



ICAO

International Civil Aviation Organization

**Eleventh Meeting of the Air Traffic Management Sub-Group
(ATM/SG/11) of APANPIRG**

Singapore, 2 – 6 October 2023

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

MAIN OUTCOMES OF CNS SG/27

(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/27 meeting which was held from 28 August to 1 September 2023.

1. INTRODUCTION

1.1 The Twenty Seventh Meeting of the Communications, Navigation and Surveillance Sub-group (CNS SG/27) of Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) was held at the ICAO APAC Regional Office, Bangkok, Thailand, from 28 August to 1 September 2023. The Meeting was attended by 108 participants from 24 States/Administrations, 3 International Organizations and some industry partners. The meeting report, papers and other resources can be accessed at <https://www.icao.int/APAC/Meetings/Pages/2023-CNS-SG-27.aspx>

2. DISCUSSION

Review outcome of relevant meetings

2.1 The CNS SG/27 meeting reviewed the outcomes of 41st Session of ICAO Assembly, APANPIRG/33, APAC ANSP Committee/1, ATM Sub-group, MET Sub-group and other meetings relevant to CNS Sub-group. In addition, the meeting noted the latest status and action taken for various Conclusions/Decisions adopted and recommended by CNS SG/26, Conclusions/Decisions adopted by the APANPIRG/33 related to CNS, along with the latest status and action taken on various Action Items formulated by the CNS SG/26 Meeting.

2.2 The Meeting noted the need to enhance the communication and surveillance capability of Member States to improve situational awareness, work towards strengthening effective implementation indicators by complying with protocol questions related to CNS, review the NOTAM list, and consider removing old and very old NOTAMs related to CNS, implement AIDC to mitigate LHD incidents, and the need for robust ATC training to ensure the compliance of new technology and the application of contingency procedures when system operation failed.

2.3 The Meeting also noted the need to prioritize implementation of network circuits necessary to support the global exchange of meteorological information in IWXXM form. The Meeting noted that MET/IE WG/21 is planning for a conjoint Meeting session with ACSICG/11 in 2024 to facilitate further regional discussion and progress on the abovementioned matters.

2.4 The Meeting was also presented on the latest status of relevant ICAO SARPs and global development related to CNS and aeronautical radio frequency spectrum.

Outcome of ACSICG/10

2.5 The Meeting reviewed the discussions and relevant outcomes of the ACSICG/10 (24 to 26 May 2023) along with key outcomes of the ICAO Asia Pacific Idea Generation Workshop (31 January 2023) and CRV OG/11 (1 to 3 February 2023).

2.6 The Meeting noted the **Conclusion APANPIRG/33/7 - Extension of CRV Contract for one year**. Member States are urged to initiate a service order with the PCCW Global for CRV implementation as early as possible, on or **before 31 December 2023** and synchronize the implementation of CRV in the APAC region.

2.7 The Meeting supported the global dissemination of meteorological information in IWXXM format by prioritizing the implementation of intra- and inter-regional aeronautical communication services and network circuits, including support for the implementation of AMHS with File Transfer Body Part (FTBP) and Interpersonal Message Heading Extension (IHE), and facilitating, through inter-regional consultation, the enhancement of inter-regional network redundancy (i.e., primary circuits and backup paths).

2.8 India provided its latest progress of AMHS/CRV implementation and suggested extending the existing CRV network to the MID Region to facilitate smooth connectivity and exchange of Aeronautical/meteorological and other traffic from the APAC region. The Meeting supported the suggestion for MID States to join CRV and the potential benefits to both regions. The ICAO Secretariat will coordinate with the MID office and PCCWG to take follow-up actions.

Outcome of SWIM TF/7

2.9 Considering a way forward to meet the 2024 Asia/Pacific SWIM implementation timeline, the SWIM TF/7 Meeting established an ad-hoc group for gathering the guidance materials. China, Hong Kong China, India, Singapore, Thailand, and the USA volunteered to participate in this editorial task ad-hoc group led by Thailand aiming to complete the task in the *one-year* timeline.

2.10 The SWIM TF/7 Meeting adopted the **Decision SWIM/TF/07/03 – Formation of the SWIM Implementation Pioneer Ad-hoc Group** with deliverables outlined in its ToR. Australia, Hong Kong China, Japan, Malaysia, Republic of Korea, Singapore, Thailand, and IATA volunteered to join the group.

2.11 The SWIM TF will review the proposed data catalogue and provide suggestions on additional information that should be exchanged through APAC Common Information Services.

2.12 MET/R WG Ad-hoc Group presented the recent updates on the work to identify and document use cases and user requirements for SWIM-based MET information services supporting ATFM in the APAC region in coordination with other working groups and provided an updated draft version of the regional document for consultation. The SWIM TF/7 Meeting shared that use cases could be potentially included in the Asia/Pacific regional SWIM implementation guidance material, which the Editorial Task Ad-hoc Group is drafting.

2.13 A SWIM Seminar was held on 8 May 2023 at the ICAO Asia and Pacific Regional Office with the theme - *Asia/Pacific SWIM: Where are We Now?* The presentations to the Seminar can be accessed at <https://www.icao.int/APAC/Meetings/Pages/2023-SWIM-Seminar-and-SWIM-TF7.aspx>

2.14 The CNS SG/27 endorsed **Draft Conclusion CNS SG/27/04 (SWIM/TF/07/04) – Asia/Pacific Regional FIXM version 4.2 Extension** formulated by SWIM TF/7 for APANPIRG/34 adoption.

Multi-Regional TBO Demonstration

2.15 Japan, Singapore, Thailand, and USA jointly presented to CNS SG/27 an overview of the Multi-Regional TBO Demonstration, a collaborative project undertaken by Japan, Singapore, Thailand, USA, and Canada to validate the TBO concept as well as to showcase the TBO operational values and key capabilities, both operational and technical, required to support TBO. The Meeting was encouraged to provide guidance and collaborate on establishing the crucial TBO building blocks, i.e., SWIM and FF-ICE, to support the development and realization of TBO in Asia/Pacific.

2.16 The Meeting was informed that the MR TBO Demo has been concluded with the live-flight demonstration in June 2023, and at present, there is no plan to conduct any other phase of the MR TBO demonstration. However, another discussion in APAC SWIM TF among the MR TBO ANSP partners to conduct such a demo in Asia/Pacific in the future is going on.

2.17 The Meeting agreed to support the collaboration and coordination between the SWIM TF and FF-ICE Operational Requirements Small Working Group (SWG) under ATM SG as well as Workstream 2 - Accelerate the Development and Implementation of Seamless ANS and Collaborate on Green Initiatives to Enhance ANS Sustainability under Asia and Pacific ANSP Committee (AAC) in building the TBO enablers, i.e. SWIM and FF-ICE, in Asia/Pacific.

Report of SRWG/7

2.18 The Meeting was presented an overview of the findings from the global database, supplementing the discussion proposed to review the VHF COM frequency allotment plan for APAC to accommodate new requirements. Simulations of future spectrum requirements have shown that certain allotments were prone to saturation while others were underutilized. Reconsideration on such allotments was proposed for better utilization of the allotments. It was proposed to establish an ad hoc expert group to study the allotment plan, analyse the actual usage of allotment registered, identify areas for improvement and to propose solutions (technical and administrative), explore the potential in reallocating sub-bands/pools, survey the use of TIBA.

2.19 The Meeting was informed that the questionnaire results on introducing 50 kHz channel spacing for ILS and VOR facilities in the APAC Region, which was the outcome from the ad-hoc group formed by SRWG/5 in 2021. 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 aircraft operating in their airspaces can support the use of 50 kHz channel spacing.

2.20 The Meeting reviewed the Asia Pacific Regional Aeronautical Radio Frequency Management Guidance Material draft and noted that this guidance material was not intended to and should not replace the relevant requirements stipulated in Annex 10 and Doc 9718, therefore, the CNS SG/27 adopted the material through **Conclusion CNS SG/27/05 (SRWG/7/1) - Asia Pacific Regional Aeronautical Radio Frequency Management Guidance Material Edition 1.0**.

Guidance Material on Protecting Radio Altimeter from Interference

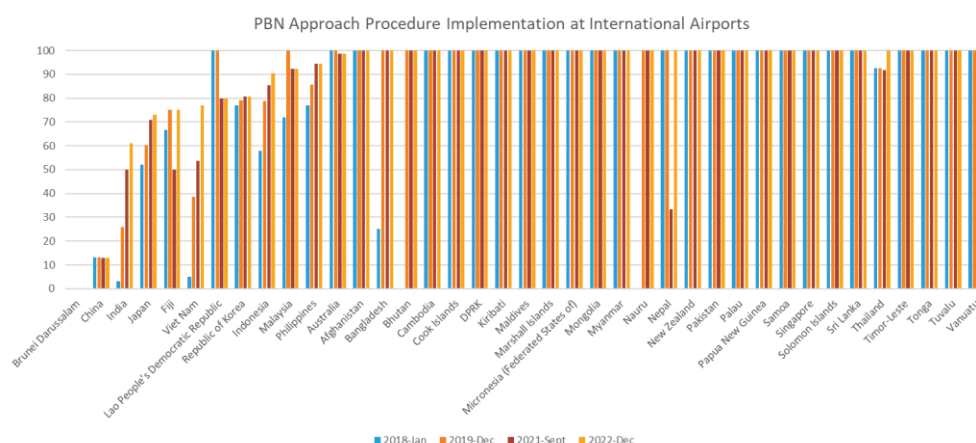
2.21 The Meeting reviewed Resolution A41-7 “Support of the ICAO policy on radio frequency spectrum matters,” adopted by the ICAO Assembly 41st, and noted that the Secretariat has been working with FSMP and the ICAO Middle East Regional Office (MID) Radio Altimeter (RADALT) Action Group (AG) to develop a guidance material to protect radio altimeters from potential harmful

interference from new cellular broadband technologies such as 5G. The latest draft of this guidance material is to be published as an ICAO circular this year.

Outcome of PBNICG/10

2.22 The Meeting noted the global PBN implementation status as available in ICAO iSTARS. ICAO informed that implementation of APV procedures for all instrument runways ends by 2016, the key requirement of ICAO Assembly Resolution A37-11, was behind global achievement. However, PBN SID/STAR implementation was above the global implementation status (see Chart 1).

Chart 1. PBN (Approach) Update, as of Dec 2022 (as per iSTARS)



2.23 ICAO Council adopted ICAO SARPs for dual-frequency multi-constellation (DFMC) GNSS in March 2023 to improve overall safety, capacity and efficiency by providing better navigation performance and availability. The DFMC GNSS SARPs will introduce the next generation of GNSS for aviation, such as two entirely new GNSS constellations, Galileo (Europe) and BeiDou (China).

2.24 The Meeting was informed the PBNICG/10 Meeting that although Baro-VNAV approaches provide significant safety benefits over conventional LOC, NDB and VOR approaches as they provide vertical guidance; however, they are significantly less robust than geometric PBN approaches enabled by SBAS and GBAS as they depend on temperature & QNH setting. The main vulnerability of Baro-VNAV approaches lies in their dependence on the correct altimeter setting, which involves multiple human interventions such as,

- determination of the local QNH by the meteorological service provider,
- publication of the local QNH in ATIS,
- transmission of the local QNH by ATC to the flight crew,
- altimeter setting by the flight crew, and
- correction for the effects of temperature on the atmospheric pressure at aircraft altitude.

2.25 The concept of Established on RNP AR APCH was introduced, which is a procedure for a simultaneous parallel independent approach that takes advantage of RNP AR.

Outcome of GBAS/SBAS ITF/5

2.26 The revised GBAS safety assessment guidance document related to anomalous ionospheric conditions (Edition 2.0) was reviewed and endorsed by the Meeting through Conclusion CNS SG/27/06. Additionally, the Revised SBAS safety assessment guidance document related to anomalous ionospheric conditions (Edition 2.0) was endorsed by CNS SG/27 through Conclusion CNS SG 27/07.

2.27 The Meeting adopted Conclusion CNS SG/27/08 to extend the period of Asia/Pacific GBAS/SBAS Implementation Task Force for another 3 years (i.e., up to 2026).

Revised Navigation Strategy for Asia Pacific Region

2.28 The Meeting reviewed the proposal to revise the Navigation Strategy for the Asia/Pacific Region in view of the latest development in GNSS navigation, which was adopted via Conclusion APANPIRG/27/37 in 2016. The Meeting endorsed the revised version through Draft Conclusion **CNS SG/27/09** for adoption in APANPIRG/34.

Managing Challenges of In-Situ Replacement for ILS at Busy Airport

2.29 Taking opportunity of Three Runway System Project at the Hong Kong International Airport (HKIA), the replacement of existing ILS has to be carried out in an in-situ manner for an operating runway. A flight check will be conducted on the new ILS right after the existing ILS is dismantled. Besides, the flight procedure associated with the ILS was revisited by the flight procedure designer even though the two systems are located close to each other.

Using Drone to Enhance Efficiency in Flight Inspections

2.30 Hong Kong China and Republic of Korea shared their exploring on the use of drone technology to enhance efficiency in flight inspections. A video link to the trial titled “Civil Aviation Department conducts trial flight inspection by small unmanned aircraft at the Hong Kong International Airport to enhance efficiency” was given at <https://isd.wecast.hk/vod/?>. Video on DIVA from ROK is at [\(Drone for ILS VOR Analyzer\)](#)

2.31 China supplemented its experiments using 3 types of drones: fixed-wing RPAS with a heavy payload, hybrid-wing RPAS with a medium payload, and multirotor drones with detachable payload. China is proposing with the USA and European countries to setup an ad hoc group under ICAO NSP to update Doc 8071.

Outcome of SURICG/8

2.32 The Meeting reviewed the outcomes of SURICG/8, including the Sixth Meeting of the Mode S Downlinked Aircraft Parameters Working Group (Mode S and DAPs WG/6) and the Third Meeting of the Surveillance Study Group (SURSG/3).

2.33 The ICAO Aircraft Address and Target Identification in Surveillance Data and Flight Plan Workshop was held at ICAO APAC Regional Office, Bangkok, Thailand, on 6 June 2023. All presentations can be accessed at <https://www.icao.int/APAC/Meetings/Pages/2023-SURICG8.aspx>.

2.34 The CNS SG/27 endorsed Draft Conclusion **CNS SG/27/10 - General Strategy on Assignment of and Migration to SI Code in the APAC Region** for APANPIRG adoption to synchronize the APAC region on the general principles applied for assignment of and migration to SI codes.

2.35 The Meeting noted the **Decision SURICG/8/3 (Mode S and DAPs WG/6/3) - Dissolution of Mode S and DAPs Working Group** was discussed and endorsed by SURICG/8. The Meeting endorsed

Decision CNS SG/27/12 (SURICG/8/4): Revised ToR of Surveillance Implementation to reflect the change due to the dissolution of Mode S and DAPs WG.

2.36 The work and progress of updating the coverage charts of ATS Surveillance and Direct Controller and Pilot Communication (DCPC) VHF for the APAC Region were discussed and expected to be incorporated in the next update of the APAC Seamless ANS Plan.

Implementation of ADS-B verification technologies

2.37 Japan presented to CNS SG/27 on the implementation status of the ADS-B anti-spoofing function used for the ATC system in Japan. The anti-spoofing function consists of the position verification function using TDOA and a supplementary function to detect position jumps using the CPR decoding method. JCAB is currently developing the prototype ADS-B ground station with the above anti-spoofing function.

Outcome of ATMAS TF/4

2.38 The Meeting was presented a summary of the discussion in the Seminar on Air Traffic Management Automation System and the work accomplished by the Fourth Meeting of the Asia/Pacific Air Traffic Management Automation System Task Force (ATMAS TF/4), which were held at ICAO APAC Regional Office, Bangkok, Thailand, from 27 to 30 June 2023. The presentations to the Seminar can be accessed at <https://www.icao.int/APAC/Meetings/Pages/2023-ATMAS-TF4.aspx>

2.39 The ATMAS repository has been circulated through State Letter, and total 11 updates have been received from States/Administrations. Based on the ATM automation systems status collected, the preliminary analysis of the key performance indicators on the ATMAS Repository has also been summarized.

2.40 The Meeting was informed that the revised draft (Edition 1.3) of the Air Traffic Management Automation System Implementation and Operations Guidance Document (ATMAS IGD) was adopted by ATMAS TF/4 by **Conclusion ATMAS TF/04/01 - ATMAS IGD (Edition 1.3)**.

2.41 The table of the AIDC repository with current status has been circulated through State Letter. The ATMAS TF/4 Meeting presented the latest repository of AIDC Implementation Status with a preliminary analysis. It was noted that a total of 21 States/Administrations have already implemented AIDC, 3 States/Administrations updated that the AIDC is still under testing, and 19 States/Administrations have not implemented AIDC yet.

Regional implementation review and updates

Achieving High Resilience in Sustaining Operations of

Critical Aeronautical Infrastructure

2.42 Hong Kong, China highlighted that Critical Aeronautical Infrastructure (CAI) needs uninterrupted operations for sustaining round-the-clock provision of air navigation services for flight safety purpose. CAI includes but not limited to air traffic control centres, towers and corresponding equipment rooms, on-airport and off-airport CNS stations, systems and supporting electrical and mechanical (E&M) facilities, such as power supply and air conditioning etc. Resilience, redundancy and robustness (“3R”) are vital factors to consider in the planning, design and implementation and maintenance of CAI for coping with unexpected emergency circumstances caused by natural disasters or human-induced incident.

2.43 The Meeting emphasized the reference to the guidance document adopted by the ICAO APAC ATM Automation System Task Force in providing an independent full-fledged Contingency system from another supplier on top of the Main and Fallback systems for ATM Automation System. The ICAO Secretariat recalled the Assembly Resolution **A41-8: Ensuring the resilience of ICAO CNS/ATM systems and services**, advised that Resilience will be a keyword in near future on ICAO forums and encouraged CAAs/ANSPs to share their relevant experience in various contributory bodies of CNS SG.

Preparation of Emergency Equipment for ATC

2.44 Japan presented the operation of a Transportable Radar Control System (TRCS) and Emergency VFR system for ATC (EVA), which enabled the early recovery of ATC systems required for the operation of commercial flights after catastrophes such as earthquake, fire, Tsunami, and the training for the early resumption at the airport.

2.45 The Meeting recognized the need for regular maintenance and calibration of the contingency system to ensure its availability in emergencies, advised about the importance of a contingency or business continuity plan, only with the plan in place and exercised the ANSP could ensure continuous operation without interruption. The Meeting also encouraged States to join the work of the third work stream of the APAC ANSP Committee, “**Collaborate on business continuity and contingency planning**”.

Status of CNS Deficiencies

2.46 The only outstanding issue on the list of Air Navigation Deficiencies in the CNS field was related to the unreliability of AFS communication between Afghanistan and Pakistan. The Secretariat invited inputs from Member States/Administrations and international organizations to explore a way to enhance the ANS implementation in the region by identifying and addressing ANS deficiencies.

Capacity Building

Study on Human Factor Issues of ATSEP

2.47 The revised regional ATSEP human factor guidance document was reviewed and adopted by CNS SG/27 Meeting through Conclusion **CNS SG/27/13**. The Guidance document is prepared for the improvisation of existing human resource management process towards ATSEP for addressing the factors adding stress and fatigue, improve their job performance and for achieving organizational resilience and cost benefits.

ATM Infrastructure Operations Capability Building in Lao

2.48 The ICAO funded Implementation Support Project in Lao People’s Democratic Republic (Lao PDR) - ATM Infrastructure Operations Capability Building has been conducted *from October 2022 to May 2023*, which was managed by the ICAO APAC Office as Special Implementation Projects under ANB.

Asia/Pacific Seamless ANS Plan (the plan) Update

2.49 The paper presented the Seamless ANS Plan (the plan) related discussion outcomes from the APANPIRG/33 Meeting and a proposed update of the Performance Improvement Plan of the Asia/Pacific Seamless ANS Plan for initial review by CNS SG.

2.50 ICAO Secretariat informed that SWIM TF already shared SWIM related ASBUs to be included in the next edition of ICAO APAC Seamless ANS plan as per APANPIRG Conclusion

APANPIRG/33/9 “The Asia-Pacific SWIM Implementation Timeframe and inclusion of the Asia/Pacific SWIM Implementation in the Asia/Pacific Seamless ANS Plan”. ICAO Secretariat added that except SWIM related ASBUs, other ASBUs required Member State’s observations, feedback, and consent before CNS SG agreed to incorporate them into the next version of the plan.

2.51 As a way forward, the CNS SG/27 Meeting agreed to form a “CNS related ASBUs review Ad-hoc Group for next edition of Seamless ANS Plan”, which will review the proposed ASBUs, prepare a list of CNS related ASBUs to include in the plan, share interim report to APANPIRG/34, and seek consent from CNS SG/28.

2.52 The Meeting agreed that the available timelines to complete the task are very difficult to accomplish. Therefore, an ad-hoc group will try its best to fulfill the expectations by preparing revised content for providing an interim report to APANPIRG/34. A high-level plan was prepared for further action for which latest status is provided in the following table.

SN	Task	Responsible Parties	Tentative Timelines (2023)	Latest Status
1.	ICAO Secretariat preliminary editorial review, and inclusion of new element	ICAO Secretariat	Completed	Completed
2.	Formation of CNS related ASBUs review Ad-hoc Group for Next Edition of ICAO APAC Seamless ANS Plan	CNS SG/27	1 September	1 September
3.	Issuing email to Member States to join the Ad-hoc Group, advise their PoC, and share commitment to update on Next Edition of Seamless ANS Plan	ICAO Secretariat	7 September	4 September
4.	Sharing brief information about To-do work by email	ICAO Secretariat	15 September	11 September
5.	Online Meeting to review the background and list of ASBUs to include in the Seamless ANS Plan	ICAO Secretariat CNS ASBUs review Ad-hoc Group	30 September	26 September
6.	Consolidate initial comments from Ad-hoc Group and preparation of the list of CNS related ASBUs	ICAO Secretariat	7 October	
7.	Issuing State Letter to Member States for reviewing the list of CNS related ASBUs for Next Edition of Seamless ANS Plan	ICAO Secretariat	10 October (3 Weeks State Letter response time)	
8.	Compilation of Member States' response and sharing with CNS ASBUs review Ad-hoc Group	ICAO Secretariat	17 November	
9.	Online Meeting to review the initial list of ASBUs	ICAO Secretariat CNS ASBUs review Ad-hoc Group	25 November	

10.	Prepare an interim updates to APANPIRG/34	ICAO Secretariat	APANPIRG/34 (11-13 December 2023)	
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Date of next Meeting

2.53 The CNS SG/28 has been tentatively scheduled for 1-5 July 2024, in ICAO APAC Regional Office.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) continue keeping the ICAO Secretariat updated on the latest AIDC implementation status/progress/plan to better mitigate LHD incidents.
- c) continue contributing operational experts to contributory bodies reporting to APANPIRG through CNS SG; and
- d) discuss any relevant matters as appropriate.

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