearly Service Review 2023

2.21 PCCWG shared the Latest CRV Updates and CRV Network Yearly Service Review for 2023.

Monitoring and Analyzing CRV Network Traffic in Hong Kong, China

2.22 Hong Kong, China introduced the CRV network traffic capturing equipment deployed in Hong Kong, China, and presented the insights and analysis derived from the captured network traffic. Based on the CRV network traffic captured between 8 and 14 January 2024 in Hong Kong China, there is no immediate need to upgrade bandwidth capacity, assuming no significant changes in bandwidth usage patterns in the near future. The CRV OG/12 Meeting agreed that the initiative by Hong Kong China is excellent for understanding and analyzing CRV network traffic and encouraged other States/Administrations using CRV to conduct such experiments and share their similar experience.

Bandwidth Extension of CRV to Meet Future Requirements

2.23 PCCWG shared that various States/Administrations raised concerns with PCCWG on bandwidth capacity limitation to match future SWIM applications that might consume large amounts of data in SWIM TF meetings. PCCWG shared that bandwidth up to 2M has been quoted in the tender

in 2015 to suit the initial requirement to build the CRV network. Other than the 2M options mentioned in the PCCWG price book, more pricing and bandwidth options can be provided for States/Administrations' consideration on request. As a rule of thumb, PCCWG further clarified the bandwidth upgrade cost concept. The CRV OG/12 Meeting requested that Member States/Administrations review the CRV bandwidth requirement and estimate the cost based on the conceptual diagram PCCWG shared. States/Administrations may contact PCCWG directly for further commercial discussion as needed.

CRV Bandwidth Utilization Rate

2.24 PCCWG presented the bandwidth utilization of each Member State/Administration in 2023. The CRV OG/12 Meeting reviewed the monthly traffic report and it was observed that the average utilization rate cannot share peak bandwidth utilization. Member States/Administrations were requested to make additional efforts to measure and monitor CRV network performance and share it with CRV OG regularly.

The Collection of CRV Requirements

2.25 The CRV OG/12 Meeting conferred the expectations of SWIM TF from CRV OG regarding CRV network requirements for providing SWIM services over CRV. The new CRV contract management process also needs CRV requirements to accommodate other future services. The CRV Operations Manual has specific parameters for the CRV network performance, such as bandwidth, latency, jitter, packet loss, QoS and connectivity. To ensure new services and applications provide the CRV OG with sufficient information to decide on any potential changes to the CRV Network, CRV OG needs the application owner to give details. Due to SWIM TF and CRV OG's dependency on each other's information, the discussion is not progressing well.

2.26 To further progress the discussion, CRV OG/12 Meeting developed the first draft of a form, provided to describe the parameters that the CRV Network performs under, validation from the application or service owner that these parameters are acceptable or not and if not acceptable, the application or service owner is to provide in detail what is required.

2.27 The CRV OG/12 Meeting agreed that the first draft of the form will be sent to the Ad Hoc Expert Design Group before **31 January 2024** for comment and feedback, which has been completed. The ICAO Secretariat also shared the draft form with the SWIM Task Force Task Leads to fill in the form and for comments and feedback. CRV OG Ad-hoc Expert Group will review the duly filled form in the 3 May 2024 Meeting.

2.28 Based on the information shared in the form and outcomes of the joint event (trial/demo), **"CRV data requirements for SWIM Workshop"** was planned to be hosted by the USA in late August/September 2024. It was recommended that CRV OG Experts and SWIM TF Task Leads attend the workshop. The workshop objectives would be to review the joint event's outcomes and analyse CRV performance and other crucial information to finalise the requirements and technical specifications for the new CRV contract management process. The workshop is being organised in Guam, USA, from 17-20 September 2024. CRV OG Co-Chair (Pacific) suggested sharing the *Proof of Concept test document* of CRV with SWIM TF to understand CRV's performance and capabilities by SWIM TF, which was completed.

MPLS/IP-Based Inter-Regional Connection

2.29 The CRV OG/12 Meeting noted the current discussion status for the potential interconnection of CRV and REDDIG II and CRV and New PENS.

2.30 The CRV OG/12 Meeting recalled the efforts made for CRV and REDDIG II Interconnection and noted that the ICAO APAC Office has requested PCCW Global contact Cirion Technologies to discuss the interconnection proposal. However, despite several coordination in 2023, no concert technical proposal is ready to work further for CRV and REDDIG II interconnection.

2.31 After analysis of the issues, it seems that in the current CRV/REDDIG II contract, no clause requires PCCW Global/Cirion Technologies to establish interconnection with different regional networks. It was essential to include a requirement in the new service contracting processes to establish interconnections with other ICAO regional networks.

Regional IP Network Interconnection Discussion

2.32 PCCWG highlighted the status of the interconnection discussion between the CRV Network provider (PCCW Global) and the REDDIG II Network provider (Cirion, previously Lumen). PCCWG updated that they have offered the other high-level interconnection diagram to Cirion for comment, which is still awaiting Cirion's feedback. Concurrently, the CRV OG/12 Meeting requested that the ICAO Secretariat and PCCWG continue their efforts to reach relevant parties to progress the work on CRV-REDDIG II and CRV-New PENS interconnection. During the new CRV contract management process, CRV OG will incorporate the clause of interconnection with other regional networks into the contract document.

2.33 The CRV OG/12 Meeting suggested that the CRV OG Ad-hoc Expert group prepare use cases for regional interconnection of CRV and continue to work to support and encourage MID states to work with PCCWG to join CRV, with the support of the ICAO APAC Secretariat and the ICAO MID office, to implement CRV in the MID region.

Updates on CRV Pioneer States' Remaining Contribution to the ICAO Managed Service Agreement (MSA)

2.34 The paper shared information about the recent development of using the balance fund of the MSA. The CRV OG/12 Meeting was informed that to follow up on Conclusion ACSICG/10/02 (CRV OG/11/03) – Selection of Security Review Options 2 and 5 and Develop a ToR, for utilization of remaining money from CRV Project, the draft ToR was prepared by the CRV OG Ad-hoc Expert Group, which was reviewed by the ACSICG/10 Meeting and endorsed as Conclusion ACSICG/10/03 – Adoption of ToR for CRV Security Review using Options 2 and/or 5. Based on the adopted ToR, CRV OG Ad-hoc Expert Group invited quotations from different vendors to prepare cost estimates for the work. Further information about the cost estimate and way forward was shared by CRV OG Co-Chair (Asia) by WP/08.

Cyber Security Review Update

2.35 CRV OG Co-chair (Asia) presented WP/08 on an update on the proposed Cyber Security Review. The CRV OG/12 Meeting noted that the two cybersecurity organizations specializing in cybersecurity, namely Aura Cyber Security Consultant - IT Risk Assessment - New Zealand and ZX Security Full Spectrum Security Services - ZX Security, had provided quotations. The CRV OG/12 Meeting discussed the way forward for generating two work orders for two tasks to Aura and ZX Security and requested the ICAO Secretariat to suggest the process to transfer money to Aura and ZX Security for assigned tasks if agreed to be appointed by the Meeting in the future.

2.36 ICAO Secretariat informed that it has coordinated with ICAO HQ CDI to share the formal process to transfer the 16 pioneer States' money to the third-party supplier. However, this could be seen as a way to use funds from an ICAO project to solo-source, thus circumventing ICAO regulations on procuring goods and services. ICAO CDI cannot proceed this way, and the funds must

agree with ICAO provisions, as described in the MSA/Project Document. ICAO CDI suggested that as it is a Regional project, the best way to do this would be for the CRV OG to take the resolution to close the project, conclude that all objectives have been reached within this project, and advise the project management of ICAO APAC Regional Office. Then, the ICAO APAC Regional Office can request ICAO CDI to proceed to the closure of the project and will transfer the remaining funds requested to each contributor.

2.37 The CRV OG/12 Meeting acknowledged the significance of CRV's security assessment task, an APAC regional network. However, the process would be very complicated if ICAO CDI carried out the project. CRV OG is already working on a new CRV contractual process, which is a very extensive and exhaustive process and requires significant effort, time, and contributions. Given that the timeline to utilize the remaining funds is five years, from December 2022 to December 2027, the CRV OG/12 Meeting suggested not using MSA's remaining money for security assessment work. As the security assessment of CRV is essential and crucial for determining the security and trust of the APAC regional network, the CRV OG/12 Meeting agreed to incorporate this task in the new CRV contract management process.

Japan Concept of Firewall Installation

2.38 Japan presented the concept of introducing firewalls to systems connected to the CRV in Japan and supported discussions on future mandatory firewalls. Japan introduced the overview of the system in Japan for connecting the CRV to the CRV NID. Japan summarized that a uniform firewall mandate could be excessive, as it would be required even for systems that each Member State/Administration considers less necessary to have a firewall in place.

Review ToR and Action Items

2.39 The CRV OG/12 Meeting reviewed the ToR of CRV OG and further updated the Action Items for CRV OG. The revised ToR was adopted by ACSICG by **Decision ACSICG/11/01**.

Update on AFTN/ATSMHS Routing Directory in APAC

2.40 The paper presented a brief history of the ICAO APAC AFTN Routing Directory which was based on the existing AFTN circuits in the Asia and Pacific regions. The meeting was reminded again that the region would follow the AFTN/ATSMHS routing directory during transition period, for inter-regional traffic, it is required to follow the existing entry/exit points and procedure. With the proposal from Russia to correct the tables "AFTN/ATSMHS ROUTING DIRECTORY ASIA AND PACIFIC REGIONS" for the UHHH and UUUU centres, ICAO APAC Office incorporated the amendment into the routing table. Additionally, due to the IT issue of the old computer for Routing Manager failed in January 2024, the new changes to the routing table (page 5-25) may be delayed.

APAC AMHS Implementation Status from AMC

2.41 The paper presented the AMHS implementation status information in the Asia/Pacific Region updated in the ATS Messaging Management Centre (AMC) (OPER 259) on 22 FEB 2024. All revised AFTN/AMHS connections, links, and line speeds will be updated to the Communication Chart in AMC. The meeting was invited to review and update information to AMC via AEROTHAI, if necessary, including points of contact.

PCAA Coordination with Eurocontrol AMC

2.42 The paper updated the PCAA’s coordination with Eurocontrol ATS Messaging Management Centre (AMC). Pakistan provides AMHS services and is responsible for the worldwide

distribution/routing of AMHS/AFTN traffic through 06 international circuits as per the ICAO APAC Routing Directory. The meeting was updated that in January 2023, Eurocontrol intimated that a new AMC version 5.1 is live on its portal and requested to nominate experts for registration on its portal. Eurocontrol registered three PCAA officers on its portal for getting AMC data. PCAA can now regularly upload AMC data on AMHS as per the AIRAC cycle and is not facing any issues with the worldwide routing of AMHS / AFTN traffic.

Space-Based Very High Frequency (VHF) Communication Services

2.43 The paper summarized the progress of the technical and regulatory studies of space-based VHF communications (voice and data) in the frequency band 117.975-137 MHz in the International Telecommunication Union ("ITU"), ICAO Future VHF Subgroup ("FVSG"), and ICAO Frequency Spectrum Management Panel ("FSMP"). The paper shared that there are two companies working in parallel to launch prototype satellites with VHF payload for Proof-of-Concept (PoC) Demonstration between 2023 and 2025. To conduct the PoC demonstration, there will be a need for ICAO regional office to assign appropriate VHF frequencies so that verification tests could take place. The meeting was invited to support the ICAO activities on space-based VHF at the FVSG and FSMP, and support the frequency assignments for proof-of-concept demonstration when the need arises.

2.44 Regarding the current plan for the proof-of-concept demonstration, the meeting was informed that any ANSP interested in participating in the demonstration should engage directly with the two service providers and notify and coordinate with ICAO APAC for the frequency that can be used. ICAO Secretariat will maintain communication with the service providers to ensure the region stays updated on developments.

AMHS Readiness Status for Supporting IWXXM Traffic in the APAC Region

2.45 The paper summarised the AMHS readiness status for supporting IWXXM Traffic of the States/Administrations in the APAC Region, including States/Administrations that have no AMHS in operations, to facilitate the relevant Meteorological authorities/organisations with the dissemination of IWXXM messages accordingly. As of CNS SG/27, 14 States/Administrations provided their status on AMHS readiness and experience for supporting IWXXM Traffic with details. Although there has been a significant increase in the AMHS readiness for supporting IWXXM Traffic, the reporting gap was still identified, States/Administrations were urged to inform the ICAO APAC Regional Office on their readiness and implementation progress/plan of AMHS with FTBP as soon as possible. The Meeting updated the AMHS Readiness Table for Supporting IWXXM Traffic.

APAC Region IWXXM Implementation

2.46 To review the IWXXM implement status and gauge the readiness of the APAC Region for full implementation of IWXXM data exchange, the CNS SG/28 adopted the Conclusion: **Conclusion CNS SG/28/01 (ACSICG/11/02)** - *Review of APAC Region IWXXM Implementation Status/ Readiness.*

Description of FAA AMHS SWIM Gateway and IWXXM Status

2.47 The FAA informed that it is currently developing an AMHS SWIM Gateway (ASG) that will be implemented as an enhancement to the FAA's operational AMHS to support the international exchange of XML-formatted messages encoded using the ICAO Meteorological Information Exchange Model (IWXXM). The effort and status of the ASG were summarised in the paper. The Meeting noted that it was anticipated that ASG development would be complete by Q3/2024, followed by internal testing and then external test with international partners. Operational implementation is dependent upon data production/consumption by the National Weather Service (NWS).

PCAA Readiness for ICAO IWXXM Implementation and AMHS Transition to SWIM

2.48 The paper presented Pakistan's readiness of AMHS to support IWXXM and AMHS transition to SWIM. The Meeting noted that PCAA has initiated the implementation of the exchange of data in XML format to support the implementation of SWIM enable data sharing (IWXXM, AIXM and FIXM). The agreement has been reached with the OEM of AMHS for the exchange of meteorological data in IWXXM. Furthermore, PCAA has already replaced the Karachi-Mumbai AFTN data link with the AMHS / X-400 link to support the exchange of IWXXM data. Replacement of the Karachi-Beijing AFTN data link over TCP / IP/MPLS circuit link has been completed.

Fiji AMHS & IWXXM Implementation Status

2.49 The paper presented the update for Fiji to implement AMHS system to enable international exchange of the ICAO Meteorological Information Exchange Model (IWXXM) data for ROBEX IWXXM with the five (5) Regional OPMET Data Bank (RODB) in the Asia/Pacific region. The AMHS & IWXXM is expected to be commissioned in December 2024 to enable the Nadi RODB to exchange ROBEX IWXXM format and perform the TAC to IWXXM translation.

AMHS Operation and Support of XML Based Messages

2.50 The paper presented the current AMHS operation and its capability to support XML based messages. AMHS and its AFTN/AMHS address header based on ASCII is a critical address that allows messages to be distributed globally and is compatible with ATC automation systems. The paper analysed the future of AMHS operational requirements and AMHS to support future data distribution. The Meeting was informed that AMHS is a critical element in routing messages to their intended users using globally adopted and ICAO sanctioned AFTN addressing. Any system that plans to succeed/replace AMHS would likely need to support similar elements of AFTN address functionality.

Leveraging TBO through regional SWIM services and AMHS

2.51 Frequentis introduced the TBO with regional SWIM services and AMHS. The regional ATM operational SWIM services roadmap for TBO and the TBO mix mode transition were explained in detail. It was concluded that by providing a consistent cloud-based ATM operational infrastructure regional SWIM services will speed up the digital transformation towards TBO. The Meeting further discussed the topics interested, including the information loss between FPL2012 and FIXM, the meaning of SWIM governance, the sunset date of FPL2012, etc. For more information, Member States/Administrations were welcome to contact Mr. Ulrich Kaage through email: Ulrich.KAAGE@frequentis.com

AMHS/SWIM Gateway Progress & FF-ICE Migration Plans

2.52 The SWAMWAY Study Group under the cooperation of ICAO EUR NAT/AST TF presented the AMHS/SWIM Gateway Progress & FF-ICE Migration Plans. With the sharing of SWAMWAY SG activities during 2023, the presentation introduced the progress and development of the AMHS/SWIM Gateway specification, identified use cases, next steps for the AMHS/SWIM Gateway, and European strategy towards FF-ICE migration. The Meeting was invited to provide comments about the proposed use cases, identify potential synergies with the EUR/NAT Region, and promote the exchange of information in terms of activities, projects, and initiatives with a common interest for APAC and EUR/NAT Regions.

Eighth Meeting of the System Wide Information Management Task Force (SWIM TF/8 and Ninth Meeting of System Wide Information Management Task Force (SWIM TF/9)

2.53 The APANPIRG/35 reviewed the report of the Eighth Meeting of the System Wide Information Management Task Force (SWIM TF/8) held from 8 to 10 November 2023 and the Ninth Meeting of the System Wide Information Management Task Force (SWIM TF/9) held from 14 to 17 May 2024 in ICAO Asia and Pacific Regional Office, Bangkok, Thailand.

Proposal of Regional Candidate Standard for Service Discovery

2.54 Due to the need for global standards on SDS [https://discovery.swim.aero/], the **Decision APANPIRG/35/6** *(Decision CNS SG/28/02 (Decision SWIM TF/08/01))* - **Information Management Panel considers the adoption of SWIM Discovery Service as a Global Standard for Globally Interoperable Service Discovery** was adopted.

2.55 For the need to have a candidate baseline standard for SDS to support APAC SWIM implementation within the 2024-2030 target implementation timeframe, **Decision CNS SG/28/03** *(Decision SWIM TF/08/02)* - **Candidate Baseline SWIM Discovery Service Standard for APAC** was adopted by SWIM TF/8 for CNS SG/28 consideration, which was adopted by CNS SG/28.

Election of Co-Chair

2.56 Nominated by the USA and seconded by USA, Dr. Amornrat Jirattigalachote, Strategic Planning Manager (Engineering), Policy and Strategy Management Bureau of AEROTHAI was re-elected as Co-Chair of the SWIM TF in the SWIM TF/9 Meeting.

Review of Relevant Meetings – Sec (WP/02)

2.57 The paper summarised relevant information and updates highlighting the outcomes of the Thirty-Fourth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/34), the Twenty-Seventh Meeting of Communications, Navigation, and Surveillance Sub Group (CNS SG/27), the Third Meeting of the Surveillance Study Group (SURSG/3), the Seventh and Eighth Meeting of the APAC SWIM Task Force (SWIM TF/7 and SWIM TF/8) and the Eighth Meeting of the Surveillance Implementation Coordination Group (SURICG/8).

2.58 Regarding ICAO Secretariat Action Item 7-12, *"the SWIM TF/7 Meeting discussed the utilisation of Mode S DAPs in developing an integrated SWIM service incorporating MET information derived from Mode S DAPs. It was informed that the detailed consideration on exchanging MET information derived from Mode S DAPs through IWXXM should be done in consultation with MET SG (MET/IE WG). ICAO Secretariat will coordinate with the Secretariat of MET SG (MET/IE WG) to explore options on this matter,"* ICAO Secretariat suggested that SWIM TF representatives should present a paper on this topic in MET/IE WG as the available information in the working paper is insufficient for ICAO Secretariat to share details to another contributory body, explain the issues, and participate in further discussion.

2.59 The SWIM TF/9 meeting discussed under WP/16 the potential inclusion of **MET information derived from Mode S DAPs** in the **APAC Common SWIM Meteorological Information Services** list. However, as Mode S DAPS are considered a source of MET data, the Meeting suggested that further discussion in relevant MET groups is required to determine the justifiability of including this information service in the APAC Common MET Information Services list. **ACTION ITEM 9-1**

Outcomes of SWIM TF Task Leads (TLs) Meetings and Joint CRV OG Ad-hoc Expert Group and SWIM TF TLs Meetings after SWIM TF/7 – Sec (WP/08)

2.60 The paper presented outcomes of SWIM TF TLs Meetings and Joint CRV OG Ad-hoc Expert Group and SWIM TF TLs Meetings after SWIM TF/7.

Outcomes of ATFM SG/14 Meetings – WP/20

2.61 The paper provided updates on the fourteenth meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/14) held in Bangkok, Thailand, from 22 to 26 April 2024. The meeting noted that the APANPIRG/34 adopted FIXM version v4.2 with APAC extension in December 2023 after a nearly one-year formal recommendation-and-adoption process. During this period, the FIXM Change Control Board (CCB) also released FIXM Core v4.3.0 to support the FF-ICE/R1 requirements identified by the ICAO ATM Requirements and Performance Panel (ATMRPP).

2.62 During the ATFM/SG/14 meeting, it was agreed to establish a standard FIXM version for exchanging cross-border information between operational ATFM systems in the Asia/Pacific region. It was recognised that implementing a new system could be a time-consuming process, and changing the version during the implementation phase would only add complexity. The meeting was informed that a process for version change is needed to provide a platform for ANSPs to implement the capability to discuss their concerns regarding the change.

2.63 It was informed that the ongoing ATFM-on-SWIM trial has revealed that many ANSPs are still working towards implementing the ATFM system to be SWIM capable. However, the ATFM data exchange in FIXM via SWIM has yet to be operationalised. In light of this, the ATFM/SG/14 agreed that FIXM v4.3 be formalised as the agreed version for Cross-Border ATFM operations in the Asia/Pacific region from Q3/2026 as FIXM 4.3 could support the FF-ICE/R1 implementation, as recognised by the ICAO ATMRPP. Furthermore, the two-year period would provide ANSPs sufficient time to transition the ATFM-on-SWIM trial into an operational environment and implement any necessary changes. This generous transition period would ensure the new system's smooth and successful adoption, reassuring the ANSPs.

2.64 The Meeting was informed that the FIXM v4.1 with APAC Extension was chosen for the ATFM-on-SWIM trial. Considering significant effort was put into preparing for the trial, the ATFM/SG/14 agreed to use this version until Q2/2025. While recognising the need to adapt to a newer version, the ATFM/SG/14 decided to revise the version used for the trial from FIXM v4.1 to FIXM v4.3 from Q2/2025 onwards.

2.65 The Meeting noted that the ATFM/SG/14 agreed to establish a change process for revising the common FIXM version to support the information exchange among operational ATFM systems and the ATFM-on-SWIM trial. It was decided at the ATFM/SG/14 that, while a change process is required, it should not be too complex nor administrative intensive to avoid adding unnecessary steps for operational implementation. The ATFM/SG/14 will further develop this process, which starts with the preliminary step that States or Collaboration Bodies propose changes to ATFM/SG for further coordination with SWIM TF.

2.66 The Meeting requested ATFM SG to formulate the detailed change process to revise a commonly agreed FIXM version for the cross-border ATFM-related information exchange and share it with the SWIM TF/10 meeting next year for further deliberations. **ACTION ITEM 9-2**

2.67 The Meeting was informed that ATFM/SG/14 agreed that FIXM v4.3 should be formalised as an agreed-upon version to support information exchange between operational ATFM systems. The draft conclusion ***Draft Conclusion ATFM/SG/14-01 – Asia/Pacific Regional FIXM 4.3***

was presented to SWIM TF. The SWIM TF/9 meeting provided support to the draft conclusion for further adoption by ATM SG/12**.**

2.68 The Meeting agreed that Task 4 leads, along with contributors, will evaluate FIXM v4.3's suitability to support ATFM, A-CDM, and integrated ATFM/A-CDM operations. Based on the outcomes of the analysis, a FIXM v4.3 extension may be proposed for consideration by the next meetings of ATFM SG and SWIM TF. **ACTION ITEM 9-3**

2.69 In response to a question regarding the stability of the information exchange model version, the Meeting noted that ATMRPP does not foresee further major changes in the proposed FIXM v4.3 for the next few years. Therefore, FIXM v4.3, along with a potential FIXM v4.3 extension, may be considered a stable information exchange format till the release of FF-ICE/R2. The Meeting also noted that, as per the Asia/Pacific Seamless ANS Plan v3.0, ATM systems should be supported by aeronautical information digital data exchange of, at a minimum, version AIXM 5.1. For IWXXM, the MET IE/WG Chair shared the following compatibility table showing IWXXM versions, associated report packages, and relevant ICAO Annex 3 requirements. The Meeting was also informed that the latest version of the compatibility table maintained by WMO can be accessed via https://github.com/wmo-im/iwxxm/wiki/Package-Compatibility

IWXXM Version	METAR/ SPECI	TAF	SIGMET	AIRMET	TCA	VAA	SWA	WAFS SIGWX F/C	VONA	QVA	Requirements
1.1	1.1.0	1.1.0	1.1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Am76
2.1	2.1.1	2.1.1	2.1.1	2.1.1	2.1.1	2.1.1	N/A	N/A	N/A	N/A	Am77
3.0	3.0.0	3.0.0	3.0.0	3.0.0	3.0.0	3.0.0	3.0.0	N/A	N/A	N/A	Am78
2021-2	3.1.0	3.0.1	4.0.0	3.1.0	3.1.0	3.1.0	3.0.1	1.0.0	N/A	N/A	Am79 + Am80
2023-1	3.1.0	3.0.1	4.0.1	3.1.1	3.1.0	3.1.0	3.0.1	1.1.0	N/A	N/A	Am79 + Am80
2025-2	3.2.0	3.0.1	4.0.1	3.1.1	3.1.0	3.2.0	3.1.0	1.1.1	1.0.0	1.0.0	Am82

2.70 The Meeting noted that further discussion on AIXM 5.1 may be held in the Nineteenth Meeting of the ICAO Aeronautical Information Services − Aeronautical Information Management Implementation Task Force (AAITF/19) to be held from 10-13 June 2024 in the ICAO APAC Office. Further relevant updates, if any, will be provided by the ICAO Secretariat in the next SWIM TF meeting.

2.71 The Meeting discussed the possibility of including the latest applicable versions of AIXM, FIXM, and IWXXM in the common APAC information services list. However, during discussion under WP/16, it was concluded that the appropriate bodies to discuss and agree on this matter are ICAO AAITF, FF-ICE Ad-hoc Group and MET/IE WG. The Meeting agreed to propose to these contributory bodies to consider making a decision on the applicable version of information exchange models during a review of relevant common APAC SWIM Information Services to be submitted to them by SWIM TF. **ACTION ITEM 9-4**

Outcomes from ICAO APAC MET related Meetings – Sec (IP/05)

2.72 The paper presented a summary of outcomes of MET-related matters after the SWIM TF/8 meeting, including APANPIRG/34 and MET/IE WG/22 discussions on SWIM (including IWXXM)-related substances. The Meeting noted that additional updates on MET-SWIM Information Services discussions are provided in IP/07 of the SWIM TF/9 meeting.

Progress Update for the Joint Event – Hong Kong China (WP/05)

2.73 Hong Kong China shared that, with the consolidated effort made by SWIM TF and SURSG, the SWIM Demonstration over CRV and surveillance data sharing in the SWIM trial ('the Joint Event') will be held in Hong Kong China from 28-29 May 2024. The Joint Event will mainly consist of scenario-based demonstrations, including ATFM, surveillance data sharing, FF-ICE and MET. The Meeting was informed about the tasks completed, ongoing tasks, and items to be followed up after the Joint Event. The Meeting noted that, after completing the Joint Event, the current system setup will be accessible for 1-month until the end of June 2024 for participants to appreciate the SWIM environment and system HMI.

Comments on Draft TMC (Final) – New Zealand (WP/06)

2.74 New Zealand shared comments on the *draft Technical Memorandum of Cooperation (TMC) document for ATM Information Exchange through SWIM,* a guidance document that can be used as a template for discussion between ANSPs, in response to the SWIM TF/8 meeting Action Item 8-2 to provide feedback on draft TMC to ICAO by February 2024. The Meeting noted with appreciation that Malaysia had taken the time to draft the TMC to assist States in bilateral cooperation/agreement for ATM Information Exchange through SWIM.

2.75 New Zealand referred to Paragraph 10, section 10.1 of the draft TMC and suggested that a more structured dispute resolution clause may be required to help prevent prolonged disputes between States/Administrations, including the proposed number of days (which can be amended to suit each State/Administration). The suggested text was shown in clause 10 in the proposed version of the amended draft TMC.

2.76 In reference to Paragraph 11, section 11.1, New Zealand informed that there may be laws in countries that require an organisation to provide notification of a release/dissemination of documentation on specific information. Therefore, New Zealand proposed adding a sentence that explicitly allows for the release of the information 'where required by law' even without consent from the other State/Administration. Consideration of how the other State/Administration was informed of the 'released information' can be captured in the individual agreement, depending on the legal environment in each State. The suggested text was shown in clause 11 in the proposed version of the amended draft TMC attached.

2.77 The Meeting was informed that Paragraph 13, section 13.2 of TMC suggested a binding nature. New Zealand requested clarification of which legal jurisdiction would apply to these governing / binding paragraphs, given that original Paragraph 10 refers to no recourse to courts. It was informed that the intention is for the TMC to be a guidance document in which States/Administrations can make amendments to support the bilateral agreement. Therefore, the Meeting may not need to adopt this document. Additionally, New Zealand shared that there may be further changes to the draft TMC after the joint event scheduled for 28-29 May 2024. Thus, it was proposed that the finalisation of the TMC can be discussed at the next SWIM meeting.

2.78 The Meeting reviewed the draft TMC incorporated with New Zealand's comments. It was agreed that the SWIM TF/9 participants would share the latest revision of TMC with respective legal experts for comments and observations. Considering that this consultation process takes time, the meeting agreed to defer consideration of the proposed **Draft Decision: - *SWIM Technical Memorandum of Cooperation Document*** in the SWIM TF/8 meeting to the SWIM TF/10 meeting to be held in May 2025. **ACTION ITEM 9-5** To achieve this target, the meeting requested all States/Administrations to deliberate among their related stakeholders and provide feedback on the draft TMC template document to the ICAO Secretariat by February 2025. **ACTION ITEM 9-6**

Revision of APAC SWIM Technical Infrastructure Profiles – Task 2 Lead (WP/09)

2.79 Considering the benefits of making the draft version of APAC SWIM Technical Infrastructure Profiles available for States/Administrations to refer to as guidance to assist in their SWIM development and implementation, CNS SG/28 adopted **Decision CNS SG/28/04 (Decision SWIM TF/09/01)** - *APAC SWIM Technical Infrastructure Profiles v1.0*. which was uploaded to the ICAO APAC e-docs portal. The **ACTION ITEM 9-7, ACTION ITEM 9-8** were completed.

SWIM Implementation Pioneer Group Progress Report – Singapore (WP/13)

2.80 Singapore shared a summary of the work that the SWIM Implementation Pioneer Ad-hoc Group (SIPG) has done to progress the implementation of an Asia/Pacific SWIM since the eighth meeting of the SWIM Task Force. The Meeting recalled that the SIPG was formed at the 7th Meeting of the SWIM Task Force (SWIM TF/7). The first deliverable of the SIPG was to build a SWIM Technical Infrastructure prototype according to the architecture as decided by the SWIM task force using the CRV as the IP-based network.

2.81 The SWIM TF/9 Meeting noted that SIPG used the SWIM over CRV Demonstration and Surveillance Sharing in the SWIM Technical Trial, the joint event, as the target for constructing the APAC SWIM prototype. To achieve this goal, the SIPG held a total of 12 virtual meetings before the SWIM TF/9. After deliberating over several options to identify the appropriate SWIM architecture for the joint event, the SIPG adopted a hierarchical SWIM architecture, considering that it would fit into the model decided at the SWIM Task Force level due to its best compromise between connectivity and simplicity.

2.82 To facilitate message transmission within this architecture, the Meeting was informed that it was necessary to use metadata to route messages, especially between edge EMS (Enterprise Messaging Service) of different sub-communities. To this end, the SIPG developed a set of metadata for routing messages during the Joint Event. The Meeting was informed that, after the joint event, the SIPG will need to carry on its work post-event to document the lessons learned from the setup and operation of this hierarchical SWIM architecture. There was a need to measure the amount of bandwidth used during the demonstration and trial, from which the potential bandwidth needed to support an operational Asia/Pacific SWIM will be estimated. The SIPG will also study the strengths and weaknesses of the implemented SWIM architecture. There may be a need to explore different SWIM architectures and further trials may be proposed. The Meeting was informed that the SIPG may expand its work to interconnect the registries within the SWIM architecture implemented.

2.83 The SWIM TF/9 Meeting noted that the ICAO Trust Framework Panel has produced some guidance material for trusted message exchange. The guidance material references the Public Key Infrastructure (PKI) and the use of certificates to protect the messages being transferred. The SIPG plans to study this material and implement a version of it in the SWIM architecture. The SIPG will also investigate the identified common SWIM information services that could be implemented. It was highlighted to the Meeting that it is essential to specify use cases to support the implementation of the services.

2.84 Additionally, the SWIM TF/9 Meeting was informed that, as the SWIM architecture continues to evolve, other States and parties may want to be onboarded as an edge EMS or gateway EMS in the architecture. Part of the continuing work of the SIPG would be to aid these States and parties in completing the onboarding and help confirm the connection and message routing. The SIPG will also look to other APANPIRG contributory bodies working on topics closely related to SWIM, e.g. FF-ICE and TBO, for collaboration opportunities.

2.85 The SWIM TF/9 Meeting discussed the SIPG's proposed work plan as presented in WP/13, taking into account also the information provided in WP/10 and IP/02. The meeting agreed that SIPG should include the suggestions presented in WP/10 and IP/02 in its work plan for the next 12

months. The revised work plan of SIPG, together with the activity priority, will be further discussed at SIPG's monthly meeting in June 2024. **ACTION ITEM 9-9** Furthermore, the SWIM TF/9 Meeting noted that the SIPG meeting would be held on the last Monday of each month and encouraged States/Administrations to consider joining the SIPG.

Consideration on Guaranteed Message Delivery for Regional SWIM Architecture – ROK (WP/10)

2.86 ROK presented a consideration on guaranteed-message delivery in regional SWIM architecture (i.e. hierarchical architecture) and introduced vulnerabilities that possibly break guaranteed message delivery in this architecture as well as considerations to ensure reliable and guaranteed message delivery.

2.87 The Meeting recalled that, at the SWIM TF/8 meeting in 2023, a hierarchical architecture was proposed to avoid the issue of having a single point of failure presented in the centralised approach while at the same time avoiding the case of a very complex topology in the decentralised approach. To support message exchange in that architecture, SIPG was requested to define the message header format and contents. ROK also informed that the hierarchical architecture is an implementation of edge or fog computing, and through it, this could enable efficient usage of bandwidth on a CRV network and prevent the propagation of failures. However, potential architectural vulnerabilities have been identified (e.g. guaranteed message delivery failure due to improper failover or message handling during the partitioning phase) during the implementation of the hierarchical architecture. These vulnerabilities could impair reliable messaging (i.e. provide support for various types of guarantees for message delivery), a core capability defined in the SWIM ConOps (Doc 10039).

2.88 Moreover, ROK shared that guaranteed message delivery is a capability commonly provided by Commercial, off-the-shelf (COTs) or Open Source (OS) message brokers. Still, in a hierarchical architecture in the APAC region, this is not applicable as it does not force the use of a specific message broker. In the practical implementation of the architecture, States in SIPG adopt the use of heterogeneous message brokers. Substantial architectural vulnerabilities identified during the implementation of the hierarchical architecture in terms of guaranteed message delivery were shared with the Meeting. The list of vulnerabilities identified were:

- Priority messaging is not possible depending on the importance of the information;
- Guaranteed message delivery is destroyed when malfunctioning of a message broker occurs in the message delivery chain;
- Compensation transactions cannot be performed to compensate for transaction failure in the message delivery chain;
- Detouring cannot be performed if a failure occurs in the message delivery chain; and
- The edge node does not know which message to resend when message loss occurs.

2.89 Potential resolutions were shared for each vulnerability. ROK concluded that implementing the hierarchical architecture in the APAC SWIM presents promising opportunities for enhancing efficiency and reliability in message delivery. However, adopting a hierarchical architecture with heterogeneous message brokers could introduce certain vulnerabilities, especially concerning guaranteed message delivery. Given the critical nature of SWIM operations and the need for reliable messaging to address these vulnerabilities effectively to ensure guaranteed message delivery within the hierarchical architecture, the list of considerations was suggested:

(1) Standardise common logic or process for message handling;
(2) Design failover mechanisms and redundancy both in technical and business aspects;

(3) Design common monitoring and notification mechanisms;
(4) Identify abnormal use-case and conduct testing and validation; and
(5) Conduct collaborative efforts and knowledge sharing;

2.90 The SWIM TF/9 Meeting appreciated ROK's effort in listing vulnerabilities and possible solutions and deliberated on the proposed considerations in various aspects, including standard and governance, to ensure transparency in message delivery. Additionally, the Meeting suggested that message type and message usage should be considered when identifying that it would require guaranteed message delivery so as not to cause performance issues. It was concluded that technical solutions to address these vulnerabilities would have to be supported by strong governance and standardisation when implemented and should be captured accordingly.

2.91 It was discussed that SIPG would consider the information provided in WP/10 on the guaranteed message delivery for regional SWIM architecture. The SWIM TF/9 Meeting agreed to incorporate suggestions outlined in this WP/10 in the work program of SIPG. (action consolidated in **ACTION ITEM 9-9** as shown in para 2.84)

2.92 The SWIM TF/9 Meeting encouraged other Member States/Administrations to analyse the issues faced during the joint event preparation and document lessons learned. It was suggested that, after the SIPG task is completed, all compiled lessons learned by SIPG can be shared with other contributory bodies at both regional and global levels to support global SWIM implementation.

Lesson learned and suggestions for SWIM Implementation Pioneer Group – China (IP/02)

2.93 China presented the summary of China's participation in the implementation of SIPG and suggestions for the subsequent work ideas and plans of SIPG. China informed that to better support the continuous and stable implementation of SIPG, China has completed the development and deployment of monitoring software for SWIM message exchange and carried out research and development on SWIM Discovery Service (SDS). Based on the experience gained from participation in SIPG, China presented three suggestions regarding the SWIM Service Registry, the SWIM Discovery Service (SDS), and Information Services Implementation for the subsequent work of SIPG.

2.94 The SWIM TF/9 Meeting was reminded that the Interoperable Registry Model was the proposed model for the APAC region. Based on China's completion of the SWIM Service Registry development and deployment, China shared willingness to cooperate with SIPG to carry out the experimental work on the SWIM Service Registry to reduce documentation work required for the registration and discovery of Information Services and to further enhance the work efficiency.

2.95 With the adaptation and improvement of SDS jointly researched by USA/FAA, Korea/KAC, China/ATMB, and Japan/ENRI, China shared a willingness to participate in SDS's implementation and experimental work in SIPG. Regarding the implementation method of SDS, China presented that one consideration was to combine the existing hierarchical approach of SIPG EMS and deploy the SDS at each EMS node, where the Gateway EMS was responsible for responding and forwarding the SDS requests while the Edge EMS was responsible for responding to the SDS requests.

2.96 To continuously promote the establishment of the prototype of the regional SWIM, China suggested continuing to sustain the SWIM architecture and strengthen the sharing and coordination with the newly established FF-ICE Ad-hoc Group and other working groups. Additionally, China suggested further research on application scenarios and use cases of regional Information Services, a list of regional Common Information Services, the unified standards of regional Common Information Services, the Service Level Agreement (SLA) and Quality of Service (QoS) of regional Common Information Services.

2.97 The SWIM TF/9 Meeting was informed that the Service Level Agreement (SLA) and Quality of Service (QoS) of regional Common Information Services are outside the scope of SIPG. It was suggested that SLA and QoS be considered under Task 5 and Task 6, respectively.

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

2.98 The Editorial Task Ad-hoc Group recalled the priority of topics discussed and agreed to be addressed in the APAC Regional SWIM Implementation Guidance Document (IGD) at SWIM TF/7 and SWIM TF/8, including:

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

2.99 The SWIM TF/9 Meeting was informed about the current work status on the prioritised topics at SWIM TF and ICAO panels while preparing the IGD. Considering the SWIM-related maturing specifications and technologies, the time required to process the ICAO regional document, and the upcoming ICAO Doc 10203 Manual on SWIM Implementation planned to be published in Q3/2024, two options for way forward for IGD drafting were proposed. Namely, the first option was to fix versions/specifications of relevant SWIM components and continue drafting the IGD. The second option was to develop an online repository that would be modified with evolving versions/specifications.

2.100 The SWIM TF/9 Meeting agreed that the second option was the most appropriate. It was suggested that, while preparing a graphical tree of topics to be included as the IGD, with relevant links on an online repository portal, different versions should be tracked. The tool to be used for online repository, repository host, and management of repository users will be discussed at future meetings of the Editorial Task Ad-hoc Group. **ACTION ITEM 9-10** The group may propose a draft decision to SWIM TF/10 for publication of the repository if ready. Additionally, it was shared that SWIM TF may wish to obtain the authority from CNS SG to update the online repository to timely update the repository with the latest information.

2.101 The SWIM TF/9 Meeting requested the ICAO Secretariat to explore the possibility of hosting the online repository on the ICAO Secure Portal or in another platform such as Sharepoint. ICAO Secretariat informed about the resource constraints for hosting and managing the portal. However, the ICAO Secretariat agreed to explore the option and share information about the possibility of hosting and managing by ICAO after consultation with ICAO HQ. **ACTION ITEM 9-11**

SIPG Breakout Session

2.102 The SIPG breakout session planned for day four could not be conducted due to extensive discussion held during the review of the APAC SWIM TI Profiles document and APAC Common SWIM Information Services document.

Leveraging DNS for robust APAC SWIM Implementation – Indonesia (WP/17)

2.103 The paper explored the critical role of Domain Name System (DNS) in facilitating seamless information exchange and data sharing to obtain a robust and efficient DNS within the SWIM ecosystem. The SWIM TF/9 Meeting was informed that a critical component of SWIM is the designation of Service Addresses (SAs) that uniquely identify information providers and consumers within the network. The DNS is pivotal in resolving these SAs into their corresponding Internet Protocol (IP) addresses, ensuring efficient data routing and access.

2.104 The SWIM TF/9 Meeting was informed that service end-point addresses could be expressed in a human-readable format using SAs instead of complex IP addresses by leveraging DNS. This simplifies user interaction and reduces the risk of errors. SAs can be structured to be inherently informative, incorporating elements that convey the type of service or organisation they represent. Additionally, within the SA, the service provided can be further specified. DNS allows for the use of domain naming conventions to categorise service addresses. This enables users and systems to quickly identify the type of service based on the domain name. Lastly, DNS facilitates the dynamic update of service end-point addresses without requiring changes to all consumer or subscriber systems. This simplifies service maintenance and avoids potential disruptions caused by outdated address information.

2.105 The SWIM TF/9 Meeting noted that the ICAO Information Management Panel (IMP) was deliberating on the use of a Uniform Resource Identifier (URI) to identify information services. It was suggested to defer the discussion on DNS till the outcomes of the IMP discussion are available. Ms. Cropf, SWIM TF Co-Chair, will coordinate with IMP experts and provide updates to the future SWIM TF meeting about the progress of the URI discussion. ACTION ITEM 9-12

Updates on FIXM 4.2 Extension – Thailand and USA (WP/18)

2.106 Thailand and the USA presented the APAC FIXM version 4.2 Extension analysis results of the FIXM Development Team under the FIXM Change Control Board (CCB). Recommendations and feedback provided by the FIXM Development Team as well as the next steps to improve the Extension for the next version, were also discussed.

2.107 The Meeting was informed that it was specified in the Asia/Pacific Regional Framework for Collaborative Air Traffic Flow Management (ATFM), version 4 (October 2022), developed by the Asia/Pacific ATFM Steering Group (ATFM SG) that FIXM version 4.2 (or later), extended where necessary to accommodate additional requirements, was the agreed ATFM information exchange model for exchanging ATFM data between ATFM systems in the region. Based on the operational requirements obtained from ATFM SG and the scenarios developed for the Multi-Regional TBO (Trajectory-Based Operation) Demonstration, a set of data attributes was derived and examined against FIXM version 4.2 Core. With the finding that the data fields identified as necessary to support the requirements and the conduct of the Multi-Regional TBO Demonstration scenarios were not included in FIXM version 4.2 Core, the FIXM version 4.2 Extension was developed to include these data fields.

2.108 In December 2023, the FIXM version 4.2 Extension was adopted by APANPIRG/34 (Conclusion APANPIRG/34/9) to be the Asia/Pacific (APAC) FIXM version 4.2 Extension for use by Asia/Pacific States/Administrations to support the cross-border ATFM information exchange and the ATFM/A-CDM integration. This APAC FIXM Extension was also uploaded to the ICAO Asia/Pacific Regional Office website. Moreover, the Extension was forwarded to the FIXM CCB for review before publishing on the FIXM official website for use by other stakeholders.

2.109 A review of the APAC FIXM version 4.2 Extension was completed by the FIXM Development Team of the FIXM CCB in March 2024. The analysis resulted in several optional recommendations for data modelling and technical considerations. The FIXM Development Team's detailed recommendations and feedback ranked by priority, together with the discussion between the FIXM Development Team and the Extension Development Team, were shared with the Meeting. The Meeting noted that, for some recommendations, such as modelling design decisions, additional coordination between the FIXM Development Team and the Extension Development Team may be required.

2.110 The Meeting was also informed that the review resulted in no immediate required changes for the APAC Extension, and it will be presented to the FIXM CCB to raise awareness among members. Several items identified by the FIXM Development Team will be considered for improvement in the next extension version. Additionally, the teams will coordinate further to address several areas specified, including conceptual areas such as the usage of the actual trajectory as well as technical considerations of modelling decisions. In particular, the teams will continue to discuss the usage of the actual trajectory data elements. Based on the outcome of coordination so far, these elements could be recommended as a candidate for inclusion in the next version of FIXM Core. For technical-related matters, the teams will continue coordinating to determine the most appropriate modelling to accomplish the use cases intended for the APAC Extension. Any changes would be targeted for the FIXM version 4.3 update to the Extension.

2.111 The Meeting noted that FIXM CCB met on 16 May 2024 during the ongoing SWIM TF/9 and the feedback on the analysis results of the FIXM Development Team was presented by Thailand and USA to the FIXM CCB. Based on the meeting results with the FIXM CCB on 16 May 2024, additional coordination is required. The meeting between the FIXM Development Team, the Extension Development Team, and the FIXM CCB was planned to be held to discuss observations from the FIXM CCB and then the APAC FIXM version 4.2 Extension will be considered for publication on the FIXM official website. Since no immediate required changes are needed, actions recommended by Conclusion APANPIRG/34/9 to forward the APAC FIXM version 4.2 extension to the FIXM CCB for review before publishing on the FIXM official website are considered completed.

SWIM Discovery Service Jump Starter Kit – ROK (WP/12)

2.112 ROK introduced the SWIM Discovery Service (SDS) Jump Starter Kit, which was developed by the ROK and aligned with the SDS specification v1.0 to contribute to a better understanding of and implementation of the SDS in the APAC region. ROK informed that the SDS is a web service that enables the exchange of metadata for a SWIM information service between independently managed SWIM programs. The SDS implementation specification v1.0.0 developed by the FAA addressed this need by defining a standard mechanism for exchanging service description information or metadata. It specified a web services interface, key interaction patterns, schemas, and message exchange formats required to exchange service metadata.

2.113 The Meeting was informed that the SDS Jump Starter Kit followed the Massachusetts Institute of Technology (MIT) license with permission, which is a permissive open-source software license. The Meeting noted that the SDS Jump Starter Kit is the implementation of the SDS specification v1.0 written in Typescript and operated in the NodeJS environment in the NestJS framework. It was added that the SDS Jump Starter Kit includes sample data in JSON format, and a user could modify sample data located in [/src/smxs/sample] directory. A user who wishes to use their own database could uncomment sample codes which bind and query to the database using GraphQL. The Meeting also noted that a database is not included in the SDS Jump Starter Kit, and a user needs to build their own database and configure the GraphQL server. In addition, ROK informed that the SDS Jump Starter Kit is available on GitHub (https://github.com/Korea-Airports-Corporation/SWIM-Discovery-Service-Jump-Starter-Kit).

2.114 The SWIM TF/9 Meeting discussed that the latest version of the SDS implementation specification is v2.0, which was published in March 2024, and questioned whether this new release would impact the SDS Jump Starter Kit. In response, ROK agreed to verify whether differences between SDS implementation specifications v1.0 and v2.0 would result in the update required for the developed SDS Jump Starter Kit and will share finding with the future SWIM TF meeting. **ACTION ITEM 9-13**

2.115 The SWIM TF/9 Meeting appreciated and congratulated ROK on developing the SDS Jump Starter Kit and providing it for others to use. Moreover, it was shared that this Jump Starter Kit will help accelerate SIPG's work.

Proposed Business Functionality of APAC Common SWIM Information Services – Hong Kong (WP/16)

2.116 Hong Kong China presented the updates on the work of the SWIM TF Task 6 team to identify the catalogue of basic data elements to be exchanged via APAC SWIM and proposed business functionality to be supported by APAC Common SWIM Information Services for addressing the operational needs in APAC. The draft list of the initial set of APAC Common SWIM Information Services was further reviewed and modified by the SWIM TF/9 Meeting. It was agreed that Hong Kong China, together with relevant subject matter experts of SWIM TF, will present the finalised version to the next Meeting of AAITF, ATFM SG, FF-ICE Ad-hoc group, MET/IE WG, SURSG, MET SG, AOP SG, and ATM SG. All comments received from all proposed groups will be presented to SWIM TF/10. **ACTION ITEM 9-14**

2.117 Additional discussion required on the finalised document is as follows:

1. Search and rescue services defined under APAC Common SWIM Aeronautical Information Services and its priority need further discussion in the relevant SAR groups with APAC. SWIM TF Secretary will coordinate with the secretary of the ICAO Asia/Pacific Search and Rescue Working Group (APSAR/WG) for this discussion. **ACTION ITEM 9-15**

2. The information exchange model for each APAC Common SWIM Information service will be discussed and finalised by the subject-matter-expert contributory bodies, i.e. AAITF for AIXM, ATFM SG and FF-ICE Ad-hoc Group for FIXM, and MET/IE WG for IWXXM. **ACTION ITEM 9-4**

3. As recorded under WP/02, MET information derived from Mode S DAPs was included in the APAC Common SWIM Meteorological Information Services list. However, as Mode S DAPS are considered a source of MET data, the Meeting suggested that further discussion in relevant MET groups is required to determine the justifiability of including this information service in the list of APAC Common MET Information Services. **ACTION ITEM 9-1**

4. Based on feedback received from different contributory bodies, the draft data catalogue will be further modified by the Task 6 group. **ACTION ITEM 9-16**

2.118 For the suggestion to incorporate the initial set of APAC Common SWIM Information Services into the initial version of the APAC SWIM Implementation Guidance Document, it was decided to add to the IGD after the details of this initial APAC Common SWIM Information Service list matured.

2.119 The SWIM TF/9 Meeting noted that IMP is working on an Information Service Definition (ISD) template for subject-matter-expert Panels, e.g. ATMRPP, METP, to develop domain-specific ISDs that work well related to WP/16. It was suggested that the progress of these works in the IMP, ATMRPP, and METP be tracked to align regional descriptions with the global guidance.

Overview of MET Scenario (#3) for Joint event of SWIM over CRV Demonstration and Surveillance data over SWIM Trial – ROK (WP/11)

2.120 This paper presented an overview of the MET scenarios supported by ROK for the joint event of SWIM over CRV Demonstration and Surveillance Sharing in the SWIM Technical Trial. It was informed that, for one of the two scenarios in which ROK is involved, non-demonstration participants could self-try the scenario online by accessing SWIM services used for demonstration with Service Descriptions provided in WP/11.

IMP Updates – Japan (IP/06)

2.121 Japan presented some topics discussed in past IMP/WG meetings, the Twelfth Working Group Meeting of the Information Management Panel (IMP-WG/12) which was held at IATA HQ in Montreal, Canada, from 15 to 19 April 2024, and other related Panels.

2.122 The SWIM TF/9 Meeting noted that the first edition of the Procedures for Air Navigation Services – Information Management (PANS-IM, Doc 10199) was approved by the Council at the fifth meeting of its 231st session on 18 March 2024 for applicability on 28 November 2024. A copy of it is available as an attachment to the electronic version of the State letter on the ICAO-NET (http://portal.icao.int). It was also informed that the Manual on the SWIM Concept (Doc 10039) had been published in English and that translation was ongoing. In addition, the Manual on SWIM Implementation (Doc 10203) was being edited, and an English version will be published shortly.

2.123 Draft ICAO Guidance Material on Protection of Information was considered by the Governance Working Group under the IMP (IMP WG-G) as mature enough (pending discussion during IMP WG/12, at the time of this paper writing) to be proposed for adoption during IMP/3. This document explains the SWIM Service Environment. It is a conceptual representation of the path that information takes between the information provider and the information consumer through various information service providers and consumers. Within the SWIM Service Environment, each intermediate stakeholder acts both as a consumer of information received from "upstream" and as a provider of information to "downstream" stakeholders. The IMP Meeting raised concerns about the legal implications of having this kind of text in an ICAO Manual.

2.124 The SWIM TF/9 Meeting was informed that there are two main drivers for replacing the current NOTAM system and improving the aeronautical information update system. One is the necessity of accompanying the aeronautical digital datasets; the second is addressing commonly reported shortfalls. This NOTAM replacement system concept, known as the Digital Operational Reporting Information Service (DORIS) concept, must enable the tailored retrieval and presentation of information to minimise the impact of worldwide volume increases. It must enable graphical representations for optimal human use to avoid inaccurate mental models. It must also be interoperable between systems and between States to provide the maximum benefits. The IMP will continue to work on revising the document, but this concept should be promoted as contributing to safety.

2.125 The Forty-Fourth Working Group Meeting of the Air Traffic Management Requirements and Performance Panel (ATMRPP-WG/44), which was held in Seoul, Korea, from 29 April to 3 May 2024, highlighted the importance of ensuring a common understanding of the concept for TBO (Trajectory-Based Operations), FF-ICE (Flight & Flow Information for a Collaborative Environment), and connected aircraft. It also stressed the need for robust and open discussions to understand different limitations and expectations and to develop scalable and adaptable solutions that deliver tangible benefits.

2.126 The SWIM TF/9 Meeting was informed of a trust framework being developed by the ICAO Trust Framework Panel (TFP). In particular, it was shared that a trust framework can be described as a set of policies, procedures, and technical requirements enabling organisations to share information and retain confidence that shared information is authentic, unaltered, and sufficiently protected. During

the Second Meeting of the TFP (TFP/2) held in Montreal, Canada, from 29 April to 3 May 2024, the participants worked on developing the first edition of the Manual on Information Security, conducted the final review of the Aviation Common Certificate Policy, began development of Manual on Trust Framework Implementation, and continued to support the work of other panels.

2.127 The SWIM TF/9 Meeting suggested participants refer to the already-published first edition of the PANS-IM (Doc 10199) and the Manual on SWIM Concept (Doc 10039) as well as the to-be-published Manual on SWIM Implementation (Doc 10203) to better understand the SWIM concept and to obtain information to support SWIM implementation that is well aligned with the ICAO global provisions.

2.128 Additionally, the SWIM TF/9 Meeting noted that the Working Group – Information/Service under the IMP (IMP/WG-I/S) held its second meeting in Brussels, Belgium, from 27 February to 1 March 2024. It was shared that, at the meeting, the IMP/WG-I/S focused on finalising the Air-to-Ground SWIM job card and progressing the work on the SWIM Registry Interoperability Concept of Operations as well as the Information Service Definition template and framework.

2.129 IMP members, presented in the Meeting, provided clarification that the DORIS concept is not a replacement for the NOTAM system concept. Rather, it is a future concept for providing aeronautical information.

Key SWIM related activities being progressed by METP – Australia (IP/07)

2.130 Australia presented a summary of key activities undertaken by ICAO METP relevant to SWIM TF. The Meeting noted that the ICAO METP tasked its Working Group on MET Information Exchange (WG-MIE) to carry out the goals set forth in Job Card METP.004 *Inclusion of aeronautical meteorological information in the SWIM-enabled environment and further development of the SWIM concept relating to meteorology.*

2.131 The latest status of various amendments to ICAO Annex 3, their original expected applicability, and new expected applicability were shared with the Meeting. A list of the first ICAO meteorological SWIM (MET-SWIM) services to be introduced to the Annex, benefits of MET-SWIM, and progress on MET-SWIM Documentation were also informed at the Meeting. The Meeting noted the transition plan from traditional OPMET exchange to MET-SWIM, notifications procedures for changes to IWXXM, and updates to the IWXXM guidelines. Additionally, the Meeting was shared that the World Metrological Organization (WMO) IWXXM compatibility table that is maintained by WMO can be accessed by this link: https://github.com/wmo-im/iwxxm/wiki/Package-Compatibility

2.132 The SWIM TF/9 Meeting noted that WG-MIE is currently developing a draft version 3.0 of the *MET-SWIM Roadmap*, including revised transition capabilities and implementation schedules. WG-MIE has decided that the *Plan for Meteorology in SWIM* (MET-SWIM Plan) should be deprecated, and the contents of the current version (Version 2.3) should be brought into a new *Guidelines for MET-SWIM Implementation* (MET-SWIM Guidelines) document. The METP is planning to release the MET-SWIM Guidelines in Q2 2025.

Summary of SWIM Activities – IATA (WP/14)

2.133 IATA presented a brief on identified SWIM-related activities being undertaken in the APAC region outside of the ongoing direct SWIM discussions and initiatives. The Meeting noted the APAC TBO Pathfinder project being conducted under the APAC ANSP Committee (AAC) is developing a TBO education package expected to be finalised by Q2/2025 and preparing for a TBO trial with a target of 2028. The Meeting was informed that Airservices Australia convened an FF-ICE 'kick-off' Meeting in February 2024 intending to bring together relevant stakeholders in starting to

understand what benefits it will provide to both the Airspace Users (AUs) and the Airspace Service Providers (ASPs), and how to unpack the concept at both a regional and State level.

2.134 For airline readiness, IATA informed that during April 2024, the twenty IATA member airlines of the APAC/NASIA Regional Coordination Group (RCG) met for the bi-annual meeting and were briefed on SWIM activities in this and other regions. Remainder members are then notified through the distribution of meeting minutes. It was informed that Qatar Airways (QR) had held open discussions with several vendors at ATM World 2024 for presentations on software applications and the provision of datasets in AIXM format. Most applications are naturally orientated to AIS-AIM office usage, so potential customisation may be required. QR has also reported that AIS Doha has implementation targets for AIXM datasets of Q4/2024 for AIP and Obstacle Data, Q2/2025 for Airport Mapping and Q4/2025 for Instrument Flight Procedure Data. Digital NOTAMs are already viewable on their AIS website.

Review of SWIM TF ToR, Programme, Work Plan, and Outstanding Action Items – Sec (WP/07)

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

2.136 To ensure that the objectives set in the ToR can be achieved, the Statement of Work (SOW) of each Task needed to be further reviewed to be consistent with the current SWIM TF ToR. It was agreed at the SWIM TF/8 meeting that all Task Leads would review and modify the SOW to accommodate the latest requirements from SWIM TF ToR and share it with the ICAO Secretariat.

2.137 The SWIM TF/9 Meeting was informed of the current Rask leads as follows:

Groups	Task No.	Subject/Task	Task Leads
Implementation Planning	1	Regional implementation philosophy & roadmap	David Leow (Singapore) Amornrat Jirattigalachote (Thailand)
SWIM infrastructure	2	Regional SWIM infrastructure	Xiaodong Lu (Japan), Yasushi Iwasawa (Japan) Henry Chan (Hong Kong, China)
	3	Security service	Jim Laymon (USA)
Technical Architecture	4	Development and maintenance of regional information exchange models	Amornrat Jirattigalachote (Thailand) Wen Zhu (USA)
Governance	5	Regional SWIM Governance Framework	~~Dongkie Park (ROK)~~ YoungJin Ha (ROK) Mark Kaplun (USA), Yasushi Iwasawa (Japan) Xiaodong Lu (Japan), Honglei Gao (China)
Information Services	6	Information services	Marco Kok (Hong Kong, China) Vacant

Groups	Task No.	Subject/Task	Task Leads
Validation & Demonstration	7	SWIM Demonstration	David Leow (Singapore) Amornrat Jirattigalachote (Thailand)
	8	SWIM services and application validation	Yasushi Iwasawa (Japan) Xiaodong Lu (Japan), Honglei Gao (China), ~~Dongkie Park (ROK)~~ YoungJin Ha (ROK)
Coordination and Promotion	9	Monitoring of Panels' work	Yasushi Iwasawa (Japan)
	10	Regional coordination and SWIM-related information sharing	John Moore (IATA)
	11	SWIM implementation education and promotion (New task)	Thomas Green (USA)

2.138 The SWIM TF/9 Meeting was informed that Task 3 required a co-lead from the APAC region to be able to suggest better and incorporate the security requirements specific to the APAC region. Similarly, additional support was required for Task 6 and Task 11. As the current ToR of SWIM TF has significantly increased the work of SWIM TF, the meeting was encouraged to also nominate co-leads of Task 6 and Task 11 on a priority basis.

2.139 ICAO secretariat informed that after the retirement of Task 6 lead from Australia, Australia shared its intention to nominate a replacement. The Meeting requested Australia to reconsider sharing the nomination for Task 6 lead. Australia shared that they will discuss this internally and share nominations, if possible, before 14 June 2024. **ACTION ITEM 9-17**

2.140 The Meeting discussed the SWIM TF Task structure and SOW of each task. The proposal to remove Task 1 due to most of the work taken over by SIPG was considered. The Meeting agreed that Task 1 should be kept, as when the ToR of SIPG is completed, the relevant work under the Task 1 group will still require to be continued. Therefore, it was recommended that the SOW of Task 1 be modified to incorporate the need to develop a detailed SWIM roadmap and include the APANPIRG-approved APAC SWIM implementation timelines for 2024-2030. Task 1 leads will modify the Task 1 SOW and submit it to the ICAO Secretariat before 14 June 2024. The Meeting also requested all Task leads to provide feedback on the review of corresponding SOWs and submit it to the ICAO Secretariat **ACTION ITEM 9-18** SWIM TF/9 report updates by SWIM TF Co-chair to CNS SG/28 will incorporate the new SOW of all Tasks. **ACTION ITEM 9-19**

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

2.141 The paper presented the recent updates on the work to identify and document use cases and user requirements for SWIM-based MET information services supporting ATFM in the APAC region in coordination with other APANPIRG contributory bodies. The paper invited SWIM TF to review the updated draft reference document already reviewed and modified by ATFM/SG/14 and MET/R WG/13 and provide any comments, particularly suggestions on the use cases and/or any other requirements. The Meeting reviewed the draft reference document and modified the name of Use Case 7 as follows. Apart from this modification, no changes were made.

USE CASE 7: (potential future use case) Aircraft spacing management based on MET information and real-time surveillance information shared in SWIM

FAA Strategic Decision: Leverage legacy technology investments to support ATC data exchange by prioritising internet-enabled SWIM for ATM information sharing – USA (WP/19)

2.142 The SWIM TF/9 Meeting noted the need for a dedicated group to support APAC Member States/Administrations in implementing recommendations being developed by the TFP. CNS SG/28 will be requested to provide guidance, especially for the group to be responsible for implementing information security provisions in the APAC region. **ACTION ITEM 9-20**

2.143 The CNS SG/28 Meeting deliberated the requirements to establish a dedicated group to support the implementation of the ICAO information security provisions in the APAC region. With the expectation that the Manual on Information Security is to be published in the second half of 2024, later than the time of the CNS SG/28, the CNS SG/28 Meeting discussed that the APAC States/Administration would need adequate time to study and understand the content and recommendations contained in the manual before making a decision on the appropriate way forwards. Therefore, it was advised that the discussion on forming a dedicated group be deferred to the CNS SG/29 Meeting in 2025. It was anticipated that, by the next CNS SG/29 Meeting, most States/Administrations would have enough details and knowledge to share their views on the need for a formal group along with the required expertise and ToR.

The Fourth meeting of the Surveillance Study Group (SURSG/4)

Outcomes of Joint event of SWIM over CRV Demonstration and Surveillance data over SWIM Trial

2.144 The Joint event of SWIM over CRV Demonstration (the demo) and Surveillance data over SWIM Trial (the trial) was a collaborative and intricate work of S3TIG. The Joint event was successfully conducted from 28 May to 29 May 2024.

2.145 The SURSG/4 Meeting noted that three scenario-based demonstrations were demonstrated with real-time data exchange among involved parties in the Joint event and the operational benefits brought by SWIM were showcased. The Meeting was informed that a Pseudo CRV network was established among participant States acting as Gateway EMS and Edge EMS. This network supported the demonstration and was noted to include both CRV-based SLA-guaranteed networks and internet-based networks.

2.146 The Meeting discussed the outcomes of the Joint event and agreed that with the successful completion of the Joint event, S3TIG can be dissolved. The S3TIG was dissolved by the SURSG/4 Meeting.

Study on bandwidth used for ADS-B data being transmitted on SWIM CRV

2.147 Hong Kong China shared the outcomes of the Study on bandwidth used for ADS-B data being transmitted on SWIM CRV. Thailand and Singapore requested Hong Kong China to capture and analyse ADS-B data supplied by their surveillance system as the current setup for the Joint event will be accessible for one month until the end of June 2024 for participants. Hong Kong China accepted the request.

Use case of MET information services in SWIM demonstration for ATFM with surveillance data sharing

2.148 The meeting agreed that the demonstration scenario outlined the operational benefits of efficient MET information exchange and surveillance data sharing for improving traffic demand and capacity forecasting in ATFM. In addition, machine-readable MET and surveillance information in SWIM could be used directly in future ATFM Systems for automatic calculations and updates of landing slot allocations.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the outcome of the APANPIRG/35, CNS SG/28, and its contributory bodies, and take any necessary follow-up actions; and

b) discuss any relevant matter as appropriate

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List of Conclusions/Decisions adopted by CNS SG/28 on behalf of APANPIRG on Technical Matters

Conclusion CNS SG/28/01 (ACSICG/11/02) - Review of APAC Region IWXXM Implementation Status/ Readiness	
What: States / Administrations provide ICAO an update on the status and readiness dates for the following: (a) AMHS with FTBP/IHE and configuration for single body part; (b) AMHS connection(s) will have sufficient capacity to support IWXXM exchange;	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: As per Amendment 79 to Annex 3 (applicable November 2020), States/ Administrations are required to exchange meteorological information in IWXXM form.	Follow-up: ☒Required from States
When: 05-Jul-2024	Status: Adopted by Subgroup.
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XX	

Decision CNS SG/28/03 (**Decision SWIM TF/08/02)** Candidate Baseline SWIM Discovery Service Standard for APAC	
What: To position the SWIM Discovery Service (SDS) specification as a candidate baseline standard for APAC SWIM implementation.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: A candidate baseline standard for SDS is needed to support APAC SWIM implementation within the regionally-agreed target implementation timeframe of 2024-2030.	Follow-up: ☐Required from States
When: 5-Jul-24	Status: Adopted by Subgroup
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other: SWIM TF	

Decision CNS SG/28/04 (Decision SWIM TF/09/01) –APAC SWIM Technical Infrastructure Profiles v1.0	
What: The APAC SWIM Technical Infrastructure Profiles v1.0 is adopted as a living document for immediate use by APAC States/Administrations.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To assist APAC States/Administrations in their SWIM development and implementation,	Follow-up: ☐Required from States

guidance specific to the operational environment within APAC is required. The draft APAC SWIM Technical Infrastructure Profiles v1.0 is matured enough to be immediately used by APAC States/Administration.	
When: 5-Jul-24	Status: Adopted by Subgroup
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF	

Conclusion CNS SG/28/08 (GBAS-SBAS ITF 06/01) - Guidance Document for Implementation of GBAS in the APAC Region	
What: The Guidance document for the implementation of GBAS in the APAC Region developed by the APAC GBAS/SBAS ITF is adopted.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To provide guidance to States for the implementation of GBAS	Follow-up: ☐Required from States
When: 5 Jul 2024	Status: Adopted by CNS SG
Who: ☒CNS Sub group ☐APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Conclusion CNS/SG/28/09 - Update of Flight Inspection Guidance Material (FIGM)	
What: That, the Edition 4.0 of the Flight Inspection Guidance Material (FIGM) is adopted.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: The FIGM is subject to regular review and update in the light of on-going development of flight inspection standards and recommended practices.	Follow-up: ☒ Required from States
When: 5-Jul-24	Status: Adopted by Subgroup
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Conclusion CNS/SG/28/11 (SURICG/9/2) - Guideline on addressing inconsistencies of Aircraft Address (AD) and Target Identification (ID) between Surveillance Data and Flight Plan

List of Conclusions/Decisions adopted by CNS SG/28 on behalf of APANPIRG on Technical Matters

<table>
<tr><td colspan="2">What: APAC guideline on addressing inconsistencies of ICAO Aircraft Address (AD) and Target Identification (ID) between Surveillance Data and Flight Plan is adopted.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: The guideline consolidated the outcomes of the Workshop on ICAO Aircraft Address and Target Identification between Surveillance Data and Flight Plan held in June 2023.</td><td>Follow-up: ☐Required from States</td></tr>
<tr><td>When: 05-July-24</td><td colspan="2">Status: Adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☐APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXXX</td></tr>
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A List of Conclusions adopted by APANPIRG/35 Meeting related to CNS

<table>
<tr><td colspan="3">Decision APANPIRG/35/6 (Decision CNS SG/28/02 (Decision SWIM TF/08/01)) - The Information Management Panel considers the adoption of SWIM Discovery Service as a Global Standard for Globally Interoperable Service Discovery.</td></tr>
<tr><td colspan="2">What: To propose to the Information Management Panel (IMP) to consider adopting the SWIM Discovery Service (SDS) as a global standard for globally interoperable service discovery.</td><td>Expected impact:
☒ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Considering that APAC regional SWIM will also be part of global SWIM and that SDS was studied and tested by the SWIM TF, the consideration of IMP on the possible adoption of SDS as a global standard is required to ensure cross-regional interoperability of SWIM service discovery,</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 27-Nov-24</td><td colspan="2">Status: Adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☐APAC States ☒ICAO APAC RO ☒ICAO HQ ☒Other: SWIM TF</td></tr>
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<table>
<tr><td colspan="3">Conclusion APANPIRG/35/7 (Conclusion CNS SG/28/05 (SRWG/8/1) -
Preparation for World Radiocommunication Conference - 2027 (WRC-27)</td></tr>
<tr><td colspan="2">That, States,
a) assign high priority to aeronautical spectrum management;
b) participate in the development of the ICAO Position for WRC-27;
c) participate in the development of States' positions for WRCs at the national level to ensure support for the ICAO Position;
d) ensure, to the extent possible, that, aviation representatives are included in States delegations to the APAC Telecommunity (APT) Conference Preparatory Group Meetings and at WRCs;
e) to nominate an ICAO designated focal point or contact person for aviation issues related to the WRC-27; and
f) ensure participation of the designated focal point or contact person at the ICAO Regional Preparatory Group Meetings for WRC-27, APT Conference Preparatory Group Meetings for WRC-27, and at WRC-27.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why:
a) implement Assembly Resolution A41-7;
b) support the early development and dissemination of the draft ICAO Position;
c) actively participate in the preparatory work of the ITU and the Meetings of APT to ensure the development of proposals by the regional telecommunication organizations to the conference are in line with the ICAO Position;</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
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A List of Conclusions adopted by APANPIRG/35 Meeting related to CNS

When: 27-Nov-24	Status: Adopted by PIRG
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SRWG	

Conclusion APANPIRG/35/8 *(Conclusion CNS SG/28/06 (SRWG/8/2))* - **VHF COM Frequency Allotment Plan for APAC Region**		
What: The VHF COM Frequency Allotment Plan for the APAC Region is adopted.		Expected impact: ☒ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: Per discussion from SRWG, the Region should simplify the VHF COM Frequency Allotment Plan and clarify the function of the twelve frequencies for inclusion in the next edition of the Frequency Guidance Material (Management Manual).	Follow-up: ☐Required from States	
When: 27-Nov- 24	Status: Adopted by PIRG	
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SRWG		

Conclusion APANPIRG/35/9 *(Conclusion CNS SG/28/07 (SRWG/8/4))* - **Transition from the regular publication of Frequency List 2 to the global database of frequencies included in the Frequency Finder**		
What: Transition from the regular publication of Frequency List 2 to the global database of frequencies included in the FF is adopted		Expected impact: ☒ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: The regular publication (currently once a year at the end or beginning of the year) of the Frequency List 2 i.e. List of facilities in the band 108 - 117.975 MHz and 960 - 1215 MHz will no longer be required as the global database of frequencies included in the FF would provide an up-to-date status of frequencies assigned or used by States/Administrations.	Follow-up: ☐Required from States	
When: 27-Nov-24	Status: Adopted by PIRG	
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SRWG		

A List of Conclusions adopted by APANPIRG/35 Meeting related to CNS

<table>
<tr><td colspan="3">Conclusion APANPIRG/35/10 (Conclusion CNS/SG/28/10 (SURICG/9/1)) - Update of the General Strategy on Assignment of and Migration to SI Code in the APAC Region</td></tr>
<tr><td colspan="2">That:
1. The ICAO APAC regional office will manage the assignment of II codes 14 and 15 and their matching SI codes like the rest of the II and SI codes.
2. Revised General Strategy on Assignment of and Migration to SI Code is adopted.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: A study by SURICG concluded that reservation of II codes 14 and 15 and their matching SI codes for research/test radars and military radars on a region-wide basis is not practicable in APAC.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 27-Nov-24</td><td colspan="2">Status: Adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXX</td></tr>
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