International Civil Aviation Organization

Third Meeting of the Surveillance Study Group (SURSG/3)

(Hong Kong China, 22– 24 March 2023)

Agenda Item 2: Review of outcome of relevant meetings

REVIEW OF RELEVANT MEETINGS

(Presented by the Secretariat)

SUMMARY

The paper presents the relevant outcomes of the meetings held in the year 2022 including the thirty third Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/33), the twenty sixth meeting of Communication, Navigation, and Surveillance Sub Group (CNS SG/26), actions on the works accomplished by the Second Meeting of the Surveillance Study Group (SURSG/2), the Sixth Meeting of the APAC SWIM Task Force (SWIM TF/6) and the Seventh Meeting of the Surveillance Implementation Coordination Group (SURICG/7).

1. INTRODUCTION

1.1 The Thirty-third Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/33) was hosted by Indonesia at the Trans Resort Bali in Bali, Indonesia *from 22 to 24 November 2022* as a hybrid event (in-person and virtual participation). The Meeting was attended by **326** participants from **30** Member States, **2** Special Administrative Regions of China, and **7** International Organizations (ACI, CANSO, IATA, ICAO, IFALPA, IFATSEA and PASO). The APANPIRG/33 meeting report, working papers, information papers, and other resources can be accessed by following link:

https://www.icao.int/APAC/Meetings/Pages/2022-APANPIRG33.aspx

1.2 The Twenty Sixth Meeting of the Communications, Navigation and Surveillance Sub-group (**CNS SG/26**) of APANPIRG was held *from 5 to 9 September 2022* via Video Tele-Conference (VTC) using Microsoft Teams. The meeting was attended by **247** participants from **26** States/Administrations, and **4** International Organizations, including 21 participants from industry partners. The CNS SG/26 meeting report, working papers, information papers, and other resources can be accessed by following link:

https://www.icao.int/APAC/Meetings/Pages/2022-CNS-SG-26.aspx.

1.3 The Sixth Meeting of the APAC SWIM Task Force (SWIM TF/6) was held from *17 – 20 May 2022* via Video Tele-Conferencing (VTC). The meeting was attended by **213** participants from **18** States/Administrations, **5** International Organizations and **1** service provider. The papers and report of SWIM TF/6 meeting are available at:

https://www.icao.int/APAC/Meetings/Pages/2022-SWIM-TF6.aspx.

1.4 The Seventh Meeting of the Surveillance Implementation Coordination Group (SURICG/7) was held *from 24 to 27 May 2022* via video teleconference. The meeting was attended by **117** participants from **21** States/Administrations, **4** International Organizations and **2** service providers from industry. The meeting report, working papers, information papers and other resources can be accessed at

https://www.icao.int/APAC/Meetings/Pages/2022-SURICG-7.aspx.

1.5 The Second Meeting of the Surveillance Study Group (SURSG/2) was held via Video Tele-Conference (VTC) from *15 to 17 March 2022*. The Meeting was attended by **97** participants from **16** States/Administration and **2** International Organizations and **1** industry partner. The meeting report, working papers, information papers, and other resources can be accessed by following link:

https://www.icao.int/APAC/Meetings/Pages/2022-SURSG2.aspx

1.6 The APANPIRG/33 meeting reviewed the outcomes of the CNS SG/26, 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 the following actions on the report of CNS SG/26 meeting and other papers presented under Agenda Item 3.4.

1.7 This paper summarized relevant information and updates from CNS SG/26 and APANPIRG/33 with the highlight on the reviewed outcomes of SURSG/2, SWIM TF/6, and SURICG/7 meetings, and relevant discussions of other meetings of CNS SG/26.

2. DISCUSSION

The actions taken by APANPIRG/33 meeting on CNS related matters are highlighted below:

2.1 The CNS SG/26 meeting adopted following **5** Conclusions and **2** Decisions:

Reference		Subject
Conclusion CNS SG/26/03 *(ACSICG/09/04)*	-	Revised AFTN/ATSMHS Routing Directory
Decision CNS SG/26/04 *(SWIM TF/06/01))*	-	The Use of the Internet for MET Information Services in Regional SWIM architecture
Decision CNS SG/26/07 (*SWIM TF/06/06)*	-	Revised SWIM TF Terms of Reference
Conclusion CNS/SG/26/09	-	Update of Flight Inspection Guidance Material (FIGM)
Conclusion CNS SG/26/10 *(SURICG/7/1 (DAPs WG/5/1))*	-	Mode S DAPs IGD 4.0
Conclusion CNS SG/26/12 (*SURICG/7/4)*	-	Revised ADS-B Implementation and Operations Guidance Document (AIGD)
Conclusion CNS SG/26/13 *(ATMAS TF/3/1)*	-	ATMAS IGD Edition 1.0

2.2 The contents of above Conclusions/Decisions adopted by the CNS SG/26 are provided in the **Attachment A** to this paper.

2.3 Based on the outcome of discussions on various agenda items, the CNS SG/26 meeting developed **5** Draft Conclusions and **1** Draft Decision for consideration by APANPIRG/33 Meeting, which were further adopted by APANPIRG/33. The Conclusions/Decisions adopted by APANPIRG/33 are as follows:

Reference		Subject
Conclusion APANPIRG/33/6 *(CNS SG/26/01 (ACSICG/09/01 (CRV OG/09/01)))*	-	Revised Amendment of the Management Service Agreement for CRV project (RAS14801)
Conclusion APANPIRG/33/7 *(CNS SG/26/02 (ACSICG/09/02 (CRV OG/10/01)))*	-	Extension of CRV Contract for one year.
Decision APANPIRG/33/8 *(CNS SG/26/05 (SWIM TF/06/03))*	-	Harmonization of Timelines for SWIM-related Initiatives
Conclusion APANPIRG/33/9 *(CNS SG/26/06 (SWIM TF/06/02, SWIM TF/06/04))*	-	The Asia-Pacific SWIM Implementation Timeframe and inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan
Conclusion APANPIRG/33/10 *(CNS SG/26/08 (SRWG/6/2))*	-	Planning Principle for Aeronautical Frequency Bands of 108-117.975 MHz, 960-1215 MHz and 117.975-137 MHz
Conclusion APANPIRG/33/11 *(CNS SG/26/11 (SURICG/7/3))*	-	Revised Surveillance Strategy for the APAC Region

2.4 All APANPIRG/33 Conclusions related to CNS are provided in **Attachment B** to this paper.

The Seventh Meeting of the Surveillance Implementation Coordination Group (SURICG/7) and The Second Meeting of the Surveillance Study Group (SURSG/2)

Review Report of the Fifth Meeting of the Mode S Downlink Aircraft Parameters Working Group (Mode S DAPs WG/5)

APAC Regional Workshop on Mode S Implementation

2.5 The Workshop organized in conjunction with the Mode S DAPs WG/5 discussed various topics under Mode S operations flight inspection to a Mode S Radar, and the introduction of APAC's proposed modifications to Appendices H and J of Doc 9924 to facilitate the implementation of Mode S.

Update on Interregional IC Coordination

2.6 The paper summarized the latest updates about the procedures on SSR IC code interregional coordination from a virtual meeting organized within ICAO on 20 January 2022 to review and understand procedures established for SSR IC code assignment and Inter-regional coordination

mechanism.

Guidance Material for Assignment of Interrogator Codes (IC) for MLAT and ADS-B

2.7 The SURICG/7 meeting was recalled that during Mode S DAPs WG/2 in 2019, it was discussed whether interrogators that come with ADS-B need to be assigned with a distinct IC. SURICG/7 noted current practices suggested that II=0 can be used. However, the existing provisions in ICAO documents are not clear to the reader and can be confusing. The Surveillance Panel Aeronautical Surveillance Working Group is working on revising the text in the SARPs and guidance material. The paper provided the updates on the proposed amendments to Annex 10 Vol IV and ICAO Doc 9924 Appendix M which have been endorsed by the Technical Sub-group in Feb 2022. It was further discussed at the Aeronautical Surveillance Working Group in Apr 2022 and subsequent meetings before its formal adoption.

A GPS Interference Identification Method based on ADS-B Data

2.8 China introduced a GPS interference source identification and screening method in civil aviation operations. Using the changes of aircraft ADS-B report data, combined with the change rule of historical data when GPS was interfered and the principle of satellite navigation signal, this paper presented the construction of an index of GPS interference, which can check and locate interference area and time sensitively.

Roadmap on Mode S Implementation for APAC Region

2.9 The ICAO Secretariat summarised the history of the Roadmap on Mode S implementation for APAC Region and proposed the future work on it. The Roadmap was adopted by the Conclusion **APANPIRG/32/10 (CNS SG/25/09) -** *The APAC Regional Roadmap for Mode S Implementation* and circulated through the State Letter ref: T 8/5.11-AP200/21 (CNS), Subject: Mode S Implementation in APAC Region, dated 22 December 2021. Mode S DAPs WG/5 was informed that the Roadmap is a regional planning reference to provide certainty to stakeholders in the near term, while as a living document which is subject to change with the revision of APAC Surveillance Strategy and the new relevant outcome from Assembly 41st Session.

Updates to the Mode S DAPs Implementation and Operations Guidance Document

2.10 The Mode S DAPs WG/5 updated to the Mode S DAPs Implementation and Operations Guidance Document to include ADS-B DAPs and their benefits, which covered ADS-B DAPs data and the differences between Mode S SSR DAPs and ADS-B DAPs, the mandate of implementing ADS-B DAPs, the Mode S extended squitter transponder capability to broadcast ADS-B DAPs, and the application of ADS-B DAPs in the ATM automation system. After review, CNS SG/26 endorsed the **Conclusion CNS SG/26/10** *(SURICG/7/1 (DAPs WG/5/1)) - Mode S DAPs IGD 4.0***,** which is available at ICAO e-document portal.

Review of Terms of Reference

2.11 SURICG/7 reviewed and deliberated the proposal from Mode S DAPs Working Group to rename the Group and updated its Terms of Reference (ToR). SURICG/7 renamed the Group as "Mode S and DAPs Working Group", and endorsed the **Decision SURICG/7/2 -** *Revised ToR of the Mode S and DAPs Working Group*. The updated ToR is provided in **Appendix A** of this paper.

Review Report of the Second Meeting of the Surveillance Study Group (SURSG/2)

Surveillance Study Group: Progress Report, Recommendations in Study Report on

surveillance sharing, and moving forward

2.12 SURSG/2 provided a progress summary of SURSG tasks since SURSG/1, listed out major recommendations in the Study Report, and proposed way forwards for the recommendations. The details of revised high-level recommendation and moving forward agreed by SURSG/2 was shared.

2.13 SURSG/2 deliberated the necessity for establishment of the Surveillance Sharing in SWIM Trial Implementation Group (S3TIG) to oversee a trial proposed by the recommendation. China, Hong Kong China, IATA, Singapore, and Thailand seconded the proposal, with PCCWG also indicated its interest in participating in the trial. SURICG/7 discussed the proposal for establishment of S3TIG and suggested that it would be more effective to form S3TIG as an ad-hoc group within SURSG in lieu of a contributory body under SURSG.

2.14 In SURSG/2, while reviewing the proposed recommendation, Singapore shared the concern about the expectations from the specification related to System Reliability for Tier 1 and System Availability for Tier 2, which was seconded by Australia. SURSG/2 was informed that the specifications were adopted from the thirteenth edition of ADS-B Implementation and Operations Guidance Document (AIGD v13.0). The requirements may be modified in the future based on the trial outcomes.

2.15 In SURICG/7, Hong Kong China clarified the reasons for the difference between the adopted values of service level of shared data for Tiers 1 and 2 in the SURSG outcome and those specified in the AIGD, and suggested a need to align the SURSG outcome as described in **Table 1 – High-Level Recommendations from Study Report** with the definitions of Appendix 6 of AIGD. After deliberation, Hong Kong China agreed to take up an action to discuss with the Chair of SURSG to align the SURSG outcome with AIGD thus ensuring no misunderstanding and the specified performance requirements are suitable for the targeted services.

2.16 In response to the abovementioned action item, the Study Report was updated to align with the definitions of Appendix 6 of AIGD. The revised study report is uploaded on ICAO APAC e-document webpage.

Surveillance Data Sharing Proof of Concept

2.17 SURSG/2 discussed the Surveillance Data Sharing Proof of Concept (POC) conducted by HKCAD, PCCWG and Frequentis ComSoft. PCCWG shared the outcomes of a POC conducted on 4 March 2022 to demonstrate sharing ADS-B data in a simulated SWIM over CRV environment and the benefits of a Surveillance Central Data Processor (SCDP). PCCWG shared a video to introduce the POC exercise which was presented in SURICG/7.

Implementation of FF-ICE Interoperability using GUFI in SWIM

2.18 ROK presented its efforts to Implement FF-ICE Interoperability using Globally Unique Flight Identifier (GUFI) in SWIM Environment. The SURSG/2 meeting noted that by introduction of GUFI to the surveillance data, it will not only solved mismatch problems on co-relation between FPL and surveillance data by Call sign, DoF, departure/arrival aerodrome, but also made the co-relation become simple and reliable. Additionally, ROK shared the detailed method of introducing the GUFI in the surveillance information domain.

Review of Regional Requirements for Surveillance in APAC e-ANP and Seamless ANS Plan

2.19 The ICAO Secretariat reviewed and consolidated the Regional surveillance requirements specified in the APAC Regional e-ANP and the Seamless ANS Plan (Version 3.0, November 2019). States were encouraged to review TABLE CNS II-APAC-3 SURVEILLANCE in the Specific Regional Requirements in e-ANP Volume II, and provide update to ICAO APAC Regional

Office as necessary through the PfA Process mentioned in the paper.

1090MHz Occupancy Monitoring

2.20 Singapore and ICCAIA discussed in this paper the need to measure 1090MHz channel occupancy at flight levels as well as at ground level, and proposed some congestion mitigations. The paper suggested that congestion seen by receivers depends on coverage volume. Various methodologies to avoid/reduce channel congestion at 1090Mhz were discussed and provided in the paper. States were encouraged to 1090 MHz channel occupancy monitoring at operating Flight levels and at ground level, and to always seek to minimise 1090MHz channel occupancy commensurate with their operational needs and environment.

The Sharing of the Software Resource for Benchmarking Radars

2.21 To address the need to access the radar performance among APAC ANSPs for maintenance and evaluation purposes, this paper proposed that each Member State to share the relevant radar analysis software for the radar benchmark. ROK introduced their radar analysis software "Astecat" developed by Incheon International Airport as one of the cost-free software tools for benchmarking radar performance that is openly shared for APAC States to use with no warranty and minimum maintenance support. The paper introduced the details of benchmarking of their surveillance systems, and their use of software in evaluating SI operation tests in Incheon International Airport. ROK was invited to provide their point of contact to ICAO on sharing their software.

ADS-B Equipage and Quality Performance in the U.S.

2.22 FAA provided a summary of observed NIC/NACp performance compared to the requirements of the USA ADS-B mandate, as well as ADS-B equipage trends in the USA. The paper demonstrated how the performance benchmarking from airlines fleet were performed. FAA added that FAA's ADS-B Performance Monitor (APM) has capabilities for tracking ADS-B equipage trends. The paper further provided the FAA ADS-B coverage map at FL350, which extends somewhat beyond the airspace of U.S. ADS-B mandate.

Recent ADS-B Avionics Issues Observed in the United States

2.23 FAA described two recent ADS-B avionics issues observed in the USA with DO-260B/ED-102A systems, namely Embraer 17x track jumping and Honeywell Primus II RCZ. FAA informed that it monitors all ADS-B Version 2 information received in all airspace covered by FAA-contracted ADS-B ground stations via the tool ADS-B Performance Monitor (APM). In addition, FAA Flight Standards personnel have begun a campaign to reach out to aircraft owners, operators, and certificate holders that operate this equipment to inform them of the Service Bulletin available to correct the issue.

Study on Application Optimization and Improvement of ADS-B technology for CAAC Air Traffic Control

2.24 China introduced the outcomes of the ADS-B application study carried out by ATMB CAAC between 2020 and 2021, which stemmed from issues that affected the quality of ATC surveillance for the National ADS-B Project. This study was dedicated to standardising the construction and operation of ADS-B ground equipment in China, making them in better accordance with the needs of ADS-B operation in China.

ADS-B IN Retrofit Spacing (AIRS) Evaluation Project

2.25 United States presented the updates to the ADS-B In Retrofit Spacing (AIRS) evaluation project after the introduction in SURICG/6 IP/08, a large-scale operational evaluation of two ADS-B In

applications since September 2017, namely Cockpit Display of Traffic Information (CDTI)-Assisted Visual Separation (CAVS) and Interval Management (IM). It was informed that the project aimed to promote early adoption of ADS-B In applications and benefits data will be gathered for one year after operation commenced.

Update on Air Traffic Control Surveillance Activities in Australia

2.26 Australia presented updates on their ATC surveillance activities including new radars, sharing of surveillance data via IP based network, the upgrading of Sydney's ground display system with A-SMGCS integrated into the tower automation system, and replacement of ADS-B installations. Australia informed about a trial ground surface movement situational awareness system and a work on low-cost ADS-B avionics for VFR and added that future joint Civilian/Military Australia wide ATM system will provide a "Multi Sensor" surveillance tracking function. Australia is in the implementation phase of an Integrated Drone Surveillance System (IDSS) Trial.

Update on Surveillance Activities in New Zealand

2.27 New Zealand presented an overview of their current and planned surveillance activities on MSSRs, PSRs, Multilateration/WAM and ADS-B. ADS-B will be mandated for use within all controlled airspace in NZZC FIR by Dec 31, 2022. Their work on migrating data from surveillance systems to IP-based network over the last few years, and their use of UAS Traffic Management (UTM) system "Airshare" were discussed. The paper also shared their new Air Traffic Management system "SkyX" to be operational in Q1 2023, and a joint project between Australia and New Zealand for the introduction of a Satellite-based augmentation system called the Southern Positioning Augmentation Network (SouthPAN) to improve GNSS accuracy.

The Update Activity of ATC Surveillance in China

2.28 China introduced their current status of civil ATC surveillance system and latest development, including Mode S radars, A-SMGCS, SMRs, MLAT and ADS-B ground stations, with local, regional and national data processing centres as their hierarchal processing infrastructure. CAAC actively carries out research on Mode S DAPs, and launched surveys on II conflict and II/SI mix operation capabilities for the APAC Region, launched Mode S Clustering trials in China, and conduct Surveillance Coordination Network (SCN) trials. The paper also presented the Development Plan for CNS approved by CAAC in 2021.

Evaluation of Space Based ADS-B

2.29 ICCAIA introduced that the space-based ADS-B provider, Aireon, has developed the capability to demonstrate and test the integration of Space based ADS-B into customer ATC automation systems. The paper also shared the experience and the way forward to arrange such evaluation.

ICAO Surveillance Panel Activities

2.30 Chair of the ICAO Surveillance Panel updated SURICG/7 about the information and discussions from the Fourth Meeting of the Surveillance Panel (SP/4) held on 28 March – 8 April 2022, including the two working groups of SP, i.e. the Fifteenth Meeting of Aeronautical Surveillance Working Group (SP-ASWG/15) and the Thirteenth Meeting of Airborne Surveillance Working Group (SP-AIRBWG/13). The paper also revealed the plan for SP/5 to be held in September 2023.

Review APAC Regional Surveillance Strategy

2.31 The ICAO Secretariat presented the last version of the Surveillance Strategy for the APAC Region adopted in 2019 for SURICG/7 review. The SURICG/7 reviewed and revised the Strategy, which was endorsed by CNS SG/26. APANPIRG/33 adopted the **Conclusion**

APANPIRG/33/11 *(CNS SG/26/11 (SURICG/7/3))* **-** *Revised Surveillance Strategy for the APAC Region* provided in **Appendix B** to this paper.

Positive Effect of CPR Reasonableness Test on ADS-B Security

2.32 In SURICG/7, Japan presented test for Compact Position Reporting (CPR) for improving ADS-B security via numerical simulation, and reducing false information that is intentionally transmitted. In Mode S DAPs WG/5, China presented the technique called reasonableness test for CPR Decoding, originally written in RTCA-DO260B. Electronic Navigation Research Institute (ENRI)thus conducted a numerical simulation using this technique with the procedure, parameters and detailed results provided in the paper.

Revision of Updates to AIGD

2.33 Hong Kong China led the incorporation of materials to update AIGD during the SURICG/7 meeting with the methodologies to measure 1090MHz congestions and mitigating measures raised by Singapore and ICCAIA, and the CPR Reasonableness Test by Japan. SURICG/7 formulated the Draft Conclusion, which was reviewed and adopted by CNS SG/26 as **Conclusion CNS SG/26/12 (SURICG/7/4) - Revised ADS-B Implementation and Operations Guidance Document (AIGD).** The revised AIGD is available at ICAO APAC e-document portal.

Progress on Data Sharing Projects among States

2.34 SURICG/7 reviewed the updated table on ADS-B Data Sharing Implementation Status which States and Administrations provided their updates during the ad-hoc working group sessions. The updated table is provided in **Appendix C** of this paper.

Research on ADS-B Position Verification

2.35 Japan summarized the outcome of the research on ADS-B position verification obtained in ENRI. The purpose of position verification was to detect false positions which may be caused by illegal transmissions or avionics failures. Co-chair of SURICG stated that the materials provided by Japan are informative and it was agreed in SURICG/7 meeting to incorporate them into the AIGD Ver. 15.0 as adopted in CNS SG/26, and CNS SG Chair encouraged the Region for more sharing from research and experiences to enable more members States could broaden the horizon in resolving issues observed.

Inconsistent ICAO Aircraft Address and Target Identification between Surveillance Data and Flight Plan

2.36 Hong Kong China updated on the observed discrepancies and contributing factors of ICAO Aircraft Address and Target Identification between surveillance data and flight plans for some aircraft flying within the Hong Kong Flight Information Region (HKFIR). Detailed analysis of the causal factors contributing to “Aircraft Address” (AD) / “Target Identification” (ID) discrepancies were provided in the paper and discussed in the meeting. CNS SG Chair highlighted that this could lead to concern on additional workload to ATC thus potential safety hazard to ATC operations, and the issue presented in this paper would still require further effort in the Region considering recovery in air traffic. As such, the Secretariat invited Hong Kong China and IATA to support ICAO APAC Regional Office to organize a webinar/workshop on this topic in 2023 to promote awareness of this issue and the best practice in mitigation as an action item.

Sixth Meeting of System Wide Information Management Task Force (SWIM TF/6)

Implications of the Revised Terms of Reference as a result of the CNS SG/25 Decision

2.37 SWIM TF/6 noted the impact and implications of the change in the Terms of Reference (ToR) of the SWIM Task Force as a result of the decision by the CNS SG/25 meeting. The SWIM TF/6 meeting was informed that with revised ToR, the work of the APAC SWIM Task Force has been increased significantly. The SWIM TF will need to deliberate the impact of these changes on ongoing work. The SWIM TF/6 meeting was invited to review the current deliverables, how to deliver on the items stated in the new ToR, and consider how the task groups should be structured to produce the required deliverables.

Aviation Support Service Providers Joining CRV

2.38 PCCW introduced PCCWG Console Connect Aviation Platform for non-ANSP users to exchange SWIM data with CRV members. PCCWG informed that in order to provide an easy, managed, flexible and scalable mechanism for non-ANSP users to exchange SWIM data with CRV users, PCCW Global planned to extend its EMS node with its own developed software defined interconnection platform - Console Connect for Aviation and purposed built SWIM as Service Platform. The SWIM TF/6 meeting discussed the certification standard and ability to support MET data of the PCCW Console Connect Aviation Platform, and was informed that the platform is in concept stage. The SWIM TF/6 meeting agreed that there is the need to deliberate in CRV OG the security impact of mixed operational environment, i.e. connecting more SWIM technical infrastructure service providers and users using internet/other network based services with CRV through a gateway.

Consideration of SWIM Architecture for Efficient Provision of MET Information Services - MET SG nominated experts

2.39 With the operational needs of efficient MET information service provision, the Use of the Internet for MET Information Services in Regional SWIM architecture was endorsed as *Decision CNS SG/26/04 (SWIM TF/06/01)* to include the use of Internet for meteorological information services in designing the regional SWIM architecture. The SWIM TF/6 meeting also discussed the need of participation of MET experts in SWIM TF and requested Member States to nominate MET experts to contribute and participate in various tasks of SWIM TF. The Meeting also noted that the revised SWIM TF ToR was adopted by CNS SG via *Decision CNS SG/26/07.*

The Asia-Pacific SWIM Implementation Timeline

2.40 China, Japan, Singapore, and Thailand presented a proposal for a target timeframe for SWIM implementation in the Asia-Pacific Region. Considering a significant amount of work produced by SWIM TF so far, the meeting was suggested to consolidate all these works, experiences, and lessons learnt and to form an actionable implementation plan with a target timeframe for operational SWIM implementation in the Asia-Pacific region. Referencing to the timeframes of related events and publications, including the publication of the ICAO PANS-Information Management (PANS-IM), which is expected to be published in 2024, and the sunset date of the current flight plan format (FPL2012) in 2032 being considered by ICAO ATMRPP, the paper proposed that the timeframe for SWIM implementation in the Asia-Pacific region to be set at between 2024 and 2030 with a buffer of 2 years before 2032 to conduct FF-ICE related operational trials prior to the planned sunset date for the FPL2012.

2.41 Considering the need to align all the timelines across different ICAO Air Navigation Commission Technical Panels regarding components related to SWIM to assist States in planning their investment and transition, APANPIRG/33 adopted the **Decision APANPIRG/33/8** *(CNS SG/26/05 (SWIM TF/06/03)) - Harmonization of Timelines for SWIM-related Initiatives***.**

SWIM Implementation and the Asia-Pacific Seamless ANS Plan

2.42 To align the relationship between SWIM implementation in Asia/Pacific and the Asia/Pacific Seamless ANS Plan, it was proposed that CNS SG and SWIM TF consider including SWIM implementation as part of Performance Improvement Plan in the next edition the Asia/Pacific Seamless ANS Plan aligned with SWIM implementation timeframe. Considering that APAC SWIM Timeline is proposed to be started from 2024 and to incorporate into the Seamless ANS Plan v5.0, which will be published in 2025, the SWIM TF/6 meeting agreed to add SWIM-B2/1- Information Service Provision and SWIM-B2/2- Information Service Consumption under Priority Two in the Seamless ANS Plan v4.0 to be published in 2022. The content to be added to the plan was proposed in **Appendix D** to this paper. Accordingly, APANPIRG/33 adopted the **Conclusion APANPIRG/33/9** *(CNS SG/26/06 (SWIM TF/06/02, SWIM TF/06/04)) - The Asia-Pacific SWIM Implementation Timeframe and inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan.*

Result of Asia/Pacific SWIM Implementation Plan and Status Survey- Task 1 Leads

2.43 Following the **Conclusion CNS SG/25/03**, the ICAO Asia/Pacific SWIM Implementation Plan and Status Survey was prepared by China, Japan, Singapore, and Thailand in consultation with Task leads under SWIM TF, and later disseminated to all Asia/Pacific States/Administrations by State Letter on 1 March 2022. Throughout March and April 2022, 49 responses in total were received from 26 States/Administrations. The majority of the responses was from civil aviation regulators, AIS/AIM providers, ANSPs or ATM service providers, and MET service providers. Only one response was from airport operator, while none was obtained from airspace user.

2.44 Through elaboration on the survey results, some recommendations were provided:

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

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

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

2.45 The SWIM TF/6 meeting noted that Recommendation-1 was already discussed and agreed. Recommendation-2 can be added in the Task 1 once detailed SWIM Roadmap is prepared. Recommendation-3 was discussed in WP/21 of SWIM TF/6. Task 1 will consider a phased approach and a common set of SWIM information services while developing APAC SWIM Implementation Roadmap.

SWIM-TI Interface Binding to Achieve Interoperability

2.46 Japan clarified the required indicators for IP-based network that should be considered to construct the APAC regional SWIM and the current capabilities of CRV) that can provided to support the regional SWIM implementation at the beginning of the shift. To satisfy different requirements, the paper presented an interface binding approach for SWIM Technical Infrastructure to achieve both operational interoperability and applicational flexibility by considering the CRV based regional SWIM implementation.

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

2.47 The paper introduced the general Service Level Agreement (SLA) template intended for use as the basis for negotiating SLAs between APAC SWIM service providers and consumers. To provide a uniform and standardized format for an APAC SLA document, the SLA template, which was introduced in detail in WP/12, should be considered as a baseline SLA to be modified by APAC SWIM service providers and consumers. It is expected that users will extend the SLA template as required to fit their specific organizational and technological needs.

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

2.48 The paper contained the Service Level Agreement (SLA) template intended for use as the basis for negotiating SLAs between APAC SWIM service providers and consumers. Task 5 elaborated on the format and information needed in the Service Level Agreement (SLA) template, including its parties (service provider and service consumer), obligations (service performance and problem reporting), service maintenance, etc. SWIM TF/6 agreed that SLA template should be included in ICAO APAC SWIM Implementation Guidance Material, which is being developed, so that States can use it when they will develop their information services and provide information to their consumers. The SLA template will be reviewed and updated annually. The meeting also discussed the SLA management approach and suggested Task 5 group to prioritize and further study the details of SLA management method appropriate for APAC.

SWIM Discovery Service (SDS) Update and Next Steps

2.49 USA, ROK, China, and Japan described the status and plans of a growing collaborative effort to deploy a network of SWIM Discovery Services (SDS) in the Asia Pacific Region (APAC). The effort aims to support federated service discovery among independently developed and autonomously managed SWIM domains. The SWIM TF/6 meeting noted that the development of SDS will encourage the adoption of SWIM in the APAC region by allowing SWIM services to be discovered and used by aviation partners. The partners will work together to enhance service discoverability in the region by considering SDS use cases for multi-party environments and supporting for advanced data filtering in SDS.

APAC Service Overview Specification - Optional Fields

2.50 Hong Kong China proposed the optional descriptive elements to be added to the initial version of the APAC Service Overview Specification. The paper recalled the proposed additional fields for initial version of APAC Service Overview Specification presented in SWIM TF/5 – WP/14 and summarized the suggestions on further addition of the fields received after SWIM TF/5 which were different from the current requirement set by IMP. The SWIM TF/6 meeting agreed that for the next steps, as Task 5 has been working on exchanging service metadata for APAC SWIM using a mature service description, Task 6 will join the ongoing registries effort of Task 5 to continue the work on the APAC SWIM service metadata model, and coordinate with Task 5 to study whether the descriptive capabilities suggested by States in the previous meetings could be accommodated as optional elements in the existing implementations of service description fields

Update on APAC SWIM Implementation Materials

2.51 The Information Management Panel (IMP) delivered to the Secretariat a draft of the Manual on SWM Implementation during its Second meeting. The goal of this Manual is to support, at a global level, the implementation of the draft provision proposed as a new Procedures for Air Navigation Services - Information Management (PANS-IM), which aims to publicize at the **beginning of 2023.** The SWIM TF/6 meeting was invited to review the draft ToC of the APAC SWIM Implementation Guidance Document and requested that SWIM TF may consider to consolidate the work, completed by SWIM TF and aligning with global guidance documents, into the APAC regional guidance material.

2.52 The SWIM TF/6 meeting requested ICAO Secretariat to compile all work done by the SWIM TF and consolidate the first draft of IGD for consideration by Task Leads prior to presenting the draft to SWIM TF. ICAO Secretariat will take the action and inform to SWIM TF in case of difficulties in completion of this task. The SWIM TF/6 meeting agreed to add the catalogue being prepared by Task 11 as a supplement material in the first draft of IGD.

Proposal to establish a Joint Work Group between the ATM SG and CNS SG to Create the FF-ICE Implementation Strategy

2.53 In SWIM TF/6, Task 9 leads shared the latest outcomes of the Second Meeting of the Information Management Panel (IMP/2), and the status of the Air Traffic Management Requirements and Performance Panel (ATMRPP), which is developing SARPs and Guidance Materials to implement FF-ICE operations under the SWIM environment.

2.54 Considering the FF-ICE implementation is not something that can be completed by the SWIM TF alone and collaboration with other groups such as ATM and CNS is important, the SWIM TF/6 meeting formulated and adopted the Draft Decision SWIM TF/06/05- *Establish a Joint Work Group between the ATM SG and CNS SG to Create the FF-ICE Implementation Strategy* for CNS SG/26 consideration.

2.55 The CNS SG/26 meeting deliberated at length on the rationale and appropriate timing for the proposal of establishing a joint working group. The CNS SG Chair expressed his appreciation to the initiatives taken by the SWIM TF and shared his views, after consulting the views from the ATM SG Chair, that we should be prudent and with very strong justifications in establishing new contributory bodies under the APANPIRG. It is important for the meeting to consider how best we could make use of the existing contributory bodies. The meeting was also informed that the implementation of FF-ICE by its nature requires a strong and close coordination and cooperation between operational and technical experts where there may not be any single existing contributory body owning such a multi-disciplinary specialists to tackle the issue.

2.56 CNS SG/26 noted that the Third Meeting of the Asia/Pacific Air Traffic Management Automation System Task Force (ATMAS TF/3) held from *7 – 10 June 2022* had proposed to set up a half-day seminar to discuss the topics of interest identified by most member States, including FF-ICE, SWIM, system interoperability, etc. In this regard, the ATMAS TF may organise the seminar on FF-ICE in the APAC region in 2023.

2.57 CNS SG/26 reminded that FF-ICE presentation and small demonstration were conducted during the ICAO APAC SWIM Workshop held from 6-7 July 2021. However, considering the existing different levels of understanding on FF-ICE among the APAC States/Administrations, the meeting suggested that the said seminar could be a starting point and relevant outcomes/recommendations may further be considered to bring the matter forward. Additionally, the meeting considered that it might be pre-mature to decide the said proposal and that a dedicated TF/WG may be considered in the future when such need has been fully deliberated by all relevant stakeholders during the seminar to be held by the ATMAS TF. CNS SG/26 requested the ICAO Secretariat to ensure that SWIM TF and ACSICG experts are involved in the FF-ICE workshop/webinar/seminar to be held by ATMAS TF.

Review of SWIM TF ToR and SWIM TF Work Plan

2.58 Revised SWIM TF Terms of Reference (ToR) was adopted by CNS SG/26 by **Decision CNS SG/26/07** *(SWIM TF/06/05) – Revised SWIM TF Terms of Reference*. The ToR is provided in **Appendix E** to this paper. The SWIM TF/6 meeting also reviewed and updated the SWIM TF Work Plan.

States's Update on SWIM Implementation

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

2.60 China presented the research and implementation of the SWIM services registry in China. SWIM TF/6 was informed that the research and demonstration of SWIM service registry has been started by Air Traffic Management Bureau (ATMB) in 2020 and a demonstrative platform of SWIM service registry which is named *SWIM service management center* has been designed and developed in a regional ATMB as experimental unit.

2.61 ROK presented UAM demonstration over SWIM in ROK that was held at Gimpo International Airport, Seoul, in 2021. For the demonstration, SWIM Testbed Configuration was introduced that SWIM-enabled application can receive all information required from the SWIM without directly connect to any ATM systems, and display ATM/UTM information and geo-spatial information in the three-dimensional map.

IATA Aircraft Equipage and Capability Survey – SWIM

2.62 IATA presented preliminary analysis of airline responses received from 22 airlines to the SWIM section of IATA's Aircraft Equipage and Capability Survey for Asia-Pacific and North Asia conducted in Quarter 1 of 2022. The IATA's Aircraft Equipage and Capability Survey specifically asked for aircraft fleet capabilities and operating approvals in the domains of PBCS, PBN, GNSS Augmentations, Mode S and SWIM. The airlines were asked to provide indications on future intentions where current capabilities were planned to be enhanced by the end of the 2022 calendar year considering the impact of COVID-19. The SWIM TF/6 meeting appreciated IATA's sharing and expressed that it would be useful if IATA would conduct a survey on FF-ICE, as its implementation is well connected with SWIM.

Latest Development of IWXXM

2.63 Hong Kong China presented the publication of the latest version of IWXXM and the further development of IWXXM since 2021. IWXXM Version 2021-2 was published on 15 November 2021 with one of the major changes to adopt a new versioning scheme where IWXXM and individual report packages no longer shared the same version number. After the publication of IWXXM Version 2021-2, WMO Task Team on Aviation Data (TT-AvData) had adopted a more proactive approach to start development of IWXXM schemas based on the requirements in proposed amendment to ICAO Annex 3 endorsed by ICAO MET Panel but yet to be approved by the ICAO ANC. Development work for changes to IWXXM in relation to the proposed Amendment 81 has already been started.

Ninth Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/9) and Ninth and Tenth Meeting of the Common aeRonautical Virtual Private Network Operations Group CRV OG/9 and 10

Proposal to Extend CRV Contract

2.64 Endorsed by CRV OG/10, ACSICG/9 and CNS SG/26, the APANPIRG/33 adopted the **Conclusion APANPIRG/33/7** - *Extension of CRV Contract for one year.*

Upgrade/Downgrade/Addition of New Services or Sites in CRV Contract

2.65 The CRV OG/10 meeting held on 18 April 2022 deliberated and reviewed the revised proposal for upgrade/downgrade/addition of new sites and services with reasonable pre-estimate of the anticipated losses suffered by PCCWG and endorsed the proposal to work further for revision of relevant documentation of CRV common package.

MPLS/IP Based Inter-Regional Connection

2.66 The Secretariat provided current status of discussion being done for potential interconnection of CRV and REDDIG II and CRV and New PENS, including the final technical proposal for interconnection of CRV and REDDIG II and business models to way forward.

2.67 The ACSICG/9 meeting agreed to form an Ad-Hoc group to discuss potential options for business cases to move forward with the proposal, which comprised of APAC Member States having interregional connections, CRV OG Chairs, CRV and REDDIG II service providers, interested Member States of SAM region, and the ICAO Secretariat under CRV OG. It was finalized that the ICAO Secretariat will coordinate with relevant APAC Member States to nominate focal points for the Ad-Hoc group. The ICAO Secretariat will also coordinate with ICAO SAM Office to get nomination from interested SAM Member States.

Reporting Template on the Monitoring of AFTN/AMHS Traffic Load

2.68 The ACSICG/9 meeting discussed on a draft reporting template on the monitoring of AFTN/AMHS traffic load. Upon discussion, the ACSICG/9 meeting agreed to monitor under different scenarios as follows:

- The CRV OG may monitor Bandwidth Utilization Rate of APAC member states already implemented CRV by adding it into its meeting agenda items. The APAC member states may request PCCWG to share information about Bandwidth Utilization Rate in monthly report and then present it to CRV OG meetings, which resulted into an action item of ACSICG/9.

- For States' non-CRV AMHS connections, after deliberation and considering the multi-facet of data sources, the ICAO Secretariat will consult with experts to propose a common template to report on the monitoring of connection loading, which resulted into an action item of ACSICG/9.

- For States' AFTN-only connections, there is no concern over increased traffic load from XML-based message and thus no such need to monitor the traffic in this regard.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) review the outcome of the APANPIRG/33 and take any necessary follow-up actions; and

b) discuss any matters as appropriate.

_ _ _ _ _ _ _ _ _ _ _ _ _

Terms of Reference of Mode S and DAPs Working Group

Working Arrangement of the Mode S and DAPS WG

Membership: The Mode S and DAPS WG shall be composed of experts involved in technical and operation of surveillance services as well as operational experts. Member States of SURICG are encouraged to volunteer to form this Working Group. The working group shall normally invite representatives of International Organizations recognized by the ICAO Council and Industry Partners as required by the group which represent important civil aviation interests to participate in its work in a consultative capacity.

Meetings: The Mode S and DAPS WG shall convene annually with at least one face-to-face meeting per year and supplemented with WebEx meetings as required. The outcome of the meetings shall be reported to the SURICG.

Schedule and delivery: Subject to the extent of prioritized applications considered by the Mode S and DAPS WG, the schedule for delivery of the working group shall be 4 +2 years after initiation ~~of the Mode S DAPS WG~~ (28 March 2018). The delivery point(s) will be nominated by SURICG through discussion. The Mode S and DAPS WG shall report to the APANPIRG via the SURICG.

Terms of Reference. See next section.

Term of Reference

The Objectives of Mode S and DAPs Working Group are to:

1) Ensure harmonized implementation of Mode S and DAPs in the Asia and Pacific Regions according to Surveillance Strategy adopted by APANPIRG;

2) Facilitate the implementation of Mode S and DAPs application in the Asia and Pacific Regions using the project management principles where appropriate to maximize its benefit to region; and

3) Review, identify and address major issues in technical, operational and regulatory aspects to facilitate the Mode S and DAPs implementation in the Asia and Pacific Regions.

Deliverables to meet the Objectives:

1) Progress report to be submitted to SURICG addressing the Mode S and DAPs Working Group deliverables (listed in 2 to 7 below);

2) To study and identify applicable Mode S and DAPs applications in the Asia and Pacific Regions considering:

- Concept of use/operation;
- Cost of system;
- Requirement of surveillance systems (focusing on radar);
- Matching functionality in ~~ATC~~ATM automation system;
- Other currently available or emerging technologies;
- ICAO Global Air Navigation Plan (GANP) and Aviation System Block Upgrades (ASBU); and
- Evaluation method for Mode S and DAPs performance.

3) To identify and develop the regional requirements of Mode S and DAPs capability in the area of aircraft equipage, surveillance systems (focusing on radar) and ~~ATC~~ ATM automation system, taking into account the relevant performance expectations of the Asia/Pacific Seamless ANS Plan;

4) To develop roadmap for Mode S and DAPs application in the Asia and Pacific Regions taking into account of:
- Available equipment standards;
- Readiness of airspace users and ATS providers; and
- Development of standardized and systematic approach to Mode S and DAPs application.

5) To develop guidance materials to assist States and airspace users (where applicable) on the use of Mode S and DAPs in the Asia and Pacific Regions;

6) To encourage research and development, trials and demonstrations in the field of Mode S and DAPs application; and

7) Draft Conclusions and Decisions to be formulated relating to matters in the field of Mode S and DAPs that come within the scope of the SURICG work plan.

[Note: Mode S and DAPS Working Group will report to SURICG and SURICG will coordinate with CNS Sub-group.]

Current Members: The working group is currently comprised of representatives from Australia, Cambodia, China, Hong Kong China, India, Indonesia, Japan, Republic of Korea, Malaysia, Nepal, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Viet Nam, and is led by China and Singapore.

Term of Reference

		Efforts thus far
The Objectives of Mode S and DAPs Working Group are to:		
1	Ensure harmonized implementation of Mode S and DAPs in the Asia and Pacific Regions according to Surveillance Strategy adopted by APANPIRG;	a) Planning of II/SI code assignment in progress. b) Encouraged Mode S forward fit. c) Guidance material on the implementation of DAPs applications in ATM systems is created.
2	Facilitate the implementation of Mode S and DAPs application in the Asia and Pacific Regions using the project management principles where appropriate to maximize its benefit to region; and	High level principle is in the draft guidance material.
3	Review, identify and address major issues in technical, operational and regulatory aspects to facilitate the Mode S and DAPs implementation in the Asia and Pacific Regions.	a) Guidance material on measurement of frequency occupancy is created. b) Guidance material to address technical and operational issues is created. c) Guidance material to address regulatory issues is created.
Deliverables to meet the Objectives:		
1	Progress report to be submitted to SURICG addressing the Mode S and DAPs Working Group deliverables (listed in 2 to 7 below);	
2	To study and identify applicable Mode S and DAPs applications in the Asia and Pacific Regions considering: - Concept of use/operation - Cost of system - Requirement of surveillance systems (focusing on radar) - Matching functionality in ~~ATC~~ATM automation system - Other currently available or emerging technologies; - ICAO Global Air Navigation Plan (GANP) and Aviation System Block Upgrades (ASBU); - Evaluation method for Mode S and DAPs performance.	a) Guidance material on the implementation of DAPs applications in ATM systems is created. b) Means to test and validate DAPs are in the guidance document.
3	To identify and develop the regional requirements of Mode S and DAPs capability in the area of aircraft equipage, surveillance systems (focusing on radar) and ~~ATC~~ATM automation system, taking into account the relevant performance expectations of the Asia/Pacific Seamless ATM Plan;	a) Planning of II/SI code assignment in progress. b) Encouraged Mode S forward fit. c) Guidance material on the implementation of DAPs applications in ATM systems is created.
4	To develop roadmap with a view to formulate mandates for Mode S and DAPs application in the Asia and Pacific Regions taking into account of: - Available equipment standards - Readiness of airspace users and ATS providers - Development of standardized and systematic approach to Mode S and DAPs application;	Road map created.

5	To develop guidance materials to educate States and airspace users (where applicable) on the use of Mode S and DAPs in the Asia and Pacific Regions:	Guidance material to educated States is created. No need for guidance material for airspace users identified yet.
6	To encourage research and development, trials and demonstrations in the field of Mode S and DAPs application; and	Research and development activities are being shared in the Working Group. These include: a) Deriving weather related information from DAPs; b) Detection of BDS swab.
7	Draft Conclusions and Decisions to be formulated relating to matters in the field of Mode S and DAPS that come within the scope of the SURICG work plan.	On going.

– – – – – – – – – – – – –

NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT

1. The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

a) ~~Text to be deleted is shown with a line through it.~~	text to be deleted in
b) New text to be inserted is highlighted with grey shading.	new text to be inserted in
c) ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.	new text to replace existing text

REVISED SURVEILLANCE STRATEGY FOR THE APAC REGION

Considering that:

1. States are implementing CNS/ATM systems to gain safety, efficiency and environmental benefits, and have endorsed the move toward satellite and data link technologies;

2. The future air traffic environment will require increased use of aircraft-derived surveillance information for the implementation of a seamless automated air traffic flow management system;

3. The 11th Air Navigation Conference endorsed the use of ADS-B as an enabler of the global air traffic management concept and encouraged States to support cost-effective early implementation of ADS-B applications;

4. The 12th Air Navigation Conference endorsed the ICAO Aviation System Block Upgrades (ASBU) Framework with Modules specifying effective use of ADS-B/MLAT and associated communication technologies in bridging surveillance gaps and its role in supporting future trajectory-based ATM operating concepts. Cooperation between States is the key to achieve harmonized ATM system operations;

5. The 13th Air Navigation Conference endorsed the multilayer structure for the GANP, the ASBU and initial version of basic building block (BBB) frameworks and its change management process, which are available in an interactive format as part of the web-based GANP Portal. This allows ICAO to incorporate a flexible framework for new/emerging surveillance-related concepts such as space based ADS-B into future editions of the GANP;

6. APANPIRG has decided to use the 1090MHz Extended Squitter data link for ADS-B air-ground and air-air applications in the Asia/Pacific Region;

7. Use of surveillance systems that do not require GNSS will continue to meet many critical surveillance needs for the foreseeable future;

8. SARPs, PANS and guidance material for the use of ADS-B have been developed;

9. Availability of new technologies, such as space based ADS-B which is now operationally used by some States;

10. Mode S and ADS-B avionics (including DAPs) and processing systems are available;

11. ADS-B IN applications and equipment are now available in commercial airliners and ICAO ASBUs include ADS-B IN applications;

12. There are continuing significant pressures on the radio spectrum for purposes outside aviation, particularly in the primary radar spectrum; and

13. ADS-B security issues are addressed by the ADS-B regional guidance material and security issues of Mode S surveillance may need to be further considered in the future.

THE SURVEILLANCE STRATEGY FOR THE ASIA/PACIFIC REGION IS TO:

1. Minimize the reliance upon pilot position reporting, particularly voice position reporting, for surveillance of aircraft;

2. Maximize the use of ADS-B on major air routes and in terminal areas, giving consideration to the mandatory carriage of ADS-B Out as specified in *Note 1* and use of ADS-B for ATC separation service;

3. Reduce the dependence on Primary Radar for area surveillance, consider the ongoing need for primary radars in terminal areas with a view to reducing primary surveillance coverage or use of phased array radar or other technologies with coverage focusing on areas of concern, and the potential use of alternate technologies or procedures (e.g. transponder veil regulations);

4. Encourage deployment of Mode S systems instead of Mode A/C only radars when replacement is required;

5. Provide maximum contiguous ATS surveillance coverage of air routes using 1090MHz Extended Squitter (1090ES) ADS-B, Wide Area Multilateration and Mode S SSR to meet operational and safety requirements;

6. Make ~~full~~ use of aircraft Mode S capabilities, where suitable surveillance systems and ATM automation systems are available, to reduce reliance on 4-digit octal codes. Mode S capabilities such as DAPs should also be considered for use~~d~~ to support ATM services where appropriate;

7. Make use of alternative technologies where technical constraint or comparative cost benefit analysis does not support the use of ADS-B, SSR or Multilateration;

8. Make use of Multilateration and/or ADS-B for surface, terminal and area surveillance where appropriate, feasible and cost effective;

9. Monitor ADS-B OUT developments such as Version 3 (DO-260C) MOPS development, and Version 2 (DO260B) equipage in the APAC region. ~~At an appropriate time (circa 2020)~~ APAC States should review progress and consider development of transition plans where cost/benefit studies indicate positive advantages for the region;

10. Monitor ADS-B IN development and cost benefits to ensure that APAC States are able to take advantage of ADS-B IN benefits when appropriate, through procedures, rules and ATC automation capabilities;

11. To the extent possible, implement ADS-B in the non-radar environment as a priority. In the radar or other surveillance environment, use ADS-B to supplement or replace existing surveillance coverage, subject to local factors and risk assessment;

12. Make use of surveillance capability to support the GADSS as appropriate;

13. Implementation of surveillance capability should also include consideration of contingency surveillance requirements [Note 2] and multilayer surveillance provision should be implemented to enhance the availability of surveillance services;

14. Monitor development of surveillance systems to support integration of UAS including new technology capable to detect non cooperative targets such as UAS.

15. Encourage sharing of surveillance data, utilizing provisions in the Region such as CRV, to improve safety and efficiency in air traffic management with a justifiable cost; and

16. Monitor potential congestion on 1090 MHz by means of routine measurements of channel occupancy, at both terrestrial and airborne levels, and monitor the availability of 24-bit aircraft address

Note 1:

a) *Version 0 ES as specified in Annex 10, Volume IV, Chapter 3, Paragraph3.1.2.8.6 (up to and including Amendment 82 to Annex 10) and Chapter 2 of* Technical Provisions for Mode S Services and Extended Squitter *(ICAO Doc 9871) (Equivalent to DO260) to be used till at least 2020.*

b) *Version 1 ES as specified in Chapter 3 of* Technical Provisions for Mode S Services and Extended Squitter *(ICAO Doc 9871) (Equivalent to DO260A);*

c) *Version 2 ES as specified in Chapter 4 of* Technical Provisions for Mode S Services and Extended Squitter *(ICAO Doc 9871) (Equivalent to DO260B).*

d) *States/Administrations in APAC region are strongly encouraged to mandate aircraft with a maximum take-off mass exceeding 5 700 kg or having a maximum cruising true airspeed capability greater than 250 knots, to be equipped with ADS-B OUT avionics compliant with Version 2 ES (DO-260B) or later version with date of manufacture on or after 1 January 2020.*

Note 2:

Contingency surveillance requirements are requirements to handle contingency situations in surveillance thus retain capacity to continue providing/using air navigation services. Such situations include but are not limited to the followings:

- *failure of surveillance system or infrastructure such as ground stations or GNSS failure;*
- *avionics failure or equipped aircraft transmitting bad data in flight with good data integrity indicators.*

– – – – – – – – – – – –

ADS-B Data Sharing Implementation Status in the Asia/Pacific Region

Related States/Administrations	ATS Route Served	Initiation Year	Agreement Date	Target Data Sharing Year	Implementation Status	Remarks/Challenges
Australia - Indonesia	Phase 1a L511, R592, G578, B349, M735, G326, A587, M768, A461, R340, B472, B473, G459	2010	2010	2010	Completed	SEA Report: Project 1
	Phase 1b M774, A458, J199, M766, G326, A587	2014	2014	TBD	Ongoing	Browse Basin oil rig (Australia) awaiting acceptance testing
	Phase 2 L895, A585	2017	2019	TBD	Completed	SEA Report: Project 2
Australia - Papua New Guinea	TBN				Ongoing	SEA Report: Project 6 (to be re-evaluated due to the implementation of space-based ADS-B in Papua New Guinea)
Brunei - Singapore	M758, M768, M767	2015	2019	2021*	Completed	SEA Report: Project 2 *Data sharing start Sep 2021
China – Hong Kong, China	Project 1 M771, L642	2010	2013	2013	Completed	
	Project 2 M771, L642, A1	2017		2018	Completed	Supplementary data sharing of Route A1
China - Lao PDR	A581, B465	2019		TBD	Ongoing	BOB Report: Project 1
China - Myanmar	A599	2019		TBD	Ongoing	BOB Report: Project 1
India - Indonesia	B466, P574, N563	2018		2022	Ongoing	BOB Report: Project 2 Data Sharing LoA on progress by end of 2022

Related States/Administrations	ATS Route Served	Initiation Year	Agreement Date	Target Data Sharing Year	Implementation Status	Remarks/Challenges
India - Malaysia	N571, P628, L510, P627, L645, P574	2017		2023	Ongoing	BOB Report: Project 3 Data Sharing LoA on progress by 2023
India - Myanmar	A201, A599, B465, G463, L507, P646, P762, G472, L524, M770, L759	2015	05/06/2015	2018	Completed	BOB Report: Project 4 Myanmar side: Discussion with ATM manufacturer for operational use at ACC is needed. Indian side completed.
Indonesia - Papua New Guinea	R204, A215, B462, B456	2018	2019	TBD	Ongoing	SEA Report: Project 6
Indonesia - Malaysia	B466, N571, P628, L510, P627, L645 and P574	2017		TBD	Ongoing	BOB Report: Project 5
Indonesia - Philippines	A461, R590, B472	2018	2019	TBD	Ongoing	SEA Report: Project 5
Indonesia - Singapore	M646, M758, M761, N875	2010		2013	Completed	SEA Report: Project 2
Malaysia - Singapore	**Project 1** M758, M768, L649,	2017		TBD	Ongoing	SEA Report: Project 2
	Project 2 M904, M765, N875, N891	2018		TBD	Ongoing	SEA Report: Project 2
Malaysia - Thailand	N571, P628, L510, P627, L645, P574	2018		TBD	Ongoing	BOB Report: Project 6
Myanmar - India	Project 1: Effect on Myanmar A201, A599, B465 Effect India: G463, L507, P646, N895	2018	2015	2020/2021	Ongoing	Data communication between Myanmar and India is stable with two links. Different Multiaircraft Address from India ADS-B Data
	Project 2: L301, M770	2019	2016	2020/2021	On trial	

Related States/Administrations	ATS Route Served	Initiation Year	Agreement Date	Target Data Sharing Year	Implementation Status	Remarks/Challenges
Philippines - Singapore	N884, M522, M754, M767, M772, L649	2018		2018	Completed	SEA Report: Project 2
Singapore - Vietnam	**Project 1** N892, N891, M771, M753, M758, L642, L644	2007		2013	Completed	SEA Report: Project 2
	Project 2 N892, N891, M771, M753, M758, M904, L642, L644	2014	2016	2018	Completed	SEA Report: Project 2

Seamless ANS Plan v4.0

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

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

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

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

TERMS OF REFERENCE

SWIM Task Force

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Composition:

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

Conduct of the work:

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

Reporting:

The group will report to CNS SG.

– – – – – – – – – – – – – – – – –

List of Conclusion/Decisions adopted by CNS SG/26 on behalf of APANPIRG on Technical Matters

Conclusion CNS SG/26/03 *(ACSICG/09/04)* - **Revised AFTN/ATSMHS Routing Directory**	
What: That, the AFTN/ATSMHS Routing Directory for the APAC Region provided in **Appendix B** to the report be further updated and distributed to States/Administrations as 29th Edition.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: A number of new ATSMHS connections have been established and became operational. Consequential amendments to the AFTN/ATSMHS Routing Directory are required.	Follow-up: ☐Required from States
When: 9-Sep-22	Status: Adopted by Subgroup
Who: ☒ CNS SG ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Decision CNS SG/26/04 (SWIM TF/06/01) - The Use of the Internet for MET Information Services in Regional SWIM architecture	
What: That, the use of Internet for meteorological information services will be considered in designing the regional SWIM architecture.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To support cost-effective and efficient meteorological information services for exchange of less-sensitive meteorological information in SWIM.	Follow-up: ☐Required from States
When: 9-Sep-22	Status: Adopted by Subgroup
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF	

Decision CNS SG/26/07 (SWIM TF/06/05) – Revised SWIM TF Terms of Reference	
What: That, the revised SWIM TF Terms of Reference (ToR) as shown in **Appendix E** be adopted.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To align with the progress made since the SWIM TF/5 and outcomes of Action item 25-1 from CNS SG/25.	Follow-up: ☐Required from States
When: 09 September 2022	Status: Adopted by Subgroup
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF	

Conclusion CNS SG/26/09 - Update of Flight Inspection Guidance Material (FIGM)	
What: That, the Edition 3.0 of the Flight Inspection Guidance Material (FIGM) provided in **Appendix F** to the Report be 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: 9-Sep-22	Status: Adopted by Subgroup
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: -	

Conclusion CNS SG/26/10 (SURICG/7/1 (DAPs WG/5/1)): Mode S DAPs IGD 4.0	
What: The Mode S DAPs Implementation and Operation Guidance Document Edition 4.0 provided in **Appendix G** to the Report be adopted	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: The revised draft includes ADS-B DAPs and adds guidance on the measurement of 1030/1090 MHz usage.	Follow-up: ☒Required from States
When: 9-Sep-22	Status: Adopted by Sub-group
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other: -	

Conclusion CNS SG/26/12 (SURICG/7/4) - Revised ADS-B Implementation and Operations Guidance Document (AIGD)	
What: That, the revised ADS-B Implementation and Operations Guidance Document (AIGD) provided in **Appendix I** to the Report, which consolidated all change proposals during SURICG/7, be adopted as Version 15.0.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: Updates from SURICG/7	Follow-up: ☐Required from States
When: 9-Sep-22	Status: Adopted by Subgroup
Who: ☒ Subgroup ☐APAC States ☒ICAO APAC RO ☐ICAO HQ ☒ Other: SURICG	

Conclusion CNS SG/26/13 *(ATMAS TF/3/1)* - ATMAS IGD Edition 1.0	
What: The Air Traffic Management Automation System Implementation and Operations Guidance Document Edition 1.0 provided in **Appendix J to this Report** be adopted	Expected impact: ☐ Political / Global

	☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: The revised draft has been added the DMAN function and reviewed/updated with inputs from various States	Follow-up: ☐Required from States
When: 9-Sep-22	Status: Adopted by Subgroup
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: ATMAS TF	

– – – – – – – – – – –

A List of Conclusions adopted by APANPIRG/33 Meeting related to CNS

<table>
<tr><td colspan="3">Conclusion APANPIRG/33/6 (CNS SG/26/01 (ACSICG/09/01 (CRV OG/09/01))):
Revised Amendment of the Management Service Agreement for CRV project (RAS14801)</td></tr>
<tr><td colspan="2">What: Recognizing that ICAO Technical Cooperation Bureau satisfactorily completed all the defined work items in the initial Management Service Agreement (MSA) and Project Document of RAS14801, that the required payments were settled, and that in end 2016, all the requirements of both parties have been fully completed and closed on record, That,

i) all Pioneer States are encouraged to counter-sign the Revised amended Pro Document provided in Appendix A to Agenda Item 3.4;

ii) any Pioneer State not countersigning is entitled to get its share of the remaining fund balance back. and

iii) a Pioneer State for which a direct CRV connection is not considered feasible in 2017 by the selected vendor is entitled to get its initial contribution in full</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☒ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: The initial scope of MSA was completed by ICAO TCB which allowed for a successful evaluation process and selection of a best and final offer; a majority of Pioneer States is willing to use the rest of their initial contribution to continue to support CRV implementation.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 24-Nov-22</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:</td></tr>
</table>

<table>
<tr><td colspan="2">Conclusion APANPIRG/33/7 (CNS SG/26/02 (ACSICG/09/02 (CRV OG/10/01))):
Extension of CRV Contract for one year</td></tr>
<tr><td>What:
a) Recognizing that as per current contract, all authorities shall join the CRV project and sign the relevant Service Contract(s) with PCCWG with the billing start date on or before 31 December 2022 to not impose additional charges by the service provider and based on the survey responses of 2022, many Member States are in process to join CRV which may not be completed by December 2022, it is recommended to extend current CRV contract for one year.

b) If agreed to extend, as per amended CRV contract, all authorities shall join the CRV program and sign the relevant Service Contract(s) with PCCWG with the billing start date on or before 31 December 2023 to not impose additional charges by the service provider.

c) After the extension, the CRV contract expiry date will be 31 December 2028.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☒ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
</table>

Why: Several ICAO Member States have requested to extend CRV contract due to COVID-19 pandemic in CRV Implementation webinar held in 2021 and based on the response of the survey done in 2022, many Member States are in process to join CRV which may not be completed by December 2022.	Follow-up: ☒Required from States
When: 24-Nov-22	Status: Adopted by PIRG
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Decision APANPIRG/33/8 *(CNS SG/26/05 (SWIM TF/06/03))*: **Harmonization of Timelines for SWIM-related Initiatives**	
What: To feedback to the ICAO Air Navigation Commission Technical Panels for a need to harmonize the implementation timelines of SWIM-related initiatives.	Expected impact: ☒ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: There exists different timelines for the implementation of SWIM-related initiatives identified by various ICAO ANC Technical Panels. This creates confusion within States on their corresponding implementation sequences and as to how these different timelines are to be met.	Follow-up: ☐Required from States
When: 24-Nov-22	Status: Adopted by PIRG
Who: ☒Sub groups ☐APAC States ☒ICAO APAC RO ☒ICAO HQ ☒Other: SWIM TF	

Conclusion APANPIRG/33/9 *(CNS SG/26/06 (SWIM TF/06/02, SWIM TF/06/04))*: **The Asia-Pacific SWIM Implementation Timeframe and inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan**	
What: 1. To set the timeframe for the implementation of SWIM in the Asia-Pacific region to be between 2024 and 2030, with 2030 being the target timeline for implementation completion. 2. To include SWIM implementation in the next edition of the Asia/Pacific Seamless ANS Plan.	Expected impact: ☐ Political / Global ☐ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical
Why: This is to set the concrete target implementation of the Asia-Pacific regional SWIM to assist States in harmonizing their implementation plans in order to achieve the seamless information exchange across the region in time for future operations, e.g. FF-ICE. Additionally, to ensure that SWIM, a key building block to achieve the vision outlined in ICAO Doc 9854 Global ATM Operational Concept (GATMOC), is captured in the Asia/Pacific Seamless ANS Plan,	Follow-up: ☒ Required from States

providing an overall framework for Asia/Pacific States to plan their implementations to meet the future performance requirements.	
When: 24-Nov-22	Status: Adopted by PIRG
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: SWIM TF	

Conclusion APANPIRG/33/10 *(CNS SG/26/08 (SRWG/6/2))*: **Planning Principle for Aeronautical Frequency Bands of 108-117.975 MHz, 960-1215 MHz and 117.975-137 MHz**	
What: That, Doc 9718, Handbook on Radio Frequency Spectrum Requirements for Civil Aviation, Volume II, Second Edition – 2022, is adopted as the planning principle for aeronautical facilities and services operating in the aeronautical frequency bands of 108-117.975 MHz, 960- 1215 MHz and 117.975- 137 MHz in APAC.	Expected impact: ☐ Political / Global ☒ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To implement the updated ICAO provisions	Follow-up: ☐Required from States
When: 24-Nov-22	Status: Adopted by PIRG
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: -	

Conclusion APANPIRG/33/11 *(CNS SG/26/11 (SURICG/7/3))*: **Revised Surveillance Strategy for the APAC Region**	
What: That, the Revised Surveillance Strategy for the APAC Region provided in **Appendix D to Agenda Item 3.4** be adopted.	Expected impact: ☐ Political / Global ☒ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical
Why: To reflect the outcome of the latest development in surveillance technology.	Follow-up: ☒Required from States
When: 24-Nov-22	Status: Adopted by PIRG
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☒ Other: SURICG	

– – – – – – – – – – –