International Civil Aviation Organization

Tenth Meeting of the Air Traffic Management Sub-Group (ATM/SG/10) of APANPIRG

Video Teleconference, 17 – 21 October 2022

Agenda Item 5: ATM Systems (Modernization, Seamless ATM, CNS, ATFM)

MAIN OUTCOMES OF CNS SG/26

(Presented by the Secretariat)

SUMMARY

This paper presents the recent developments in the CNS area that may be of interest to the ATM Sub-group, under the scope of CNS SG/26 meeting which was held from 5 to 9 September 2022.

1. INTRODUCTION

1.1 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 teleconference. The meeting was attended by 247 participants from 26 States/Administrations, 4 International Organizations and some industry partners. The CNS SG/26 working papers, information papers, and other resources can be accessed at https://www.icao.int/APAC/Meetings/Pages/2022-CNS-SG-26.aspx

1.2 A number of contributory bodies of APANPIRG have held their meetings listed below which contributed discussion outcomes to CNS SG/26, and webinars/workshops held to increase awareness and understanding on various topics for the Region to support their planning and implementation. All these activities were held via video teleconference:

No.	Meeting/Seminar/Workshop in 2022
1	CRV OG/9 (25-27 January)
2	SRWG/6 (1-3 March)
3	SURSG/2 (15-17 March)
4	PBNICG/9 (22-24 March - RSO)
5	Mode S Workshop (22 March)
6	DAPs WG/ (23-25 March)
7	CRV OG/10 (18 April)
8	ACSICG/9 (19-21 April)
9	GBAS/SBAS ITF/4 (11-12 May - RSO)
10	SWIM TF/6 (17-20 May)
11	SURICG/7 (24-27 May)
12	ATMAS Webinar (7 June)
13	ATMAS TF/3 (8-10 June)
14	CRV Webinar (29 June)
15	5G&RA webinar (23 August)

1.3 A list of Conclusions, Decisions, Draft Conclusions and Draft Decisions made by the CNS SG/26 is provided in **Appendix A** to this paper for easy reference.

2. DISCUSSION

Evolution of Agenda Items

2.1 The conventional CNS SG meeting Agenda Items mainly cover Aeronautical Fixed Service (AFS), Aeronautical Mobile Communications Service (AMS) and Aeronautical electromagnetic spectrum utilization, Navigation, Surveillance, regional performance dashboard/implementation plan, and CNS deficiencies.

2.2 In recent years, the Agenda Items have been expanded gradually to cover Human Factors and Air Traffic Safety Electronics Personnel (ATSEPs) training, Cybersecurity of CNS/ATM systems, ATM Automation, new technologies (including big data analysis, artificial intelligence, Digital Tower, counter UAS detection and identification system, UTM, etc.) and CNS related work/projects impacted by COVID-19.

2.3 Information Management (IM) was the new agenda item of CNS SG/26, as the widespread use of IP-based technology has gone far beyond the scope of conventional aeronautical CNS elements. This new setting on the agenda will highlight the importance of information management service in supporting the new operational concepts, and invite more valuable sharing from States and industry.

Outcome of ACSICG/9 Meeting

2.4 The CNS SG/26 meeting reviewed various topics discussed in ACSICG/9, updated the AMHS/ATN implementation status in States, reviewed the outcomes of CRV OG/9 and CRV OG/10 meetings which included discussions on the Upgrade/Downgrade CRV Circuits Subscribed and Contract Extension requirements, discussed and addressed the implementation issues, further explored Inter-regional AFS connection, and shared experience on AFS related cybersecurity issues.

2.5 The CNS SG/26 meeting endorsed a draft conclusion for the consideration of APANPIRG/33 meeting about the extension of the current contract for one year on the same Terms and Conditions.

2.6 The meeting noted that the current CRV OG Operations Manual has been published as version 1.1 for reference of States/Administrations to facilitate the implementation of the CRV.

AFTN/ATSMHS Routing Directory and the Communication Chart

2.7 The meeting highlighted the any to any connectivity for IP network, as well as the reality that not all APAC States have joined CRV, while automation systems still heavily depend on the character-based message exchanging applications, this hybrid environment might keep on existing and there was not yet a clear timeframe for a full transition to CRV. As such, the meeting agreed to fully follow the AFTN/ATSMHS routing directory for present time in APAC region. For inter-regional traffic, it is required to follow the existing entry/exit points and procedure. The 29th edition of AFTN/ATSMHS Routing Directory prepared by ACSICG/9 was endorsed by CNS SG/26, which will be circulated through State Letter.

MPLS/IP Based Inter-Regional Connection

2.8 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. It also requested APAC member states to record their interest, willingness, or need for interconnection of the CRV with other regional networks such as REDDIG II / New PENS with the ICAO secretariat.

Aeronautical Fixed Service (AFS) Cybersecurity Considerations for Information over CRV

2.9 Some interim security considerations for CRV were presented, including Digital Identity and Network Information Security, prior to International Aviation Trust Framework (IATF) to be implemented in future. It further introduced the requirements for IATF Digital Identity concept uses Public Key Infrastructure (PKI) Digital Certificates, Network Information Security which includes the use of IPv6, Domain Name System (DNS), information security, network management and network contingencies, and SWIM interchanges with external entities.

2.10 The ICAO Secretariat shared that the interim measures proposed in the paper are more tangible and implementable comparing high level concepts, which can be considered as a useful reference for the CRV OG Operations Manual. While CRV OG and SWIM TF have their corresponding action items, the Co-Chairs noticed that the XML-based messages may compromise automation systems and it would be necessary to formulate managing plans to address the possible threat in cybersecurity. The ICAO Secretariat suggested to add a regular Agenda Item for ACSICG meetings and invite States and Organizations concerned to continue the discussion on improving in the cybersecurity ideas presented in this paper. With CANSO and IATA expressed their interest to contribute to this Agenda Item, the Secretariat will coordinate with interested parties to discuss various tasks under this Agenda Item.

AMHS readiness status for supporting IWXXM Traffic of the States/Administrations

2.11 The meeting noted that **13** States/Administrations provided their status on AMHS readiness for supporting IWXXM Traffic as in **Appendix B** to this paper, out of the **23** States/Administrations in the APAC Region which put their AMHS into operations per the AMHS Routing Directory Tables from the ATS Messaging Management Centre (AMC). Although there has been a significant increase in the AMHS readiness for supporting IWXXM Traffic, the reporting gap as well as the slow progress on the reporting were still identified, States/Administrations were urged to inform ICAO APAC Regional Office on their readiness and implementation progress/plan of AMHS with FTBP as soon as possible.

ATS Messaging Management Centre (AMC) Updating

2.12 Since the introduction of global routing in AMC, there had been good participation from External COM Centres (i.e. States outside the ICAO EUR Region), and the AMC encouraged external COM Centres to continue to participate in the AMC operation. With the introduction of IWXXM, FTBP capabilities are of greater importance to the AFS. In this regard, all COM Centres were invited to update their FTBP capabilities information under the AMC Network Inventory section.

Outcome of SWIM TF/6 Meeting

Consideration of SWIM Architecture for Efficient Provision of MET Information Services

2.13 Considering the operational needs of efficient MET information service provision mentioned above, a draft Conclusion titled *Activities to explore the use of the Internet for MET information services in Regional SWIM architecture* was proposed for SWIM TF/6 consideration. The SWIM TF/6 meeting noted that the MET information services have already been considered as a part of SWIM TF's work and regional SWIM architecture since its establishments and a specialised group has been created by CRV OG/9 that is devising terms and conditions along with standard operating procedures to join the CRV by other service providers than ANSPs such as MET and airlines.

2.14 According to the outcomes of discussions during SWIM TF/6 and APANPIRG procedural handbook dated 1 June 2020, the draft decision was endorsed by the meeting for CNS SG/26's adoption, which was adopted by CNS SG/26 as **Decision CNS SG/26/04** (SWIM TF/06/01) - The Use of the Internet for MET Information Services in Regional SWIM architecture.

2.15 The SWIM TF/6 meeting agreed 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 Asia-Pacific SWIM Implementation Timeline

2.16 China, Japan, Singapore, and Thailand presented a proposal for a target timeframe for 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 proposed timeframe for SWIM implementation in the Asia-Pacific region is 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.

2.17 With aforementioned, the **Draft Conclusion SWIM TF/06/02**: *The Asia-Pacific SWIM Implementation Timeframe* was proposed by SWIM TF/6 and then was adopted by CNS SG/26 for APANPIRG/33 consideration.

2.18 The SWIM TF/6 meeting agreed that the scope of SWIM implementation depends on each State's strategies and the set of common information services, which States shall consider providing, needs to be agreed on by SWIM TF. The SWIM TF/6 meeting proposed that States may consider implementing SWIM technical infrastructure and participating in regional SWIM by developing their own or acquiring services provided by SWIM service provider. Moreover, States may consider implementing information service provision, information service consumption, or both, or subscribing to SWIM service provider to enable their information provision and/or consumption.

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

2.20 Considering to align all the timelines which will definitely assist States in planning their investment and transition, the meeting developed the following Draft Decision which was adopted by CNS SG/26 for APANPIRG/33 consideration: **Draft Decision CNS SG/26/05** (SWIM TF/06/03) - Harmonization of Timelines for SWIM-related Initiatives.

SWIM Implementation and the Asia-Pacific Seamless ANS Plan

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

2.22 With aforementioned, the Draft Conclusion SWIM TF/06/04: *Inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan* was developed by SWIM TF/6 and then was adopted and merged with **Draft Conclusions SWIM TF/06/02** by CNS SG/26 for APANPIRG/33 consideration.

2.23 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 discussed, prepared, and finalized, which is provided in **Appendix C** to this paper.

Result of Asia/Pacific SWIM Implementation Plan and Status Survey

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

2.25 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.

2.26 The SWIM TF/6 meeting noted that Recommendation-1 was already agreed by the **Draft Decision SWIM TF/06/03** of WP/07. Recommendation-2 can be added in the Task 1 once detailed SWIM Roadmap is prepared. Recommendation-3 was discussed in WP/21 of SWIM TF/6. Task 1 will consider a phased approach and a common set of SWIM information services while developing APAC SWIM Implementation Roadmap.

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

2.27 The SWIM TF/6 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.

2.28 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 and APANPIRG consideration.

2.29 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.

2.30 The meeting 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. The meeting was 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. The meeting 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

2.31 SWIM TF's Terms of Reference (ToR) amended in SWIM TF Task Leads meetings was presented and agreed by SWIM TF/6, which was adopted by CNS SG/26 as in **Appendix D** to this paper. To ensure that the objectives set in the ToR can be achieved, the Statement of Work (SOW) of each Task will be reviewed in further Task Leads Meeting to be in consistent with revised SWIM TF ToR. The SWIM TF/6 meeting also reviewed and updated the SWIM TF Work Plan.

Outcome of SRWG/6 Meeting and Frequency Spectrum related Issues

VHF COM Simulation for 2030

2.32 SRWG/5 prepared the survey for *Submission of Frequency Requirements for the Period 2021 – 2030*, and circulated it to Member States through State Letter *Simulation of VHF COM Frequency requirements for next 10 years* on 09 April 2021. The ICAO APAC Office has received submissions from eight States/Administrations. CNS SG/25 urged delegates to take necessary action to respond to the State Letter by providing required information for simulation as early as possible. Preliminary analysis on the States' submission revealed the challenge of uncertainty to determine the medium-term spectrum requirements for VHF communication services. Further analysis is being conducted with concerned States to determine whether these requirements can be assigned. States/Administrations were invited to review and provide up-to-date information for Frequency List 3 by using Frequency Finder as the simulation result would only be meaningful for sufficient frequency data. States/Administrations were invited to report issues to the Secretariat team during this interactive process.

Frequency Simulation for India

2.33 The frequency simulation for India demonstrated that the frequency requirements requested by India for up to 2030 can be satisfied within the frequency band 117.975 - 137 MHz with conditions, including a re-organization for the pools to which frequencies are allotted. In addition, heavy congestion is expected at that time throughout most of this frequency band. As such, a similar analysis in 3 - 5 years 2022 was recommended to assess the severity of the congestion. This study set an example on the frequency planning techniques with actual situation to estimate the future traffic growth and subsequently the need for an increase in frequency channels. From the study result, in case 8.33kHz channel spacing were identified as necessary, strategic planning similar to that of Europe could be adopted.

Preparation for Implementation of VHF Com 8.33 kHz Channel Spacing Requirements in APAC Region

2.34 Indonesia presented its preparations for the implementation of VHF COM 8.33 kHz channel spacing. Indonesia stated that the implementation directly impacts the ANSP, airline operators, ground service (e.g., ground handling, VHF data link frequencies), heliport operators as main users of such frequency. To ensure all registered civil aircraft operating in Indonesia are capable of operating at 8.33 kHz, Indonesia will conduct a further survey. When 8.33 kHz channel spacing implemented, some issues were identified as follows:

- Operational use will have an impact on the ATC load (phraseology) when using the 3 decimal place;
- Implementation of 8.33 kHz channel spacing will impact ANSP on replacing all the VHF COM facilities which incapable of working on that channel space;
- It is necessary to consider the impact on airlines; and

- Need to update national regulation of the use of 8.33 kHz if it has been recommended by ICAO APAC in future.

2.35 The SRWG/6 meeting suggested considering formulating an implementation roadmap along with deliberation with individual States when the matter matures in future. IATA acknowledged that air transport fleet of most of airlines are already equipped with 8.33 kHz VHF Voice Channel Spacing. IATA suggested that the APAC region to plan ahead and establish an agreement for a structured implementation plan and timeline for eventual migration to 8.33 kHz, including an accommodation strategy for non-complying aircraft.

Outcome of Ad-Hoc Group Activities and Survey Result of the Introduction of 50 kHz Channel Spacing for ILS and VOR Facilities in APAC

2.36 The ad-hoc group, which formed from SRWG/5 in 2021 to discuss the possible shortfall of VOR frequency channels with the current 100 kHz channel in the frequency band 108.000-117.975 MHz, reported the discussion outcome in the SRWG/6. The challenges identified of implementing 50 kHz channel spacing are deemed primarily with airspace users (airline operators) and not with ground segment. The need for active coordination between the stakeholders including ANSPs, Civil/Military and Airline Operators (IATA) was also highlighted. It is also noted that the ICAO Frequency Finder tool fully supports 50 kHz channel spacing.

2.37 The Group worked with the ICAO Secretariat and drafted a questionnaire for the APAC States and Airline Operators including IATA through State Letter Ref.: T 8/8.5 – AP067/22(CNS). Based on the survey results obtained, it was noted that certain States have already implemented or planned to implement the 50 kHz channel spacing for ILS/VOR facilities. While most of these States indicated no issues in implementation/planning, States should ensure the aircrafts operating in their airspaces are able to support the use of such 50 kHz channel spacing. It is encouraged that IATA would advise on their member airline operators about the capability of their aircraft's avionics in operating with 50 kHz channel spacing for ILS/VOR facilities. States should also confirm with other relevant bodies, e.g. Defence and Flying Service bodies, that use ILS/VOR facilities on their ability to operate with such 50 kHz channel spacing in their States. The results are planned to be further reviewed and discussed in SRWG/7 meeting in 2023.

Draft of Asia Pacific Regional Aeronautical Radio Frequency Management Guidance Material

2.38 The meeting discussed and reviewed the second edition of the draft of Asia Pacific Regional Aeronautical Radio Frequency Management Guidance Material. The guidance includes objective, scope, institutional framework, spectrum management and procedure of APAC region, air-ground communication and radio navigation aid frequency management information.

2.39 To further proceed with the draft, the Secretariat will issue a State Letter to invite the APAC States to review and comment on the draft guidance document after further completion of the draft.

Potential Impacts from 5G Implementation on Aircraft Radio Altimeters – Outcomes in Relevant Meetings and Regional Updates

2.40 The Secretariat summarized the discussions on the topic of 5G implementation and potential impacts on aircraft radio altimeters in APAC after CNS SG/25, including APANPIRG/32, RASG-APAC/11, SRWG/6, FSMP WG/13, FSMP WG/14, and certain discussions in other bodies.

2.41 CNS Section of ICAO APAC Regional Office has received zero report on such interference in radio altimeters from the Member States or IATA so far. As a reminder of agreement in

CNS SG/25, Member States would keep an eye on monitoring the impact of 5G on radio altimeters in their States/Administration regarding the safety and frequency spectrum issues. In parallel, it was advised that Member States CAA and airworthiness office may collect all relevant information and past issues reported, if any, and inform RASG-APAC in case of any significant concern. The issues related to frequency spectrum may be brought to the attention of CNS section of the ICAO APAC Office for further coordination with RASG-APAC and ICAO Headquarters.

Outcomes of APT-ICAO Webinar on 5G Implementation and Radio Altimeter

2.42 The APT-ICAO Webinar on 5G Implementation and Radio Altimeter (also known as *APT-ICAO Regional Dialogue: Radio Altimeters at 4200-4400 MHz band and implementation of 5G in adjacent bands*) was held on 23 August 2022 via Video Tele-Conferencing (VTC) on Zoom which was hosted on APT platform. The Webinar was intended to promote the common understanding among the spectrum regulators, the airlines and telecommunication industries on the operation of Radio Altimeters in the band 4.2 – 4.4 GHz and the implementation of 5G in the adjacent bands ensuring aviation safety in the Asia-Pacific region. The Webinar has registered with about **250** participants. There were four topics presented by spectrum regulators (APT), aircraft manufacturers (Airbus), aviation (ICAO) and telecommunication industries (GSMA), covering the each-different viewpoints and concerns from these entities, potential mitigation measures and future roadmap of complete resolution of the issue of co-existence of 5G implementation and radio altimeters. The webinar served as a platform to bring together the national spectrum regulators, telecommunications service providers, and the aviation community for direct engagement. Presentation slides and recording would be available on the ICAO Webinar website at https://www.icao.int/APAC/Meetings/Pages/2022-Webinar-on-5G-Implementation-and-Radio-Altimeter.aspx.

Amendment 91 to Annex 10, Volume III on Selective Calling Codes

2.43 The Secretariat presented the main points of State Letter Ref.: AN 7/64.2.2-20/127 and the action required by the letter regarding the Adoption of Amendment 91 to Annex 10, Volume III issued on 9 December 2020, which concerns the expansion of the pool of selective calling (SELCAL) codes. The SELCAL amendment uses sixteen (16) new audio tones, in addition to the existing 16 audio tones, to create SELCAL codes from a total of 32 available audio frequencies (called SELCAL32). The air navigation services providers (ANSPs) are requested to upgrade ground systems (flight planning and SELCAL encoder) to support global implementation of SELCAL32 by 3 November 2022 and should consider taking the necessary steps to be compliant with the Amendment. The ICAO APAC Regional Office issued the State Letter Ref.: T 8/4.3: AP107/22 (CNS) dated 10 August 2022 with the Subject of *Selective Calling (SELCAL) Code Pool Expansion* to remind the States/Administrations to notify ICAO Headquarters (HQ) on any differences and compliance regarding Amendment 91 to Annex 10, Volume III before 3 October 2022, copy notifications to ICAO APAC Regional Office to share readiness status for the applicability of SELCAL32. The meeting was informed that China, New Zealand and Sri Lanka have been SELCAL32 compliant.

Implementation and Application of VHF SELCAL in China

2.44 In order to prevent air-ground communication failure and enhance the safety of civil aviation operations, CAAC has conducted a series of work to improve the selective calling function. Combining the requirements of the latest technical standards of ICAO and relevant research results, CAAC implemented SELCAL function on chief position of ACC center at VHF frequency as an effective approach to re-establish air-ground communication. China further elaborated on two technical solutions, frequency choice, and the control phase of implementing the VHF SELCAL, and summarized the operation and safety benefits.

Outcome of APG23-4 Meeting

2.45 Regional Officers (CNS) from ICAO APAC Office were nominated to participate in the Fourth Meeting of Asia-Pacific Telecommunity (APT) Conference Preparatory Group for World Radiocommunication Conference 2023 (APG23-4). The outcome of the meeting is in line with the ICAO Position in overall. The Meeting was invited to note that under Agenda Item 1.9 *Digital tech for aviation safety-of-life applications* of WRC-23, APT Members are also of the view that the implementation of new wideband AM(R)S HF systems may require necessary coordination through ICAO given their role in organizing HF aeronautical channel plans in flight information regions. Although ICAO has no position and no function role in coordinating HF frequencies, for States considering to conduct future studies on applications using HF, ICAO APAC Regional Office could support and provide assistance in grouping the requests from Member States to facilitate wideband HF technology in future.

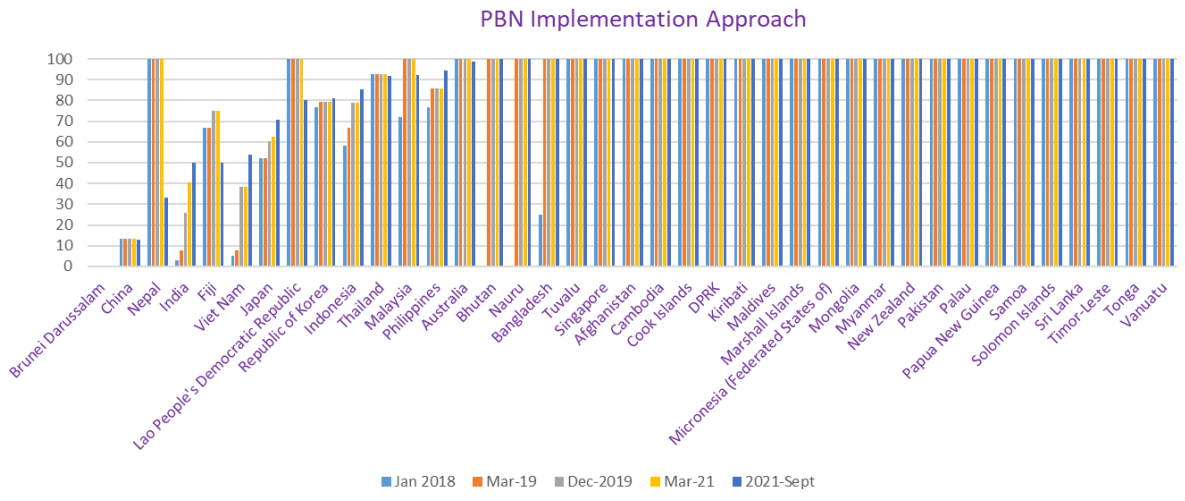
Outcomes of PBNICG/9 Meeting

2.46 The Secretariat presented global PBN implementation status at international airports. The secretariat also presented current implementation status of Asia/Pacific Regional Transition Plan for RNP APCH Chart Identification from RNAV to RNP. The Secretariat presented global PBN implementation status as available in ICAO iSTARS. ICAO informed that implementation of APV procedures for all instrument runway ends by 2016, key requirement of ICAO Assembly Resolution A37-11, was behind global achievement. However, implementation of PBN SID/STAR were above the global implementation status (see Table 1 and Chart 1)

Table 1. ICAO Assembly Resolution A37-11 Implementation Status as on September 2021

Sept 2021	LNAV	APV		PBN SID	PBN STAR
		LNAV/VNAV	LPV		
Global (%)	69.3	57.3	26.2	57.7	50.5
Asia/Pacific (%)	64.5	52.7	0	70	67

Chart 1. PBN (Approach) Update, as of September 2021(as per iSTARS)



2.47 The Secretariat informed the meeting that discrepancy about the list of International Airports in iSTARS and ANP had been resolved after extensive coordination with iSTARS team. This data is reflected in PBN Implementation of the States, and all APAC States should update their list of Airports in ANP Vol-I & Vol-II as urged by APANPIRG/31 in order to display a more accurate data of implementation.

2.48 The Secretariat presented the Implementation status of the regional transition plan for RNP APCH chart identification from RNAV to RNP, Asia/Pacific Regional Transition Plan for RNP APCH Chart Identification from RNAV to RNP as adopted by APANPIRG/30 vide Conclusion APANPIRG/30/14 (CNS SG/23/8-PBNICG/6/1). The Secretariat reminded the States about target date as November 2022 for RNP transition. The plan is available at the following link on ICAO APAC webpage: Appendix B - Regional Transition Plan for RNP Chart Identification.pdf (icao.int).

2.49 Singapore raised a query about the requirement of implementation of PBN SID/STAR in a State as the operational requirements and needs are different in each aerodrome. The ICAO Secretariat explained the ICAO Assembly Resolution A37-11, which calls for the implementation of PBN SID/STAR if the State considers it necessary for the efficiency of operation. It was further elaborated that data has been captured from iSTARS for international airports and if States want to discuss about the Key Indicators, it could be taken up in the next PBNICG.

2.50 Pakistan queried whether study was conducted on implementation of PBN SID/STAR for the improvement of efficiency of operation along with mitigation of emission and whether there is a threshold of traffic density recommended for implementation of PBN SID/STAR. The ICAO Secretariat explained that Assembly resolution A37-11 was adopted after several studies established the benefits of PBN SID/STAR in the improvement of operational efficiency and environment protection and PBN SID/STAR helps in the operational efficiency at medium to high density airports as PBN enables structured arrival and departure paths, which also helps in environment protection.

Outcomes of GBAS/SBAS ITF/4 Meeting

2.51 Co-Chair (Mr. Susumu Saito) of the task force presented status and outcomes from the activities of the Expert Group 3-1 for revision of the GBAS and SBAS safety assessment guidance documents related to anomalous ionospheric conditions and timeline for the work of the Expert Group 3-1. The group reviewed the GBAS and SBAS safety assessment guidance documents related to anomalous ionospheric conditions published in 2016, and identified points to be updated. The group targeted to deliver the first drafts of the guidance documents by fall 2022 and circulate the drafts to the Task Force members by December 2022. To achieve this, the group would have online meetings on a monthly basis. As the lead of Expert Group 3-1, India also presented outcomes from a review of SBAS Safety Assessment Guidance Document Related to Ionospheric Anomalies and those new proposed contents of the document.

2.52 On behalf of Expert Group 3-2 tasked to draft a guidance reference document for implementation of GBAS/SBAS in the Asia/Pacific Region, Co-Chair (Mr. George Wong) presented the outcomes from the review and discussion under Expert group for this task. The guidance reference document would be prepared to present a holistic view of implementation from the initial phase for the analysis of operational needs to the phase for conducting post-implementation review. States' experience in implementation of GBAS/SBAS and specific consideration(s), such as ionospheric impacts in low altitude region, only particularly applicable to the Asia/Pacific Region would also be incorporated in this guidance document to be prepared under Expert Group 3-2. Per the review conducted by the group, the structure of guidance document on implementation process for GBAS/SBAS and the timeline for drafting this guidance document for the Region as well as the regular expert group review meetings proposed by Expert Group 3-2 were deliberated and concluded in the GBAS/SBAS ITF/4.

Other Navigation Issues

ITU Circular Letter CR/488 on Prevention of Interference to GNSS

2.53 The ICAO Secretariat shared information about the Circular Letter CR/488 issued by the International Telecommunication Union (ITU) on prevention of interference to GNSS. With great concern about the increasing number and range of impact of such harmful interference on safety-of-life radiocommunication services used for the navigation of aircraft, the ITU issued the Circular Letter CR/488 with the subject *Prevention of harmful interference to Radio Navigation Satellite Service Receivers in the 1559 – 1610 MHz frequency band* on 8 July 2022. Consequently, the ICAO Regional Office issued the State Letter Ref.: T 8/5.10 : AP099/22 (CNS) dated 21 July 2022, Subject: *Prevention of harmful interference to Radio Navigation Satellite Service Receivers in the 1559 – 1610 MHz frequency band* to highlight the information with operators, service providers, and all stakeholders, sensitize the national radio regulatory Authority to the risk encountered by the civil aviation, and encourage States/Administrations to take actions to address this critical issue as appropriate.

BDS Standardization Status in ICAO

2.54 China provided the status of BeiDou Navigation Satellite System (BDS) standardization in ICAO, including the BDS SARPs endorsement progress, the BDS related contents in GNSS manual revision, and BDS related requirements development and validation in ARAIM SARPs. The meeting was informed that the proposed amendment to Annex 10, Volume I to include the BDS core constellation was agreed to become applicable on 2, November 2023. China also shared the progress of other BDS related ICAO standardization work, including BDS related part in GNSS Manual and BDS related requirements in ARAIM SARPs, which will be submitted during NSP/7 for endorsement.

Outcomes of SURICG/7 Meeting

2.55 The outcomes of SURICG/7 included the achievements made by the Fifth Meeting of Mode S Downlinked Aircraft Parameters Working Group (DAPs WG/5) and the Second Meeting of the Surveillance Study Group (SURSG/2).

Review Report of Mode S DAPs WG/5

2.56 The APAC Regional Workshop on Mode S Implementation was held in conjunction with Mode S DAPs WG/5. The papers and issues discussed in the meeting covered Interregional IC Coordination, Guidance Material for Assignment of Interrogator Codes (IC) for MLAT and ADS-B, Reservation of IC Codes 14 and 15 for Research and Military, Trials of Mode S Surveillance Co-ordination Network, Upper Air Wind Speed Estimation based on Mode S SSR DAPs, Management of 1030/1090MHz Utilization, Planning Criteria for II/SI Code Assignment.

2.57 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.

2.58 China, Singapore and the ICAO Secretariat shared the current proposals for amending the Aeronautical Surveillance Manual (Doc. 9924) Appendix H and J. Amendments in Appendix H will clarify the steps that can be taken to secure a safe introduction of Mode S II/SI capable interrogators and transponders with the focus on an environment where both Mode S II only and Mode S II/SI capable systems are being introduced. Amendments in Appendix J will update the Mode S II code assignment planning with Mode S SI code and provide for compatibility with Mode S interrogators and transponders that are not Mode S SI capable. The proposed text was still being worked out, and SP Chair commented that the enhancement work could be completed by SP/5 in fall 2023.

2.59 SURICG/7 reviewed and deliberated the proposal from DAPs Working Group to rename the Group and update its Terms of Reference (ToR) to better reflect the current work scope that covers not only DAPs but also Mode S radars. After deliberation, SURICG/7 considered it appropriate to rename the Group as "Mode S and DAPs Working Group", and endorsed the Decision SURICG/7/2.

Review Report of SURSG/2

2.60 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 for members' discussions and decisions. SURSG/2 reviewed and deliberated the recommendations and moving forward proposals provided in the Table. The details of revised high-level recommendation and moving forward agreed by SURSG/2 were provided in the paper.

2.61 SURSG/2 deliberated and approved the necessity for establishment of the Surveillance Sharing in SWIM Trial Implementation Group (S3TIG) to oversee a trial proposed by the recommendation. SURICG/7 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.

2.62 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, which was the collaboration of HKCAD, PCCWG and partner Frequentis ComSoft to demonstrate sharing ADS-B data in a simulated SWIM over CRV environment and the benefits of a Surveillance Central Data Processor (SCDP). PCCWG prepared a video to introduce the POC exercise which was presented in SURICG/7.

2.63 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 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.

1090MHz Occupancy Monitoring

2.64 Singapore and ICCAIA discussed in this paper on 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.

Evaluation of Space Based ADS-B

2.65 ICCAIA described how low-cost evaluation of Space-based ADS-B at customer premises was supported. 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.

Review APAC Regional Surveillance Strategy

2.66 The Surveillance Strategy for the APAC Region is expected to be regularly reviewed to cope with the prevailing circumstances and developments. The ICAO Secretariat presented the last version of the Surveillance Strategy for the APAC Region adopted in 2019 for review. SURICG/7 reviewed the comments/views received for revising the Surveillance Strategy, discussed the amendment proposals, and formulated the revised Strategy provided in **Appendix E** to this paper, which was further discussed and endorsed by CNS SG/26 for consideration by APANPIRG/33.

Other Surveillance Issues

ATS Surveillance and DCPC VHF Coverage Charts for APAC Region

2.67 The work and progress of updating the coverage charts of ATS Surveillance and Direct Controller and Pilot Communication (DCPC) VHF for APAC Region were discussed and expected to be incorporated in the next update of the APAC Seamless ANS Plan. The ICAO APAC Regional Office issued the State Letter AP027/22 (CNS) in February 2022 for States/Administrations to respond to the survey. With great assistance from Thailand, coverage charts on DCPC VHF and ATS Surveillance have been produced with highlights of changes discussed in the Meeting. The meeting endorsed including the updated charts into the next update of Seamless ANS Plan. States/Administrations were encouraged to work with appropriate parties and/or other States/Administrations to derive plans in addressing the coverage gaps identified in the coverage charts, and States/Administrations which have not yet responded to the survey were encouraged to contribute relevant information to complete the coverage charts.

2.68 Australia noticed that the coverage only includes ground-based surveillance while States like Papua New Guinea which have already implemented space-based ADS-B in their airspace should also be considered. Despite not receiving input related to space-based ADS-B in this round of input/update, the Secretariat noted the comment and agreed to consider also the Space-based ADS-B in future. The Secretariat also thanked Thailand for the meticulous work done and human resources paid to complete this task.

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

2.69 The CNS SG/26 meeting reviewed the update 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). Despite Conclusion CNS SG/25/13 (SURICG/6/7) endorsed to urge States/Administrations to proactively follow up with air operators to address discrepancies, the problems still persist and improvement in the overall situation has not been seen. 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. The paper further discussed the remedial and preventive measures taken by Hong Kong China to mitigate the impact on operations caused by the recurring discrepancies. With this issue also discussed in SURICG/7, in that meeting IATA appreciated the effort by Hong Kong China and agreed to continue their effort to communicate with airlines for any ANSPs that encounter such discrepancies and IATA requested copying of these communications for following up with airline operators.

2.70 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 to promote awareness of this issue and the best practice in mitigation.

2.71 IATA supplemented that they had already provided a detailed de-brief to airlines about the issue reported by Hong Kong China after the SURICG/7 meeting. The briefing specifically sensitized airlines on discrepancies and causes, and appealed to them for crosschecking and reminding their employees about the issue. IATA also reminded ANSPs to copy any communication with defaulting airlines on this subject so as to help operators in taking up the issue.

Other Updates from States

2.72 New Zealand advised that Airways New Zealand signed a contract with Indra Spain to purchase 3 MSSR/PSR3D radars to replace the existing MSSR and PSRs which are nearing end of life. The new MSSR/PSR3D radars are to be used as a contingency system to provide surveillance coverage over the international airports at NZAA, NZWN and NZCH in the event of a sustained GNSS outage affecting New Zealand's prime surveillance coverage of ADS-B.

2.73 New Zealand would like to request ICAO member states to update their airlines which operate into New Zealand, as of midnight Dec 31, 2022 (NZDT) or 202212301100 UTC that all controlled airspace within the NZZC FIR will become ADS-B mandatory airspace. Updated guidance for flight into NZ will be published in the NZ AIP towards the end of 2022.

Outcome of ATMAS TF/3 Meeting and ATM Automation System related Issues

Webinar on Implementation of ATM Automation System

2.74 The Webinar on Implementation of ATM Automation System was organized in conjunction with the ATMAS TF/3 meeting *on 7 June 2022*. The Webinar was conducted in two sessions. Session 1 focused on Experience Sharing of Practices, while Session 2 focused on System Integration and Interoperability. It provided the APAC region an update on the latest developments and practices related to ATM automation systems at global and regional levels. Total 8 comprehensive presentations from contributors were presented during the webinar.

Repository of the ATMAS in APAC

2.75 . The table of ATMAS status in APAC region, re-designed and re-formatted by the ad-hoc group led by Indonesia, has been reviewed and adopted by the ATMAS TF/3 meeting. While filling the table, the Member States are recommended to refer to the explanation of the table and the corresponding chapter of ATMAS IGD to get further information. The ICAO Secretariat was requested to issue a State Letter in due course to circulate the table to collect information in order to build the repository of the ATM automation systems.

Air Traffic Management Automation System Implementation and Operations Guidance Document

2.76 Following the ATMAS TF/2 meeting, ICAO APAC Regional Office issued the State Letter AP173-21 (CNS) to gather further inputs and comments for the draft of ATMAS IGD. With 101 comments received from States, the ad-hoc group led by China, with the support of Hong Kong China and Singapore, worked on further improvement and polishing of the ATMAS IGD. Based on New Zealand's additional comments and suggestions during the ATMAS TF/3 meeting, the ATMAS IGD was further updated by the ad-hoc group and agreed by ATMAS TF/3 meeting. With aforementioned, the CNS SG/26 meeting adopted *Air Traffic Management Automation System Implementation and Operations Guidance Document (1.0).*

Repository of AIDC Implementation Status in APAC

2.77 The ICAO Secretariat designed a new table to maintain a common understanding between ATMAS TF and ACSICG on AIDC implementation, and eventually build up the regional repository of AIDC Implementation Status. The ACSICG/9 and ATMAS TF/3 reviewed and adopted the format of the table of AIDC Implementation Status in APAC region with the current status. The ICAO Secretariat has incorporated the AIDC implementation status relevant information gathered before and will issue a State Letter in due course to circulate the table to States/Administrations for supplements and validation.

AIDC Implementation Issues Report

2.78 The ATMAS TF/3 meeting reviewed and discussed the consolidated implementation issues collected and presented by Indonesia with support from India and Singapore. Indonesia updated the meeting that there were 7 newly reported AIDC implementation issues provided in the ATMAS TF/3. The number of AIDC implementation issues reported by Member States/Administrations, based on fault category are shown in the table below:

Fault Categories	ATMAS TF/3 (2022)		
	Issues Reported	Closed	Open
a. Communication Link	9	6	2
b. ATM System	65	35	30
c. AIDC Message	23	14	9
d. Airspace Design/Procedures	13	7	6
e. Other	6	3	3
Total	**116**	**66**	**50**

Updates from States

2.79 Singapore presented its development of a prototype Secure Data Bridge (SDB) to extract historical and real-time data from the Air Traffic Management System (ATMS). Singapore also presented its plans to implement FF-ICE/Release 1 (R1) and highlighted the key considerations in planning for the Filing Services and Flight Data Request Services.China proposed a new optimized MSAW around the airport combining four regions layer by layer. China introduced the technical scheme of SWIM-based interoperability for ATM automation systems. China presented the current cybersecurity status of ATMAS in China, and the brief design on 3 key aspects of cybersecurity in common between Air Traffic Management Security Manual (ICAO Doc 9985) and Chinese cyber security standard serial (GB/T 22239-2019). Hong Kong China is implementing an Approach Spacing Tool (AST) for the final approach traffic.

Review Status of CNS Deficiencies

2.80 The only outstanding issue was related to unreliability of AFS communication between Afghanistan and Pakistan. Poor performance of AFS including data communication between Kabul and Karachi and ATS voice communication between Lahore and Kabul had become issues of regional concerns. In addition, the meeting noted WP/10 of ATM SG/9 regarding the IFALPA defined deficiencies, States/Administrations are encouraged to take note of CNS-related IFALPA deficiencies, and take proper action to address these IFALPA deficiencies.

2.81 Pakistan stated that they upgraded the hardware of VSAT from IDU 3000 to IDU 5000 in the year 2007. In addition, a VPN link was established between Karachi and Kabul through UK. Now the VPN link between UK and Kabul is un-serviceable. Pakistan identified that the data and voice communication through CRV is a workable solution. Pakistan Civil Aviation Authority has conveyed ICAO its intention to join CRV by December 2022. In the Meeting, Pakistan requested ICAO to provide assistance in establishing VSAT link and to coordinate with Afghanistan regarding their tentative timeline to join the CRV.

Cybersecurity of CNS/ATM systems

Updates on ICAO International Aviation Trust Framework

2.82 The ICAO Secretariat shared the recent development ICAO's work on building an International Aviation Trust Framework since CNS SG/25, including developments of TFSG, information security framework (ISF), new proof of concept exercise, and digital identity. The meeting was informed that several papers on the trust framework and cybersecurity were received for A41, and ICAO is working on SkyTalk and sidebar meetings to promote cyber activities within ICAO.

Ensuring Cyber Resilience for Air Navigation Service in Hong Kong International Airport and its Expansion

2.83 Hong Kong China shared the experience in the provision of an effective cyber security management framework to ensure safe and secured air navigation service (ANS) for supporting the operation of Hong Kong International Airport (HKIA) and its expansion into Three Runway System, with high digitization and interconnection put in place.

Application of New Technologies

2.84 Apart from encouraging the Member States to share their experience on new technologies application, as the response to APANPIRG's call on enhancing engagement with the industry, CNS SG and its contributory bodies invited various industry partners to share and update the latest progress in relevant areas.

2.85 The sharing and discussions covered Surface Security Enhancement Application Based on Voice and Photoelectric Intelligent Assistant; Enhancement of AeroMACS SARPs and Technical Manual; LEO Navigation Augmentation Concept, Constellation Construction and Civil Aviation Application Research; Digital Tower and Apron Management System to Support Safe and Efficient Operation, etc.

Industry Presentations

2.86 CETC Glarun Technology presented Comprehensive Applications of the Radar-based Monitoring Systems in Airport; Searidge presented the Resilience, Recovery, Refocus as its 3Rs concept applied in the process to implement digital tower; Huawei presented Advanced Digitization Facilitating Air Traffic Development; Saab shared its Experience on Digital Towers.

Impact of COVID-19 to CNS Works in 2022

2.87 Due to the decline in implementation of CNS/ATM projects by the Member States, the planned programme has been postponed or has broken into phases and the harmonisation of implementing activities between neighbouring States and among stakeholders became more difficult.

Tracking CNS-Related APANPIRG Conclusions/Decisions

2.88 In view of the importance of the APANPIRG Conclusions/Decisions, the Secretariat has reviewed the reports of the former meetings from APANPIRG/1 to APANPIRG/32, extracted more than 600 CNS-related APANPIRG Conclusions/Decisions from the reports on various media, and consolidated in one Microsoft Excel table with marked status as *in force/applicable, closed, not applicable, group dissolved, superseded, task completed, and undertaken by ICAO HQ/Panels*, for easy reference and tracking by States/Administrations.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) note the List of Conclusions, Decisions, Draft Conclusions and Draft Decisions provided in **Appendix A**, the updated status on AMHS readiness for supporting IWXXM Traffic as in **Appendix B**, proposed text for Seamless ANS Plan with SWIM ASBUs as in **Appendix C**, Revised ToR of SWIM TF as in **Appendix D**, and Revised Surveillance Strategy as in **Appendix E**;

c) provide requirements and contribute experts to support the seminar to be organised by ATMAS TF (refer to paragraph **2.30**), and

d) discuss any relevant matters as appropriate.

…….

List of Conclusions, Decisions, Draft Conclusions and Draft Decisions by CNS SG/26

Reference		Subject
Draft Conclusion CNS SG/26/01 *(ACSICG/09/01 (CRV OG/09/01))*	-	Revised Amendment of the Management Service Agreement for CRV project (RAS14801)
Draft Conclusion CNS SG/26/02 *(ACSICG/09/02 (CRV OG/10/01))*	-	Extension of CRV Contract for one year.
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
Draft Decision CNS SG/26/05 *(SWIM TF/06/03)*	-	Harmonization of Timelines for SWIM-related Initiatives
Draft Conclusion CNS SG/26/06 *(SWIM TF/06/02 and 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
Decision CNS SG/26/07 (*SWIM TF/06/06)*	-	Revised SWIM TF Terms of Reference
Draft Conclusion CNS SG/26/08 *(SRWG/6/02)*	-	Planning Principle for Aeronautical Frequency Bands of 108-117.975 MHz, 960 – 1215 MHz and 117.975 to 137 MHz
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
Draft Conclusion CNS SG/26/11 *(SURICG/7/3)*	-	Revised Surveillance Strategy for the APAC Region
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

AMHS Readiness Report for Supporting IWXXM Traffic

No.	States/Administration	Name of State (Administration)/name of BBIS/BIS location where AMHS is installed:	AFTN/AMHS transition date/schedule	Readiness Status of AMHS for supporting File Transfer Body Part (FTBP), the Interpersonal Message (IPM) Heading Extension (IHE) to support for exchanging IWXXM reports of a maximum size of 4MB and FTBP of maximum 2MB:	Capacity status of the operational AFS links to support the exchange of the required meteorological information in both IWXXM GML form and TAC form:
1	Australia	Airservices - Brisbane	Completed. AMHS exchange in place with USA, Fiji, New Zealand, Singapore and South Africa. AFTN still in place with Indonesia and PNG, migration to AMHS based on pending readiness both partners Several Pacific island nations connecting via FCO CADAS ATS Terminal, currently over AFTN. Airservices plans to migrate to AMHS P3 CADAS but will need to provide user training. All domestic users and data originators still on AFTN, no desire by external partners to migrate to AMHS, awaiting SWIM instead.	Full compliance and support since Nov 2020	Airservices has contracted a 2.0Mbps bandwidth using CRV Package C+ for Voice & AMHS services. Bandwidth on the leased line with South Africa / Johannesburg is also 2Mbps.
2	China	Beijing	AMHS deployed in 2008 which was upgraded to support ATN/IPS in 2013 and upgraded to support exchanging IWXXM in 2020.	support	CRV bandwidth is 3M. Minimally 64kbps for each AMHS connection..
3	Hong Kong China	Hong Kong China	December 2009	Support	2MB for CRV and 64kbps for IPLCs
4	Fiji	Fiji Airport/Air Traffic Management Centre	Completed. In June 2019, Fiji completed the transition of ATN BBIS to IPS for the AMHS service from Nadi to Salt Lake, USA & Brisbane, Australia over the CRV network. The local end User still operates on AFTN terminal and is converted to AMHS over the AFTN/AMHS Gateway.	The Comsoft AMHS System supports File Transfer Body Part (FTBP). Our system has the capability of exchanging IWXXM reports of a maximum size of 4MB and FTBP of maximum.	Nadi has contracted a 1.0Mbps bandwidth using CRV Package C+ for Voice & AMHS services. The total bandwidth usage for voice and data is 768K from the total 1.0Mbps. The bandwidth for AMHS is 64Kbps each to Brisbane & Salt Lake Center. It is noted in the ACSICG/7 WP04 presented by USA that 64Kbps is the minimum recommended required bandwidth for AMHS to exchange FTBP for IWXXM.
5	India	AAI/Mumbai Airport	AMHS is in operation since 2011. India is in the process of tendering for replacement of existing AMHS system . The Tender action stands delayed due to COVID pandemic.	Presently India is not able to exchange the required 4 MB messages and 2 MB FTBP attachments.	Indian Meteorological Department is in the process of upgradation of HPC & DB to support IWXXM.

CNS SG/26 - Appendix C to the Report

No.	States/Administration	Name of State (Administration)/name of BBIS/BIS location where AMHS is installed:	AFTN/AMHS transition date/schedule	Readiness Status of AMHS for supporting File Transfer Body Part (FTBP), the Interpersonal Message (IPM) Heading Extension (IHE) to support for exchanging IWXXM reports of a maximum size of 4MB and FTBP of maximum 2MB:	Capacity status of the operational AFS links to support the exchange of the required meteorological information in both IWXXM GML form and TAC form:
6	Japan	Japan/Fukuoka	ATN BBIS router and AMHS installed at 2000. Connection tests with USA 2000 - 2004 and put into operational use in 2005 and over CRV in February 2019. Put into AMHS operation with Hong- Kong and Singapore in 2021. AMHS implementation with China in 2021 , Korea and Taipei in 2022.	Already support exchange of IWXXM messages based on FTBP in August 2015. It is possible to send , receive and transfer up to 2GB for the contents such as FTBP,IPM and IHE in AMHS,and the size of IWXXM suported system by Japan Meteorological Agency is 2MB	AFS links over CRV is a Package A, Bandwidth 2M.
7	Macao China	Macao China	Q4/2009	Q3/2021	To be determined
8	New Zealand	Airways – Christchurch	AMHS connections are in place with Australia, USA and the New	Support	Airways New Zealand has contracted a 1.0Mbps bandwidth using CRV Package C+ for Voice and AMHS services from Auckland and Christchurch.
9	Philippines	Philippines/ATMC Manila	Completed March 2018	Can support IHE and FTBP maximum 1MB (tested with Taipei on 13-May-20)	1MB Philippines has contracted 2Mbps bandwidth using CRV package “A” voice and data services.
10	Republic of Korea	Gimpo international airport	ATN/AMHS with China put into operational use in June, 2011. AMHS implementation with China and Japan over CRV will be in 4Q, 2022.	AMHS implementation for supporting FTBP and IHE will be in 4Q, 2022.	AFS links over CRV is a Package A, Bandwidth 2M.
11	Singapore	Singapore	March 2011	Yes	2MB for CRV and minimally 64kbps for IPLCs
12	Thailand	Thailand	BBIS/BIS Routers already implemented. AMHS has been implemented since July 2011. Connection with Bangladesh, Bhutan, Cambodia, China, India, Lao PDR, Myanmar, Singapore, Hong Kong China, and Malaysia implemented. Connection with SITA (SITA AMHS Gateway inter-connections) implemented. **Bangkok - Vietnam Circuit**	Completed, the IWXXM exchange has been implemented since November 2020.	The capacity of links readied to support in both form.

CNS SG/26 - Appendix C to the Report

No.	States/Administration	Name of State (Administration)/name of BBIS/BIS location where AMHS is installed:	AFTN/AMHS transition date/schedule	Readiness Status of AMHS for supporting File Transfer Body Part (FTBP), the Interpersonal Message (IPM) Heading Extension (IHE) to support for exchanging IWXXM reports of a maximum size of 4MB and FTBP of maximum 2MB:	Capacity status of the operational AFS links to support the exchange of the required meteorological information in both IWXXM GML form and TAC form:
			IOT Test : Done POT Test: Planned for end of 3Q2021 **Bangkok - Rome Circuit** IOT Test: Planned for 3Q2021 POT Test: Planned for 4Q2021		
13	USA	Federal Aviation Administration	Q4, 2020	Yes. FAA AMHS has FTBP capability. National Weather Service (NWS) projected to implement IWXXM by Q3, 2021	Yes. 2MB bandwidth over CRV

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

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

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

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

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

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

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

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

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

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

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

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

Composition:

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

Conduct of the work:

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

Reporting:

The group will report to CNS SG.

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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.*

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