International Civil Aviation Organization

Twenty Seventh Meeting of the Communications/ Navigation and Surveillance Sub-group (CNS SG/27) of APANPIRG

Bangkok, Thailand, 28 August - 1 September 2023

Agenda Item 3: Aeronautical Fixed Service (AFS)

3.1. Review Report of the Tenth Meeting of the Aeronautical Communications Services Implementation Coordination Group (ACSICG/10) including:

- Report of the Eleventh Meetings of Common aeRonautical VPN Operations Group (CRV OG/11)
- Report of CRV Workshop
- Report of the first Meeting of CRV OG Ad-hoc Governance Group

REVIEW REPORT OF THE TENTH MEETING OF THE AERONAUTICAL COMMUNICATION SERVICES IMPLEMENTATION COORDINATION GROUP (ACSICG/10)

(Presented by the Secretariat)

SUMMARY

This paper presents the report of the Tenth Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/10) held from 24-26 May 2023 for review and action.

1. INTRODUCTION

1.1 The Tenth Meeting of the Aeronautical Communication Services (ACS) Implementation Coordination Group (ACSICG/10) was held at ICAO APAC Regional Office, Bangkok, Thailand, *from 24 to 26 May 2023*. The Meeting was attended by 62 participants from 19 States/Administrations, 2 International Organizations, namely IATA, and ICAO, and 1 industry partner, namely Frequentis. The ACSICG/10 meeting report, working papers, information papers, and other resources can be accessed by following link: https://www.icao.int/APAC/Meetings/Pages/2023-CRV-OG-Ad-hoc-Governance-Group-and-the-ACSICG10.aspx

1.2 The Eleventh Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/11) was held from *1 to 3 February 2023* in ICAO Asia and Pacific Regional Office, Bangkok, Thailand. The Meeting was attended by 65 participants from 19 Member States/Administrations. The meeting report, working papers, information papers, and other resources can be accessed by the following link:

https://www.icao.int/APAC/Meetings/Pages/2023-CRV-OG11-.aspx

1.2 This paper summarized the report of ACSICG/10 for review and action by CNS SG/27.

2. DISCUSSION

Relevant Outcomes of the Seventh Meeting of System Wide Information Management Task Force (SWIM TF/7) (WP/15)

2.1 The paper presented relevant information on the outcomes of SWIM TF/7 held *from 9 to 12 May 2023* with highlighted on a draft of AMHS/SWIM Gateway technical specifications presented by AMHS/SWIM Gateway Study Group (SWAMWAY SG). The work done by SWAMWAY SG to develop a draft of the technical specifications for the AMHS/SWIM Gateway, providing a minimum set of requirements ensuring the exchange of information during the transition to SWIM as well as ensuring the interoperability with AMHS and with SWIM was summarized.

2.2 SWAMWAY SG informed that the target of the study group is to get the endorsement of ICAO EUR/NAT AFS to the SWIM Transition Task Force (AST TF) Meeting, to be held from 14-16 June 2023, for the proposed AMHS/SWIM Gateway technical specification as a previous step to be recognized by ICAO and considered as an international standard. Therefore, the SWIM TF/7 Meeting requested all delegates to provide feedback on the AMHS/SWIM Gateway technical specification draft **by 31 May 2023**. ACSICG/10 was also invited to review the draft AMHS/SWIM Gateway Technical Specification and provide comments to share with SWAMWAY SG.

2.3 The Meeting was informed that since SWIM offers to provide a P1 interface to AMHS, therefore SWIM should be the one to host the AMHS/SWIM Gateway. However, further close coordination and verification with SWIM TF is necessary. Regarding the transition to comply with SWIM requirements, the Meeting was reminded to make sure that the routing for AMHS/SWIM should not be confused, and this was further discussed in the Meeting with Presentation/03 from Frequentis.

Review the report of the Eleventh Meeting of Common aeRonautical VPN Operations Group (CRV OG/11) - Sec (WP/03)

Key Outcomes of ICAO APAC Idea Generation Workshop: CRV Governance and the Draft ToR of CRV OG Ad-Hoc Governance Group

2.1 The paper presented key outcomes of the *ICAO Asia Pacific Idea Generation Workshop: CRV Governance* held at the ICAO APAC Office, Bangkok, Thailand, on **31 January 2023**, and the draft ToR of CRV OG Ad-Hoc Governance Group. Three (3) presentations were delivered, followed by brainstorming sessions to discuss improving CRV governance to meet current requirements and future challenges. The Workshop report, presentations, and other resources can be accessed by following the link: https://www.icao.int/APAC/Meetings/Pages/2023-CRV-Governance-Workshop.aspx

2.2 The Workshop agreed to create the **CRV OG Ad-hoc Governance Group** for preparing and presenting the **potential CRV OG Governance model** to future CRV OG Meetings. The CRV OG Ad-hoc Expert Group Meeting held virtually on 20 April 2023 prepared and agreed on the draft ToR of CRV OG Ad-hoc Governance Group for further discussion in the First Meeting of CRV OG Ad-hoc Governance Group.

2.3 The First Meeting of CRV OG Ad-hoc Governance Group held on 22-23 May 2023 agreed that while defining modified CRV Governance, it is crucial to consider AMHS/SWIM Transition over CRV. The CRV OG Ad-hoc Governance Group Meeting reviewed and adopted the draft ToR of

CRV OG Ad-hoc Governance Group. The finalized and agreed ToR of CRV OG Ad-hoc Governance Group is provided in **Appendix A** of the paper.

CRV OG Operations Manual Status

2.4 The CRV OG/11 meeting adopted the **Decision CRV OG/11/01** - *Publish the updated APAC CRV Operations Manual (CRV OG OM v1.2)*. The latest version of the CRV OG Operational Manual has been published on ICAO APAC e-docs under CNS, ICAO APAC CRV Secure portal, and on the CRV portal hosted by Airways New Zealand, and the relevant information has been shared with Member States/Administration through State Letter **Ref.:** 8/2.15 – AP034/23 (CNS) dated **22 February 2023** on the subject - *Publication of ICAO APAC CRV OG Operations Manual v1.2 and ICAO APAC CRV Implementation Plan v2.2*.

2.5 Nepal suggested incorporating relevant guidance in the form of Process and Procedures into the CRV OG OM, clarifying that Member States can request support from the ICAO Secretariat and CRV OG for dispute resolution matters or other significant issues if arises. The CRV OG Ad-hoc Expert Group will discuss the possibility of adding such provisions and drafting relevant clauses in CRV OG OM.

Outcomes of CRV OG Experts Ad-hoc Group Meetings

2.6 The CRV OG/11 meeting noted that a total of seven virtual Ad-hoc Meetings were held between CRV OG/9 organised from *25-27 January 2022* till CRV OG11 and one distinct Meeting was held with the SWIM Task Force task leads on 28 October 2022. The outcomes of the Ad-Hoc Group Expert Group discussions on contract extension, upgrade/downgrade CRV circuits subscribed, different CRV Users and their joining process, and Package D+ formalization were presented, which were further reviewed in CRV OG/11 by separate working papers. Other topics were discussed, including the mandate of firewall, common Package review, chair's functions, and operations manual as a formal document.

Update to CRV Implementation Plan

2.7 The CRV OG/11 meeting agreed to publish the CRV OG Implementation Plan and adopted the **Decision CRV OG/11/02** - *Update to the CRV Implementation Plan*. The latest CRV OG Implementation Plan version without restricted information has been published on ICAO APAC e-docs under CNS Section. The latest version of the CRV OG Implementation Plan has been uploaded on the ICAO CRV Secure portal and CRV portal hosted by Airways New Zealand. The relevant information has been shared with Member States/Administration through State Letter **Ref.:** 8/2.15 – AP034/23 (CNS) dated **22 February 2023** on the subject - *Publication of ICAO APAC CRV OG Operations Manual v1.2 and ICAO APAC CRV Implementation Plan v2.2*.

ATN Documentation Tree Update

2.8 The CRV OG/11 meeting deliberated the proposed **APAC ATN Documentation Tree** and various CRV documents suggested to be placed in the Tree. Supplementary consultation requirements with more Member States for further modifications and updates were sensed. The proposed ATN Documentation Tree, which was provided in **Appendix B**, was referred to as *the first snapshot of the Tree*, which required more deliberation.

2.9 The CRV OG/11 Meeting agreed that the CRV OG Ad Hoc Expert Group will work on modifying relevant CRV documents and updating the CRV OG Operations Manual to ensure that any changes within CRV consider modifications required to the document tree.

2.10 The CRV OG/11 Meeting arranged that as the current APAC ATN Documentation Tree uploaded on ICAO APAC Website was not updated for a long time, the ICAO Secretariat will take necessary action to update ATN Documentation Tree on the ICAO APAC Regional Implementation Projects webpage with the modified first snapshot of the Tree after ACSICG/10 modifications. The ATN Documentation Tree will be amended in the future as more modifications will be made by ACSICG/CRV OG Meetings.

2.11 With the aforementioned, the ACSICG/10 Meeting further reviewed and updated the Tree and endorsed the following draft conclusion for CNS SG/27 consideration:

<table>
<tr><td colspan="3">Draft Conclusion ACSICG/10/01 – Adoption of the Asia/Pacific Regional ATN Documentation Tree</td></tr>
<tr><td colspan="2">What: a. the ATN Technical Document be published in a loose-leaf form to include future amendments to the Document Tree; and
b. the ATN Documentation Tree provided in Appendix B be adopted.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☐ Ops/Technical</td></tr>
<tr><td>Why: The current ATN/AMHS Documentation Tree published on ICAO APAC Website is not updated for a few years. Therefore, it required updates. Additionally, some documents related to CRV are required to add, and others are required to delete from the Tree due to obsolete documentation.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 01-Sep-23</td><td colspan="2">Status: Draft to be adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: CRV OG</td></tr>
</table>

Risk Assessment Framework for CRV OG

2.12 New Zealand presented a risk assessment framework for CRV. Over years of CRV operations, various installations and CRV processes issues have been encountered. These issues can be considered as the risk impacting the availability of CRV networks and services. The CRV OG/11 meeting noted that these risks were documented in the Airways New Zealand risk evaluation template, which can be accessed on the portal APAC CRV - Risk Register.docx, which has criteria that suit and reflect Airways New Zealand. The CRV OG/11 meeting noted it would be prudent to create a Risk Evaluation Framework against the ICAO DOC 9859 Safety Management that would suit the particular environment for CRV. The reviewed criteria for the consequences by categories to reflect the CRV and risk assessment framework is provided in **Appendix C**.

Mandate Firewall

2.13 New Zealand presented information on the potential to mandate the use of a firewall as part of the CRV implementation. Referring to the APAC CRV Operations manual and the System Design Document (SDD), the CRV OG/11 meeting noted the router with an ACL can only provide very limited security and it is recommended that external security advice is sought. Three options for mandating a firewall were presented for consideration. These were Option 1 – *PCCW implemented firewall*, Option 2 – *CRV User implemented firewall*, and Option 3 – *Update INFOSEC Policy*.

2.14 The CRV OG/11 meeting discussed that another option might be that PCCWG provides a firewall at one end of connection for State and at another end, State may install their firewall based on States preferences. However, as implementing a firewall and its maintenance may be costly for some States, mandating firewalls for CRV needs more deliberations. The additional proposed option was that CRV OG specifies a set of requirements to meet by States to comply with CRV security policy. However, it required additional contributions from more Member States.

Update the APAC CRV Implementation Table

2.15 The latest updates presented on the planning and implementation status of CRV were as follows:

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

- **Under Provisioning**
  Nepal, Mongolia, Vietnam

- **Hot Prospects in 2023**
  Sri Lanka, Pakistan, and New Caledonia

2.16 The CRV OG/11 meeting reviewed and updated the APAC CRV Implementation Table, which is provided in **Appendix D**.

ATN Routing and Telecommunication Update

2.17 USA presented the latest Asia/Pacific Regional data telecommunication infrastructure and ATN routing, including Air Traffic Message Handling System (AMHS) and Aeronautical Fixed Telecommunication Network (AFTN), updated and maintained by Aero Thai. After reviewing the table's structure, the CRV OG/11 meeting suggested modifying it to accommodate the latest requirements. It was agreed that ACSICG Co-Chair, CRV OG Co-Chairs, and ICAO Secretariat would deliberate and review the table's structure. The revised structured table will be uploaded on the CRV portal hosted by Airways New Zealand and updated by all APAC Member States. The ACSICG/10 Meeting will further review and update the table.

2.18 After CRV OG/11 Meeting, the revised table is prepared by ACSICG Co-Chair, CRV OG Co-Chairs, and ICAO Secretariat and uploaded on the CRV portal hosted by Airways New Zealand. The table was **also shared with the Member States on 17 March 2023** for updates. The latest updated table from Member States can be accessed by AsiaPac ATN Infrastructure Routing Plan.xlsx on the CRV portal hosted by Airways New Zealand.

Upgrade/Downgrade of CRV Circuits Subscribed and Addition of New Sites and Services in the CRV Contract

2.19 The paper summarized the outcomes of the discussion of the ICAO CRV Steering Group formed in the CRV OG/9 to devise the terms and conditions for the addition of new services, upgrade/downgrade of Packages along with the addition of new sites by the CRV contracted States into their contract. In CRV OG Ad-hoc Expert Group Meetings, relevant Clauses for upgrade/downgrade/addition of new services or sites were deliberated and finalized. The CRV OG/11 meeting **reviewed, modified and endorsed** the Addendum to Terms And Conditions between PCCW Global and CRV Authority **v3**, High-Level Individual Site Questionnaire **v2.2**, PCCWG System Design Document **v4.6**, and Service Order Form (**v2**), which can be accessed on ICAO CRV Secure portal,

and CRV portal hosted by Airways New Zealand. The CRV OG Operations Manual v1.2 has also been updated to incorporate an agreed Addendum to Terms and Conditions between PCCW Global and CRV Authority.

Various CRV users and their joining process

2.20 To follow up the Action Item 9-9 of the CRV OG/9 and Action Item 6-1 of SWIM TF/6, the paper presented the outcomes of relevant discussion of various CRV OG Expert Ad-hoc group Meetings along with the definition of CRV users prepared by CRV OG Expert Ad-hoc group in concurrence with MET SG experts and their joining process for Meeting approval.

2.21 The reviewed and finalized definition agreed upon by the Meeting was as follows:

CRV USER – State/Administration: An entity officially designated by the State to provide the air traffic or air navigation services the State is obligated to provide according to the ICAO provisions.
CRV USER – Industry: An entity not officially designated by the State but authorised by the State to provide aviation or related services commercially.

2.22 It was approved that State's ANSPs will assign IP addresses to any entities joined CRV, and all entities will sign their contract individually. Additionally, for the difference in the joining process, CRV Users- State/Administration **will follow the same process** as mentioned in CRV OG Operational Manual and CRV Landing Page, while industries will **need sponsorship** by States.

2.23 The relevant amendments to CRV OG Operations Manual to include CRV Users definitions and CRV Implementation Plan for IP addressing assignments process for various CRV Users were completed.

Extension of CRV Contract

2.24 To follow up on **Conclusion APANPIRG/33/7 - *Extension of CRV Contract for one year***, the ICAO Secretariat has issued State Letter **Ref.:** T 8/2.15 –AP003/23(CNS) dated **4 January 2023** on the subject**:** - *Extension of CRV Contract for one year and a reminder for the target year of CRV Implementation by 31 December 2023 in the APAC Region* to inform Member States about the extension of the current contract on same Terms and Conditions and 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.

2.25 States were invited to modify their contract with PCCWG, as required, and initiate a service order with PCCW Global for CRV implementation before 31 December 2023 if not joined CRV.

Flexibility in CRV Contract Renewal

2.26 CRV OG Co-Chair (Asia) shared that the term of the contract with the CRV Service Provider (PCCW Global) was set for an initial five years with five additional one-year contract additions totaling a ten-year contractual agreement until 31 December 2027. However, there is an overhead to managing rolling one-year renewals, and a different degree of flexibility is required.

2.27 With some States approaching the five-year anniversary of their contracts with PCCWG, questions were being asked about the ability to sign for different periods. Therefore, it was proposed that the CRV OG Operations Manual is updated to allow contract extensions of two or three

years. The CRV OG/11 meeting agreed on the proposed clauses and added them to CRV OG Operations Manualv1.2.

Addition of New Package D+ in CRV

2.28 The paper presented the details of a new Package D+ and proposed to add them to the current CRV common Packages for Meeting review and adoption. The list of documents to be updated in CRV Common Packages after the endorsement of Package D+ definition by CRV OG/11 was shared and the finalized definition and updated CRV common Packages to include the new Package D+ was presented by PCCWG through the WP/08 to the CRV OG/11 meeting.

CRV - New Package D+

2.29 PCCWG presented the details of new Package D+, which was intended to enhance the existing Package D option. The CRV OG/11 meeting noted that the service management and SLA of Package D+ connectivity is the same as Package D. In addition, the commercial price for Package D+ is the same as Package D. Nonetheless, it needs to add the additional NID price, which is available from the current CRV price book in the common Package.

2.30 The CRV OG/11 meeting **reviewed, modified and adopted** the modified CRV common Package documentation incorporating Package D+. The collective modified CRV common Package document agreed for the upgrade/downgrade/addition of new sites and services and Package D+ is provided on the ICAO CRV Secure portal, and CRV portal hosted by Airways New Zealand.

CRV Post-Implementation Issues in Bhutan

2.31 The paper updated the progress of the issues faced by Bhutan related to CRV post-implementation in 2021 due to the non-readiness of peer States and the actions taken by CRV OG and ACSICG for its resolution. Bhutan and Thailand confirmed that the CRV connectivity among them had been implemented. Therefore, the ad-hoc group formed to resolve this issue was **dissolved**. The relevant action items resulting from past CRV OG and ACSICG Meetings were marked as closed.

PASNet for the Pacific Islands CRV connectivity

2.32 The paper presented an overview of the options for using PASNet to connect the Pacific Islands to CRV. Considering the options for network connectivity to some Pacific Islands are limited and, in some cases expensive, the World Bank implemented the **Pacific Aviation Safety Network (PASNet)** in 20xx. The PASNet was built in a similar way to the CRV, focusing on immediate needs. The options for connecting CRV to PASNet have been narrowed to two options: *installing a new CRV NID in Christchurch* and *using the existing Airways New Zealand Christchurch CRV NID*. The CRV OG/11 meeting discussed the significance of PASNet project, its potential benefits after implementation and noted the project's progress. New Zealand will share further updates on the project in CRV OG Meetings.

Progress of CRV Implementation by APAC Member States

2.33 Fiji, India, Indonesia, Japan, Malaysia, and the Republic of Korea presented the CRV implementation status through different Papers.

MPLS/IP-Based Inter-Regional Connection

2.34 The paper provided the current status of discussion being done for potential interconnection of CRV and REDDIG II and CRV and New PENS and 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. It was noted that there is no concert technical proposal ready to work further for CRV and REDDIG II interconnection, while the interconnection proposal for CRV and New PENS is in progress.

The inter-regional connection between Russian and APAC AMHS Centers

2.35 Considering the restrictions on the use of Cisco equipment at Moscow and Khabarovsk COM centers, the Russian Federation shared the 3 proposed solutions to be studied for connecting Moscow and Khabarovsk COM centers to CRV to ensure the transition to AMHS technology with COM centers of the APAC region (Japan and China). With due consideration to the time needed to study the available solutions, Russia proposed to implement an interim connection between COM centers via a dedicated L2 VPN link to expedite the transition to AMHS. The current status of the transition to AMHS with Japan and China was shared. In addition, the Russian Federation also shared its support for the initiative to explore potential MPLS/IP based inter-regional connections between CRV and REDDIG II networks.

2.36 Japan informed that as it had already implemented CRV, instead of establishing an additional L2 VPN link, Japan would prefer to wait for Russia to join CRV. Russia shared its willingness to discuss with Japan other proposals for interconnection individually.

Update on Using the Rest of CRV MSA

2.37 The paper presented an update on the recent development of using the balance fund of the MSA. To follow up **Conclusion APANPIRG/33/6 - Revised Amendment of the Management Service Agreement for CRV project (RAS14801)**, ICAO Secretariat issued State Letter **Ref.:** T 8/2.15 –AP-CNS 00xx/23 dated 9 January 2023 and Ref.: T 8/2.15 – AP-CNS 0026/23 dated 17 January 2023 on the subject: - *Revised Amendment of the Management Service Agreement for the CRV project (RAS14801)* to Countersign the Revised amended Project Document or inform the intention to receive the share of the remaining fund balance to 16 pioneer States. Additional clarifications were issued on 17 January 2023. In response, all pioneer Member States countersigned or shared confirmation to countersign the Revised amended Project Document to provide consent to utilize the remaining fund for the CRV.

2.38 It was proposed that after finalizing the Terms of Reference for the approved task and estimated cost, if the remaining amount is too low to utilize for agreed tasks, CRV OG may deliberate and decide on additional cost-sharing arrangements. Additionally, if it is agreed that the remaining amount is too low for approved work and there is no consensus for the remaining cost-sharing arrangement, it is proposed to refund the remaining share to all 16 pioneer States/Administrations.

Using the rest of the money: ToR of Safety Assessment

2.39 New Zealand presented Safety Assessment options for the CRV using the remaining Pioneer State money. Discussion at CRV OG Meeting has suggested that the remaining funds from the CRV Project could be used to facilitate a Safety Assessment of the CRV network. It was assumed that the Safety Assessment means a Cyber Security Review. The **6 possible Security Review** options were provided to be considered by the CRV OG/11 meeting.

2.40 It was anticipated that this would use all of the remaining funds from the project. The CRV should consider the possibility of contributing further funds depending on the Terms of Reference (ToR) and subsequent quote. The CRV OG/11 meeting deliberated on various proposed options and **agreed to adopt Option 2 -** *Penetration test of the PCCWG implementation only* **and Option 5 -**

Engage a Security consultant to review the Common Package, RFP documentation including the response, Implementation Plan and the Operations Manual and provide a Security recommendation based on this review.

2.41 With the aforementioned, the following **Conclusion** formulated by CRV OG/11 was adopted by ACSICG/10.

<table>
<tr><td colspan="3">Conclusion ACSICG/10/02 (CRV OG/11/03) – Selection of Security Review Options 2 and 5 and Develop a ToR</td></tr>
<tr><td colspan="2">What: The utilisation of the CRV Project Funds would be used to carry out a Security Review of the CRV.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To provide State assurance on the security of the CRV network.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 26-May-23</td><td colspan="2">Status: Adopted by ACSICG</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: CRV OG</td></tr>
</table>

2.42 Due to limited time, as a way forward, it was agreed that a draft ToR will be prepared by CRV OG Ad-hoc Expert Group and submitted to the ACSICG/10 Meeting for review and approval. After the ACSICG/10 Meeting approves ToR, quotations will be requested from various cyber security expert agencies and appraised cost with a tentative plan and timelines for its accomplishment will be presented to the CRV OG/12 Meeting for agreement on the scope of work and the final decision for utilization of fund for agreed ToR. After the approval of CRV OG/12, an agency will be selected, and the chosen agency will execute the task.

2.43 The draft ToR for Security Review using Options 2 and/or 5 was prepared by CRV OG Ad-hoc Expert Group, which was shared with the CRV OG/11 delegates for their review and feedback on 25 April 2023. The draft ToR provided in **Appendix E** was also reviewed by ACSICG/10 Meeting. With the aforementioned, the following **Conclusion** was adopted by ACSICG/10.

<table>
<tr><td colspan="3">Conclusion ACSICG/10/03– Adoption of ToR for CRV Security Review using Options 2 and/or 5</td></tr>
<tr><td colspan="2">What: The utilisation of the CRV Project Funds would be used to carry out a Security Review of the CRV using Options 2 and/or 5 as per the ToR provided in Appendix E.
Option 2 - Penetration test of the PCCWG implementation only
Option 5 - Engage a Security consultant to review the Common Package, RFP documentation including the response, Implementation Plan and the Operations Manual and provide a Security recommendation based on this review</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To provide State assurance on the security of the CRV network.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 26-May-23</td><td colspan="2">Status: Adopted by ACSICG</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☐APAC States ☒ICAO APAC RO ☐ICAO HQ ☒Other: CRV OG</td></tr>
</table>

(New) PENS and the EATM CERT Cybersecurity Considerations

2.44 EUROCONTROL generically introduced the security management practices from the PENS Community perspective and the activities of the European Air Traffic Management Computer Emergency Response Team (EATM CERT) with a focus on penetration testing (ethical testing). The CRV OG/11 meeting was informed that the Cybersecurity Assessment conducted by EUROCONTROL/NM in 2018 highlighted that the New PENS Contract/Service incorporates all industry good practices on security requirements. PENS Community approaches to User Security and Cyber Security were shared. With the introduction of the risk levels definition, the results of penetration testing on aviation systems were explained. It was further informed that the penetration testing was volunteered by States, and the New PENS service provider was obliged to allow penetration testing as per the contract.

(New) PENS IPv6 Addressing Considerations

2.45 EUROCONTROL shared that PENS is IPv6 enabled (dual IPv4/IPv6 stack available) and each individual PENS User is assigned upon request 4x /48 IPv6 public ranges by EUROCONTROL. Ranges assigned to any given PENS Users are public, specific to the user hence unique on a global scales. Ranges assigned to the PENS Users are therefore decoupled from that of the PENS Service Provider, avoiding the need for IP address change/renumbering when changing service provider. Furthermore, the IPv6 address space allocation performed through the "Network Addresses Management Services (NAMS)" was introduced.

AFTN/ATSMHS Routing Directory in APAC – Sec (WP/06)

2.46 The paper presented a brief history of the ICAO APAC AFTN Routing Directory which was based on the existing AFTN circuits in the Asia and Pacific regions. The Meeting was reminded again that the Region would follow the AFTN/ATSMHS routing directory during transition period, for inter-regional traffic, it is required to follow the existing entry/exit points and procedure.

2.47 The Meeting reviewed and updated the AFTN/ATSMHS CONNECTIONS_ASIA/PAC Routing Directory, which is provided in **Appendix F**.

APAC AMHS Implementation Status from AMC - Thailand (WP/18)

2.48 The paper presented the AMHS implementation status information in Asia/Pacific Region updated in ATS Messaging Management Centre (AMC) (OPER 247) as of 3 May 2023 in Attachment A of the paper. EUROCONTROL implemented AMC to provide off-line network management services in support of the ground ATS Messaging network of Air Navigation Service Providers (ANSPs). It was informed that AMC round 248 had been canceled due to technical failure, and the next round for AMC data update will be AMC round 249 on 18 May. The Meeting was invited to review and update information to AMC via AEROTHAI if necessary, including points of contact.

Space-Based Very High Frequency (VHF) Communication Services – Singapore (WP/12)

2.49 This paper presented the Meeting the scope of the proposal and the objectives considered in the design of the space-based VHF system, it also summarized the progress of the technical and regulatory studies of space-based VHF communications (voice and data) in the frequency band 117.975-137 MHz in International Telecommunication Union ("ITU"), ICAO Communications Panel (CP) and ICAO Frequency Spectrum Management Panel ("FSMP"). The paper shared that there are two companies working in parallel to the launch prototype satellites with VHF payload for Proof-

of-Concept (PoC) Demonstration between 2023 and 2025. To conduct the PoC demonstration, there will be a need for ICAO regional office to assign appropriate VHF frequencies so that verification tests could take place.

Proposal for Transition from AFTN to AMHS between Indonesia (Jakarta) and Australia (Brisbane) – Indonesia (WP/13)

2.50 The paper presented the proposal for the transition from AFTN to AMHS between Indonesia (Jakarta) and Australia (Brisbane). Following the AMHS Implementation, Jakarta AMHS System connected to Singapore via ATN/AMHS on February 2018 and to Australia via AFTN. Following ASIA/PAC routing directory, Indonesia is an alternate for Singapore and Australia concerning the AFTN/AMHS connectivity. Thus, Indonesia wants to connect the AMHS to Australia, involving Jakarta and Brisbane.

2.51 Several issues of message distribution between Jakarta and Brisbane due to mix used of AMHS and AFTN systems were introduced, while as a solution, a transition from AFTN to AMHS between Jakarta and Brisbane via CRV was proposed. The Meeting noted in March 2023, there were discussions between Indonesia and Australia regarding to the transition process of the AMHS. It was acknowledged to propose the connection between AMHS to AMHS and the interoperability Test is planned for June 2023. The Meeting also advised Indonesia to update the AMHS implementation with AMC in time.

AMHS/ATN Implementation Status of Thailand (IP/02)

2.52 The paper presented information about the AMHS/ATN implementation status of Thailand as well as the summary of link configuration after the successful implementation of the CRV network in May 2022. Thailand shared the work plan to consider solutions for Business Continuity Plan (BCP) for CRV connections, use ATS Direct Speech Circuit over CRV with Malaysia, and experiment on using CRV to relay ATFM messages with relevant stakeholders. The Meeting noted that the AMHS link between Thailand and Bhutan has been migrated from the Internet to CRV. Thailand and Bhutan informed that CRV provided a better performance to both parties.

AIDC Implementation Status – Malaysia (IP/04)

2.53 The paper presented the AIDC implementation status in Malaysia between Kuala Lumpur Area Control Centre (ACC), Kota Kinabalu ACC, and Kuching Sub-ACC, with adjacent ACCs, including India, Thailand, and Singapore. Following the successful implementation of AIDC as described in the matrix, Malaysia shared the plan to expand this initiative with other States on the AIDC implementation and exchange additional AIDC messages between the already established ACCs, including Vietnam, Indonesia, Philippines, and Singapore. Malaysia supplemented that with the successful implementation of TOC and AOC between Kuala Lumpur and Chennai, Malaysia is open to discuss the implementation of TOC and AOC with other States.

AMHS Implementation and Readiness Status for Supporting IWXXM Traffic in the APAC Region - Sec (WP/07)

2.54 The paper summarized the AMHS readiness status for supporting IWXXM Traffic of the States/Administrations in APAC Region, including States/Administrations that have no AMHS in operations, for facilitating the relevant Meteorological authorities/organisations with the dissemination of IWXXM messages accordingly. As of CNS SG/26, there were **13** States/Administrations provided their status on AMHS readiness and experience for supporting IWXXM Traffic with details, while out of the **23** States/Administrations in the APAC Region put their AMHS into operations per the AMHS Routing Directory Tables from the ATS Messaging Management Centre (AMC) as of April **2023**.

2.55 The Meeting was invited to consider consolidating the information in *AMHS Readiness Table for Supporting IWXXM Traffic*, *State with AMHS in Operations in APAC*, *State with no AMHS in Operations in APAC*, and *Implementation status of ATN AMHS in the APAC Region* into a new table to monitor the implementation of AMHS completely and effectively for the Region, including the readiness of AMHS to support IWXXM. The Meeting updated the AMHS Readiness Table for Supporting IWXXM Traffic and the Implementation status of ATN AMHS in the APAC Region, which are provided in **Appendix G** and **Appendix H,** respectively. The Meeting agreed that the Pacific island with AMHS UA implementation should not be considered AMHS capable.

Repository of AIDC Implementation Status in APAC – Sec (WP/05)

2.56 The paper presented the latest repository of AIDC Implementation Status in APAC region, the preliminary analysis of the current status, and invites States/Administrations to review and continue to update the AIDC implementation status if necessary.

2.57 To follow up ACTION ITEM 3-2 of ATMAS TF/3, the table of the AIDC repository with current status has been circulated through State Letter **Ref.:** T 8/3.5: AP135/22 (CNS) with Subject – *Validate and Supplement the Table of AIDC Implementation Status in APAC Region* on 17 October 2022. Total 13 updates have been received from States/Administrations, and a preliminary analysis of the current AIDC implementation status in APAC region has also been summarized and shared with the Meeting. The Meeting updated the AIDC Implementation Status table in the APAC region, provided in **Appendix I**.

2.58 Since all the AIDC messages are in AFTN format (with AFTN IA-5 message header), the co-chair suggested considering whether it is necessary to include Column 7 – Transmission Means in the repository. It was also suggested to add an additional explanation of Re-coordination or Coordination Negotiation to the Column "Methods of Coordination" to avoid ambiguity.

AIDC and AMHS Implementation Status in Republic of Korea (IP/05)

2.59 The Republic of Korea presented its AIDC and AMHS implementation status. The Republic of Korea introduced the detailed AIDC implementation status with China and Japan and highlighted that ROK has been carrying out an AIDC establishment project since June 2022 to interlink Incheon ACC with Shanghai ACC, with the project scheduled to be completed in June 2023, while the function test of the AIDC will be conducted in May. Furthermore, the establishment of AMHS between ROK and China and between ROK and Japan has been completed and officially operated since January 2023 through CRV, and the project for the exchange of next-generation weather information (IWXXM) between countries is being prepared.

Telecommunication Infrastructure Plan for APAC – USA (WP/09)

2.60 It was noted that AMHS had been centric on telecommunication infrastructure before CRV was implemented. CRV now allows direct connection over Internet Protocol (IP) networks without the need for an AMHS routing plan. As such, the current tracking table developed for AMHS should be modified to reflect CRV infrastructure. For better management and coordination, a draft version of the Telecommunication Infrastructure table, which compiles all tables developed by CRV OG and includes a section for AMHS coordination with AMC, was proposed for review and recommendation.

2.61 The drafted table was reviewed and adopted by the Meeting. It was recommended that the agreed table should be posted on the CRV OG website for members to update and supersede the

Table CNS II-2 — Required ATN Infrastructure Routing Plan in the ANP VOL II part III, and CRV OG will be the task owner to maintain the table in future. The table is now posted on CRV Portal hosted by Airways New Zealand for members to update. States were invited to visit this CRV Portal. To establish an account, members should email APAC-CRV@AirwaysCorporation.onmicrosoft.com for approval.

2.62 With the aforementioned, the following **Draft Conclusion** was endorsed by ACSICG/10 for CNS SG/27 consideration:

<table>
<tr><td colspan="3">Draft Conclusion ACSICG/10/04 - Telecommunication Infrastructure Table</td></tr>
<tr><td colspan="2">What: TRACKING TABLE
To have a single tracking table with online update capability to support the implementation of future services, managing bandwidth. This table will supersede all telecommunication tables maintained by CRV OG and ACSICG.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Managing Telecommunication Infrastructure</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 01-Sep-23</td><td colspan="2">Status: Draft to be adopted by Sub-group</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: ACSICG</td></tr>
</table>

2.63 The Meeting agreed to stop updating Table CNS II-1 and II-2 in APAC e-ANP Volume II in the APAC region.

Outcomes of MET/IE WG/21 - Chair of MET/IE WG and Sec (WP/17)

2.64 The paper presented relevant outcomes from the Twenty-first Meeting of the Meteorological Information Exchange Working Group (MET/IE WG/21) to support global IWXXM exchange and invited the ACSICG meeting to consider proposals for the expedited implementation of AMHS (with File Transfer Body Part (FTBP) and Interpersonal Message Heading Extension (IHE)) intra- and inter-regionally, and a possible conjoint meeting session to be conducted by the MET/IE WG and ACSICG in 2024. Supporting discussion and a related proposal were presented through WP/10.

2.65 The Meeting reviewed the supporting discussions during the MET/IE WG/21 and noted that while some States indicated the capability to generate meteorological information in the IWXXM form, they could not disseminate the IWXXM messages from the NOCs to the ROCs because the necessary AMHS with FTBP and IHE was not implemented. It was informed that MET/IE WG/21 formulated the ***Draft Conclusion MET/IE WG/21-03:*** *GLOBAL EXCHANGE OF IWXXM* that ACSICG prioritize the implementation of intra- and inter-region network circuits, including support for the AMHS with FTBP and IHE, to support the global exchange of messages in the IWXXM form. Furthermore, to support meteorological information exchange initiatives more generally, MET/IE WG/21 proposed an update to its terms of reference to "coordinate and seek support from other enabling ICAO groups (e.g., SWIM TF, ACSICG, CRV OG, etc.)".

2.66 The Meeting supported the proposal to conduct a conjoint meeting session of the MET/IE WG and ACSICG in 2024. Therefore, the Meeting requested the Co-Chairs and Secretariat to consider convening a conjoint meeting session of the ACSICG in 2024 in conjunction with MET/IE WG.

2.67 The Meeting suggested that MET/IE WG focus the coordination with SWIM TF and ACSICG, and SWIM TF and ACSICG would translate the requirements by MET/IE WG into the demand of bandwidth for CRV implementation. The Meeting reiterated that the MET/IE WG/21 Draft Conclusion proposal to prioritize the ACSICG support for the global dissemination of IWXXM was consistent with the existing ACSICG terms of reference and work program, a Decision or Draft Decision on action specific to the ACSICG was not required.

2.68 The Meeting agreed a modified version of the MET/IE WG/21 Draft Conclusion to propose further action by States and ICAO to support the global dissemination of meteorological information in IWXXM form would be an appropriate outcome from ACSICG/10.

2.69 The Meeting also discussed that the information traffic monitoring is provided by PCCW in the form of the percentage of the subscribed channel without detailed bandwidth usage of services exchanged between two COM centers over CRV, while this data is available for IPL.

2.70 The Meeting was brought to the attention of the IWXXM AMHS header requirement to be generated in the IWXXM message. This differs from today's procedure which TAC is not required to include. This creates some issues for MET to generate proper IWXXM messages.

ACSICG Support for Progressing Inter-Regional IWXXM Exchange – Australia (WP/10)

2.71 The paper described the status of inter-regional IWXXM exchange as observed by the Meteorological Information Exchange Working Group (MET/IE WG) and requested support from ACSICG to further progress the global exchange of IWXXM.

2.72 The recent Twenty-first Meeting of the ICAO APAC Meteorological Information Exchange Working Group (MET/IE WG/21) noted that a significant obstacle in the progress of the global availability of IWXXM is the inter-regional exchange. The lack of global availability of OPMET in IWXXM form is currently inhibiting system suppliers and users switching to IWXXM and delaying benefits realisation from the implementation of IWXXM. MET/IE WG/21 also identified the needs for establishment of inter-regional IWXXM exchange with the MID and AFI regions, alternate (secondary) paths to each Region, adequate capacity and bandwidth to support IWXXM exchange, and interconnecting of the CRV with future equivalents in the MID and AFI regions for the global IWXXM exchange to succeed.

2.73 The Meeting supported the global dissemination of meteorological information in IWXXM form, and formulated the following **Draft Conclusion** for APANPIRG/34 consideration:

Draft Conclusion ACSICG/10/05 - Global Dissemination of IWXXM	
What: Support the global dissemination of meteorological information in the ICAO Meteorological Information Exchange Model (IWXXM) form by prioritizing the implementation of intra- and inter-regional aeronautical communication services and network circuits, including support for the Air Traffic Services Message Handling System (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).	Expected impact: ☒ Political / Global ☒ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical
Why: Following the provisions of ICAO Annex 3 – *Meteorological Service for International Air Navigation*, States shall ensure that certain meteorological information is disseminated to users in the IWXXM form.	Follow-up: ☒Required from States

However, without suitable communication network connections to support the necessary intra- and inter-regional exchange of IWXXM messages, global dissemination of meteorological information in IWXXM form will not be possible. Consequently, the migration of user and supplier systems from meteorological information in the traditional alphanumeric code (TAC) form to the IWXXM form, as envisaged in the Global Air Navigation Plan (GANP), will remain inhibited.	
When: 01-Sep-23	Status: Draft to be adopted by PIRG
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☒ICAO HQ ☒Other: PIRGs in other ICAO Regions	

AFTN/AMHS Connection between APAC Region and Other Regions – Sec (WP/16)

2.74 The paper summarized the status of the AFTN/AMHS connection between the APAC region and other regions (Europe, Mideast, Africa, North America, and South America) with reference to the information contained in ASIA/PAC ROUTING DIRECTORY and the COM Charts by EUROCONTROL AMC. It was also noted there is no direct connection between South America and Asia/Pacific, the aeronautical messages are routed via USA. An extract of AFTN/ATSMHS Inter-Regional Connections from ASIA/PAC ROUTING DIRECTORY, and the COM Chart by EUROCONTROL AMC for AFI, EUR, MID, NAM and SAM as of 25 April 2023 were also shared for easy reference.

2.75 The Meeting was informed the Mumbai-Muscat AMHS connection has been implemented, and ICAO APAC Office is requested to coordinate with MID Office to push forward the AMHS implementation between Beijing and Kuwait.

2.76 The Meeting reminded that global SWIM implementation should be the real push for the interconnection of regional IP networks in the future. But for now, AMHS connections between regions are the feasible solution to support global dissemination of meteorological information in IWXXM form, which implies additional costs for concerned States if they need to enhance the inter-regional AMHS connections to support XML format messages.

2.77 The Meeting determined that the current AMHS links between Mumbai and Muscat along with the links between Singapore-London and Bangkok-Rome, could support the exchange of IWXXM between Asia/Pac and MID regions. For the AFI region, there is a connection between Brisbane- Johannesburg that could support the exchange of IWXXM. However, long term planning needed to be considered regarding the bandwidth of the underlying network.

Protecting the Integrity and Efficiency of CRV Time-Sensitive Exchanges – USA (WP/14)

2.78 The paper presented considerations for CRV information exchanges as CRV usage increases and evolved to support SWIM. CRV has been a success story for the Region, and encouraged greater interconnectivity between the States than was previously practical and cost-effective with point-to-point technologies. Increased demand, and the future evolution of SWIM services, present challenges to the efficiency of time-sensitive information exchange.

2.79 The Meeting reviewed the challenges faced by CRV regarding defined exchanges, edge protection, network user governance, network contingencies, migration to swim information exchanges, information transport priorities, and SWIM information security, and summarized the proposed suggestions for the introduction of SWIM traffic for consideration as follow:

- Use agreements to formalize the exchange of information
- Continue the use of GRE tunnels between network access points
- Consider whether extra bandwidth is needed to support the SWIM traffic
- Consider whether functionality for data integrity and confidentiality can be built into the SWIM information exchanges before implementation.
- Determine what DSCP codes should be used for network transport processing
- Address traffic contingencies for failure or compromise scenarios

CRV-Evolution of Services – USA (Presentation/01)

2.80 USA presented CRV-Evolution of Services. By introducing that a typical MPLS VPN distributes IP addresses to all users, it was informed that CRV has GRE tunnels between ANSPs that have information exchanges, which can limit IP address visibility. USA explained that different types of traffic are marked with Differentiated Services Code Points (DSCPs), such as "EF" (Expedited Forwarding) used for voice and "AF21" used for AMHS. DSCP markings help PCCW apply different priorities and transport processing in the network. Considering a network Access Point may support multiple tunnels to different partners, PCCW will engineer the network so that the minimum required bandwidth is available for each defined path. It was also suggested that as paths and traffic grows, ANSPs may have to increase access bandwidth.

2.81 Based on the discussion above, it's recommended that CRV OG coordinate with CRV vendor, PCCW Global, and SWIM Task Force to set the priority of the traffic types: voice service, time-sensitive message, advisory message, etc.

Review Terms of Reference of ACSICG – Thailand and Sec (WP/08)

2.82 Through a joint effort by Thailand and the Secretariat, a draft of ToR was proposed for ACSICG consideration. The Meeting reviewed and updated the proposed ToR against the new direction given by APANPIRG in the fields of Aeronautical Communication Services. The ToR agreed by the Meeting is provided in **Appendix J**, and the following **Draft Decision** was proposed by ACSICG/10 for CNS SG/27 consideration.

<table>
<tr><td colspan="2">Draft Decision ACSICG/10/06: Revised ToR of Aeronautical Communication Services Implementation Coordination Group (ACSICG)</td></tr>
<tr><td>That, the Revised Terms of Reference of the Aeronautical Communication Services Implementation Coordination Group (ACSICG) provided in Appendix J be adopted.</td><td>Expected impact:
☐ Political /Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: The proposed ToR of the ACSICG includes the new direction given by APANPIRG in the fields of Aeronautical Communication Services.</td><td>Follow-up: ☐Required from States</td></tr>
<tr><td>When: 01-Sep-2023</td><td>Status: To be adopted by Sub-Group</td></tr>
<tr><td colspan="2">Who:☒Sub groups ☐ APAC States ☐ICAO APAC RO ☐ICAO HQ ☐APANPIRG ☒ Other: ACSICG</td></tr>
</table>

Review Work Programme for ACSICG and AMHS Focal Point – Sec (WP/11)

2.83 The ACSICG/10 meeting further reviewed and updated the work programme of ACSICG and updated the AMHS Focal Contact Point.

Election of Co-Chair

2.84 Nominated by the USA and seconded by Thailand and Philippines, Mr. Kelepi Dainaki, General Manager Assets & Infrastructure, Fiji Airport Limited, Co-Chair (Pacific) of CRV OG, was elected as Co-Chair of ACSICG.

Bidirectional AMHS/AMQP interface- Frequentis (Presentation/03)

2.85 Frequentis presented a brief introduction to the bidirectional AMHS/AMQP interface. The bidirectional AMHS/AMQP interface concept was explained with a detailed scenario analysis by comparing the differences between AMHS and SWIM. It was informed that the bidirectional AMHS/AMQP interface can convey aeronautical information from any AMHS originator to dedicated AMQP queues (from AMHS to SWIM) and from dedicated AMQP queues to dedicated AMHS recipients (from SWIM to AMHS).

AMHS Upgrade in Jordan (IP/06)

2.86 The paper presented the AMHS implementation status in Jordan and the plan for full migration. The Meeting noted Amman COM Center implemented AMHS in 2009 to ensure seamless and interoperable Aeronautical Ground/Ground communication. Furthermore, Jordan expressed their willingness to join the Regional IP Network projects (CRV or New PENS) pending the technical and financial details that make a positive business case.

Note of Appreciation

2.87 The Meeting extended sincere gratitude to Mr. Hoang Tran for his dedication and contributions towards the planning and implementation of Aeronautical Communications Infrastructure and Services in APAC Region as the Chairman of Aeronautical Telecommunication Network (ATN) Implementation Coordination Group of APANPIRG (ATNICG) from May 2006 to March 2013 and as the Chairman of Aeronautical Communication Services Implementation Coordination Group of APANPIRG (ACSICG) from May 2014 to June 2023.

Date and Venue for the Next Meeting

2.88 The Meeting discussed a Face-to-Face (F2F) meeting with a tentative date on May 2024 to progress further the tasks listed in the Terms of Reference. However, considering the proposal to conduct the joint Meeting with MET/IE WG, the ICAO Secretariat will coordinate internally and inform participants of the exact dates and venue in due course.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to:

a) note the information contained in this paper;
b) adopt the draft conclusion mentioned in **Sections 2.11, 2.62, 2.73, and 2.82;**
c) note the conclusion/decision adopted by ACSICG/10 in **Sections 2.41 and 2.43;**
d) note various tables updated by CRV OG/ACSICG; and
e) discuss any relevant matter as appropriate.

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TERMS OF REFERENCE

CRV OG Ad-hoc Governance Group

Objectives:

The Common aeRonautical Virtual Private Network Operations Group (CRV OG) Ad-hoc Governance Group is established to review and propose an enhancement required for an effective CRV Governance to support APAC/MID Member States.

Responsibilities:

The CRV OG Ad-hoc Governance Group shall:

1. Define the problem.
2. Clarify current CRV Governance model.
3. Review the REDDIG II and New PENS Governance models.
4. Discuss options for the CRV Governance model.
5. Document the options for a CRV Governance model detailing all aspects of the model.
6. Present the options and recommendation of a CRV Governance model to the CRV OG.
7. Support implementation of the CRV Governance model.

Considerations

The CRV OG Ad-hoc Governance Group will need to consider the following:

1. Current CRV ToR
2. Ongoing support Member States for CRV Implementation.
3. Future CRV usage for SWIM, future A/G IPS, Surveillance Data, AFTM, and Navigation data sharing, and voice service including the transition from AMHS to SWIM.
4. CRV Documentation – accessibility and availability, and administration.
5. Cost – minimised, shared evenly, salaries, portals, tools.
6. Representation, membership, accessibility, expertise, responsibility and experience.

Composition:

Co-Chairs: CRV OG Co-Chairs.

Members:

1. States/Administrations of ICAO APAC
2. International organizations recognized by ICAO.

Liaison:

SWIM TF, CRV OG, ACSICG, MET SG

Conduct of the work:

The CRV OG Ad-hoc Governance Group will meet quarterly and conduct its work preferably through web conferences, teleconferences, and other electronic means of communications. The Group may meet *In Person* only if necessary.

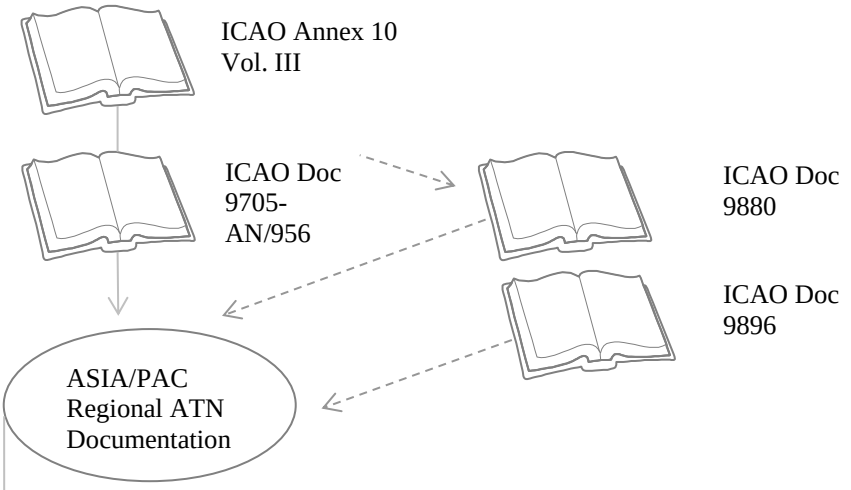
Reporting:

The group will report at least annually to CRV OG.

Timelines:

The Group should complete assigned task in 3 years. CRV OG may provide extension to the group based on the requirements.

CNS SG/27
Appendix B to WP07



Regional Planning Documents

- Basic ANP/FASID
- ATN Ground – Ground Transition Plan
- Implementation Checklist
- CP Document

	IP CRV Router	AMHS	Directory	System Management	System Integrity
Policy & Service Definition	CRV Routing Policy/Addres IP/CRV VoIP Policy	AMHS MTA Routing Policy AMHS Naming Plan	AMC Coordination	System Management Policy	System Integrity Policy
Interface Control Documents (ICDs)	IP/CRV Routing ICD VoIP ICD SN ICD ISO/IEC8208	AMHS ICD			
Implementation Documents	IP Router Test Procedure	AMHS Interoperability Test AMHS MTA Testing GD		SM Operational Procedure	ATN Security GM
Reference Documents	IP Router Description	AMHS Description AMHS Technical Specification			

APAC CRV Risk Register as at 14/09/2022

AIRWAYS
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Risk Assessment[v]

Risk Owner	Hazard / threat	Risk Description			Impact Category[i]	Consequence rating[iv]	Current Controls in place	Likelihood	Current Risk (with current controls) L/M/H/E	Further actions to be taken (mitigations/ treatments)	Action Owner and date due[ii]	Target Risk (after actions and current controls)[iii]
		Due to	Event (Something happens)	Consequence (result, impact "leading to . . .")								
OG	Failure of multiple states connections	Common POP	Maintenance or failure at the POP	Loss of redundancy or full communication between several APAC states	Service Delivery Aviation Safety Asset Performance	Major	1. APAC CRV Overview Drawing showing POP connectivity. 2. Monthly service provider reports. 3. Service Provider invited to APAC CRV OG meetings 4. Maintenance and outage notifications	Unlikely	Medium 8			
OG	Increased billing	Joining process	State joins before peering states are ready	Delayed decommissioning of current services and increased billing as supporting dual services.	Financial	Minor	1. APAC CRV Operation manual detailing the joining process. 2. Webinars on the processes 3. Lessons learned discussions at APAC CRV OG meetings	Possible	Low 3			
OG	Loss of a states connectivity	Routing failure	Service provider or last mile connection fails but not the NID to the states network	Loss of connectivity with no failover resulting in lost communication	Service Delivery Aviation Safety Asset Performance	Major	1. Service Providers System Engineering Plan	Possible	Medium 12			
OG	CRV Failure	Service provider issue	Global network or multiple POP issue	Complete loss of communication across APAC	Service Delivery Aviation Safety Asset Performance	Major	1. APAC CRV Overview Drawing showing POP connectivity. 2. Monthly service provider reports. 3. Service Provider invited to APAC CRV OG meetings 4. Where possible implement Internet based B2B connections outside of the APAC CRV Network	Rare	Low 4			

[i] There can be multiple categories that the risk may fall into and they are all relevant. Once you have identified all categories, the one which as the highest consequence will be taken to combine with the likelihood to get a risk rating

[ii] - The action owner needs to be a specific person responsible for this actions completion

- When assigning a due date, be generous to ensure it is achievable

[iii] This rating is encompassing what the risk would be if ALL the mitigation actions were to be completed (consequence, likelihood or a combination of both can be reduced)

[iv] The consequence rating does not necessarily need to be the 'worst case scenario' but should be the most **feasible** for that risk

v Use the Risk Evaluation Framework to do the assessment of the risk

Business unit: Date of review: Participants:

Risk Owner	Hazard	Risk description			Impact	Current controls	Risk assessment (current controls)				Next Review Date	Risk assessment (Target level)				Future Actions	Action Owner	Action Due Date
		Due to	Event	Resulting in			Severity	Probablility	Risk Rating	Risk Level		Severity	Probability	Risk Rating	Risk Level			
CRV OG	Failure of multiple states connections	Common POP	Maintenance or failure at the POP	Loss of redundancy or full communication between several APAC states		1. APAC CRV Overview Drawing showing POP connectivity. 2. Monthly service provider reports. 3. Service Provider invited to APAC CRV OG meetings 4. Maintenance and outage notifications	Major	Improbable		2C								
CRV OG	Increased billing	Joining process	State joins before peering states are ready	Delayed decommissioning of current services and increased billing as supporting dual services.		1. APAC CRV Operation manual detailing the joining process. 2. Webinars on the processes 3. Lessons learned discussions at APAC CRV OG meetings	Minor	Remote		3D								
CRV OG	Loss of a states connectivity	Routing failure	Service provider or last mile connection fails but not the NID to the states network	Loss of connectivity with no failover resulting in lost communication		1. Service Providers System Engineering Plan	Major	Remote		3C								
CRV OG	CRV Failure	Service provider issue	Global network or multiple POP issue	Complete loss of communication across APAC		1. APAC CRV Overview Drawing showing POP connectivity. 2. Monthly service provider reports. 3. Service Provider invited to APAC CRV OG meetings 4. Where possible implement Internet based B2B connections outside of the APAC CRV Network	Major	Extremely Improbable		1C								

Consequence by Categories	Negligible	Minor	Major	Hazardous	Catastrophic
Aviation Safety					
Service Delivery					
Reputational					
Security					
Financial					
Legal, Regulatory and Compliance					

UPDATED APAC CRV~~CRV~~ IMPLEMENTATION TABLE

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
1	**Afghanistan**					
2	**Australia***	Fiji New Zealand USA PNG Singapore	Contract in May2018 and service readiness in 3Q 2018	AFTN, ADS-B, AMHS, Voice With: Completed: **Fiji** March,2019 (AMHS June 2019/AIDC, Voice completed April) **New Zealand,** February, 2019 (AMHS June 2019, AFTN May 2019/AIDC), March, 2019 (Voice April 2019 completed) **Singapore** Dec, 2020 (AMHS/AIDC); **PNG** June 2021 (AFTN) Oct 2021 (Voice) **USA** March 2019 (AFTN) March 2019 (Voice) Pending: **South Africa TBC** (AMHS/AIDC, Voice);	Staged approach	Termination of current COM contract

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
				Indonesia TBC 2022 (AMHS/AIDC, Voice, ADS-B);		
3	**Bangladesh**					
4	**Bhutan**	Thailand (Bangkok)	Contract signed on Oct 2019. CRV installed successfully in Dec 2021. CRV P2P Test between Paro-Bangkok completed. CRV P2P Test between Paro-Mumbai completed on Jan 2023 CRV cutover between Paro-Mumbai is scheduled on March 2023	AMHS first. Voice and ADS-B – to be decided. ~~AMHS first and Voice & ADS-B will follow up after AMHS.~~	Staged Approach~~Staged Approach~~	Dependent on India for full utilization of CRV network. ~~Dependent on India and Thailand for utilization of CRV network.~~

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
			~~Contract signed on Oct 2019.~~ ~~CRV installed successfully in Dec 2021.~~ ~~CRV P2P Test between Paro - Mumbai & Paro - Bangkok to be done once India and Thailand join CRV~~			
5	**Brunei Darussalam**					
6	**Cambodia**		As early as convenient, dependent on neighbouring countries			Internal decision making

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
7	**China***	Hong Kong China Japan Republic of Korea	Contract signed on 21 June 2020.	Applications targeted: Data(AMHS) With: Hong Kong 3Q2020; Japan 4Q2020; Thailand TBD; India 2022. Republic of Korea 4Q2022 Mongolia 4Q2022 ATFM test with Japan and ROK at Sep 2020 over CRV ADP exchange with Mongolia 4Q2022	Sstaged approach	

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
8	**Hong Kong, China***	Philippines China Japan Thailand Vietnam	Contract signed on 6 April 2018. Connection was installed successfully in June 2018.	**With Manila** CRV-Voice put into operation in August 2018 CRV-AMHS put into operation in May 2019 **With Fukuoka** CRV-AMHS put into operation in September 2020 **With Beijing** CRV - AMHS POT in March and operation in April 2021 **With Bangkok** CRV-AMHS put into operation in August 2022	Staged approach	Need to coordinate with relevant CAAs/ANSPs in joining CRV in a harmonized manner, etc.
9	**Macau China**		December 2022	To be confirmed	Staged approach	Migration from X.25 to IPS
10	**Cook Islands**					
11	**Democratic People's Republic of Korea**		Contract in 3Q2018 and service readiness in 4Q2018	AFTN and VoIP		

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
12	**Fiji***	Australia New Zealand USA	Contract in May 2018 and service readiness in 3Q 2018.	Data (AMHS) and VoIP With: Australia ATS voice April 2019 completed, AMHS completed in July 2019, NZ ATS voice completed April 2019 and USA ATS voice completed in March 2019 and AMHS completed in April 2019.	Staged approach	CBA, safety case
13	**France:** **-New Caledonia** **-French Polynesia**	 Fiji New-Zealand	 Q3/2023 Q3/2023	 ATS Voice, AMHS AFTN/AMHS with NZ.	Staged approach	Depends on an agreement with peer States on adding a layer of encryption (PSK) over CRV

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
14	**India***	The GRE tunnels has been setup between: Mumbai–Bangkok, Mumbai- Singapore, Mumbai–Beijing and Mumbai-Paro. Mumbai-Kathmandu GRE Tunnel under tests Note: AMHS trails between Mumbai-Bangkok over CRV has been carried out successfully. AMHS trails between Mumbai-Singapore, Mumbai - Bhutan over CRV are presently in progress.	Contract for CRV implementation with M/s PCCW in India Signed on 15th March, 2022. CRV Circuit has been delivered in Dec, 2022. CRV Cutover: End of 1Q2023	AFTN/AMHS, , ATS Voice & ADS-B	Staged approach	Note: On successful trial Operation with BBIS/BIS States, the CRV Cutover will be planned.

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
15	**Indonesia**		Contract in 1Q2022 and service readiness in 2023.	Australia 2023 (voice & data) Malaysia 2023 (voice) Papua New Guinea 2023 (voice) Philippine 2023 (voice) Singapore 2023(voice & data) USA 2023(voice)		
16~~16~~	**Japan*~~Japan*~~**	Hong Kong China USA Singapore China RoK Philippine ~~Hong Kong China~~ ~~USA~~ ~~Singapore~~ ~~China~~ ~~RoK~~	Contract signed in Nov.2017 and service readiness in1Q 2018 for Fukuoka ~~Contract signed in Nov.2017 and service readiness in1Q 2018 for Fukuoka~~	**USA** AMHS(1Q 2019) Voice(2Q 2021) **Hong Kong, China** AMHS(3Q 2020) **Singapore** AMHS(4Q 2020) **China** AMHS(1Q 2021) ATFM(1Q 2021) **Taipei ACC** Voice(1Q 2022) AIDC(planned 1Q 2023) **R.O.K** AMHS(4Q 2022) Voice(1Q 2021) and additonal line plan in progress AIDC(planned 1Q 2024) **Philippine** Voice(2Q 2022)	In progress~~In progress~~	
17	**Kiribati**					

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
18	**Lao PDR**					
19	**Malaysia**	Thailand Singapore Indonesia India	Contract signed between CAAM and PCCWG in Sept 2022. CRV service readiness started in Nov 2021.	**Thailand** 1) Network connectivity testing (AMHS/AIDC) – Oct 2022 2) Completed cut over & migration (AMHS /AIDC) – Jan 2023 3) Voice & ADS-B (testing, migration-TBD **Singapore** 1) Network connectivity testing (AMHS/AIDC) – May 2022 2) Estimate cut over & migration (AMHS/AIDC) – Q1/2023 3) Voice & ADS-B (testing, migration-TBD **India** 1) Estimate network connectivity testing (AMHS/AIDC) – Q1/ 2023 2) Estimate cut over & migration (AMHS/AIDC) – Q1/2023 3) Voice & ADS-B (testing, migration-TBD **Indonesia**	Staged approach	

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
				1) Estimate network connectivity testing (AMHS/AIDC) – Q2/2023 2) Estimate cut over & migration (AMHS/AIDC) – Q2/2023 3) Voice & ADS-B (testing, migration- TBD		
20	**Maldives**					
21	**Marshall Islands**					
22	**Micronesia (Federated States of)**					
23	**Mongolia**	CAAM and PCCWG made ICMP package test in 2021.	Contract in 1Q2022 and service readiness in 4Q2022	AFTN, ADS-B, AMHS, Voice With: **China** Dec, 2022(AMHS), (ADP) TBD Voice, ADS-B, AFTN **Russia** TBD (AFTN, ADS-B, AMHS, Voice)	staged approach	Negotiations with neighbouring countries and stakeholders on CRVs and its use are critical to implementation.

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
24	**Myanmar**	China , India, Thailand, Laos, Bangladesh.	Contract will be signed after discussed with PCCW Global. Implementation was targeted in Q4/2023 depends on PCCW's proposal quotation. Already sent to high level questionnaire form V 2.1 in June 2021 and V 2.2 again to PCCWG in Feb 2023 to join the CRV implementation.~~Contract will be signed after discussed with PCCW Global. Implementation was targeted in 3Q/2023 depends on PCCW's proposal quotation, and getting the Budget approval from Authority concerned.~~	AFTN/AMHS, AIDC, ADS-B and Voice~~AFTN/AMHS, AIDC, ADS-B and Voice~~	Staged approach~~staged approach~~	Need to coordinate with relevant CAAs/ANSPs in joining CRV network to be harmonized regionally.~~One of counterparts join in~~
25	**Nauru**					

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
26	**Nepal**		SO signed with PCCW	AFTN/AMHS	Staged Approach	BBIS-state India joining the CRV network, as most traffic is routed through it
27	**New Zealand**	Australia USA Fiji French Polynesia Chile	Contract signed in July 2018 and service implemented December 2018	Australia Voice Completed March 2019 and AMHS June 2019 Completed USA Voice Completed March 2019 and AMHS March 2019 Completed Fiji Voice Completed April 2019 French Polynesia AMHS and Voice Chile AMHS (SAM regional network REDDIG)	Awaiting French Polynesia joining. Awaiting outcome of inter-regional network connectivity discussion. For Chile	CBA attractive if all counterparts join in.

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
28	**Pakistan**	China India	Duly Signed Service Order Form Submitted on 23rd Jan 2023 for Finalization / Execution of the Contract. As per timeline given by PCCW Global the CRV will be implemented by August / Sept 2023	AMHS /AFTN / VOICE	In progress	Package-D is opted to establish link between China and India. Connectivity with other neighbouring regions / FIRs i.e. Tehran, Kuwait, Kabul & Muscat could be migrated on CRV only if the states join CRV.
29	**Palau**					
30	**Papua New Guinea**	Australia USA-Oakland USA-Aireon		Australia: AFTN June 2021, Voice Oct 2021 USA-Oakland Voice November 2021 USA-Aireon Space based ADSB-July 2021	Staged approach	Completed
31	**Philippines**	Hong Kong China Singapore USA Japan	Contract signed in March 2018 and service readiness in 2Q2018	Completed: With **HONG KONG** AIDC - 2Q2019; AMHS - 2Q2019; Voice - 3Q2018.	staged approach	Success transition to the New ATM center in 4Q2018 Dependencies:

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
				With **SINGAPORE** AIDC – 4Q2019; AMHS – 4Q2020; Voice – 1Q2020. With **USA** AMHS – 2Q2021; Voice – 4Q2019. With **JAPAN** Voice – 1Q2022. Operational Trial: With **USA** AIDC – 4Q2022 Planned: With **INDONESIA** Ujung Pandang Voice – 1Q2023		AIDC with Kota Kinabalu implemented via BBIS Singapore AIDC with Ujung Pandang implemented via BBIS Singapore

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
32	**Republic of Korea**	Japan China	Contract in 3Q 2019 and service readiness in 4Q 2022	Completed: **with Japan** Voice –March 2021 Data(AMHS) - December 2022 **With China** Data(AMHS) – November 2022 Planned; **With Japan** Voice additional lines-from 2022 to 2023	staged approach	Data(AMHS) POT in 4Q and operation from 4Q 2022
33	**Samoa**					
34	**Singapore***	Australia Japan Philippines Thailand	Contract signed in May 2019 and service readiness in Dec 2019	Data (AMHS over IP) with: Australia Dec 2020 (completed); Japan Nov 2020 (completed); Philippines Dec 2020 (completed); Thailand Sep 2022 (completed); India Q1 2023 (in progress, testing completed); and Malaysia Q1 2023 (in progress, testing completed). Voice with: Philippines Mar 2020 (completed).	Staged approach	

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
35	**Solomon Islands**					
36	**Sri Lanka**	Planned: Australia India Indonesia Maldives Singapore	Nov-Dec 2022	Q1 2023 - AMHS with Singapore TBD - AMHS connectivity with Mumbai, and Male. TBD - Direct Speech facilities with Chennai, Trivandrum, Mumbai, Male, Jakarta, Melbourne, Singapore.	Phased Approach	Package D is planned based on CBA conducted. Comparison of performance of Package D and existing IPLC circuit.
37	**Thailand**		1. Contract in 3Q2021 Status: Completed 2. Service readiness in 2Q2022 **Status: Completed**	Data first Then voice, subject to safety case: **Bhutan 3Q2022 (Completed)** Hong Kong **3Q2022 (Completed);** Singapore **3Q2022 (Completed)**; **Malaysia 1Q2023(Completed)**; India **1Q2023**; Beijing **2Q2023**	Staged approach	
38	**Timor Leste**					
39	**Tonga**					
40	**Tuvalu**					

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
41	**United States***	Australia Fiji Japan Philippines New Zealand Papua New Guinea Tahiti Russia	Contract in January 2018	1) AMHS with Australia Fiji Japan Philippines New Zealand Papua New Guinea (2021) Indonesia (2022) 2) AIDC with Fiji Japan New Zealand Papua New Guinea (Direct planned 2021) Tahiti (via New Zealand) Indonesia (Direct planned 2022) Russia (when join CRV) 3) VoIP with Fiji Japan Philippines New Zealand Papua New Guinea (direct planned 2021) Indonesia (2022)	Staged approach	

SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
42	**Vanuatu**					
43	**Vietnam**	Hong Kong, China Singapore Philippines	Contract signed in M 4Q/2022, Service readiness in May -2023	AFTN/AMHS connectivity with Hong Kong Voice and AFTN/AMHS with Singapore Voice and AFTN/AMHS with Philippines	staged approach	

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Terms of Reference

1. Background

The Asia Pacific Common aeRonautical Virtual Provide Network (APAC CRV) provides air traffic navigation networking to the Asia Pacific Region
The APAC CRV Operations Group (APAC CRV OG) have requested a design review of the CRV.

To assess the architecture design on how well this has been secured. It will draw on industry best practices, documentation from the telecommunications provider the CRV, PCCW Global, and various CRV members using in the solution, and the experience of the consultant and wider team.

2. In Scope

The scope of this engagement will be limited to:

- A Security Design Review of the CRV
- Network Review

3. Out of Scope

The following are not in scope for the Services under this ToR:

- Any interaction with the live operational environment
- Testing which might cause a denial of service
- Implementation countermeasures and fixes. Advice will be provided on how this should be done by the consultant
- Any remediation testing is out of scope of this agreement and will be provided separately if requested in writing by the APAC CRV OG at the APAC CRV OG's cost.

Detail of Work

1. Security Design Review

The consultant will carry out a security review of the CRV design.

- A review of the design concepts and the architectural design proposal. The aim is to both understand the approach for subsequent aspects of this review and to provide early feedback that may be used to guide the design down better pathways. This can start with the signing of the ToR and once the consultant has received all the design documentation, the review can be done remotely.

In reviewing the design, the consultant will:

- Use APAC CRV security objectives from the RFP and Operations Manual to be the basis of validation but will bring industry best practices to advise if these objectives are sufficient.
- Use policies and standards by relevant government, industry or internal bodies. These are likely to include but not limited to CIS benchmarks, ISO27001, ICAO Annex 17, NIST and ASD.
- Characterise the system architecture, component technologies, and interfaces to identify trust boundaries, data flows, and current security enforcing controls,
- Identify any additional controls that could be implemented to mitigate identified risks

Security Design Review	
Service Type	Security Design Review
Assets / Targets	APAC CRV
Effort (days)	TBD
Access	Remote, with calls via video conferencing when required.
Approach	• Consume the documentation provided by the APAC CRV OG • Identify areas where further clarification may be necessary and, after receiving permission from the APAC CRV OG and PCCWG to hold video calls with authorised technical stakeholders • Walk through a list of preliminary findings with authorised technical stakeholders • Advise preliminary outcomes to APAC CRV OG Co-Chairs • Release a draft report for feedback • Release a final report
Specific requirements	• Up to date documentation • A list of authorised APAC CRV OG and PCCWG individuals who can respond to technical questions during the engagement Note: These requirements must be met at least 1 week before work is due to commence.

2. Network Review of the APAC CRV

Security Design Review	
Targets	PCCWG's APAC CRV routers
Perspectives	Unauthenticated physical network access Authenticated physical network access
Effort (days)	TBD
Access	On site using Consultant provided Laptop Computers with options to provide testing VM within instance at consultant's discretion
Approach	• The Consultant will be positioned on-site within a PCCWG POP or an APAC CRV OG members server/equipment room • The Consultant will be granted connectivity to the PCCWG CRV router or network element at the authorised site(s) • The Consultant will leverage information discovered during attacks against the CRV to compromise the CRV.

	• The Consultant is not specifically testing the APAC CRV members LAN however by design, access to this network is required to identify and access threat surface it presents to the CRV Vulnerabilities exploited or discovered that lead to a compromise of the CRV will be reported, additional vulnerabilities will be reported to the APAC CRV Co-Chairs regarding the CRV at the consultant's discretion. The assessment is conducted according to the PTES Penetration Testing Methodology[1]. Activities include but are not limited to the following: • Passive network reconnaissance • Active interception and redirection of traffic • Enumeration of exposed services and versions • Automated vulnerability scanning of network systems • Targeted exploitation of identified weaknesses • Evaluation of the technical impact of each identified issue • Horizontal and vertical privilege escalation • Provide recommendations to mitigate any issues found in the review

3. Restricting communications

- APAC CRV OG has requested that communications regarding the engagements in this Terms of Reference be treated as "Traffic Light Protocol: Red". That is to say, outcomes from each engagement must be limited to named individuals.
- APAC CRV OG must make the Consultant aware of any changes to personnel which might impact this requirement.
- The Consultants internal quality assurance processes necessitates peer review by another consultant; these consultants will be named.

Deliverables

The deliverables for this project will include:

1. Final Report

A final report that will be delivered in PDF format and available the week following testing. It will contain the following components:

- An Executive Summary providing a summary of findings and general recommendations resulting from the review. The summary presents the assessment of APAC CRV's state of security and will detail APAC CRV's adherence to industry best practices and identify the current level of risk. The Executive Summary is intended to describe business-level risks resulting from technical findings such as regulatory, reputational and operational impacts. This section also includes a summary of severity rated as "Critical", "High", "Medium" or "Low" at a level that can be easily understood by functional management. Severity is based on a number of variables including the ease with which the vulnerability may be exploited and the potential impact of its exploitation in context of Client's business environment.
- A Detailed Findings section, which will provide in-depth details of identified vulnerabilities. This will include the steps to reproduce the issue, potential impacts of exploitation and severity rationale, and recommended remediation actions.
- A Compromise Narrative section may be included should the Consultant achieve significant compromise of APAC CRV's systems during the provision of the Services. The Compromise Narrative will provide a walk-through of the process used to achieve such compromise, including information on the tools and techniques used.

From receipt of the final report, the APAC CRV's has one working month to review and request changes. After this time the report is considered final and no further changes will be made.

2. Final Presentation

The Consultant will deliver the findings of the report to the relevant project stakeholders. The purpose of this presentation is to clearly articulate our findings, ensuring they are understood and to agree on the next steps.

Updated AFTN/ATSMHS Routing Directory for APAC Region ~~AFTN/ATSMHS CONNECTIONS- ASIA/PAC ROUTING DIRECTORY~~

Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
Apia/Faleolo	Christchurch	AMHS/UA	N
Bangkok^	Beijing	AMHS	N
	Mumbai	AMHS	~~N~~Y
	Dhaka	AMHS	N
	Ho-Chi-Minh	AFTN	N
	Hong Kong	AMHS	~~N~~Y
	Kuala Lumpur	AMHS	~~N~~Y
	Phnom Penh	AMHS	N
	Rome	**AMHS**	N
	Yangon	AMHS	N
	Singapore	AMHS	~~N~~Y
	Vientiane	AMHS	N
	Paro	AMHS	~~N~~Y
Beijing^	Bangkok	AMHS	N
	Fukuoka	AMHS	Y
	Guangzhou	AFTN	N
	Hong Kong	AMHS	Y
	Karachi	AFTN	N
	Khabarovsk	**AFTN**	N
	Kathmandu	AFTN	N
	Mumbai	AMHS	~~N~~Y
	Pyongyang	AFTN	N
	Seoul	AMHS	N
	UlaanBaatar	AFTN	N
	Yangon	AFTN	N
Brisbane^	Christchurch	AMHS	Y
	TimorLeste	AFTN/UA	N
	Jakarta	AFTN	N
	Johannesburg	**AMHS**	N
	Honiara	AFTN/UA	N
	Nadi	AMHS	Y
	Nauru	AFTN/UA	N
	Port Moresby	AFTN	Y
	Port Vila	AFTN/UA	N
	Singapore	AMHS	Y
	USA	**AMHS**	Y
Brunei	Kuala Lumpur	AFTN	N
	Singapore	AFTN	N
Chennai	Mumbai	AFTN	N
	Kolkata	AFTN	N
	~~Kuala Lumpur~~	~~AFTN~~ Not in Operation	N

Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
Christchurch	Apia/Faleolo	AMHS/UA	N
	Niue	AMHS/UA	N
	Rarotonga	AMHS/UA	N
	Brisbane	AMHS	Y
	Papeete/Tahiti	AFTN	N
	Tonga/Fua'Amotu	AMHS/UA	N
	USA	**AMHS**	Y
Chuuk	USA	AMHS/UA	N
Colombo	Mumbai	AMHS	N
	Male	AFTN	N
	Singapore	AFTN	N
Delhi	Mumbai	AFTN	N
	Kolkata	AFTN	N
	~~Tashkent~~UTTT? Not in Operation	~~AFTN~~	N
Dhaka	Bangkok	AMHS	N
Fukuoka^	Beijing	AMHS	Y
	Hong Kong	AMHS	Y
	Moscow	**AFTN**	N
	Seoul	AFTN	N
	Singapore	AMHS	Y
	Taibei	AMHS	Y
	USA	**AMHS**	Y
Guangzhou	Beijing	AFTN	N
	Hong Kong	AFTN	N
	Macau	AFTN	N
	Haikou	AFTN	N
	Hanoi	AFTN	N
Hanoi	Ho-Chi-Minh	AFTN	N
	Vientiane	AFTN	N
	Guangzhou	AFTN	N
Haikou	Guangzhou	AFTN	N
	Hong Kong	AFTN	N
Ho-Chi-Minh	Bangkok	AFTN	N
	Hanoi	AFTN	N
	Hong Kong	AFTN	N
	Singapore	AFTN	N
	Manila	AFTN	N
	Phnom Penh	AFTN	N
Hong Kong^	Bangkok	AMHS	~~N~~Y

Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
	Beijing	AMHS	Y
	Guangzhou	AFTN	N
	Ho-Chi-Minh	AFTN	N
	Macau	AMHS	N
	Manila	AMHS	Y
	Haikou	AFTN	N
	Taibei	AMHS	Y
	Fukuoka	AMHS	Y
Honiara	Brisbane	AMHS/UA	N
Jakarta	Brisbane	AFTN	N
	Singapore	AMHS	N
Karachi	Beijing	AFTN	N
	Mumbai	AMHS	N
	Kabul	AFTN	N
	Kuwait	AMHS	N
	Tehran*(Not listed in the ANP AFTN Planning Table)*		
Kathmandu	Beijing	AFTN	N
	Mumbai	AMHS	~~N~~Y
Kolkata	Mumbai	AFTN	N
	Delhi	AFTN	N
	Chennai	AFTN	N
Koro	USA	AMHS/UA	N
Kosrae	USA	AMHS/UA	N
Kuala Lumpur	Bangkok	AFTN	N
	Brunei	AFTN	N
	Singapore	AFTN	N
	~~Chennai~~ ~~Not in operation~~	~~AFTN~~	N
Macau	Guangzhou	AFTN	N
	Hong Kong	AMHS	N
Majuro	USA	AMHS/UA	N
Male	Colombo	AFTN	N
Manila	Hong Kong	AMHS	Y
	Ho Chi Minh	AFTN	N
	Singapore	AMHS	Y
	Taibei	AMHS	Y
	USA	AMHS	Y

Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
Mumbai^	Bangkok	AMHS	~~N~~Y
	Dhaka	AMHS	N
	Kolkata	AFTN	N
	Colombo	AMHS	N
	Delhi	AFTN	N
	Karachi	AMHS	N
	Kathmandu	AMHS	~~N~~Y
	Beijing	AMHS	~~N~~ Y
	Chennai	AFTN	N
	Muscat/Seeb	~~AFTN~~ AMHS~~(No connection)~~	N
	Nairobi	AFTN	N
	Paro	AMHS	~~N~~Y
	Singapore	AMHS	~~N~~Y
Nadi^	Brisbane	AMHS	Y
	Funafuti	AMHS/UA	N
	Noumea	AMHS	N
	Tarawa	AMHS/UA	N
	USA	AMHS	Y
	Wallis Is.	AMHS/UA	N
Nauru	Brisbane	AMHS/UA	N
Niue	Christchurch	Email	N
Noumea	Nadi	AMHS	N
Pago Pago	USA	AMHS/UA	N
Papeete/Tahiti	Christchurch	AFTN	N
Paro	Mumbai	AMHS	~~N~~Y
	Bangkok	AMHS	N
Phnom Penh	Bangkok	AMHS	N
	Ho Chi Minh	AFTN	N
Pohnpei	USA	AMHS/UA	N
Port Moresby	Brisbane	AFTN	Y
Port Vila	Brisbane	AMHS/UA	N
Pyongyang	Beijing	AFTN	N
Rarotonga	Christchurch	AFTN	N
Salt Lake City^	Brisbane	AMHS	Y
	Christchurch	AMHS	Y
	Chuuk	AMHS UA	N

Terminal 1 (^ - BBIS)	Terminal II	ATSMHS or AFTN	Over CRV (Y/N)
	Fukuoka	AMHS	Y
	Koro	AMHS UA	N
	Kosrae	AMHS UA	N
	Majuro	AMHS UA	N
	Manila	AMHS	Y
	Nadi	AMHS	Y
	Pago Pago	AMHS UA	N
	Pohnpei	AMHS UA	N
	Yap	AMHS UA	N
Seoul	Beijing	AMHS	N
	Fukuoka	AFTN	N
Singapore^	Bangkok	AMHS	~~N~~Y
	Bahrain	AFTN	N
	Brisbane	AMHS	Y
	Brunei	AFTN	N
	Colombo	~~AFTN~~AMHS	N
	Ho-Chi-Minh	AFTN	N
	Jakarta	AMHS	N
	Kuala Lumpur	AMHS	~~N~~Y
	London	**AMHS**	N
	Manila	AMHS	Y
	Mumbai	AMHS	~~N~~Y
	Fukuoka	AMHS	Y
Taibei	Hong Kong	AMHS	Y
	Manila	AMHS	Y
	Fukuoka	AMHS	Y
Tarawa	Nadi	AMHS/UA	N
Timor Leste	Brisbane	AMHS	N
Tonga/Fua'Amotu	Christchurch	AMHS/UA	N
UlaanBaatar	Beijing	AFTN	N
	Irkutsk	AFTN	N
Vientiane	Bangkok	AMHS	N
	Hanoi	AFTN	N
Wallist Is.	Nadi	(planning)	-
Yangon	Bangkok	AMHS	N
	Beijing	AFTN	N
Yap	USA	AMHS/UA	N

Note: Interregional connections are highlighted in yello~~w~~

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.		

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:**
			Note: 1. PO was awarded to Frequentis Comsoft on Jan-2023 for the replacement of existing AMHS System at Mumbai. 2. New AMHS System will be having DC at Mumbai & DR at Delhi. Subsequently second CRV connection will be implemented with at Delhi for DR AMHS Operation. 3. SDR (System Design Review) meeting with Frequentis Comsoft is planned in May 2023 4. Tentative timeline for commissioning of new AMHS System is Dec 2024.	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.
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	Support exchange of IWXXM messages based on FTBP.	To be determined
8	Maldives	Maldives / Velana International Airport (VRMM)	Contract awarded to replace existing AFTN system to an AMHS in 1Q2023. Installation and commissioning of AMHS to be completed by 3Q2023	AMHS supports FTBP	Discussion with PCCW for 128k bandwidth CRV package D
9	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.

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:**
10	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.
11	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.
12	Singapore	Singapore	March 2011	Yes	2MB for CRV and minimally 64kbps for IPLCs
13	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** IOT Test : Done POT Test: Planned for end of 3Q2021 **Bangkok - Rome Circuit** IOT Test: Planned for 3Q2021 POT Test: Planned for 4Q2021	Completed, the IWXXM exchange has been implemented since November 2020.	The capacity of links readied to support in both form.
14	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

Implementation Status of ATN/AMHS in the APAC Region Extracted from ATN/AMHS/AIDC Implementation Table

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
AFGHANISTAN			
AUSTRALIA	AMHS over CRV with: Singapore, New Zealand, Fiji and USA AMHS over leased line with: South Africa AFTN over CRV with: PNG AFTN over leased line with: Indonesia Planning to migrate existing AFTN connections with Indonesia and PNG to AMHS over CRV (TBC, pending readiness both ends) Extended AMHS with FTBP in support of IWXXM exchange in operation since Nov. 2020.	Frequentis Comsoft	
BANGLADESH	In Q1/2013, Bangladesh installed ATN/AMHS and BIS Router at Dhaka (VGHS) with User Agents at Chittagong (VGEG) and Sylhet (VGSY).	COMSOFT	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
BHUTAN	ATN/AMHS circuits, using IP over VPN, with Thailand (Bangkok) and India (Mumbai) commissioned in June and July 2017 respectively. IOT and POT with Mumbai completed on 27th June 2017. IOT and POT with Thailand completed on 2nd May 2017. TMC signing with both countries signed.	AEROTHAI'S AMHS System	
BRUNEI DARUSSALAM	ATN BIS Router planned for 2015 and AMHS planned for 2015		
CAMBODIA	BIS Router and AMHS installed. Cambodia (CATS) AMHS connected with Bangkok via VSAT IP link since 10 December 2013	AVITECH	

CHINA	ATN Router and AMHS including NCC deployed in 2008 which is being upgraded to support ATN/IPS with target date of completion in December 2013. Hong Kong China The Beijing-Hong Kong AMHS link was put into operation in 2018; CRV/AMHS circuit was put into operation in April 2021 Thailand With Thailand was put into operation in Q12020 Plan implement IOT and POT in 2022 Macau China AMHS/ATN technical tests with Macau completed in 2009. Plan for ATN/AMHS implementation with Macao China is TBD. Korea ATN/AMHS circuit with ROK has been put into operation since June 2011. Completed CRV/AMHS IOT in 2021 Plan implement POT in Q2 2022 India ATN/AMHS tests with India has been put into operation since 2016. Mongolia ATN and AMHS IOT with Mongolia is completed in May 2018. Plan for commissioning after POT completion in 2021 Nepal Connection tests with Nepal is TBD. Japan AMHS testing with Japan was completed in March 2021.It will put into operation after TMC is signed.	IN-HOUSE (Aero-Info Technologies Co., Ltd)	IN-HOUSE (Aero-Info Technologies Co., Ltd)

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
	China have completed TMC signed and circuit put into operation in 2021 Russia AMHS IOT with Russia in 2021.		
HONG KONG, CHINA	**Manila / Philippines** CRV/AMHS circuit was put into operation in May 2019. **Beijing / China** CRV/AMHS circuit was put into operation in April 2021 Macao / China ATN/AMHS circuit was put into operation in December 2009. Wait for Macao to join CRV. **Bangkok / Thailand** ~~ATN/AMHS circuit was put into operation use in 2014. Wait for Thailand to join CRV.~~ CRV/AMHS circuit was put into operation in August 2022. **Fukuoka / Japan** CRV/AMHS circuit was put into operation in September 2020. **HoChiMinh / Vietnam** Currently on AFTN. Simple AMHS IOT was conducted in Dec 2019. Wait for Vietnam to join CRV. **Taibei / China** CRV/AMHS circuit was put into operation in June 2020.	COMSOFT	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
MACAO, CHINA	ATN/AMHS interoperability test with Beijing commenced in March 2009. ATN/AMHS circuit with Hong Kong put into operational use in end Dec 2009. Upgrade of ATN/AMHS to support IPS and IWXXM 3.0 planned with tentative target date of Q4 2023.~~Upgrade of ATN/AMHS to support IPS and IWXXM planned with tentative target date of Q2 2023.~~	COMSOFT	
COOK ISLANDS			
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	The ATN BIS Router and AMHS planned for in 2011.		
FIJI ISLANDS	ATN BBIS IPS router and AMHS implemented over CRV for connection to USA in April, 2019 with Australia planned for June, 2019. . For connections with sub-regional centers: For New Caledonia using AMHS since 2017; For connection with Kiribati using UA/AMHS implemented in 2015. Upgrade of AMHS to support the Extended ATS service with up to 4.0MB file size including FTBP. and IWXXM planned with tentative target date of Q2 2023.	COMSOFT	B2B connection between Nadi AMHS and Brisbane AMHS planned for Q3, 2022 as backup for CRV.

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
FRANCE *(French Polynesia Tahiti)*	Planned for implementation of AMHS in 2022 (T2). Using IP with New Zealand since 2017.	COMSOFT	

INDIA	Dual stack ATN/IP router and AMHS implemented at Mumbai in 2011. Operational AMHS connections with Bangkok, Dhaka, Singapore, Kathmandu, Karachi, Beijing, Bhutan, Colombo & Muscat implemented. ~~With Beijing implemented in 2016;~~ ~~With Colombo implemented in May2017; With Bhutan implemented in July 2017;~~ Mumbai-Nairobi- AFTN Connectivity Implemented. CRV Circuits has been delivered in India/AMHS Mumbai in Dec 2022. Following AMHS Circuits has been migrated to CRV In Q1 of 2023: Mumbai-Bangkok Mumbai-Kathmandu Mumbai-Bhutan Mumbai-Singapore In Q2 of 2023: Mumbai-Beijing Note: CRV Connection with Karachi, Dhaka & Sri Lanka will be implemented once these states are ready with their CRV Connection from PCCWG. AMHS & AFTN Connection with Muscat & Nairobi respectively may be continuing with the existing IPLC circuit. ~~(IOT/POT) between Mumbai – Muscat is scheduled with mutual agreement between India & Oman between 0600-0900 UTC from 21.06.2021. Technical Memorandum of Cooperation (TMC) between Oman and India has been~~	COMSOFT	1. PO was awarded to Frequentis Comsoft in Q1 of 2023 for the replacement of existing AMHS System at Mumbai. 2. New AMHS System will be having DC at Mumbai & DR at Delhi. Subsequently, second CRV Connection may be implemented at Delhi for DR AMHS Connection. 3. SDR (System Design Review) meeting with Frequentis Comsoft is planned in May 2023 4. Tentative timeline for commissioning of new AMHS System is Dec 2024. ~~INDIA~~

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
	~~signed in Feb. 2022. As agreed mutually, Mumbai- Muscat AMHS circuit will be commissioned on 25/04/2022 at 0600UTC.~~ ~~Technical Memorandum of Cooperation (TMC) between Oman and India has been signed in Feb. 2022. As agreed mutually, Mumbai-Muscat AMHS circuit will be commissioned on 25/04/2022 at 0600UTC.~~		
INDONESIA	ATN BIS Router and AMHS with Singapore implemented since February 2018; AMHS Trial (IOT) with Brisbane pending for CRV implementation.	IDS	For CRV, target of contract in 2Q2022 and implementation in 4Q2022.

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
JAPAN	ATN BBIS router and AMHS installed at **USA** in 2000. Connection tests with USA in 2000 - 2004 and put into operational use in 2005. ATN BBIS router (to apply to Dual Stack) and AMHS (to upgrade in 2015. The connection test with each country which is not currently connecting is started after update. Hong-Kong AMHS/FTBP over CRV was put into operation in September 2020. **Singapore** AMHS/FTBP over CRV was put into operation in December 2020. **Beijing/China** AMHS/FTBP over CRV was put into operation in March 2021. **Taipei/China** AMHS/FTBP over CRV was put into operation in March 2022. **Incheon/Korea** Plan for AMHS/FTBP over CRV IOT in 4Q 2022	NEC	Japan and USA conducting testing AIDC over AMHS and cutover date is 5 May 2017.
KIRIBATI	Connection with Nadi using UA/AMHS implemented in 2015.		
LAO PDR	- ATN BIS Router and AMHS Implemented with Bangkok and Phnom Penh. - AFTN used with Hanoi and Kunming. - For Yangon we have no direct link the connection is used via Bangkok.	THALES	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
MALAYSIA	ATN BIS Router completed 2007. AMHS for Malaysia – Singapore implemented in March 2020. AMHS for Malaysia – Thailand implemented in Dec 2019.	FREQUENTIS	
MALDIVES	~~In the process of replacing the existing operational AFTN system by AMHS. It is expected to complete the installation before the end of 2019.~~ ~~With the new AMHS, it is planned to establish a new IP connection between an additional neighboring ATSU as the current link is an X.25 connection between Colombo.~~ ~~Also will look for the possibility of implementing the CRV network to use with AMHS and AIDC during the same phase.~~ IP link with Colombo to be established by 3Q2023 to replace the X.25 link used by AFTN. AMHS installation and commissioning to be completed 3Q2023.	IDS AirNav	
MARSHALL ISLANDS			
MICRONESIA (EDERATED STATES OF)			
Chuuk			
Kosrae			

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
Pohnpei			
Yap			
MONGOLIA	AMHS/AFTN gateway implemented 2012. ATNBIS router implemented in 2014. ATN and AMHS IOT with China was completed in May 2018. ATN and AMHS POT with China was completed in May 2019. Upgraded the AMHS system and purchased UA terminals in 2020, but it is not yet fully operational due to the Covid-19 pandemic situation. The AMHS system is planned to be fully operational in the fourth quarter of 2022.	COMSOFT	
MYANMAR	AMHS including AFTN/AMHS gateway implemented in Nov 2011. Connection with Thailand implemented in 4Q2016. Planned for AMHS connection with Beijing. Target date TBC.	THALES	AMHS including AFTN/AMHS gateway implemented in Nov 2011. Connection with Thailand implemented in 4Q2016. Planned for AMHS connection with Beijing. Target date TBC.
NAURU			

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
NEPAL	AFTN/AMHS Gateway implemented in 2012. AMHS implemented with India since June 2014. AFTN connection with China. Plan to test AMHS connection soon.	COMSOFT	
NEW CALEDONIA	New router and AMHS commissioned December 2016	COMSOFT	
NEW ZEALAND	An AMHS connection with the USA over CRV was implemented in April 2019. The AFTN connection to Australia was moved to CRV in June 2019. The AFTN connection to Australia over CRV was replaced with an AMHS connection over CRV in September 2020 Work to provide an AMHS connection over CRV between Bhutan and New Zealand as a temporary solution for their usage of CRV (pending Thailand and India connecting to CRV) is ongoing (April-2022).	Frequentis Comsoft	
PAKISTAN	ATN/AMHS connections with Mumbai and Kuwait since 2015 and 2018 respectively. AMHS connection with Beijing, Kabul, Tehran and Muscat will be provided after up gradation of existing AMHS at Karachi which is already in progress.	Existing COMSOFT After up gradation ISD	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
PAPUA NEW GUINEA	Currently AFTN over IP. AMHS implementation is planned for after successful implementation of CRV this year. AMHS implementation planned for 2020.	COMSOFT is the supplier of PNG AFTN/AMHS system	
PHILIPPINES	ATN/AMHS Boundary Intermediate System was installed at the new Manila CNS/ATM Center; • Site Acceptance, Oct. 2015 • Commissioned & operational, March 2018 AMHS implementation over CRV with the following adjacent FIR's; • **HONG KONG** - May 2019 • **TAIPEI** - Sept. 2019 • **SINGAPORE** - Dec. 2020 • **OAKLAND** - April 2021	**Frequentis - Comsoft**	The New ATN/AMHS of Manila CNS/ATM center has been in domestic operations since March 2018. And with the implementation of CRV, AMHS connection has been implemented with the following adjacent FIR's; **-HONG KONG** **-TAIPEI** **-SINGAPORE** **-OAKLAND**

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
REPUBLIC OF KOREA	Plan to upgrade AMHS supporting IWXXM from 2022 over CRV 1) AMHS/CRV IOT with China and Japan in 4Q of 2021 2) AMHS/CRV POT with China on July 2022, and with Japan in 4Q 2022 3) Cutover to CRV with China and Japan in 4Q 2022 4) Implementation of AMHS/CRV with China and Japan in 4Q 2022	FREQUENTIS	
SINGAPORE	AMHS implemented with: 1) AMHS circuit with India put into operational use in Mar 2011. 2) AMHS circuit with UK put into operational use in Mar 2012. 3) AMHS circuit with Thailand put into operational use in Dec 2014. 4) AMHS circuit with Australia put into operational use in Oct 2016. 5) AMHS circuit with Indonesia put into operational use in Feb 2018. 6) AMHS circuit with Malaysia put into operational in Mar 2020. 7) AMHS circuit with Japan put into operational in Dec 2020. 8) AMHS circuit with Philippines put into operational in Dec 2020. ~~8)~~9) AMHS circuit with Sri Lanka put into operational in May 2022. Inter-Operability Test (IOT) with Vietnam and Sri Lanka started in 2019 and 2022 respectively. IOT with Bahrain and Brunei to be confirmed.	FREQUENTIS COMSOFT	
SRI LANKA	ATN BIS Router Planned for 2013. IP based AMHS implemented by Oct. 2017. - Mumbai tested May 2017 operational planned for Q4 2017; - Singapore testing in Q4 2017 operational for 2018; - Male testing and operational date TBD.	IDS	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
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, -Malaysia, and Italy (Rome) implemented. Bangkok - Vietnam Circuit IOT Test: Done POT Test: Done Commissioning: Planned for end of 4Q2023~~3Q2022~~ Connection with SITA (SITA AMHS Gateway inter-connections) implemented.	AEROTHAI's AMHS System	
TONGA	AMHS planned for 2008. The provider is linked to the New Zealand AFTN		CPDLC and ADS-C is not considered for lower airspace
UNITED STATES	- Australia - Fiji - New Zealand - Japan - Philippines - Indonesia (2023)	IN-HOUSE	
VANUATU			

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	Remarks
VIET NAM	AMHS (basic) implemented from 4Q/2018. Plan AMHS extended from Q4 2022 IOT with Singapore from 10/2019 to 8/2020 IOT with Hong Kong 12/2019 IOT with Thailand 6/2020, POT 8/2020.	IN-HOUSE	
Wallis and Futuna (FRANCE)	AMHS implementation planned for end of 2017		

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Table of AIDC Implementation Status in APAC

State/Administration	AIDC Implementation Status(Implemented or not)	Location of AIDC System ATSU1	ATM Automation System (Make/Model)	ATSU2 /Correspondent State – Administration	Intraregional/Interregional	Transmission Means	Frequency of Use(days in a week)	Main/Back up Circuit	Communication Signal Speed (bps)	Average Transmission Delay (One Trip Time in Seconds)	Implementation Date or Target Date as MON yyyy or xQyyyy	Interface Status (Operational, Testing, Planned, No plan)	Interface Protocol / Version (OLDI or AIDC Version)	List of AIDC Messages Applicable between the Two ATSUs (ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC; TRU, EMG, MIS, TDM, ASM, FAN, FCN; ADS)	Coordination by CDN or Voice	Automatic or Manual EST	A Warning Message to Controller in Case of AIDC Failure	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
AFGHANISTAN	**non-implemented**	Kabul ACC		Kabul ACC /Afghanistan	Intraregional	AMHS												
				Karachi ACC/Pakistan	Intraregional	AFTN												
AUSTRALIA	**Implemented**	Brisbane ACC	Thales ATM system	Oakland ARTCC /USA	Interregional	AFTN	7					Operational	ICD V.X.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, CDN, REJ, MAC, CPL	CDN	Automatic	yes	Up- and down conversion of AMHS and AFTN required as connection between Australian ATM system and national Message Transfer Agent is X25/AFTN.
				Auckland ACC /New Zealand	Intraregional	AFTN	7					Operational	ICD V.X.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, CDN, REJ, MAC, CPL, PAC	CDN	Automatic	yes	
				Melbourne ACC /Australia	Intraregional	AFTN	7					Operational	ICD V.X.0	ABI, ACP, AOC, EST, LAM, LRM, MAC, PAC, TOC	Voice	Automatic	yes	
				Ujung Pandang ACC /Indonesia	Intraregional	AFTN	7					Operational	ICD V.X.0	ABI, ACP, AOC, EST, LAM, LRM, MAC, TOC	Voice	Automatic	yes	
				Nadi ACC /Fiji	Intraregional	AFTN	7					Operational	ICD V.X.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, CDN, REJ, MAC, CPL, PAC	CDN	Automatic		
				Port Moresby/PNG	Intraregional	AFTN	7					Operational	ICD V.X.0	ABI, EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
		Melbourne ACC	Thales ATM system	Brisbane ACC /Australia	Intraregional	AFTN	7					Operational	ICD V.X.0	ABI, ACP, AOC, EST, LAM, LRM, MAC, PAC, TOC	Voice	Automatic	yes	
				Colombo ACC / Sri Lanka	Intraregional	AFTN	N/A					No plan		N/A				
				Jakarta ACC /Indonesia	Intraregional	AFTN	N/A					No plan		N/A				
				Johannesburg ACC / South Africa	Interregional	AFTN	7					Operational	ICD V.X.0	EST, ACP, LAM, LRM	Voice	Automatic	yes	
				Male ACC / Maldives	Intraregional	AFTN	7					Operational	ICD V.X.0	ABI, ACP, EST, LAM, LRM	Voice	Automatic	yes	
				Mauritius ACC /Mauritius	Interregional	AFTN	7					Operational	ICD V.X.0	ABI, ACP, AOC, CPL, EST, LAM, PAC, TOC, LRM	Voice	Automatic	yes	
				Auckland ACC /New Zealand	Intraregional	AFTN	7					Operational	ICD V.X.0	ABI, EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
BANGLADESH	non-implemented	Dhaka ACC		Kolkata ACC /India	Intraregional	AMHS					4Q2023							Implementation of AIDC is included in the "Modernization of CNS-ATM System of CAAB" project which is going on G2G agreement with French Government and likely to be implemented by the end of 2023.
				Yangon ACC /Myanmar	Intraregional	AMHS					4Q2023		ICD V.2.0					
BHUTAN	non-implemented											No plan						Currently not applicable. If required in the future, will decide after CRV implementation.
BRUNEI DARUSSALAM	non-implemented																	
CAMBODIA	Testing	Phnom Penh ACC		Bangkok ACC /Thailand	Intraregional	AMHS					4Q2019	Testing	ICD V.1.0					
				Vientiane ACC/Laos PDR	Intraregional	AFTN						Testing	ICD V.1.0					
				Ho Chi Minh ACC/Viet Nam	Intraregional	AMHS						Testing	ICD V.1.0					
CHINA	Implemented	Beijing ACC	THALES	Ulaanbaatar ACC/Mongolia	Interregional	AFTN					Dec 2023	Testing		EST, ACP, TOC, AOC, LRM, LAM				
		Sanya ACC	NUMEN	Hong Kong ACC / Hong Kong, China	Intraregional	AFTN					Dec 2007	Operational	ICD V.3.0	EST, ACP, TOC, AOC, LRM, LAM		Automatic	yes	
				Hanoi ACC/Vietnam	Intraregional	AFTN					Dec 2023	Testing		EST, ACP, TOC, AOC, LRM, LAM				
				Ho Chi Minh ACC /Vietnam	Intraregional	AFTN					Dec 2023	Planned		EST, ACP, TOC, AOC, LRM, LAM				
		Kunming ACC	NUMEN	Vientiane ACC/Laos PDR	Interregional						Jan 2021	Operational	ICD V.3.0	EST, ACP, TOC, AOC, LRM, LAM		Automatic	yes	
				Yangon ACC /Myanmar	Intraregional	AFTN						Testing		EST, ACP, TOC, AOC, LRM, LAM				
		Lanzhou ACC	NUMEN	Ulaanbaatar ACC/Mongolia	Intraregional	AFTN					Dec 2023	Planned		EST, ACP, TOC, AOC, LRM, LAM				
		Lhasa ACC		Kathmandu ACC/Nepal	Interregional	AFTN												
		Guangzhou ACC	THALES	Taibei ACC /China	Intraregional						Jan 2013	Operational	ICD V.3.0	EST, ACP, TOC, AOC, LRM, LAM		Automatic	yes	

Table of AIDC Implementation Status in APAC

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Guangzhou ACC	THALES	Hong Kong ACC / Hong Kong, China	Intraregional	AFTN					May 2018	Operational	ICD V.3.0	EST, ACP, TOC, AOC, LRM, LAM		Automatic	yes	
		Taibei ACC		Hong Kong ACC / Hong Kong, China	Intraregional	AFTN						Operational	ICD V.3.0					
				Fukuoka ATMC/Japan	Interregional	AFTN						Operational						
				Manila ACC/Philippines	Interregional	AFTN												
		Shenyang ACC	NUMEN	Khabarovsk/Russia	Interregional						Oct 2019	Operational	OLDI	ABI, ACT, MAC, HOP, ACP, LAM, and LRM		Automatic	yes	
		Urumqi ACC	NUMEN	Lahore ACC /Pakistan	Intraregional	AMHS												
		Nanning ACC	NUMEN	Hanoi ACC/Vietnam	Intraregional						Dec 2023	Planned						
		Dalian ACC	NUMEN	Incheon ACC /Republic of Korea	Interregional						Oct 2016	Operational	ICD V.3.0 (trial opera	ABI, EST, ACP, TOC, AOC, LRM, LAM		Automatic	yes	
		Shanghai ACC	NUMEN	Taibei ACC /China	Intraregional						Jan 2013	Operational	ICD V.3.0	LAM		Automatic	yes	
HONG KONG, CHINA	Implemented	Hong Kong ACC	Raytheon ATM system	Guangzhou ACC /China	Intraregional	AFTN	7	Main	2400	4	May 2018	Operational	ICD V.3.0	EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
				Sanya ACC /China	Intraregional	AFTN	7	Main	2400	4	Feb 2007	Operational	ICD V.3.0	EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
				Manila ACC /Philippines	Intraregional	AMHS	7	Main	up to 2M on C	1	May 2019	Operational	ICD V.3.0	EST, ACP, LAM, LRM	Voice	Automatic	yes	
				Taibei ACC /China	Intraregional	AMHS	7	Main	up to 2M on C	1	Nov 2012	Operational	ICD V.3.0	EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
MACAO, CHINA	non-implemented	Macao ATZ										No plan						
COOK ISLANDS	non-implemented																	
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	non-implemented											Planned						
FIJI	Implemented	Nadi ACC	Adacel ATM system	Auckland ACC /New Zealand	Intraregional	AFTN						Operational	ICD V. 2.0	ABI, EST, ACP, TOC, AOC, CDN, CPL				
				Brisbane ACC /Australia	Intraregional	AFTN						Operational	ICD V.1.0	ABI, EST, ACP, TOC, AOC, CDN, CPL				
				Oakland ARTCC /USA	Intraregional	AFTN						Operational	ICD V. 2.0	ABI, EST, ACP, TOC, AOC, CDN, CPL				
FRANCE FRENCH POLYNESIA, NEW CALEDONIA	Implemented	Papeete ACC	THALES EUROCAT	Auckland ACC /New Zealand	Intraregional	AFTN					2009	Operational	ICD V.3.0					
				Oakland ARTCC /USA	Intraregional	AFTN					2009	Operational	ICD V.3.0					
INDIA	Implemented	Ahmedabad ACC	INDRA Aircon 2100	Karachi ACC /Pakistan	Intraregional	AFTN						Testing		ABI, EST				
		Chennai ACC	Raytheon Auto track-III +	Colombo ACC / Sri Lanka	Intraregional	AMHS					4Q2018	Planned						
				Jakarta ACC /Indonesia	Intraregional	AFTN					4Q2019	Planned						
				Kuala Lumpur ACC / Malaysia	Intraregional	AFTN					Jan 2021	Operational	ICD V.3.0	ABI, EST, TOC, AOC	Voice			
				Male ACC /Maldives	Intraregional	AFTN					Sep 2021	Operational						
				Yangon ACC /Myanmar	Intraregional	AFTN						Testing	ICD V.2.0					
		Delhi ACC	INDRA Aircon	Karachi ACC /Pakistan	Intraregional	AFTN					1Q2019	No plan						
				Lahore ACC /Pakistan	Intraregional	AFTN						Testing						
		Kolkata ACC	INDRA Aircon	Dhaka ACC /Bangladesh	Intraregional	AMHS					4Q2018	Planned						
				Yangon ACC /Myanmar	Intraregional	AFTN					4Q2018	Testing	ICD V.2.0					
				Kathmandu ACC /Nepal	Intraregional	AFTN												
		Mumbai ACC	Raytheon Auto track-III	Karachi ACC /Pakistan	Intraregional	AMHS					1Q2019	Planned						
				Male ACC /Maldives	Intraregional	AFTN					Nov 2021	Operational						
				Mogadishu ACC/Somalia	Interregional							Testing						
				Muscat ACC /Oman	Interregional	AFTN						Testing						
				Seychelles ACC / Mauritius	Interregional	AFTN												
		Trivandrum ACC	INDRA Aircon 2100	Male ACC/Maldives	Intraregional	AFTN					3Q2018							
		Varanasi ACC	INDRA Aircon 2100	Kathmandu ACC /Nepal	Intraregional	AFTN						Planned						

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
INDONESIA	Implemented	Jakarta ACC		Melbourne /Australia	Intraregional	AFTN					2023	Testing						
				Colombo ACC / Sri Lanka	Intraregional	AFTN					2024	Testing						
				Singapore ACC /Singapore	Intraregional	AFTN					2022	Testing	ICD V.3.0					
				Kuala Lumpur ACC / Malaysia	Intraregional	AFTN					2024	Testing	ICD V.3.0					
				Kota Kinabalu ACC /Malaysia	Intraregional	AFTN					2025	Testing						
				Chennai ACC /India	Intraregional	AFTN					2022	Testing						
		Ujung Pandang ACC		Brisbane ACC /Australia	Intraregional	AFTN					July 2017	Operational						
				Oakland ARTCC /USA	Intraregional	AMHS						Planned						
				Port Moresby ACC/ PNG	Intraregional	AFTN					2Q2021	Operational						
				Kota Kinabalu ACC/Malaysia	Intraregional	AFTN						Testing						
				Jakarta ACC /Indonesia	Intraregional						3Q2022	Testing						
				Manila ACC/Philippines	Intraregional	AMHS					4Q 2020	Operational						
JAPAN	Implemented	Fukuoka ATMC	NEC	Anchorage ARTCC / USA	Intraregional	AMHS			2M		2005	Operational	ICD V.2.0					
				Oakland ARTCC / USA	Intraregional	AMHS					May 2017	Operational	ICD V.2.0					
		Tokyo ACC	NTTD	Incheon ACC / Republic of Korea	Intraregional				64K		2010	Operational	ICD V.1.0					
				Daegu ACC / Republic of Korea	Intraregional						Feb 2021	Operational	ICD V.1.0					
		Kobe ACC		Daegu ACC / Republic of Korea	Intraregional						Feb 2021	Operational	ICD V.1.0					
		Fukuoka ACC		Incheon ACC / Republic of Korea	Intraregional						2010	Operational	ICD V.1.0					
				Daegu ACC / Republic of Korea	Intraregional						Feb 2021	Operational	ICD V.1.0					
				Taibei ACC / China	Intraregional				64K		2012	Operational	ICD V.3.0					
KIRIBATI	non-implemented																	
LAO PEOPLE'S DEMOCRATIC REPUBLIC	Implemented	Vientiane ACC	THALES TOPSKY (EUROCAT-C)	Bangkok ACC /Thailand	Intraregional	AMHS	7	Main	9600		14-Jul-20	Operational	ICD V.2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM	CDN	Automatic	no	
				Hanoi ACC /Veitnam	Intraregional	AFTN	7	Main	9600		2Q2023	Planned	ICD V.2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM				
				Phnom Penh ACC /Cambodia	Intraregional	AFTN	7	Main	9600		2-Jan-20	Operational	ICD V.2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM	CDN	Automatic	no	
				Yangoon/ Myanmar	Intraregional	AFTN	7	Main	9600		4Q2023	Planned	ICD V.2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM				
				Kunming ACC /China	Intraregional	AFTN	7	Main	9600		1Q2023	Testing	ICD V.2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM	CDN	Automatic	no	
				Ho Chi Minh/ Vietnam	Intraregional	AFTN	7	Main	9600		3Q2023	Planned	ICD V.2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM				
MALAYSIA	Implemented	Kuala Lumpur ACC	LEONARDO	Bangkok ACC /Thailand	Intraregional	AMHS	7	Main	9600	7	Mar 2020	Operational	ICD V.3.0	EST, ACP, LAM, LRM	Voice	Automatic	yes	
				Singapore ACC /Singapore	Intraregional	AMHS	7	Main	9600	7	Nov 2019	Operational	ICD V.3.0	EST, ACP, LAM, LRM	Voice	Automatic	yes	
				Chennai ACC /India	Intraregional	AMHS	7	Main	9600	7	Apr 2020	Operational	ICD V.3.0	ABI, EST, ACP, LAM, LRM, CDN, REJ,MAC,TOC,AOC	CDN	Automatic	yes	
				Ho Chi Minh ACC /Vietnam	Intraregional	AMHS	7	Main	TBA	TBA	3Q2024	Planned	ICD V.3.0	EST, ACP, LAM, LRM, TOC, AOC	Voice	Automatic	yes	
				Jakarta ACC /Indonesia	Intraregional	AMHS	7	Main	TBA	TBA	3Q2024	Planned	ICD V.3.0	EST, ACP, LAM, LRM, TOC, AOC	Voice	Automatic	yes	
		Kota Kinabalu ACC	THALES	Ujung Pandang ACC /Indonesia	Intraregional	AMHS	7	Main	TBA	TBA	2Q2023	Planned	ICD V.3.0	EST, ACP, LAM, LRM, TOC, AOC	Voice	Automatic	yes	
				Manila ACC /Philippines	Intraregional	AMHS	7	Main	TBA	TBA	3Q2023	Planned	ICD V.3.0	EST, ACP, LAM, LRM, TOC, AOC	Voice	Automatic	yes	
				Singapore ACC /Singapore	Intraregional	AMHS	7	Main	9600	1	Jul 2021	Operational	ICD V.3.0	EST, ACP, LAM, LRM	Voice	Automatic	yes	
											Sept 2022	Testing	ICD V.3.0	TOC, AOC	Voice	Automatic	yes	
				Jakarta ACC /Indonesia	Intraregional	AMHS	7	Main	TBA	TBA	3Q2024	Planned	ICD V.3.0	EST, ACP, LAM, LRM, TOC, AOC	Voice	Automatic	yes	
				Singapore ACC /Singapore	Intraregional	AMHS	7	Main	9600	1	Feb 2021	Operational	ICD V.3.0	EST, ACP, LAM, LRM	Voice	Automatic	yes	

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Kuching ACC	THALES	Singapore ACC /Singapore	Intraregional	AMHS	7	Main	9600	1	Sept 2022	Testing	ICD V.3.0	TOC, AOC	Voice	Automatic	yes	
				Jakarta ACC /Indonesia	Intraregional	AMHS	7	Main	TBA	TBA	3Q2024	Planned	ICD V.3.0	EST, ACP, LAM, LRM, TOC, AOC	Voice	Automatic	yes	
MALDIVES	Implemented	Male ACC	LEONARDO	Mumbai ACC / India	Intraregional	AFTN	7	Main			3Q2021	Operational	ICD V.3.0	ABI, EST, ACP, LAM, LRM, TOC, AOC	Voice	Automatic	yes	
				Chennai ACC /India	Intraregional	AFTN	7	Main			3Q2021	Operational	ICD V.3.0	ABI, EST, ACP, LAM, LRM, TOC, AOC	Voice	Automatic		
				Mauritius ACC/Mauritius	Interregional	AFTN						No plan						
				Melbourne ACC /Australia	Intraregional	AFTN	7	Main			TBA	Testing	ICD V.3.0		Voice			
				Colombo ACC/Sri Lanka	Intraregional	AFTN		Main	64K		TBA	Testing	ICD V.3.0		Voice			Colombo AIDC connection temporarily disabled due to request from VCCC
				Trivandrum ACC/India	Intraregional	AFTN	7	Main			3Q2021	Operational	ICD V.3.0	ABI, EST, ACP, LAM, LRM, TOC, AOC	Voice			
MARSHALL ISLANDS	non-implemented																	
MICRONESIA (FEDERATED STATE OF)	non-implemented																	
MONGOLIA	Implemented	Ulaanbaatar ACC	INDRA Aircon - 2100	Khabarovsk/Russia	Interregional						2016		OLDI					
				Beijing ACC/ China	Intraregional	AFTN					4Q2022	Testing						
MYANMAR	Testing	Yangon ACC	THALES Automation system (Topsky ATC)	Bangkok ACC /Thailand	Intraregional	AMHS					4Q2020	Testing	ICD V.2.0					
				Kolkata ACC /India	Intraregional	AFTN					4Q2018	Testing	ICD V.2.0					Existing ATM system are likely to be upgraded in Lahore and Karachi ACC.
				Chennai ACC /India	Intraregional	AFTN					4Q2018	Testing	ICD V.2.0					
				Kunming ACC /China	Intraregional	AFTN						Testing	ICD V.2.0					
				Vientianne ACC /Lao PDR	Intraregional	AFTN					4Q2018	Testing	ICD V.2.0					
				Dhaka ACC /Bangladesh	Intraregional	AFTN					4Q2018		ICD V.2.0					
NAURU	non-implemented																	
NEPAL	non-implemented	Kathmandu ACC	ATM system from NEC	Kolkata ACC /India	Intraregional	AFTN												
				Varanasi ACC/India	Intraregional	AFTN												
				Lhasa ACC /China	Intraregional	AFTN												
NEW ZEALAND	Implemented	Auckland ACC	LEIDOS and ADACEL	Brisbane ACC /Australia	Intraregional	AFTN						Operational	ICD V.1.0	ABI, EST, ACP, TOC, AOC				
						AMHS						Operational	ICD V.1.0	ABI, EST, ACP, TOC, AOC				
				Nadi ACC /Fiji	Intraregional	AFTN						Operational	ICD V.1.0					
						AMHS						Operational	ICD V.1.0					
				Oakland ARTCC /USA	Intraregional	AFTN						Operational	ICD V.2.0					
						AMHS						Operational	ICD V.2.0					
				Papeete ACC /French Polynesia	Intraregional	AFTN						Operational	ICD V.2.0					
						AMHS						Operational	ICD V.2.0					
				Chile	Intraregional	AFTN						Operational						
						AMHS						Operational						
		Karachi ACC	Indra AIRCON 2100	Mumbai ACC /India	Intraregional	AMHS	7	Main	128 & 64Kbps		Jun 2025	Testing	ICD Version 2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	*Trial run carried out between Karachi and Ahmedabad. Partial connectivity between both systems is observed and Some issues regarding the auto acceptance of EST messages in Karachi ATM need to be addressed *Trial run between Karachi and Mumbai was remained unsuccessful due to integration problems. * Trial run carried out between Lahore and Delhi ACCs in March 2021. Delhi ATM system rejects the ABI messages due to adding double space in FPL by Lahore ATM system (East bound Flights).
				Muscat ACC /Oman	Interregional	AFTN	7	Main	64Kbps		Jun 2025	No Plan	ICD Version 2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	
				Tehran ACC /Iran	Interregional	AFTN	7	Main	1 Mbps		Jun 2025	No Plan	ICD Version 2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	
				Ahmadabad ACC /India	Intraregional	AMHS	7	Main	Via Mumbai AMHS		Jun 2025	Testing	ICD Version 2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	
				Kabul ACC /Afghanistan	Intraregional	AFTN	7	Main	1Mbps		Jun 2025	No Plan	ICD Version 2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	
		Lahore ACC	Indra AIRCON	Delhi ACC /India	Intraregional	AMHS	7	Main	VIA Mumbai AHMS		Jun 2025	Testing	ICD Version 2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
PAKISTAN	Testing	Lahore ACC	2100	Kabul ACC /Afghanistan	Intraregional	AFTN	7	Main	1 Mbps via Karachi AMHS		Jun 2025	No Plan	ICD Version 2.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	system (Date Delhi Flight). Lahore ATM does not genenerate ACP message in responce to ABI message sent by Delhi ATM system (West Bound) Note :- Due to restructuring of Karachi ACC and Lahore ACC no need to AIDC testing /requirement between Karachi ACC and Delhi ACC. .*AIDC is not fully functional with neighbouring FIRs due to difference in AIDC version. AIDC will be fully functional up to June, 2025 after replacement of ATM System at Karachi & Lahore ACCs.
		Islamabad ACC	Si ATM	Kabul ACC /Afghanistan	Intraregional	AFTN	7	Main	1 Mbps via Karachi AMHS			No Plan	ICD Version 3.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	
				Urumqui ACC /China	Intraregional	AFTN	7	Main	Via Beijing AFTN			No Plan	ICD Version 3.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	
				Tajakistan ACC /Tajakistan	Interregional	AFTN	7	Main	Via Tehran AFTN			No Plan	ICD Version 3.0	ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC	Voice	Automatic	Yes	
PALAU	non-implemented																	
PAPUA NEW GUINEA	Implemented	Port Moresby	Thales (TopSky-ATC)	Brisbane ACC/Australia	Intraregional	AMHS						Operational	ICD V.3.0					
				Ujung Pandang ACC/Indonesia	Intraregional	AFTN						Planned	ICD V.3.0					
				Oakland ARTCC /USA	Intraregional	AFTN						Testing	ICD V.3.0					
PHILIPPINES	Implemented	Manila ACC	THALES	Hong Kong ACC / Hong Kong, China	Intraregional	AFTN												
					Intraregional	AMHS					May 2019	Operational						
				Singapore ACC /Singapore	Intraregional	AMHS					Dec 2020	Operational						
				Taibei ACC/China	Intraregional	AFTN												
					Intraregional	AMHS					Dec 2019	Operational						
				Kota Kinabalu ACC /Malaysia	Intraregional	AMHS						Testing						
				Ho Chi Minh ACC /Viet Nam	Intraregional	AMHS						Testing						
				Oakland ARTCC /USA	Intraregional	AMHS						Planned						
				Fukoka ATMC /Japan	Intraregional	AMHS					1Q2019							
				Ujung Pandang ACC /Indonesia	Intraregional	AMHS					Dec 2020	Operational						
REPUBLIC OF KOREA	Implemented	Incheon ACC	Leidos System	Fukuoka ATMC /Japan	Intraregional	Dedicated L	7	Main	64000	1	2010	Operational	ICD V.1.0	CPL, EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
				Shanghai ACC/China	Intraregional						3Q2023	Planned						
				Dalian ACC /China	Intraregional	Dedicated L	7	Backup	64000	1	Nov 2016	Operational	ICD V.3.0	ABI, EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
		Daegu ACC	Leidos System	Fukuoka ATMC /Japan	Intraregional	Dedicated L	7	Backup	64000	1	2010	Operational	ICD V.1.0	CPL, EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
				Shanghai ACC/China	Intraregional						3Q2023	Planned						
				Dalian ACC /China	Intraregional	Dedicated L	7	Main	64000	1	Nov 2016	Operational	ICD V.3.0	ABI, EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
SAMOA	non-implemented																	
SINGAPORE	Implemented	Singapore ACC	THALES	Ho Chi Minh ACC /Vietnam	Intraregional	AMHS	7	Main	64k	80ms	Jul 2014	Operational	ICD V.1.0	EST,ACP,LAM,LRM	Voice	Automatic	yes	
				Manila ACC /Philippines	Intraregional	AMHS	7	Main	64k	45ms	Nov 2019	Operational	ICD V.3.0	EST,ACP,LAM,LRM,TOC,AOC	Voice	Automatic	yes	
				Jakarta ACC /Indonesia	Intraregional	AMHS	0	Main	64k	60ms		Planned	ICD V.3.0					
				Kuala Lumpur ACC /Malaysia	Intraregional	AMHS	7	Main	64k	20ms	Nov 2019	Operational	ICD V.3.0	EST,ACP,LAM,LRM	Voice	Automatic	yes	
				Kota Kinabalu ACC /Malaysia	Intraregional	AMHS	7	Main	64k	55ms	Jul 2021	Operational	ICD V.3.0	EST,ACP,LAM,LRM,TOC,AOC	Voice	Automatic	yes	
				Kuching ACC /Malaysia	Intraregional	AMHS	7	Main	64k	50ms	Feb 2021	Operational	ICD V.3.0	EST,ACP,LAM,LRM,TOC,AOC	Voice	Automatic	yes	
SOLOMON ISLANDS	non-implemented			Nadi ACC /Fiji	Intraregional													
				Port Moresby ACC/PNG	Intraregional													
				Brisbane ATSC /Australia	Intraregional													
SRI LANKA	Testing	Colombo ACC	INTELCAN	Male ACC /Maldives	Intraregional	AFTN			64000		SEP 2023	Testing	ICD V.3.0		Voice	Manual	no	ABI message is not working during trials.
				Jakarta ACC / Indonesia	Intraregional	AMHS			2048000		SEP 2023	Planned	ICD V.3.0		Voice	Manual	no	

Table of AIDC Implementation Status in APAC

State/Administration	AIDC Implementation Status(Implemented or not)	Location of AIDC System ATSU1	ATM Automation System (Make/Model)	ATSU2 /Correspondent State – Administration	Intraregional/Interregional	Transmission Means	Frequency of Use(days in a week)	Main/Back up Circuit	Communication Signal Speed (bps)	Average Transimission Delay (One Trip Time in Seconds)	Implementation Date or Target Date as MON yyyy or xQyyyy	Interface Status (Operational, Testing, Planned, No plan)	Interface Protocol / Version (OLDI or AIDC Version)	List of AIDC Messages Applicable between the Two ATSUs (ABI, EST, ACP, TOC, AOC, LAM, LRM, PAC, CDN, CPL, REJ, MAC; TRU, EMG, MIS, TDM, ASM, FAN, FCN; ADS)	Coordination by CDN or Voice	Automatic or Manual EST	A Warning Message to Controller in Case of AIDC Failure	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
SRI LANKA	Testing	Colombo ACC	INTELCAN	Melbourne ACC /Australia	Intraregional	AMHS			2048000		SEP 2023	Planned	ICD V.3.0		Voice	Manual	no	
				Chennai ACC /India	Intraregional	AMHS			2048000		SEP 2023	Testing	ICD V.3.0		Voice	Manual	no	ABI message is not working during trials.
THAILAND	Implemented	Bangkok ACC	THALES	Kuala Lumpur ACC /Malaysia	Intraregional	AMHS					Mar 2020	Operational	ICD V.3.0	EST, ACP, LAM, LRM	Voice	Automatic	yes	
				Phnom Penh ACC /Cambodia	Intraregional	AMHS					Feb 2021	Operational	ICD V.3.0	ABI, EST, ACP, LAM, LRM	Voice	Automatic	yes	
				Vientiane ACC /Lao PDR	Intraregional	AMHS					Jul 2020	Operational	ICD V.3.0	ABI, EST, ACP, TOC, AOC, LAM, LRM	Voice	Automatic	yes	
				Yangon ACC /Myanmar	Intraregional	AMHS						Testing						Continuous operational use still not possible due to system limitation at Yangon ACC
TIMOR LESTE	non-implemented																	
TONGA	non-implemented																	
TUVALU	non-implemented																	
VANUATU	non-implemented																	
UNITED STATES	Implemented	Oakland ARTCC	Liedos, ATOP System	Anchorage ARTCC /United States	Intraregional	AMHS	7	Main	64,000	3	Oct 2005	Operational	ICD V.2.0	ABI, CPL, EST, MAC, CDN, ACP, REJ, EMG, MIS, LAM, LRM, PAC	CDN	Automatic	yes	
				Auckland OAC /New Zealand	Intraregional	AMHS	7	Main	64,000	4	Oct 2005	Operational	ICD V.2.0	ABI, CPL, MAC, CDN, ACP, REJ, LAM, LRM, PAC	CDN	Automatic	yes	
				Fukuoka ATMC /Japan	Intraregional	AMHS	7	Main	64,000	4	Oct 2005	Operational	ICD V.2.0	ABI, ACP, CDN, CPL, LAM, LRM, MAC	CDN	Automatic	yes	
				Nadi ATMC /Fiji	Intraregional	AMHS	7	Main	64,000	5	Oct 2005	Operational	ICD V.2.0	ABI, CPL, CDN, PAC, ACP, MAC, REJ, LAM, LRM	CDN	Automatic	yes	
				Brisbane ACC /Australia	Intraregional	AMHS	7	Main	64,000	1	Oct 2005	Operational	ICD V.2.0	ABI, EST, ACP, MAC, CDN, LAM, LRM	CDN	Automatic	yes	Full CDN functionality proposed 1-30-2023 via LOA.
				Tahiti ACC /French Polynesia	Intraregional	AMHS	7	Main	64,000	10	Dec 2014	Operational	ICD V 2.0	ABI, CPL, CDN, PAC, ACP, MAC, LAM, LRM	CDN	Automatic	yes	
				Port Moresby/PNG	Intraregional	AMHS	7	Main	64,000	6	Dec 2021	Operational	ICD V 2.0	ABI, EST, ACP, LAM, LRM	Voice	Automatic	yes	
				Manila /Philippines	Intraregional	AMHS	7	Main	64,000	5	Dec 2022	Planned	ICD V.2.0	ABI, EST, ACP, LAM, LRM	Voice	Automatic	yes	AIDC testing implemented via MOU with verbal verification for 30 days. Pending test results AIDC incorporation permanently via LOA.
				Mazatlan ACC	Interregional	AMHS	7	Main	64,000	4	Mar 2015	Operational	ICD V.2.0	ABI, ACP, EST, LAM, LRM	Voice	Automatic	yes	
				Ujung Padang/Indonesia	Intraregional	AMHS		Main	64,000		Mar 2023	Planned	ICD V 2.0	TBD-ABI, EST, ACP, LAM, LRM	Voice	Automatic	yes	Pending meeting to determine implementation dates in Jan 2023. Initial testing completed, propose additional live testing phase followed by revised LOA.
		Anchorage ARTCC	Liedos, ATOP System	Magadan ACC	Interregional	AMHS	7	Main	64,000	7	Jun 2018	Operational	ICD V.2.0	ABI, CPL, ACP, LAM, LRM	Voice	Automatic	yes	
				Fukuoka ATMC /Japan	Intraregional	AMHS	7	Main	64,000	4	Mar 2007	Operational	ICD V.2.0	ABI, ACP, CDN, CPL, LAM, LRM, MAC	CDN	Automatic	yes	
				Oakland ARTCC /United States	Intraregional	AMHS	7	Main	64,000	1	Mar 2007	Operational	ICD V.2.0	ABI, CPL, EST, MAC, CDN, ACP, REJ, EMG, MIS, LAM, LRM, PAC	CDN	Automatic	yes	
VIET NAM	Implemented	Ho Chi Minh ACC	THALES	Sanya ACC /China	Intraregional	AFTN												
					Intraregional	AMHS												
				Phnom Penh ACC /Cambodia	Intraregional	AMHS						Testing						
				Vientiane ACC /Lao PDR	Intraregional	AMHS												
				Singapore ACC /Singapore	Intraregional	AMHS					Jul 2014	Operational	ICD V.1.0					
				Manila /Philippines	Intraregional	AFTN						Testing						
				Kuala Lumpur /Malaysia	Intraregional	AFTN												
		Hanoi ACC	Selex	Vientiane ACC/Lao PDR	Intraregional	AMHS						Testing						

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 TERMS OF REFERENCE FOR AERONAUTICAL COMMUNICATION SERVICES IMPLEMENTATION CO-ORDIANTION GROUP (ACSICG)

The Objectives of the APAC ACSICG are to:

1) Complete implementation of Asia and Pacific Regions (APAC) Aeronautical Telecommunication Network (ATN) and voice/data service to support the evolving ICAO operational requirements for the dynamic exchange and management of aeronautical information.

2) *Ensure continuous and coherent development of the aeronautical communication services and infrastructure of the Asia/Pacific Regional Air Navigation Plan (APAC ANP) in a manner that is harmonized with adjacent regions, consistent with ICAO SARPs, the Global Air Navigation Plan and the Global Aviation Safety Plan.*

3) *Facilitate the implementation, enhancements, operation and maintenance of aeronautical communication services and infrastructure identified in the Aviation System Block Upgrades (ASBU) elements and Asia/Pacific Seamless Air Navigation Service (ANS) Plan (APSAP) elements using the project management principles where appropriate.*

4) Review, identify and address major issues in technical, operational, safety and regulatory aspects to facilitate the implementation or provision of safe, secure, efficient and orderly aeronautical communication services to enhance systems robustness, resilience, interoperability and cybersecurity.

5) Encourage collaboration among ANSPs and keep abreast of the latest developments in aeronautical communication services and infrastructure to cope with forthcoming development and implementation so as to reduce operating costs and enable quick implementation of new requirements to cope with new challenges.

Deliverables to meet the Objectives:

1) To submit progress report to the ICAO APAC CNS Sub-group while keeping ATM Sub-group , MET Sub-group informed of addressing the APAC ACSICG deliverables (listed in 2 to 7 below);

2) To support the ICAO in making specific recommendations and developing guidance materials, such as general/specific regional requirements, which aim at facilitating the implementation or provision of safe, secure and performance based aeronautical communication services by the use of existing and/or new procedures, facilities and technologies;

3) To review outcome of the AN-Conf., DGCA Conference, APANPIRG and its contributory bodies, ~~CNS Sub-group, ATM Sub-group, MET Sub-group, RASMAG, FIT-Asia, SWIM TF and ATMAS TF~~ related to aeronautical communication services and infrastructure, revise and update a tasks list and action items for the ACSICG;

4) To facilitate and coordinate the implementations of aeronautical communication services and infrastructures within the Asia/Pacific Regions to support existing and evolving aeronautical applications, including

- inter-facility communications,
- datalink implementations,
- air/ground communications
- ground/ground communications
- *etc.*

5) To Monitor the progress of aeronautical communication service and infrastructure implementation and provide regular updates ~~to stakeholders~~.

6) *To provide guidance on the implementation of aeronautical communication services in accordance with relevant standards and regulations, facilitate sharing of information and recommend the best industry practice to Asia/Pacific States and aviation stakeholders on the progress of the development, standardization, and implementation of ICAO provisions* relating to aeronautical communication services and infrastructures.*

7) *To encourage research and development, trials and demonstrations of applications and technologies, and, as necessary, steer for the sharing of this information and expertise between States/Administrations through organizing educational seminars and symposia to educate States/Administrations and airspace users;*

8) *To formulate draft Conclusions and Decisions relating to matters in the field of aeronautical communication services that come within the scope of the APANPIRG~~, CNS Sub-group, ATM Sub-group, and RASMAG~~ work plan;*

9) *To develop Asia/Pacific regional input and suggestions relating to the implementations and global standardization of aeronautical communication services and infrastructures to be submitted through the CNS Sub-group for APANPIRG consideration and endorsements, in support of ICAO technical panels' developments and implementations of ICAO SARPs; and*

10) To collaborate with relevant international organizations (such as EUROCONTROL) for harmonisation of aeronautical communication services and infrastructures requirements.

Timeframe for Deliverables:

For deliverable items, the guidance materials and progress reports would be developed, updated/enhanced on an on-going basis and be made available as appropriate subject to review by the ACSICG. The life time of the ACSICG would be subject to review against the implementation and operation of all identified aeronautical communication services.

Meeting:

The APAC ACSICG shall convene annually, to review progress and address any issues that arise during implementation, at least one face-to-face meeting per year, which is supplemented by teleconference meetings (e.g. MS Teams, ZOOM or WebEx) as appropriate.

Membership:

All APAC member States/Administrations providing air navigation services in the Asia and Pacific Regions. APAC members should nominate Subject Matter Experts from Civil Aviation Authorities, ANSPs, and other organizations with strong background in engineering and operation in relation to aeronautical communication services and infrastructures requirements to participate into the ACSICG. The ACSICG would also invite representatives of International Organizations recognized by the ICAO Council and Industry partners as required by the group which as represent~~ing~~ important civil aviation interests to participate in its work in a consultative capacity.

Reporting
The Group will present its report to APANPIRG through the CNS Sub-group.

~~Note:~~

~~*ICAO provisions mainly refer to the following~~

~~*ICAO Annex 10,*~~
~~*Doc 9869: Performance-based Communication and Surveillance (PBCS) Manual,*~~
~~*Doc 9880: Technical Specifications for ATN using ISO/OSI Standards and Protocols;*~~
~~*Doc 9896: Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocol;*~~
~~*Doc 10037: Global Operational Data Link (GOLD) Manual*~~
~~*Doc 9673: Asia and Pacific Air Navigation Plan*~~
~~*Doc 7030: Regional Supplementary Procedures.*~~
~~*Doc 9750:* Global Air Navigation Plan (GANP), https://www4.icao.int/ganpportal/~~
~~*Doc 10004:* Global Aviation Safety Plan (GASP)~~
~~Asia/Pacific Seamless Air Navigation Service (ANS) Plan (APSAP)~~