



ICAO

International Civil Aviation Organization

**Eighth Meeting of the Common aeRonautical Virtual
Private Network Operations Group (CRV OG/8)**

Video Teleconference, 17 – 19 May 2021

Agenda Item 3: Review outcomes of relevant meetings

REVIEW OF RELEVANT MEETINGS

(Presented by the Secretariat)

SUMMARY

This paper presents the relevant outcomes of the Thirty First Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/31), actions on the works accomplished by seventh meeting Common aeRonautical Virtual Private Network Operations Group (CRV OG/7), Seventh Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/7), Fourth Meeting of the APAC SWIM Task Force (SWIM TF/4) and relevant discussions in other meetings.

1. INTRODUCTION

1.1 The Thirty-first Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/31) was held from *14 to 16 December 2020* via video teleconference. The Meeting was attended by 193 participants from 23 Member States, 2 Special Administrative Regions of China, and 8 International Organizations (AAPA, ACI, CANSO, IATA, ICAO, IFALPA, IFATCA and IFATSEA). APANPIRG/31 meeting report, working papers, information papers, and other resources can be accessed by following link:

<https://www.icao.int/APAC/Meetings/Pages/2020-APANPIRG31.aspx>.

1.2 The Twenty Fourth Meeting of the Communications, Navigation and Surveillance Subgroup (CNS SG/24) of APANPIRG was held from *30 November to 4 December 2020* via video teleconference. The meeting was attended by 176 participants from 26 States/Administrations and 5 International Organizations namely CANSO, EUROCONTROL, IATA, IFATCA and IFATSEA, plus 26 participants from industry partners. CNS SG/24 meeting report, working papers, information papers, and other resources can be accessed by following link:

<https://www.icao.int/APAC/Meetings/Pages/2020-CNS-SG24.aspx>.

1.3 The Seventh Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/7) of CNS SG was held from *21 July to 23 July 2020* via video teleconference. The meeting was attended by 95 participants from 19 States/Administrations and 01 International Organization and representatives from 02 industries (Frequentis and NCS). The ACSICG/7 meeting reviewed the outcomes of the Seventh Meeting of the Common aeRonautical Virtual Private Network Operations Group (CRV OG/7) and took follow-up actions. ACSICG/7

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meeting report, working papers, information papers, and other resources can be accessed by following link:

<https://www.icao.int/APAC/Meetings/Pages/2020-ACSICG7.aspx>.

1.4 The Seventh Meeting of the Common Aeronautical Virtual Private Network Operations Group (**CRV OG/7**) of CNS SG was held from *20 January to 22 January 2020* at the Conference Building of ICAO Asia Pacific Office, Bangkok. The meeting was attended by 57 participants from 17 States/Administration along with ICCAIA (AIREON) and PCCW Global. CRV OG/7 meeting report, working papers, information papers, and other resources can be accessed by following link:

<https://www.icao.int/APAC/Meetings/Pages/2020-CRV-OG7.aspx>.

1.5 The Fourth Meeting of the APAC SWIM Task Force (**SWIM TF/4**) was held from *3 to 6 November 2020* via video teleconference. The meeting was attended by 135 participants from 17 States/Administrations, 3 International Organizations namely IATA, IFALPA, IFATCA and 5 Industry partners namely, Atlas Air, Cirium, Frequentis, PCCW Global and Snowflake. SWIM TF/4 meeting report, working papers, information papers, and other resources can be accessed by following link:

<https://www.icao.int/APAC/Meetings/Pages/2020-SWIM-TF4.aspx>.

1.6 The APANPIRG/31 meeting reviewed the outcomes of the CNS SG/24, noted with appreciation the work done and achievements by the SG and the contributory bodies reporting to APANPIRG through the SG, the meeting discussed CNS related matters and took following actions on the report of CNS SG/24 meeting and other papers presented under Agenda Item 3.4.

1.7 This paper summarized relevant information and updates with the highlight on the reviewed outcomes of CRV OG/7, ACSICG/7, SWIM TF/4 and relevant discussions of other meetings of CNS SG/24 and APANPIRG/31.

2. DISCUSSION

The actions taken by APANPIRG/31 meeting on Aeronautical Fixed Service (AFS) related matters are highlighted below:

2.1 The CNS SG/24 meeting adopted following **8** Conclusions and **5** Decisions:

Reference	Subject
Conclusion CNS SG/24/3 (ACSICG/7/2 (ATFM/SG/10-3))	- Amendment of the AFTN/AMHS-based Interface Control Document (ICD) for ATFM
Conclusion CNS SG/24/4	- Publishing of the CRV Operations Manual
Decision CNS SG/24/5	- CRV Landing Page on the ICAO APAC Website
Decision CNS SG/24/6 (SRWG/4/1)	- Frequency requirements for VHF-COM systems and ILS, VOR, DME and GBAS/VDB facilities
Conclusion CNS SG/24/7 (SRWG/4/2)	- Simulation of VHF COM Frequency requirements for next 10 years
Conclusion CNS SG/24/8 (SRWG/4/3)	- Establishment a list of focal point responsible for the operation of Frequency Finder in States

- | | |
|--|---|
| Decision CNS SG/24/9 (<i>SRWG/4/4</i>) | - Revision of the Term of Reference of the SRWG |
| Conclusion CNS SG/24/10 | - Flight Inspection Guidance Material (FIGM) for APAC Region |
| Conclusion CNS SG/24/11 | - Protection of ILS Critical and Sensitive Areas in Three Dimensional |
| Decision CNS SG/24/12 (<i>SURICG/5/2</i>) | - Dissolution of SEA/BOB ADS-B WG |
| Conclusion CNS SG/24/14
(<i>SURICG/5/4(DAPs WG/3/2)</i>) | - Mode S DAPs IGD 2.0 |
| Conclusion CNS SG/24/15 (<i>SURICG/5/6</i>) | - Revised ADS-B Implementation and Operations Guidance Document (AIGD) Edition13 |
| Decision CNS SG/24/16 (<i>SURICG/5/1</i>) | - Establishment of Study Group under SURICG on Sharing of Surveillance Data in SWIM |

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

2.3 Based on the outcome of discussions on various agenda items, the CNS SG/24 meeting developed 4 Draft Conclusions for consideration by APANPIRG/31 Meeting, which were further adopted by APANPIRG/31. The conclusions adopted by APANPIRG/31 are as follows:

Reference	Subject
APANPIRG C 31/12 (<i>Draft Conclusion CNS SG/24/1</i>)	- Target Year of CRV Implementation in APAC Region
APANPIRG C 31/13 (<i>Draft Conclusion CNS SG/24/2 (ACSICG/7/1)</i>)	- Revised Regional Strategies on AMS and Datalink
APANPIRG C 31/14 (<i>Draft Conclusion CNS SG/24/13 (SURICG/5/3(DAPs WG/3/1))</i>)	- Mode S Forward Fit Equipage in APAC Region
APANPIRG C 31/15 (<i>Draft Conclusion CNS SG/24/17</i>)	- Addressing Human Factor Issues of ATSEP

2.4 All APANPIRG/31 Conclusions related to CNS are included in **Attachment B** to this paper.

Seventh Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/7)

2.5. The meeting noted the ATN/AMHS and AIDC implementation status in the APAC Region provided in Appendix A to CNS SG/24 meeting report.

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Election of a co-chair of the ACSICG

2.6. Mr. Chonlawit Banphawattharak, Chief, Policy and Strategy Management Bureau of AEROTHAI was unanimously elected as co-chair of the ACSICG of APANPIRG.

Action taken on the Report of CRV OG/7 Meeting

2.7. The ACSICG/7 meeting recognized the challenges and difficulties faced by States/Administrations under current pandemic situation and recommended to postpone the target year of regional implementation of CRV from 2020 to end of 2021. PCCW Global Limited (PCCWG), as the contractor for the provision of CRV infrastructure and services, also agreed to extended target year for regional CRV implementation from 2020 to 2021 without changing terms and conditions of their technical/price offers. CNS SG/24 proposed a draft conclusion **CNS SG/24/1- Target Year of CRV Implementation in APAC Region** for consideration of APANPIRG/31, which was approved by APANPIRG/31 as **APAPPIRG C 31/12**. The ICAO secretariat issued a state letter reference number **T 8/2.10-AP002/21 (CNS)** dated **6 January 2021** to inform states about this conclusion.

2.8. According to the updates in November 2020 from PCCWG, twelve States/Administrations had joined CRV and implemented operations: Australia, Bhutan, China, Hong Kong China, Fiji, Japan, New Zealand, Philippines, PNG, Republic of Korea, Singapore and USA. Additional eight States/Administration had plan to join CRV: France-New Caledonia and Polynesia, India, Indonesia, Malaysia, Nepal, Russia, Thailand. The Updated CRV Implementation Status Table was provided in Appendix B to the CNS SG/24 meeting report.

CRV Pioneer State contribution to the ICAO Managed Service Agreement

2.9. Pioneer States contributed to the CRV MSA fund that was used to fund the ICAO Assistance for the procurement of Asia/Pacific Common Regional Virtual Private Network (CRV) Services (RAS14801). Currently there is an available balance of approximately USD 88,000.00 less the ICAO Technical Cooperation Bureau (TCB) service overhead. The CRV OG co-chair (Asia) and & pioneer CRV member States were tasked to investigate use the MSA funds to undertake the independent safety assessment of the CRV. Accordingly, Decision CRV OG/6/3 was made in May 2019 on the funds to be used for an independent assessment on the safety and security of the CRV. The Co-Chair (Asia) will coordinate to finalize a scope of work to address the agreed use of the funds.

CRV for AMHS Centres of the Russian Federation Interacting of COM Centres in the APAC Region

2.10. Russian Federation provided updates on their plan and progress of joining CRV at number of centres (Moscow, Khabarovsk, Irkutsk) in Russia to interact with COM Centres (Fu Kuok, Beijing and Ulaanbaatar) in the APAC Region as well as COM centres in USA (Salk Lake City and Anchorage). In following up the outcome of COM Coordination Meeting in May 2019, Russian Federation is considering options to join CRV at those designated entry/exit points in Russia with entry/exit points in the APAC Region.

MPLS/IP Based Inter-Regional Connection

2.11. The meeting agreed to a proposal to develop a high-level concept on the interconnection of CRV with other regional network such as REDDIG/MEVA/PENS. A number of States that connecting to the CRV are also planning to connect to other regional networks for cost reduction and improve efficiency. Noting these requirements, the CRV OG and PCCWG will enhance and trigger early discussions with these regional networks at future opportunity to consider how the CRV can potentially be interconnected with other regional networks.

CRV and AFS Safety and Protection planning

2.12. In following up the outcome of CNS SG/23 meeting, the AFS Safety and Protection joint working group meeting scheduled for 21 to 23 April 2020 in Nevada, USA has been postponed without a firm date. The meeting considered necessary and timely to address safety and security concerns as more and more AFS and other new applications being transferred to and exchanged over CRV. This meeting was also planning to discuss inter-network connection as indicated in the paragraph above.

Proposal to use CRV for Space based ADS-B

2.13. One prime purpose for using CRV for delivery of surveillance data from space-based ADS-B is to reduce the need for point-to-point circuits and would result in lower data communications costs for ANSPs. PNG Air Services Limited (PNGASL) has contracted for the supply of space-based ADS-B data from Aireon LLC and is intending to contract for a CRV connection in early 2020. Indonesia expressed support to PNG's proposal to use CRV for distribution of space-based ADS-B data.

SWIM Demonstration on CRV

2.14. Hong Kong China, Thailand, Singapore and PCCWG jointly presented a proposal for SWIM Demonstration on CRV hosted by Hong Kong China was scheduled for March 2020 to demonstrate the exchange of SWIM data over CRV, which is a potential hybrid SWIM infrastructure presented in HKCAD's previous paper at CRV OG/5 meeting. The demonstration would be conducted over a dedicated mini-CRV to be provided by PCCWG for the demonstration which would not impact normal operations for the routine traffic being exchanged over CRV. The SWIM Demonstration on CRV will showcase the operational benefits in using CRV to carry SWIM data and the corresponding services envisaged as necessary or complementary to support implementation of SWIM in APAC region through an operational scenario with real exchange of SWIM data.

2.15. The member States of CRV OG presented at the meeting fully supported the demonstration to be conducted by States concerned with PCCWG as it is a further step forward after SWIM Demonstration in ASEAN were conducted in Bangkok and Singapore in November 2019. Due to the COVID-19 crisis the demonstration was not able to progress. Hong Kong China will notify interested parties of a new date once available.

Report on the readiness status of AMHS to support IWXXM service by November 2020

2.16. The following ANSPs should be able to support IWXXM using their respective AMHS with FTBP capability: Australia; Bangladesh; Bhutan; Cambodia; China; Hong Kong, China; Macao, China; Fiji; India; Indonesia; Japan; Republic of Korea; Myanmar; Nepal; New Zealand; Pakistan; Philippines; Singapore; Sri Lanka; Thailand; and USA.

2.17. The meeting recommended that States with designated BBIS (viz Australia, China, Hong Kong, China, Fiji, India, Japan, Singapore, Thailand and USA) should increase their respective connection bandwidth to greater than 64kbps if feasible and applicable.

APAC regional Strategies on AMS and Air-Ground Data Link

2.18. As assigned by the CNS SG in 2019, China took the lead and worked together with Australia, Japan and USA to review the regional AMS strategy adopted by APANPIRG in 2013 and the Datalink strategy adopted by APANPIRG in 2005. The draft on the revised strategies was distributed among members and discussed through a teleconference on 1 July 2020.

2.19. The ACSICG/7 meeting reviewed the draft on the revised strategies and further discussed some additional changes proposed by Singapore. The FIT-Asia/10 noted the revision and the CNS SG proposed to APANPIRG for further consideration. With aforementioned, the meeting adopted the

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Conclusion **APANPIRG C 31/13** (*Draft Conclusion CNS SG/24/2 (ACSICG/7/1)*) *The Revised Regional Strategies on AMS and Datalink*, which were later approved by APANPIRG.

2.20. The Revised Regional Strategies on AMS and Datalink is available on <http://www.icao.int/APAC/Pages/edocs.aspx>. It was informed to states by state letter reference number **T 8/4.1 - AP005/21 (CNS)** dated **8 January 2021**.

Amendment to AFTN/AMHS-based ATFM Interface Control Document (ICD)

2.21. The Tenth Meeting of the Asia/Pacific ATFM Steering Group (ATFM/SG/10, Video Teleconference, 4 to 8 May 2020) proposed amendment to the AFTN/AMHS-based ATFM ICD which was endorsed by ACSICG and adopted by CNS SG/23 meeting in 2019. Subsequent to the ATFM/SG/10 meeting, the Secretariat conducted a further editorial review of the ICD, in consultation with the ATFM/SG/10 Chair and the AMNAC Technical Sub-group. The document was further amended to correct some errors and minor omissions. In view of the foregoing, the SG meeting adopted the following Conclusion: **Conclusion CNS SG/24/3(ACSICG/7-2 (ATFM/SG/10-3)) - Amendment of the AFTN/AMHS-based Interface Control Document (ICD) for ATFM**.

2.22. The AFTN/AMHS-based Interface Control Document (ICD) for ATFM is available on <http://www.icao.int/APAC/Pages/edocs.aspx>. It was informed to states by state letter reference number **T 8/9.1 - AP262/20 (CNS)** dated **28 December 2020**.

Draft CRV Operations Manual

2.23. New Zealand presented an update on the CRV Operations Manual after the ACSICG/7 meeting, as the outcome of the ACTION ITEM of the meeting. Since then, several ad hoc meetings have been held. The main focus has been on the Request Fulfillment Process and procedures as this provides the information and directions required to join, leave or make changes the CRV network. This has also led to the need to have a CRV landing page on the ICAO APAC and MID regional websites. This landing page will provide an overview of CRV and who to contact. An initial request will be sent to the APAC CRV Portal Administrator requesting to join, leave or add a new connection to CRV. Upon receipt of the request, a registration form is provided and check the content is completed. Once published, the CRV OG will manage changes to the Operations Manual and other CRV related documentation through the Document Administration Process and Procedure which is detailed in the Operations Manual.

2.24. With the abovementioned, the SG meeting adopted the **Conclusion CNS SG/24/4 - Publishing of the CRV Operations Manual** and endorsed the **Decision CNS SG/24/5 - CRV landing page on the ICAO APAC website**. The meeting appreciated contributions from Airways New Zealand to host web portal to hold updated CRV documentation, as well as Mr. Vaughan Hickford's continuous contribution in supporting regional CRV implementation issue and drafting this manual.

2.25. The SG meeting also noted the issues related to CRV operational support at a regional level, as more and more ANSPs, service providers and service consumers have been joining CRV, various services are being implemented over CRV. States/Administrations are encouraged to share their new ideas on this issue in future meetings. **ACTION ITEM 24-2**.

Updates on APAC Implementation of IWXXM Exchange over AMHS

2.26. The meeting noted that a majority of APAC States/Administrations had not yet reported full implementation of IWXXM format, in accordance with the standards in ICAO Annex 3, applicable from 5 November 2020. IWXXM exchange requires AMHS (with FTBP) and the use of unique AMHS addresses. The Regional OPMET Centres (ROCs) will be responsible for distribution of IWXXM formatted OPMET data in APAC. An online register of the status of IWXXM exchange capabilities in APAC Region will facilitate IWXXM exchange between capable ROCs.

2.27. The meeting requested the MET SG and CNS SG to enhance mutual coordination and sharing outcomes of related survey and seminar/workshop, and encouraged States/Administrations to expedite responding to the ICAO's survey as soon as possible before APANPIRG/31 meeting, and the contributory body of MET SG (Meteorological Information Exchange Working Group (MET/IE WG)) should work collaboratively with ACSICG for a way forward in APAC region.

Presentation of PCCW Network Based IWXXM Translation and Exchange Services

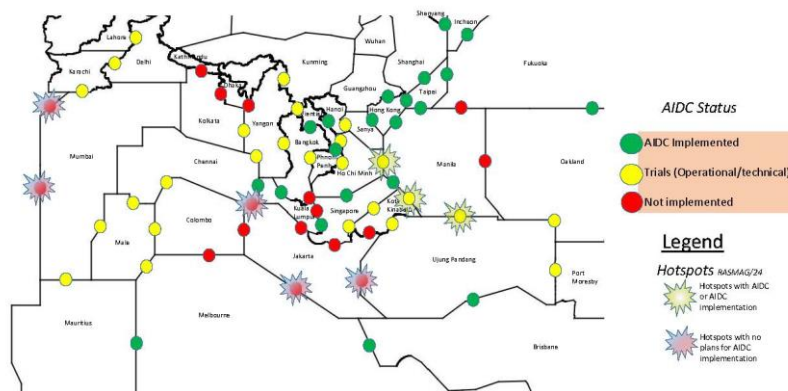
2.28. Fiji and PCCWG described PCCW IWXXM Translation and Exchange Services. They proposed that it could serve as an alternative solution for member States to fulfil the exchange of IWXXM messages.

Sixth Meeting of the Asia Pacific AIDC Task Force (APA TF/6)

2.29. The Sixth meeting of the ATS Inter-facility Data Communication Task Force (APA TF/6) noted that AIDC implementation in South China Sea sub-region had been satisfactory while further efforts by States in the Bay of Bengal sub-region are required. The summary of the new AIDC connections implemented since the APA TF/5 meeting is listed below:

- Automatic handling over based on OLDI ICD between Shenyang ACC and Khabarovsk ACC implemented in October 2019 over a dedicated line;
- AIDC operational implementation between Kuala Lumpur ACC and Chennai OCC came into effect on 1 April 2020;
- Operational AIDC between Singapore ACC and Kuala Lumpur ATCC with limited messages set was implemented on 1 November 2019;
- Operational AIDC between Bangkok ACC and Kuala Lumpur ATCC with limited messages set was implemented on 14 March 2020;
- Operational AIDC between Bangkok ACC and Vientiane ACC with 5 messages set was implemented on 14 July 2020;
- AIDC service between Manila ACC and Hong Kong ACC implemented on 23 May 2019;
- AIDC service between Manila ACC and Singapore ACC implemented on 1 November 2019; and
- AIDC service between Manila ACC and Taipei ACC implemented on 5 December 2019.

2.30. The meeting encouraged States/Administrations concerned to continue work bilaterally to expedite implementation of those planned AIDC connections as priorities identified by APANPIRG. The graphical map for quick and easy understanding of the regional AIDC implementation status is shown below.



APA AIDC Implementation Chart ver 2 (Jul 2020)

Collected AIDC Implementation Issues

2.31. The latest AIDC issues were presented to APA TF/6 meeting by Indonesia with support from India and Singapore. The meeting considered that the issue table would continue to serve as a reference for other States. A summary of the 89 issues identified is shown in the Table below:

Fault Categories	APA TF/6 (2020)		
	Issues Reported	Closed	Open
a. Communication Link	9	3	6
b. ATM System	50	20	30
c. AIDC Message	17	15	2
d. Airspace Design/Procedures	8	4	4
e. Other	5	2	3
Total	89	44	45

2.32. The meeting appreciated the great contribution of the APA TF since its establishment including the guidance material and promotion on implementation. The meeting also agreed that the understanding on AIDC implementation may differ from the regional perspective and State’s perspective, based on regional planning document or bilateral agreement between ATSUs. APA TF holds the view that the number of messages to be implemented in AIDC operation would be considered as far as practical. Regarding the AIDC/OLDI implementation between India and Oman, the meeting was informed that ATM automation system of Mumbai is capable to support AIDC and OLDI, inter-regional coordination between India and Oman may require escalation through ICAO APAC and MID Office.

Fourth Meeting of System Wide Information Management Task Force

Election of Co-Chair of the Task Force

2.33. Dr. Amornrat Jirattigalachote, Strategic Planning Manager (Engineering), Policy and Strategy Management Bureau of AEROTHAI, was elected as co-chair of the APAC SWIM Task Force.

Review SWIM Task Force Programme and outstanding action items

2.34. The meeting reviewed the development of SWIM TF's work plan and the updating of Action List with highlight on the restructure of the task assignment and numbering. The meeting adopted the revised task structure through **Decision SWIM TF/4/1 - Revised SWIM TF Task Group**.

An Approach for APAC Regional SWIM Implementation

2.35. Japan presented the research and practical results of previous Task 1.8 and the optional approaches of regional SWIM construction and implementations within transition period. The research work of this Task was carried out in coordination with the tasks of ASEAN SWIM Demonstration and SWIM Service and Application Validation. To overcome the limitations of CRV and avoid the unsupportable point-to-point connections between all stakeholders, the cooperation between CRV and SWIM service providers is required. As result of discussion, the meeting agreed to adopt a *CRV-based interoperable architecture* in which the CRV communication and SWIM communication are divided into different layers to assure the performance of CRV for conventional AFTN/AMHS applications and improve the flexibility required for regional SWIM implementation. It is required SWIM service providers to establish common agreements and creating a collaborative environment at the regional level to ensure information exchange between different systems.

2.36. The meeting further discussed the technical capabilities of SWIM TI required to achieve interoperability during the transition period, such as: 1) The SWIM TI will have two interfaces that enable the exchange of information with both CRV-based legacy systems and SWIM-enabled systems; 2) SWIM-enabled systems need to receive/send different AFTN/AMHS message types (MET, AIS, and ATS) from/to CRV-based legacy systems according to information domain requirements; 3) The SWIM TI is able to decouple CRV-based legacy and SWIM-enabled applications from external systems that implement different communication protocols.

SWIM Technical Overview Centered around CRV

2.37. PCCWG, the CRV provider selected through ICAO TCB process, presented a system architecture of SWIM service. It is a managed SWIM solution which can be deployed with the preference of each member States and is proposed to run on CRV network as value-added service. PCCW SWIM infrastructure could be one of the global/commercial EMS nodes to deliver SWIM services or qualified third party services. The deployment options include on premise deployment, network based as well as hybrid model. This enables flexibility to meet individual State requirement.

Extension Development of FIXM to Support National ATFM Operations and ATFM/A-CDM Integration in China

2.38. In order to implement data sharing among ATFM stakeholders, and facilitate a seamless and agile exchange of ATFM data, the development of FIXM has been started by ATMB of CAAC in 2019, based on FIXM APAC FLOW Extension version 1.0. Additional data attributes required to be exchanged among stakeholders involving in ATFM operations and to support the integration between ATFM and A-CDM were identified in FIXM ATMB ATFM Extension version 0.1.

SWIM Discovery Service (SDS): Introduction

2.39. United States (USA) and Republic of Korea (ROK) introduced the concept of a SWIM Discovery Service (SDS). The ability to search for and locate (discover) services offered by a growing number of independently developed and autonomously managed SWIM domains is highly important and is a precursor for achieving global information exchange. The Federal Aviation Administration (FAA) and Korea Airports Corporation (KAC) are collaborating in an effort to define and test an approach for enabling federated service discovery across geographical and organizational boundaries. The paper described SDS interaction patterns and discussed the contents of the Implementation Specification, including SDS behavior model, information model, resource model, interface

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requirements, and security requirements. The meeting noted that the SDS approach is consistent with the federated registry architecture adopted at SWIM TF/3, and encouraged participants to collaborate on SDS development.

Security and Trust in the Context of SWIM Service Discovery

2.40. USA and ROK provided a discussion of Security and Trust in the Context of SWIM Service Discovery. The joint FAA and KAC effort to establish a SDS development and testing environment has identified the need to address issues of security and trust that might occur when multiple independently operated discovery services exchange information. The paper illustrated some of these issues using an example scenario (an end user wants to “find all operational flight services”) that requires intercommunication among three different discovery services. It went on to explain that FAA and KAC are investigating using a federated identity management solution approach to secure the communication and showed how this approach could answer questions raised in the scenario. The paper also provided an overview of the latest relevant security technologies, and it discussed the proposed APAC Mutual Trust Infrastructure being developed as part of the Security Management subtask (Task 5) and its relationship to issues of trust between discovery services. The meeting recommended that issues identified in the paper be addressed by the TF Governance task and TF Security Management task, and encouraged participants to collaborate further on this subject.

SWIM Service Category Taxonomy

2.41. USA presented a SWIM Service Category Taxonomy designed for the purpose of organizing SWIM services into classes or categories to make the services easier to find or manage. The paper defined taxonomies as hierarchical classification schemes and described this particular scheme as a 3-level hierarchy with a top level “SWIM Service” classified into two categories, “Information Service” (services that provide information products) and “Core Service” (services that provide support capabilities). Each category has subcategories; e.g., “Weather Service” is a subcategory of Information Service, and “Security Service” is a subcategory of Core Service. The virtue of this taxonomy is that it can be extended horizontally by adding more categories to any level of the hierarchy, or vertically by further dividing a particular category into more specialized subcategories; in this way it is able to meet future business needs. Rendering the taxonomy into machine language (see <https://semantics.aero/service-category>) also allows it to support applications for service discovery or governance processing. The paper concluded by suggesting that the taxonomy be adopted as a standard approach for classifying SWIM services.

Implementation Status of SWIM Discovery Service (SDS)

2.42. USA and ROK provided information on the Implementation Status of the joint FAA/KAC SDS effort. In October 2019, (FAA) SWIM and KAC began a collaborative effort to establish a virtual environment for conducting transparent and replicable development of discovery services for future deployment by APAC SWIM initiatives. The paper presented a list of FAA/KAC work items together with the current status of each item. Completed items include: a service registry for ROK SWIM, a SDS Specification v.1.0.0 (<https://discovery.swim.aero/sds/1.0.0/>), a Service Description Model for JSON (SDM-J) (<https://discovery.swim.aero/sdm-j/1.0.0/>), and several SDS operations implemented. Remaining items include carrying out bi-directional testing of SDS operations and formally reporting the result of the joint effort to SWIM APAC TF/4.

FF-ICE/R1 Service Validation and Implementation

2.43. This WP was presented via a joint demonstration led by Japan, China and Republic of Korea. To implement FF-ICE/R1 operation, not only SWIM Technical Infrastructure for sharing information between different systems but also information services for supporting operation between different ATM applications are required. The FF-ICE services are expected to be highly automated and are expected to be performed through computer-to-computer links within a SWIM environment. This

demonstration validated the implementation of FF-ICE services and the process of related messages for FF-ICE/R1 operation through two scenarios by considering the FF-ICE/R1 capable ASPs and AUs (eASP and eAU). The demonstration shows that the SWIM-based FF-ICE operation is capable to provide related information in greater detail and allow the eAU and the eASP to share their expectations in an unambiguous manner via the exchange of trajectory information. Moreover, according to the scenario discussion and the test system development, some technical observations and recommendations are presented for improving regional SWIM and FF-ICE/R1 implementation.

SWIM in APAC Region: Where are we now and where are we going?

2.44. Japan recalled the main regional activities since the establishment of SWIM Task Force in 2017. Considering the important role and function of SWIM in Global Air Navigation Plan (Doc 9750) and the Global ATM Operation Concept (GATMOC), as well as the significant impact of COVID-19 on the aviation industry, it is essential to highlight more efficiency and a strengthened and shared strategy for implementing SWIM in the region with stakeholders.

Regional Coordination

2.45. IATA presented to the meeting about the SWIM related activities (and their interdependencies) in planning or development within other Working Groups (WGs) and Task Forces (TFs) at regional level since SWIM TF/3, for a broader coordination of SWIM activities in APAC (not solely MET) and improved awareness of the work of the SWIM Task Force.

Breakout Session Summaries

2.46. During the planning period of SWIM TF/4, the chair, Task Leads and secretariat team conducted a number of online discussions, therefore agreed to set up a breakout session for SWIM TF/4 to facilitate the Task Leads and contributors to meet and update their assignment respectively with efficiency and effectiveness. Three online breakout meeting rooms were provided to accommodate tasks' discussion. The outcome of breakout session was reported by to the plenary by various Task Leads.

Update on APAC SWIM Implementation Materials

2.47. The outbreak of COVID-19 pandemic projected unprecedented impact on aviation industry and also changed the original plan and available resource of this task. Considering the significant change of task force programme after SWIM TF/3, and the progress of DOC 10039 Vol II, the meeting agreed to suspend ACTION ITEM SWIMTF/3/2 for some time and reactivate it upon further updates during the future Task Lead meetings or SWIM TF/5, and the meeting encouraged the participants and concerned parties to provide and share SWIM related video, training material and other useful information to SWIM TF and secretariat for future compilation.

Generation and Life Cycle Management of GUFIs and Related Issues

2.48. China implemented the wide-area surveillance network function verification system which was fed with various data sources including AFS message system, satellite/ground-based ADS-B system, surveillance radar system, ACARS, etc. The system provides multi-category data services for airlines, airports, ATC units, administration, GADSS-related organizations and other data users. GUFIs (Globally Unique Flight Identifiers) are used in flight data management in the system, which are usually generated in the flight planning stage by the simulated ATM role and participate in the subsequent data exchange, and they are managed in the entire life cycle of a flight, so as to realize the persistent storage of FIXM format flight data in the system.

2.49. The paper briefed the GUFIs' textual representation, encoding rules, and the accessing of various flight-related data, part of which is generated in real time, while others are generated after the flight. At each flight data access point, a GUFIs management component is set up. Some identified issues

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to be addressed were also discussed in the paper, such as the method to exchange data between systems in different countries/regions, difficulty to uniformly generate GUF1 on a global scale, and GUF1 use to exchange flight data in the transition environment.

The Status of SWIM R&D in the Republic of Korea

2.50. The Republic of Korea has been conducting SWIM R&D following the ICAO Global Air Navigation Plan (GANP) and Korea's National ATM Reformation and Enhancement Plan (NARAE) since 2016. Korea Airports Corporation (KAC) is in charge of SWIM R&D and its purpose is to implement SWIM testbed and lay the foundation for the transition to a SWIM environment.

Report on SWIM in Australia

2.51. Australia summarised the activities and plans for the design and implementation of SWIM services in Australia. SWIM architecture and planning activities have been carried out by Airservices Australia (ASA) and the Australian Bureau of the Meteorology (BOM) over the past 18 months. A number of proposals for the APAC SWIM community were formulated.

New IWXXM design to better support SWIM

2.52. Hong Kong China, being one of the members of the Task Team on Aviation Data (TT-Av Data) of World Meteorological Organization (WMO), presented the latest update on the development of a new IWXXM design being studied by WMO TT-Av Data for future versions of IWXXM. The new IWXXM design would introduce "Weather Object" to better facilitate retrieval and consolidation of individual meteorological element through SWIM information services.

The Status of Shared Information Quality Management in China

2.53. The paper presented the exploration and practice of Civil Aviation Administration of China (CAAC) for establishing information quality management system based on SWIM concept. As the number of participants and information shared for operation coordination are increasing rapidly, it is necessary to clarify the accountabilities, standardize the procedures and enhance the platform functions for information quality management.

SWIM in ASEAN Demonstration Report

2.54. Singapore and Thailand presented the SWIM in ASEAN Demonstration Report. SWIM in ASEAN Demonstration was successfully conducted on the 12 and 15 of November 2019, in Bangkok, Thailand and Singapore, respectively to demonstrate the principles of SWIM, show the potential operational benefits of SWIM and to demonstrate a model of SWIM implementation for ASEAN and Asia/Pacific Region. It got a wide participation of aviation stakeholders including CAAs, ANSPs, airport operators, airlines, and international organizations such as ICAO APAC, and IATA.

2.55. The Report covered details of the demonstration development, including operational scenario development, SWIM infrastructure, information services, and SWIM-enabled applications design, development, and test, and observations and lessons learnt. Various operational scenarios were conducted. Global Enterprise Messaging Services (GEMS) was selected as the architecture to support the demonstration. To ensure that messages would be routed correctly and in the most efficient manner possible, AMQP version 1.0 was chosen to be the standard protocol for the Demonstration. It was concluded that the existing standardized information exchange models, namely AIXM, FIXM, and IWXXM could be utilized for the exchange of aeronautical information, flight information, and weather information, respectively. The specific version of information exchange models, i.e. AIXM version 5.1, FIXM version 4.1, and IWXXM version 2.0, were selected. It was found that to address the specific needs, extensions to the core of the existing information exchange models are viable and effective solution. Additionally, mediation is a key to bring diverse stakeholders on board and to enable the early

leveraging of seamless information sharing. Clearly defined operational use cases and processes are crucial to and prerequisite for SWIM development and implementation. SWIM ASEAN Demonstration Report was provided in Appendix I to CNS SG/24 meeting report.

2.56. The meeting congratulated Thailand and Singapore in leading this SWIM Demonstration, and highly recognized its contribution to the regional SWIM implementation. The meeting also encouraged SWIM TF to make better benefits from the cross cutting coordination with other contributory bodies of APANPIRG, in particular with CRV and ATFM, to further enhance the connection with infrastructure and the users.

ENRI Forum on SWIM

2.57. The Electronic Navigation Research Institute (ENRI) in Japan hosted a virtual seminar on SWIM in January 2021. Presentations included:

- SWIM in Japan – Towards the next stage of CARATS (JCAB)
- FAA SWIM activities: Implementation of Future Research (US FAA)
- SWIM – An Airline Perspective (IATA)
- A Regional Picture on SWIM Related Activities (ICAO RO)
- SWIM Research & Development in ENRI (ENRI)

Fifth Meeting of the Surveillance Implementation Coordination Group (SURICG/5)

Collaboration in Sharing of Surveillance Data in SWIM

2.58. Following the **Conclusion CNS SG/23/10 (SURICG/4/1) - ADS-B and Flow Management**, it was agreed there is a need to share surveillance data to provide surveillance from “departure to destination”. Singapore proposed solutions for sharing of surveillance data using SWIM/CRV and PCCW Global, the selected CRV service provider through ICAO TCB process, presented their capability to provide a hosted platform over SWIM/CRV for sharing of surveillance data.

2.59. Singapore proposed a multidisciplinary study group be established, to be led by SURICG, including experts from surveillance, SWIM and ATFM and it was intended that they inform this meeting of further details. General availability to all ANSPs, contributing or not, to the shared surveillance data is recommended to realize benefits such as more rapid expansion of CRV community and the launch of SWIM services. With the concern of sensitivity of surveillance data, the ownership and accountability of correctness on surveillance data, contributing ANSPs need to consider what surveillance data to be shared and associated commitment to high availability, system redundancy and coverage of surveillance data to be shared.

2.60. The meeting noted the Draft Decision SURICG/5/1 for *Establishment of Study Group under SURICG on Sharing of Surveillance Data in SWIM* as well as the relevant outcome from SWIM TF/4, and an ad hoc group led by Hong Kong China had prepared a draft ToR for the proposed Study Group for further consideration by CNS SG. After deliberation, the meeting discussed the draft ToR through **Flimsy/06**, and deferred to the Study Group to fine-tune its TOR and decided its time schedule and deliverables for updating to SURICG. SWIM TF/4 agreed to a study group to further explore an initiative for a Surveillance Central Data Processor (SCDP), a possible Commercial-ANSP collaboration, and to study the data sharing model at EUROCONTROL’S Network Manager as a possible reference model for surveillance data sharing in APAC. The study group was named as Surveillance data study group (SURSG) and established through Decision CNS SG/24/16 (SURICG/5/1). The *First meeting of surveillance data study group (SURSG/1)* was held from 20– 22 April 2021. SURSG/1 meeting report, working papers, information papers, and other resources can be accessed by following link: <https://www.icao.int/APAC/Meetings/Pages/2021-SURSG-1.aspx>.

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First Meeting of the Surveillance Study Group (SURSG/1)*Election of Chair*

2.61. Mr. Vincent Wong, Acting Chief Electronics Engineer of the Air Traffic Engineering Services Division of the Hong Kong Civil Aviation Department (HKCAD), was elected as the chair of the surveillance study group (SURSG).

Surveillance Exchange Model Framework- Hong Kong, China

2.62. Hong Kong, China presented some key considerations leading to a proposal of ANSP's collaboration scheme in sharing and enriching surveillance coverage for the region to benefit the aviation community. The sharing of surveillance data is expected to benefit the aviation industry in the APAC region given a more comprehensive and much wider map of surveillance coverage in the region. The paper explored ANSP's surveillance data sharing collaborative approach to expand surveillance coverage.

Proposed Solutions for Sharing of Surveillance Data- Singapore

2.63. Singapore proposed solutions for States to share surveillance data and listed the pros and cons of the solutions. It was discussed that there are three models, namely distributed solution, central database, and hybrid model, which can potentially be used for the implementation of the data sharing. Detailed description, advantages, and disadvantages of each model were described. It was further informed that there might be some interested parties, who are not subscribers to CRV or without SWIM capabilities, but are keen to share their surveillance data with other States. Adjustment to the models will be required to accommodate these parties. One possible solution could be for these parties to connect directly to one or more of the centralized service data providers, if available.

Distribution of Surveillance Data to PNG via CRV- ICCAIA&PNG

2.64. ICCAIA (Aireon) and Papua New Guinea jointly presented the status of Space based ADS-B data distribution using CRV. It was informed that NiuSky Pacific Limited has designed and is in the final stages of implementing a countrywide CNS/ATM modernisation program in PNG. In 2020, the CRV Operations Group authorised Aireon to connect and contract with the CRV provider. The contract has been signed by Aireon and NiuSky Pacific Limited. Aireon has established the first of two connections to CRV while NuiSky Pacific Limited implemented and tested the initial CRV connections. Space based ADS-B data can now be delivered to other Aireon customers in Asia Pacific via CRV, potentially without need for any additional communication link or telecommunications costs. The meeting noted the implementation of Space-Based ADS-B system in PNG and in particular, that Space based ADS-B is now operational and one path is already using CRV.

Surveillance Data Sharing Platform- PCCW Global

2.65. PCCW Global described the system architecture of PCCW SWIM service and its progresses to build its Surveillance data-sharing platform with EMS and Service Registry. It was informed that PCCW Global aimed at expanding the network by offering value-added services on top of the advanced aeronautical network. These services cover the provision of critical information through the globally interoperable System Wide Information Management (SWIM) infrastructure, interfaces and exchange models. By combining PCCW Global network infrastructure and hosting facilities with Frequentis, State ANSPs will be able to benefit from SWIM initiatives without the high investment costs and development expenses of traditional systems. The meeting was informed that PCCW Global is working with Frequentis Comsoft to host their SDDS-NG (Surveillance Data Distribution System – Next Generation) in PCCW SWIM for qualified States/Administrations/Stakeholders to publish or subscribe surveillance data by following the guidelines of the CRV OG & SWIM TF.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) review the outcome of the APANPIRG/31 and take any necessary follow-up actions; and
- b) discuss any relevant matters as appropriate.
