International Civil Aviation Organization

THE THIRTIETH MEETING OF THE COMMUNICATIONS / NAVIGATION AND SURVEILLANCE SUB-GROUP (CNS SG/30) OF APANPIRG

Bangkok, Thailand, 06 - 10 July 2026

Agenda Item 3: Aeronautical Fixed Service (AFS)

3.2. Review Report of the Fifteenth Meetings of Common aeRonautical VPN Operations Group (CRV OG/15)

OUTCOMES OF THE FIFTEENTH MEETINGS OF COMMON AERONAUTICAL VPN OPERATIONS GROUP (CRV OG/15)

(Presented by the Secretariat)

SUMMARY

This paper presents the relevant outcomes of the Fifteenth Meetings of Common aeRonautical VPN Operations Group (CRV OG/15) for meeting review.

1. INTRODUCTION

1.1 The Fifteenth Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/15) was held from 15 to 19 June 2026 in Mumbai, India. The Meeting was attended by 60 participants from 17 Member States/Administrations, 1 International Organisation and 1 industry partner. The Meeting report, working papers, information papers, and other resources can be accessed by the following link:

https://www.icao.int/APAC/meetingdocs?fid=65942

1.2 This paper summarised relevant information and updates with a highlight on the outcomes of CRV OG/15 for meeting review.

2. DISCUSSION

Review of Relevant Meetings – Sec (WP/02)

2.1 The CRV OG/15 Meeting requested updates from the CRV Service provider about the Middle East States, which are in contact with PCCWG for the CRV joining process. PCCWG was informed that, currently, only Oman has initiated contact with the CRV service provider, and discussions are ongoing.

Outcomes of SURICG/11 Meeting – Sec (WP/03)

2.2 The Meeting reviewed the Guidance Materials for the sharing of surveillance data in SWIM. Several clarifications were requested for several paragraphs, including the SWIM Technical Infrastructure and the Surveillance Central Data Processor sections. As the key authors of this document

and surveillance experts were not in the Meeting, the ICAO Secretariat was requested to coordinate with SURICG experts to arrange a Meeting of the CRV OG Ad-hoc Expert group and key authors of the document to obtain clarification. **ACTION ITEM 15-1**

Outcomes of ACSICG/13 Meeting – Sec (WP/05)

2.3 Russia shared further updates on the progress of AMHS implementation between Japan and Russia. It was informed that the tests for transition to interaction under AMHS procedures between the COM Centres UUUU and RJJJ will be completed soon. Russia added that in preparation for the transition to real AMHS traffic exchange, the routing tables between the COM Centres of the Russian (UUUU and UHHH) and the COM Centres of the ICAO APAC region were reviewed. As a result, asymmetric routing was identified. It was reminded that, according to the ATS Messaging Management Manual (2.1.5.1.4.1), it is important to ensure symmetric routing of AMHS messages. For this purpose, Russia requested the ability to modify the routing tables. It was added that the issue has been shared with the ICAO APAC Office and the APAC AMC coordinator. As the issue fell under ACSICG's purview and the ACSICG Co-Chairs were attending the CRV OG/15 Meeting, the CRV OG Co-Chairs requested that ACSICG look into the matter and support Russia in resolving it. **ACTION ITEM 15-2**

2.4 Russia shared concerns about the delay in ongoing AMHS implementation efforts between Russia and Japan and requested that efforts be accelerated to complete the trial of the Russia-Japan AMHS interconnection. The issue was further discussed during the breakout session with Japan, Russia, the ACSICG Co-Chairs, and the ICAO Secretariat.

Outcomes of SWIM TF/11 – Sec (WP/06)

2.5 The Meeting noted the information on SWIM indicators finalised at the SWIM TF/11. Information about the SWIM TF restructuring was also shared with the Meeting.

2.6 It was also noted that the SWIM hierarchical architecture Technical Infrastructure for the APAC region proposed using message header routing at the application layer rather than the network layer, while one of the main purposes of the CRV was to support the SWIM environment. **ACTION ITEM 15-3**

2.7 In response to the SWIM TF/11 Meeting request to the ICAO APAC Office to encourage India to re-engage in SWIM TF Meetings and to share its implementation status, with a view to ensuring the benefits of harmonised and timely SWIM implementation across the APAC region, India shared the detailed information. India acknowledged the concerns expressed regarding India's absence from SWIM TF Meetings in recent years and the importance of harmonised implementation across APAC States/Administrations.

2.8 India shared its commitment to the objectives of SWIM and recognised the value of regional collaboration. India appreciated the encouragement from the Meeting and ensured to take steps to re-engage actively in upcoming SWIM TF sessions. It was recalled that in past, India had successfully developed and validated a Proof-of-Concept (PoC) SWIM platform to establish a roadmap for implementing ICAO SWIM concepts within the Indian Air Navigation System. The PoC implementation included:

- SWIM Technical Infrastructure.
- Digital NOTAM services based on AIXM.
- Flight Information Exchange services based on FIXM.
- Meteorological Information Exchange services based on IWXXM.
- SWIM Gateway integration with existing AMHS and AFTN systems.

- Hybrid operational applications supporting both digital and legacy messaging formats

2.9 India added that, building upon the successful PoC implementation, India has initiated a comprehensive Annual Maintenance and Enhancement Program to upgrade the SWIM platform to SWIM Version 2.0 and prepare for future operational deployment across the Indian ATM environment as a pilot project. SWIM Version 2.0 includes the following key upgrades:

- FF-ICE/R1 Implementation
- ADS-B data exchange using ASTERIX CAT-21.
- Implementation of SWIM Registry and Service Management to strengthen SWIM governance and service discoverability.

2.10 The CRV OG/15 Meeting noted that the upgraded SWIM platform will support integration with PAN-India AMHS infrastructure, Digital ATIS systems, Air Traffic Management Automation Systems, FF-ICE-compliant systems, Regional and international SWIM implementations, and other ICAO-compliant information exchange systems. India added that, in addition to the above upgrades, it is also tendering for a new operational-ready SWIM system with Gateway EMS at Delhi and Mumbai, in a DC-DR architecture, and Edge EMS at Delhi, Mumbai, Chennai, and Kolkata. India shared its commitment to contribute once again to the collective progress of SWIM in the APAC region.

Outcomes of SIPG WS/3 – Sec (WP/07)

2.11 Eleven action items were assigned to the SIPG as a result of the discussion in the SWIM TF/11 Meeting, emphasising the necessity for the SIPG to conclude on the Request-Reply Message Exchange Patterns (R-R MEP), the Application Programming Interface (API) gateway architecture, and most importantly, the SWIM routing mechanism.

2.12 The Working Session was reminded that the FF-ICE ad-hoc group has an expectation of having the SWIM Technical Infrastructure (SWIM TI) available to do FF-ICE R1 operational trials in April 2030. It was suggested that, in order for the FF-ICE Ad-hoc Group to achieve the expected timeline, the FF-ICE Ad-hoc Group was encouraged to consider conducting the test with SIPG starting in April 2027.

2.13 In response to a question about CRV OG not yet receiving the expected documents agreed in the joint Meeting of CRV and SWIM Experts from SIPG members utilising operational CRV for SIPG testing before testing is initiated, it was clarified that SIPG members are consolidating the documents to send to the CRV OG Co-Chairs for further review. It was also noted that only ping testing is currently being conducted. It was agreed that CRV OG will wait for further responses from SIPG. **Action Item 15-4**

2.14 The Meeting discussed message header-based and topic-based routing to understand the differences and other relevant details. The ICAO Secretariat clarified some details and informed that SIPG Experts will be able to provide further details. It will be incorporated into the agenda items of the joint Meeting of CRV and SWIM Experts. **Action Item 15-5**

Outcomes of the discussion on SWIM sandbox needs – Sec (WP/10)

2.15 The paper presented information on outcomes of the discussion on SWIM sandbox needs agreed upon during the joint Meeting of SWIM and CRV experts in September 2025. It was recalled that during the Joint Meeting of CRV OG Experts and SWIM TF Task Leads on 12 November 2024, SWIM TF informed the CRV OG that it is interested in developing or purchasing a SWIM Sandbox tool for APAC States/Administration, which can be used to test SWIM in a lab environment.

It was added that this sandbox will help States understand the benefits of SWIM. In the same Meeting, CRV OG Co-chair (Asia) informed that Airways New Zealand has done virtualisation work in their corporate operational and secure monitoring spaces, and the CRV OG Co-Chair (Asia), with the support of Airways New Zealand, can host the sandbox if detailed requirements can be shared. SWIM TF Co-Chair agreed to share a list of the functionalities expected from the SWIM sandbox.

2.16 The Meeting was informed that in the In-Person Workshop of CRV OG Ad-hoc Expert Group and SWIM TF Task Leads in September 2025, the draft requirements and functionalities document for the Regional SWIM Sandbox was presented to the Workshop. To help States meet the APAC SWIM implementation timeline, it was proposed to establish a regional SWIM Sandbox. After sharing details of expected functions and specifications, the Workshop noted that the proposed scope of the Sandbox aligns more closely with the demonstration phase of software development, whereas a sandbox typically refers to the development and/or pre-production phase. Therefore, it was suggested to rename the **Regional SWIM Sandbox** to a name better reflecting its intended role, such as the **Regional SWIM Development Environment**.

2.17 The Workshop also discussed network options, either CRV or the Internet, for establishing the regional SWIM sandbox. It was concluded that the Internet would be the preferred option, as it offers better accessibility for users.

2.18 It was recommended that SWIM TF continue discussions on the draft document and on the phased development of such a SWIM development/test tool/environment. Meanwhile, States/Administrations were encouraged to use existing platforms, such as the USA-hosted FAA SWIFT Portal, to gain initial hands-on experience with SWIM. SWIM TF will share further technical details with the CRV OG Co-Chair (Asia) if support is needed for hosting the SWIM Sandbox.

Initial Draft for APAC Sub-Regional Maintenance Window for CRV Network – India (WP/11)

2.19 India presented a draft for the APAC Sub-Regional Maintenance Window for the CRV Network to be adopted and further incorporated in the CRV Operational Manual. It was recalled that during the CRV OG/13 Meeting, Sri Lanka informed that the CRV circuit for Sri Lanka was interrupted by two major service failures, which highlighted the need for clearly coordinated maintenance windows between States and Service Provider PCCW Global to minimize operational impact and avoid disruptions to Air Traffic Services. It was agreed in the CRV OG/13 Meeting that the concept of standardized sub-regional maintenance windows within the APAC Region may be formulated and further study is required due to different operational environments among APAC States. The matter was proposed for further examination by the CRV OG Ad-hoc Expert Group, including harmonized maintenance procedures, notification timelines and recommended maintenance window.

2.20 The initial draft of the APAC Sub-regional maintenance window for the CRV network, prepared by India, was first presented in the CRV OG Ad-hoc Expert Group during the online Meeting held in January 2026. It was agreed to circulate the document to Member States for comments and preferred maintenance window timings. Feedback and suggestions received from Member States were incorporated into the revised draft, and further discussed during the CRV OG Ad-hoc Expert Group in May 2026. The revised draft was reviewed and invited for additional comments from Member States and PCCW Global. Based on the comments received from Member States and PCCWG, the draft APAC sub-regional maintenance window document for the CRV network was discussed and endorsed by the CRV OG Ad-hoc Expert Group and presented in the CRV OG/15 for adoption.

2.21 Regarding the suggestion that planned maintenance shall not be scheduled on major regional holidays of States and declared blackout periods, it was discussed how the CRV Service Provider will obtain information on such periods and holidays for each APAC State/Administration.

The suggestion was that the CRV Service Provider can coordinate with the APAC States/Administrations to get this information. However, it was argued that this may be a challenging task for the CRV Service provider. It was suggested that another better option may be to assign a subregional lead for each proposed subregion to compile this information.

2.22 The Meeting appreciated India for drafting the document and agreed that, firstly, all APAC States/Administrations should provide information about their preferred maintenance window. **ACTION ITEM 15-6**

2.23 The CRV OG/15 Meeting reviewed the proposed "APAC Sub-Regional Maintenance Window for the CRV Network" to be followed by CRV Service Provider and APAC Member States/Administrations, and endorsed the document with the following draft conclusion.

<table>
<tr><td colspan="3">Draft Conclusion CRV OG/15/01 - Sub-Regional Maintenance Window for CRV Network.</td></tr>
<tr><td colspan="2">What: The Sub-Regional Maintenance Window for the CRV Network for the APAC Region be adopted.</td><td>Expected impact:
☐Political / Global
☐Inter-regional
☐Economic
☐Environmental
☒Ops/Technical</td></tr>
<tr><td>Why: Enhance and encourage continuity of regional ATS communication services during planned and emergency maintenance activities of the CRV network carried out by the Service Provider.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 19-June-26</td><td colspan="2">Status: 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>

2.24 It was noted that this document needs to be adopted by the CNS SG Meeting and endorsed by ACSICG. Therefore, the CRV OG/16 Meeting will have another opportunity to review and modify the document before submitting it for endorsement by the ACSICG/14 Meeting and adoption by the CNS SG/31 Meeting in 2027.

SOP for contracting Space-based ADS-B services over CRV – Philippines (WP/18)

2.25 The Philippines presented the Standard Operating Procedure (SOP) for contracting Space-Based ADS-B services over CRV. It was recalled that the CRV OG/13 Meeting requested documentation on the process to follow if they want to utilise CRV for space-based ADS-B data transmission. Aireon suggested that the Philippines initially draft the document based on their recent experience of contracting space-based ADS-B services over CRV. Aireon would provide additional steps to the process, including coordination between Aireon and the CRV service provider.

2.26 The Meeting noted this SOP for contracting and implementing Space-Based ADS-B services over the CRV, presents the practical implementation scenario for establishing connectivity between a Space-Based ADS-B data provider and an ANSP data consumer. The implementation activities described herein were based on and shall be conducted in accordance with the CRV Operations Group (CRV OG) Manual, the approved CRV Implementation Plan, and the applicable System Engineering Plan (SEP).

2.27 The CRV OG/15 Meeting reviewed the proposed SOP for contracting and implementing Space-Based ADS-B services over the CRV and noted that the document mainly shares the Philippines' perspective. There was a need to tailor this SOP to convert it into a standard procedure applicable to any APAC States/Administrations. It was agreed that the Philippines and CRV OG Co-Chair (Asia) will lead this task; however, feedback can be provided by other APAC States/Administrations that have contracted space-based ADS-B. **ACTION ITEM 15-7**

2.28 The CRV OG/15 Meeting agreed to adopt this document as a guidance document for APAC States/Administrations by the following decision.

<table>
<tr><td colspan="2">Conclusion CRV OG/15/02 - Standard Operating Procedure (SOP) for contracting Space-Based ADS-B services over CRV- Philippines perspective</td></tr>
<tr><td>What: The proposed Standard Operating Procedures (SOP) for contracting and implementing Space-Based ADS-B services over the CRV be adopted.</td><td>Expected impact:
☐Political / Global
☐Inter-regional
☐Economic
☐Environmental
☒Ops/Technical</td></tr>
<tr><td>Why: To guide States/Administrations that want to utilise CRV for space-based ADS-B data transmission.</td><td>Follow-up: ☐Required from States</td></tr>
<tr><td>When: 19-June-26</td><td>Status: Adopted by CRV OG</td></tr>
<tr><td colspan="2">Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: CRV OG</td></tr>
</table>

2.29 In response to a question about the number of Aireon space-based ADS-B service delivery points (SDPs) in PNG, PNG shared that it has 2 SDPs.

2.30 It was noted that the Philippines and PNG are both utilising CRV for space-based ADS-B; however, Aireon has provided a dedicated, secure link for India to deliver space-based ADS-B services until SDPs in Mumbai. It was anticipated that, if this link were CRV, there might be a low monthly cost. India was requested to conduct an internal analysis and to share its analysis outcomes and experience in future CRV OG Meetings. **ACTION ITEM 15-8** It was agreed that this analysis could provide more information on utilising space-based ADS-B over CRV and would be useful for future space-based ADS-B subscribers.

Review of Outcomes and action items from the ICAO APAC CRV-SWIM Experts workshop: Reviewing of CRV II specifications and ICAO APAC SWIM Architecture in September 2025 – Sec (WP/28)

2.31 The paper presented the key outcomes of the ICAO APAC CRV-SWIM experts Workshop: Reviewing of CRV II Specifications and ICAO APAC SWIM Architecture, held in Bangkok, Thailand, from 01-05 September 2025. Detailed information on the Meeting proceedings is available in the Report of the Meeting. The Meeting was informed that action items resulting from this workshop were also presented to the SWIM TF/11 Meeting, and the SWIM TF Meeting has revised and incorporated the action items assigned to SWIM TF in their action items list. The Meeting reviewed all pending action items from the workshop items assigned to CRV OG, and it was agreed that all actions assigned to CRV OG were completed.

CRV OG Operations Manual Updates – New Zealand (WP/32)

2.32 New Zealand presented the status of the current Draft of the CRV Operations Manual. It was recalled that the current version of the CRV OG Operations Manual was published as version 1.4 following adoption by the CRV OG/13 Meeting, under Decision CRV OG/13/02. It was agreed that from the CRV OG/13 Meeting held from 5-8 March 2025 in Wellington, New Zealand, to date, much progress has been achieved by the CRV OG Ad-hoc Expert Groups. These progresses have been in the form of various new documents, clauses and revised terms and conditions. All of these works are being consolidated by the CRV OG Ad-hoc Expert group.

2.33 As much of this content needed approval at the CRV OG/15 Meeting, and a significant amount of content needed to be updated into the current version of the manual after their adoption by the CRV OG/15 Meeting, it was proposed to retain the current version of the manual. It was noted that in future versions, the content to be updated includes, but is not limited to, Bandwidth calculations, the SOP for joining the Space-Based ADS-B Implementation, and Procedures and Test procedures for using residual CRV Bandwidth. **ACTION ITEM 15-9** It was agreed that, currently, these adopted documents will be provided as separate documents in the Operations Manual Current Version folder.

2.34 The Meeting was informed that the CRV OG Operations Manual will be updated to incorporate all agreed changes after the CRV OG/15 Meeting and will be presented to CRV OG/16 for adoption. **ACTION ITEM 15-10**

CRV Overview Diagram – New Zealand (WP/17)

2.35 This paper presented the CRV Overview Diagram, which resulted from discussions on updating the Com Chart in the AMC managed by Eurocontrol to reflect CRV information. The diagram addressed the limitation of the Com Chart, which showed only physical point-to-point connections, whereas CRV connections are logical. It attempted to illustrate these logical connections from a Com Centre point of view, while also considering voice implementations.

2.36 The Meeting noted that the diagram is currently available in the CRV Portal, the CRV Overview diagram.vsd and that future updates may include SWIM Gateway EMS and sub-services; there may be a future limitation in that the logical connections overwhelm the diagram.

2.37 The Meeting reviewed and modified the CRV Overview Diagram and adopted the draft conclusion.

<table>
<tr><td colspan="3">Conclusion CRV OG/15/03 - CRV Overview Diagram</td></tr>
<tr><td colspan="2">What: Adopt and maintain a CRV Overview Diagram with a view to maintaining a level of detail to assist with CRV implementation understanding.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: There has been a request for an interconnection diagram for CRV from the SWIM TF to understand the current logical connection while designing APAC SWIM Technical Infrastructure. In addition, this information is useful for States/Administrations to identify current CRV users and their interconnections.</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
<tr><td>When: 19-Jun-26</td><td colspan="2">Status: Adopted by CRV OG</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
</table>

2.38 It was noted that the CRV Overview diagram has been updated to include information on all CRV States/Administrations. It was suggested that all CRV focal points review and verify the information in the CRV Overview diagram and update it as needed. **ACTION ITEM 15-11** If any CRV focal points face issues updating the diagram, they can request assistance from the CRV OG Co-Chair (Asia).

2.39 In response to a question about how to get information about updates to the CRV Overview diagram made by any State/Administration, it was suggested to utilise the SharePoint notification feature, which sends a notification to all users whenever a document is changed. CRV OG Co-Chair (Asia) will activate notification for any edits made in the CRV Overview diagram. **ACTION ITEM 15-12**

New Zealand hosted CRV Portal – New Zealand (WP/37)

2.40 New Zealand shared information about the CRV Portal. It was informed that New Zealand hosts the CRV Portal, which provides a common platform for compiling all necessary information related to CRV, including the Operations Manual, Transition Plan and Common Package for all CRV Users. Having this portal provides the flexibility to update the various documents and to provide access to them under the control of the CRV Operations Group.

2.41 It was added that access to the portal is limited to three per State for the following users:

a. National CRV Point of Contact
b. Nominated deputy to the National CRV Point of Contact
c. Person responsible for updating the AsiaPac Telecommunication Infrastructure Routing Plan.

2.42 The Meeting was informed that a Teams function associated with the portal is currently unused. This could provide the opportunity for channels, chat and posting.

2.43 The Meeting discussed the portal's functions and governance, along with proposed improvements to utilise it more effectively to provide better visibility of activities within the CRV OG.

2.44 It was also noted that security enhancements have been completed by implementing multifactor authorisation for the portal; all CRV focal points that need access to the portal must link their mobile devices to receive an authorisation code. In case of any issues or changes to the mobile device or mobile number, the associated information can be updated. In case of any issues with access, it was suggested to contact the portal administrator, Mr Vaughan Hickford, CRV OG Co-Chair (Asia).

2.45 Regarding concerns about the future management of the CRV Portal hosted by Airways New Zealand, if New Zealand is unable to manage the portal, it was informed that it may be hosted by another State/Administration, and all portal documents can be moved.

Way forward for CRV Governance – New Zealand (WP/12)

2.46 This paper presented discussions on the CRV Governance and Operating Model currently implemented in CRV and options to be considered for improving transparency and participation.

2.47 The Meeting noted that the current informality of CRV OG enables flexibility and achieves outcomes relatively quickly. Governance appears to be working well; items of work are reported to the Operations Group, then to ACISCG, followed by CNS SG and ultimately to APANPIRG if needed.

2.48 The Meeting noted the current way of working is predominantly through the Ad Hoc Experts Group. It was recalled that the intention of the CRV OG Ah-hoc Expert Group was to progress the sections of the Operations Manual of Strategy, Design, Transition and Operation. It was intended that each group would have a leader who could present outcomes to the CRV OG; however, the Co-Chairs and Secretariat are leading this group. It was noted that the CRV OG Ad hoc experts also collaborate with the SWIM TF Task leads as the upcoming implementation of SWIM will introduce new CRV requirements, including cloud connectivity, cross-regional networking, and standardised security, bringing unresolved cost allocation questions between shared funding and user-paid models.

2.49 The Meeting discussed the possibility of implementing a lifted level of formality without compromising the existing flexibility that enables CRV delivery. The following actions were proposed for consideration:

i. Centralise Ad Hoc Meeting artefacts in the APAC CRV Portal
ii. Centralise Action Items in the APAC CRV Portal
iii. Implement the National and Local Points of contact as list items in the APAC CRV portal (reduces the number or republishing of this document)
iv. Implement leads for the Ad Hoc groups that are not the Co-Chairs
v. Implement more admins to the APAC CRV Portal

2.50 Additionally, the Meeting discussed the shared cost model for the basic functionality of the CRV and future enhancements. It was informed that the current combined MRC is USD 223,551, as follows:

Item	Cost
Monthly price for Managed NID	878, 968, 1068, 1144, 1208, 1106, 918, 1148, 1138, 1312

Package	Varies based on BW, location and package

2.51 The Meeting discussed how proposed models could be standardised to provide a base level of consistency, similar to what REDDIG does, as well as the impact and how this would translate into other services and functions, such as security and NNI.

2.52 Following detailed deliberations, the Meeting agreed that the CRV OG Ad-hoc Expert Group should be transformed into a formal body in order to enhance its authority and decision-making capacity. It was noted that ad hoc groups are typically established for a limited duration; however, the CRV OG Ad-hoc Expert Group has been active for over five years and is expected to continue its work to meet the ongoing requirements and responsibilities of the CRV OG. These tasks cannot be effectively accomplished through Meetings held only once per year. Accordingly, it was agreed that the **CRV OG Ad-hoc Expert Group** will be converted into a formal entity, to be known as the **Technical Control Board,** which will support and provide expert advice to the CRV OG on all CRV-related matters.

2.53 The Meeting drafted the Terms of Reference of the Technical Control Board and requested the CRV OG Ad-hoc Expert Group to further review the draft ToR and present a polished version to the CRV OG/16 Meeting for endorsement. **ACTION ITEM 15-13**

2.54 It was suggested that further modifications to CRV governance be discussed in the CRV OG Ad-hoc Expert Group and present the finalised revised CRV governance proposal to the CRV OG/16 Meeting for consideration. **ACTION ITEM 15-14**

2.55 The Meeting noted that the following table has not been updated after more members joined the CRV OG Ad-hoc Expert Group. The Meeting requested all CRV OG Ad-hoc Expert Group members to share their nominations for their preferred groups. The Meeting modified the list of States volunteered for Strategy, Design, Transition and Operation. The finalised table was as follows:

SN	Expert Group Name	Volunteered Member	Group leader
1	Service Strategy	India, Singapore, United States	New Zealand/Fiji
2	Service Design	Hong Kong China, Singapore, United States	New Zealand/Fiji
3	Service Transition	China, Singapore	New Zealand/Fiji
4	Service Operations	Australia, China, India, Singapore	New Zealand/Fiji

Table 1- CRV OG Ad-hoc Expert Group Members

2.56 The Meeting noted the importance of CRV expertise and recognised that developing such expertise requires time. It was also agreed that strong governance contributes to building trust and transparency, thereby attracting new members. In this context, States/Administrations were encouraged to train additional experts to ensure the smooth and efficient operation of CRV activities in the region.

2.57 It was further suggested that the names of key members of the CRV OG Ad-hoc Expert Group should be compiled and made available for reference by States. The ICAO Secretariat will prepare this list and upload it to the ICAO APAC CRV Secure Portal, as well as to the CRV Portal hosted by New Zealand. **ACTION ITEM 15-15**

CRV contract management

2.58 Due to the confidentiality of the CRV contract management process, the report under agenda item 5 is published on the ICAO APAC CRV Secure portal under the CRV group.

Guidance Material on using the Residual Bandwidth of the operational CRV for testing SWIM/New Services – Sec (WP/15)

2.59 The paper presented draft Guidance Material on using the Residual Bandwidth of the Operational CRV for New Services/SWIM services Testing, prepared during the joint Meeting of SWIM and CRV experts in September 2025, for Meeting adoption.

2.60 It was reminded that in the workshop, the definition of residual bandwidth of CRV was shared as follows:

The CRV residual bandwidth is the bandwidth allocated under operational CRV with Service quality marked through DSCP markings and QoS of 'DF'.

2.61 It was added that based on this definition, the residual bandwidth will be calculated by States/Administrations by looking into their System Engineering Plan about the bandwidth allocation made under DSCP 'DF'. Therefore, even if there is spare bandwidth allocation within other DSCP markings such as 'EF' or 'AF21', it will not be counted under residual bandwidth. It was informed that States/Administrations have the option to re-tag their bandwidth with the support of the CRV services provider under 'DF', if they wish to do so, to increase bandwidth allocation under 'DF' to facilitate SWIM testing.

2.62 CRV Service provider clarified that States/Administrations should note that 'DF' bandwidth may already be allocated by them for other applications. In such a case, other applications will share bandwidth along with SWIM testing services. It was also mentioned that Package D assigned only one class, which is "DF".

2.63 The Meeting recalled in the ICAO APAC CRV-SWIM Experts Workshop: Reviewing of CRV II Specifications and ICAO APAC SWIM Architecture, held from **1 – 5 September 2025**, a table was developed to record the required information on SWIM tests over the residual bandwidth of operational CRV, especially the CRV bandwidth allocated/used for these tests, named "**Template for sharing CRV Bandwidth Results of SWIM Testing**". The Workshop also reviewed the **Guidance on using the (Residual) bandwidth of the Operational CRV**, and agreed to recommend the amended version for further adoption by CRV OG/15 in 2026.

2.64 Both documents were further revised and modified by the Meeting. The following decision was proposed to adopt both documents, which were adopted by the Meeting:

<table>
<tr><td colspan="3">Conclusion CRV OG/15/04 – Guidance Material for using the Residual bandwidth of the Operational CRV and template for sharing CRV Bandwidth Results of SWIM Testing for SWIM TF</td></tr>
<tr><td colspan="2">What: The Guidance Material for using the Residual bandwidth of the Operational CRV and template for sharing CRV Bandwidth Results of SWIM Testing for SWIM TF be adopted.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: SWIM TF has requested to provide Guidance Material for using the Residual bandwidth of the Operational CRV and a template</td><td colspan="2">Follow-up: ☐Required from States</td></tr>
</table>

for sharing CRV Bandwidth Results of SWIM Testing, for testing being conducted by SIPG under SWIM TF.	
When: 19-Jun-26	Status: Adopted by CRV OG
Who: ☐Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: CRV OG	

2.65 In response to a question about what a State/Administration should do in case there is no residual bandwidth in operational CRV, and they want to participate in SIPG activities, it was informed that a similar question was asked in SIPG WS/3. It was noted that one option may be to upgrade the CRV package to a higher bandwidth plan or subscribe to another CRV package. As shared in SIPG WS/3, States can join the SIPG work via the Internet and connect as an Internet-based Edge EMS to another State's Edge EMS, which is then connected to a Gateway EMS on the CRV.

Review and update the APAC CRV Implementation Table – Sec (WP/16)

2.66 The latest updates presented on the planning and implementation status of CRV were:

- **Under Operation**

  Australia, Bhutan, Cambodia, China, Cook Islands, Hong Kong China, Fiji, French Polynesia, India, Indonesia, Japan, Macau China, Malaysia, Maldives, Mongolia, Myanmar, Nepal, New Caledonia, New Zealand, Niue, Pakistan, Philippines, PNG, Republic of Korea, Singapore, Sri Lanka, Thailand, Tonga, USA and Vietnam

- **Under Provisioning**

  Solomon Islands

- **Not joined yet**

  Afghanistan, Bangladesh, DPRK, Kiribati, Nauru, Timor Leste, Vanuatu, Russia, ICAO MID States

  Currently not joining

  Marshal Islands, Micronesia, Palau, Tuvalu

2.67 The Meeting reviewed and updated the Telecommunication Infrastructure Table on the New Zealand-hosted CRV portal.

Update of CRV National and Local Focal Points – Sec (WP/27)

2.68 This paper shared information about CRV's National and local points of contact (PoC) roles and responsibilities. The Meeting requested that States/Administrations update National and local PoC information in the event of any changes.

2.69 The updated list of national and local points of contact will be uploaded to the ICAO APAC CRV Secure portal under the CRV OG/15 folder.

CRV Operational Performance Report – PCCWG (SP/01)

2.70 PCCW Global presented the CRV Operational Performance Report, which analysed the reliability and overall performance of the CRV network in 2025. The Meeting was informed that the CRV network consists of 75 circuits in 43 cities with different CRV packages. 2 service providers in the CRV network, 5 circuits are under implementation. Additionally, 8 member states are joining CRV in 2026, including Bangladesh, Brunei, Kiribati, Laos PDR, Oman, Samoa, Tuvalu, and Tonga. The Meeting noted the service inventory and site availability details, which highlighted high service reliability across various administrations. It also took note of ongoing contract negotiations with prospective member states. PCCW Global provided a ticket overview and details for 2025, including various incidents, operational requests, and planned maintenance.

2.71 The Meeting noted that some information provided in the table was not accurate, such as Sri Lanka Site Availability in the month of November was 98.33%, not 99.86%. CRV Service provider will revalidate the figure, confirm with Sri Lanka and update the figure in the report. **ACTION ITEM 15-29**

2.72 It was also noted that, for some States, Site Availability may be displayed as 100% where basic connectivity remains available. However, this metric does not account for periods of network degradation or partial loss of GRE tunnel connectivity. This was one of the considerations behind the SLA proposal presented by Singapore in WP/31 of CRV OG/15. The CRV Service Provider acknowledged the point and will include this consideration in its internal review of the proposal. **ACTION ITEM 15-30**

2.73 It was observed that some of the GRE tunnel loss issues were faced by Member States due to a configuration error. The Meeting suggested sharing details of the PCCWG quality assurance process for configuration, as several errors have been reported due to configuration issues. CRV Service Provider was requested to follow up on the quality assurance process around the delivery of the configuration creation and implementation across the region. **ACTION ITEM 15-31** It was noted that the CRV Service Provider has reviewed all cases internally across teams, including technical support at the project management interface, to improve the process before implementation.

2.74 Fiji shared the issue of one-way voice communication, which persists, but does not affect availability. A similar issue was faced by PNG with one-way voice routing. CRV Service Provider was suggested to investigate this issue and provide feedback. **ACTION ITEM 15-32**

2.75 For Incident - issue pertaining to another member state, it was suggested that States share information about planned or unplanned maintenance and fault occurrence with their peer States so that the number of tickets can be reduced.

Analysis of APAC CRV Bandwidth Utilisation – PCCWG(SP/02)

2.76 The paper presented the bandwidth utilisation of each member State in 2025, providing a comprehensive understanding of how network bandwidth is utilised within the organisation. PCCWG informed that the reporting tool captured and recorded the average traffic value from the NID interface at 5-minute intervals and averaged the collected data to generate the monthly traffic report. The Meeting reviewed the monthly traffic report, and it was observed that the average utilisation rate cannot share peak bandwidth utilisation. Member States/Administrations were requested to make additional efforts to measure and monitor CRV network performance and to regularly share the results with the CRV OG.

2.77 On the request to provide an update on the request to explore a way to capture peak bandwidth, the CRV service provider informed that the work is ongoing and further progress will be shared in the next Meeting. **ACTION ITEM 15-33**

2.78 India observed that the bandwidth information presented for their subscribed package was 1 Mbps, while India has upgraded their package to 2 Mbps. PCCWG clarified that the report was produced based on information in the first half of 2025. It was suggested that future updates provide details of all packages in separate rows if multiple packages were subscribed to in a year. **ACTION ITEM 15-34**

2.79 Indonesia requested to correct information about the dedicated Bandwidth for the Voice Channel to 1152 Kbps.

2.80 It was noted that under the CRV Implementation plan, there was a CRV Implementation document that needs to be updated by the CRV Service Provider, in collaboration with the CRV OG Co-Chairs, to reflect the latest information on the CRV package and other details of CRV Users. **ACTION ITEM 15-35**

2.81 In response to a question about computing bandwidth for multiple voice channels, it was clarified that, in an ideal situation, the projected bandwidth equals the number of voice channels multiplied by 112 kbps. However, States/Administrations can conduct a safety case to estimate the maximum number of active channels over time and the maximum utilised bandwidth in voice channels. It was also suggested that AIDC may reduce the number of voice channels, and it may be prudent to implement AIDC based on operational needs.

Incident Summary in 2025 – PCCWG (WP/03)

2.82 PCCW Global presented the four major incidents summary in 2025, including Thailand Fibre Optic Circuit Incidents, Sri Lanka Colombo CRV Circuit incident, Cambodia CRV Service Disruptions and the Republic of Korea (ROK) CRV Service Disruptions.

2.83 ROK shared its appreciation for PCCWG's efforts to create opportunities to optimise traffic classification at ROK sites and for traffic fine-tuning initiatives. However, it suggested that advance notification for such improvements would be appreciated.

2.84 The Meeting noted that the Cambodia CRV Service Disruptions provide a lesson to consider physical diversity while implementing CRV.

2.85 It was noted that Thailand Fiber Optic Circuit Incidents teach the importance of ensuring physical diversity among multiple local telecom service providers.

2.86 Sri Lanka appreciated the efforts made by PCCWG in resolving the issue; however, it was informed that the service desk repeatedly requests the same details when coordinating the resolution of lodged complaints. It was suggested that PCCWG improve internal processes to log the complainant's information so the complainant does not need to reshare event details.

2.87 The Meeting was requested to use the emergency telephone number to lodge an emergency issue and receive feedback, as a telephone call is quicker than an email response.

2.88 It was also suggested to follow the escalation matrix provided in the CRV documents.

A formula to compute the bandwidth required for surveillance data sharing – Secretariat on behalf of Hong Kong China (WP/19)

2.89 The paper presented a formula based on analysis to compute the bandwidth required for surveillance data sharing. It was recalled that during the CRV OG/13 Meeting, Hong Kong China

presented a study on the bandwidth used for the ADS-B data transmitted over the SWIM/CRV environment and analyzed outcomes in WP/22 which resulted into Action Item 13-23 to work on deriving a formula based on analysis to compute the bandwidth required for surveillance data sharing and suggest it to the CRV OG Ad-hoc Expert Group to incorporate it into the CRV OG Operations Manual.

2.90 The Meeting was informed in the Seventeenth Ad-hoc Expert Group Meeting held on 27 January 2026 via Microsoft Teams VTC, Hong Kong China presented the formula. based on the study conducted under the Surveillance Study Group (SURSG) in 2024 and reported in WP/22 of CRV OG/13, the maximum message size for an AMQP transmission containing a single ADS-B target with its associated Flight Plan information was determined to be 1,200 bytes, including network overheads.

2.91 Therefore, the required bandwidth for transmitting such ADS-B data was derived as follows:

[Bandwidth Required] = (1,200 bytes × [Number of Targets in Interest]) / ([Data Reception Interval (seconds)])

e.g.,
Number of Targets of Interest = 300
Data Reception Interval (seconds) = 2
Bandwidth required = (1,200 bytes x 300) ÷ 2 seconds
Bandwidth required = 0.18 megabytes per second (i.e. 1.44 megabits per second)

2.92 The Meeting reviewed the formula and agreed to incorporate the formula into the CRV OG Operations Manual in the service design section. **ACTION ITEM 15-36**

Implementation of the cloud within the CRV network and integration of it with another cloud network – CRV OG Co-Chair (Asia) (WP/20)

2.93 This paper presented options for connecting the CRV network to cloud providers to support the potential adoption of cloud connectivity by ANSPs and Service Providers. It was recalled that during the CRV OG/13 Meeting, Singapore presented on a CAAS SWIM-CRV Cloud Platform use case. It was noted that with cloud-based infrastructure options available across the region, aviation organisations continue to assess and adopt fit-for-purpose solutions such as SaaS, PaaS or IaaS in commercial or government-delivered clouds. The benefits and challenges of cloud adoption were shared in the Meeting.

2.94 The Meeting was informed that there appeared to be **two options available for CRV connectivity** to cloud services: one is **Direct Peering,** in which PCCWG would create a provider peering to the cloud provider and manage traffic from the current CRV network to the cloud-based services. This would not support GRE tunnels, which will require configuration changes to the peering interface in CRV to manage traffic. There are security considerations required here that require further exploration with PCCWG.

2.95 The second option is **Direct Connect,** in which a CRV NID would be installed in the cloud provider's premises. This would support GRE tunnels and would be treated as another CRV site with the associated billing. Security would be the responsibility of the User implementing this option. It was added that there is a risk with this option in that cloud providers may restrict the installation of the NID or, in a future change, require the use of their products, such as Direct Peering.

2.96 The Meeting noted that, with either option, the user needs to consider the cost-benefit of requiring a CRV cloud connection. If this becomes a regional requirement, a cost-sharing model would need to be considered. PCCWG's Console Connect could also be considered an option, but PCCWG needs to provide more details. It was recommended that work be carried out with PCCWG to consider and develop suitable connectivity options for cloud connectivity.

2.97 The Meeting agreed that as SWIM implementation progresses, many States may find it difficult to manage their on-premises equipment, as SWIM traffic will be based on subscriber counts that could grow exponentially. Therefore, it is important to integrate CRV with the cloud network.

2.98 The Meeting discussed whether it is within the roles and responsibilities of the CRV OG to determine cloud service providers for SWIM services in the APAC region. It was also deliberated whether SWIM TF should discuss and select cloud service providers for the APAC Region, or whether this should be done at the individual or group level.

2.99 The Meeting noted that, while the cloud requirements arise from SWIM implementation, CRV OG is also involved as the required connectivity is provided through CRV. It was proposed that the two solutions presented in this paper be discussed at the joint Meeting of the CRV OG Ad-hoc Expert Group and the SWIM TF Task Leads. It was also noted that further discussion would be needed regarding security controls and data sovereignty. **ACTION ITEM 15-37**

2.100 The proposal to provide cloud services at the sub-regional level may also be considered.

2.101 The CRV service provider explained that, for direct peering, a demarcation point is required. While the NID can support GRE tunnel connections, it still needs to be hosted at a physical location or data centre. However, cloud providers do not generally offer space to accommodate external NIDs. One possible solution is for PCCWG to identify an alternative data centre or host the router within a Member State. Another option is to utilise Console Connect, which operates independently of the CRV network and already supports multi-cloud connectivity. As Console Connect is not part of the CRV network, it would also allow participation from other entities, such as airports or non-State members. It was noted that further discussion is needed to determine which States will adopt cloud solutions and who will be responsible for their management. These matters require further deliberation. It was agreed that PCCWG will discuss and propose various solutions for the different use cases and present them at the next CRV OG Meeting. **ACTION ITEM 15-38**

2.102 It was suggested that, along with this discussion initiated with the CRV Service provider, it also be considered for inclusion in the CRV III RFP. **ACTION ITEM 15-39**

Inordinate Delay in Provisioning of Second CRV Node at Delhi by PCCW Global – India (WP/30)

2.103 India reported an inordinate delay experienced during the implementation of the second CRV node at Delhi for DR AMHS operations by PCCW Global. The Meeting was informed that India placed a purchase order with PCCWG on 1 July 2025 for the provision of a second CRV node (2 Mbps, Package C) at Delhi to enhance redundancy and operational reliability of the CRV network services for aeronautical communications through DR AMHS operations. PCCWG acknowledged and accepted the purchase order on 7 July 2025 for the implementation of the second CRV node in Delhi, engaged M/S Airtel as the local service partner, and communicated a tentative Service Provision Guarantee date of 28 November 2025 for the delivery of the node. However, despite continuous follow-up by AAI and repeated coordination with PCCWG via email and WhatsApp, the implementation of the second CRV node in Delhi has experienced a significant delay, extending well beyond the committed Service Provision Guarantee date.

2.104 The Meeting was informed that this delay in the provision of the CRV node at Delhi was caused by a combination of factors, including inadequate planning, poor initial site validation, delayed submission of OFC laying permission requests to the Airport Operator, and the need for a more robust follow-up mechanism. Excessive dependence on the local service provider (Airtel), without ensuring accountability and commitment, further aggravated the delay. Moreover, PCCWG did not provide a firm Service Provision Guarantee date for the delivery of the CRV node in Delhi, as stipulated in the terms and conditions of the CRV service contract. PCCW Global acknowledged the delay and has since strengthened its internal governance, monitoring, and escalation processes with local partners to better ensure timely delivery in accordance.

2.105 The Meeting was informed that due to the delay in provisioning of the second CRV node at Delhi for DR AMHS operation, a lot of operational difficulties were faced in commissioning of PAN India AMHS, as DC-DR switch over testing was pending due to the non-availability of the second CRV node at Delhi. Following the intervention by the ICAO APAC office and the CRV OG Co-Chair, the second CRV node was delivered on 15 May 2026 by PCCWG, after a delay of about six months, for the DR AMHS operation at Delhi.

2.106 The Meeting noted the implementation challenges and delays experienced in provisioning of the second CRV node at Delhi. The Meeting discussed measures for PCCWG to strengthen coordination and escalation mechanisms with its local partner and to establish effective governance, monitoring, and reporting mechanisms to ensure timely CRV service delivery in accordance with the committed SPG dates for Member States.

2.107 The Meeting noted that, following the signing of the purchase order, a tentative Service Provision Guarantee date for node delivery is typically provided. However, a query was raised regarding penalties in cases where vendors are unable to meet the committed timeline. The CRV OG Co-Chair and India will review the relevant CRV documentation to identify the applicable provisions and share the information with the Meeting. **ACTION ITEM 15-40**

2.108 After detailed deliberation on the root cause of the issue and what could have been done differently, it was noted that at the time of commitment of service provision date by the CRV service provider, PCCWG did not have information that fibre laying work could not be conducted by their local partner. Also, after coordination with the major telecom service provider, it was noted that only Airtel was willing to complete this task. It was also noted that a site inspection was conducted in advance. PCCWG was requested to review and, if needed, propose modifications to the high-level questionnaire to strengthen the document and ensure that all required information is provided to support the provision of services. **ACTION ITEM 15-41**

PSIDS updates for CRV joining – Fiji (WP/21)

2.109 This paper presented the update of the PSIDS CRV Implementation to date and the challenges faced with alternative solutions for PSIDS that cannot implement CRV. The table below summarised the CRV implementation of the PSIDS that consists of 13 ICAO-accredited PSIDS and one non-accredited PSIDS:

SN	PSIDS Name	CRV Package	Implementation Status	Alternative Solution for Joining CRV	Remarks
1	Cook Islands	D	Implemented December 2025	N/A	Service supported TBD
2	Federated States of Micronesia	Not Implementing	Not Implementing	Secured VPN connection over	Low traffic flight movement against

				the Internet to the United States	the high cost of implementing CRV
3	Fiji	B+ (1Mbps)	Implemented 2019	N/A	Support Voice and AMHS services
4	Kiribati	D+	In Progress	N/A	Work in progress with Fiji support to implement CRV in Q4 2026
5	Nauru	D+	In progress	N/A	Prospect for 2026 (PCWWG)
6	Niue	D	Implemented January 2026	N/A	Service supported TBD
7	Palau	Not Implementing	Not Implementing	Secured VPN connection over the Internet to the United States	Low traffic flight movement against the high cost of implementing CRV
8	Papua New Guinea	C (2 x 640Kbps)	Implemented 2021	N/A	Support Voice, AMHS & Aireon Space ADS-B services
9	Marshall Island	Not Implementing	Not Implementing	Secured VPN connection over the Internet to the United States	Low traffic flight movement against the high cost of implementing CRV
10	Samoa	D+	In progress	N/A	Prospect 2026 (PCCWG)
11	Solomon Islands	D+	In progress	N/A	Under provisioning (PCWWG)
12	Tonga	D	Implemented May 2026	N/A	Service supported TBD
13	Tuvalu	Not Implementing	Not Implementing	Secured VPN connection over the Internet to Fiji	Low traffic flight movement against the high cost of implementing CRV
14	Vanuatu	D+	In progress	N/A	Work in progress with Fiji support to implement CRV in Q4 2026

Table 2-PSIDS updates for CRV joining

2.110 On the suggestion of CRV OG to study and provide guidelines for PSIDS on an alternative CRV joining solution to support SWIM, the Meeting recalled the CRV promotional offer for PSDIS shared in past, which costs approximately USD2000 per month for Package D subscription. It was also noted that many PSDIS are joining CRV or are in the process of joining.

2.111 The need for understanding what would be a reasonable cost of such PSIDS, which has constraints of low traffic flight movement against the high cost of implementing CRV, was discussed in the Meeting. It was added that if a reasonable cost for such PSIDS can be estimated, the CRV OG Ad-hoc Expert group can work with the CRV Service Provider to identify another potential solution to support them. **ACTION ITEM 15-42**

2.112 The definition of low traffic was also raised in the Meeting for which a particular State may decide not to join CRV. As most PSIDS CRV-joining support is the responsibility of their partner

States, it was suggested that PSIDS partner States discuss these questions and identify proposed solutions.

2.113 As most PSIDS not joining CRV fall under the responsibility of the United States, the Meeting requested that the United States provide information on traffic movements in the Federated States of Micronesia, Palau and the Marshall Islands to help understand and determine the definition of low traffic. **ACTION ITEM 15-43** Fiji will take similar action for Tuvalu. **ACTION ITEM 15-44**

2.114 It was also agreed that partner States, which informed ICAO that PSIDS under their responsibility will not join CRV, will share their plans to support such PSIDS in meeting the future SWIM/FF-ICE/sunset date of the FPL2012 requirements. **ACTION ITEM 15-45**

CRV joining with proposed solutions – Russia (WP/22)

2.115 Russia presented a proposal to consider an option of using the resources of a Russian telecommunication provider, TTK, to ensure connectivity of the Russian Federation communication centres to CRV for obtaining support from the CRV OG and the ICAO Asia-Pacific Office.

2.116 Russia informed that at the end of 2021, PCCW Global Limited completed the development of technical solutions to connect Moscow and Khabarovsk COM centres to CRV to ensure transition to AMHS exchange with the APAC region COM centres (Japan and China), and in December 2021 an official technical proposal was submitted to the State ATM Corporation. The connection diagram for Russian COM centres presented by PCCW Global Limited (Fig.1) was approved by the Russian Federation, and the parties began addressing the contract conclusion. However, the process was suspended due to restrictions on the use of Cisco equipment in the COM centres of Moscow and Khabarovsk.

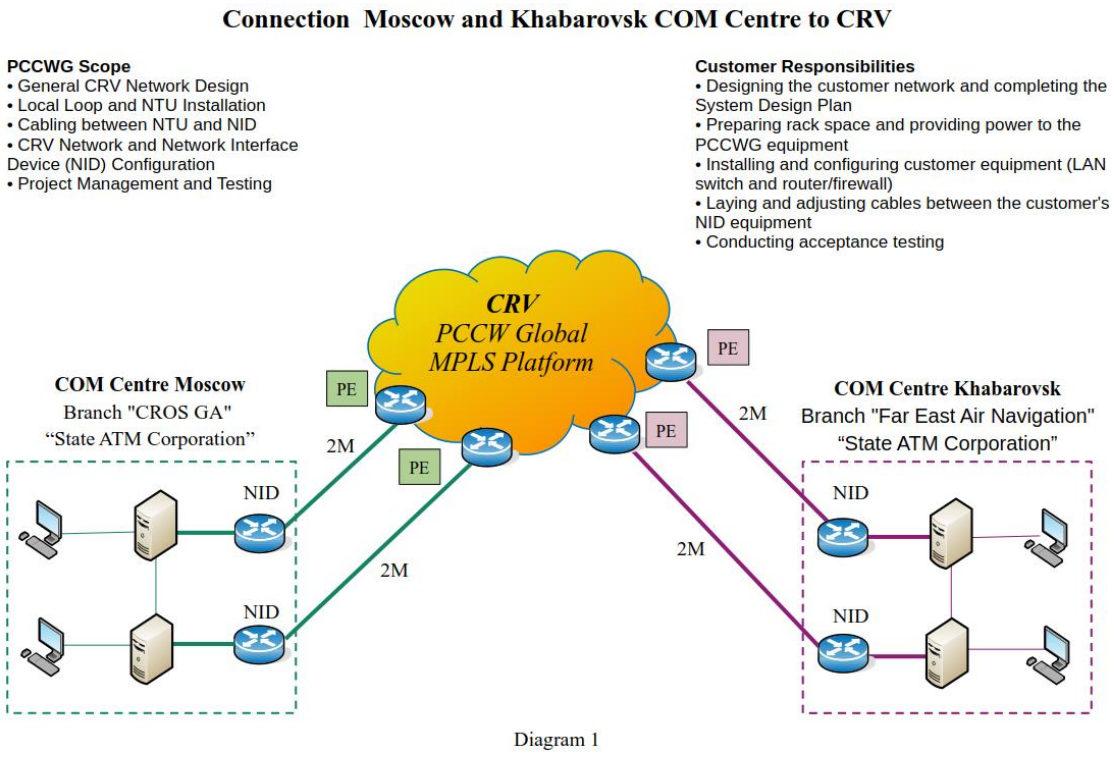

Figure 1- Initial Propsoal in 2021 for Russia joining CRV

2.117 It was informed that the search for alternative connection options was complicated by the fact that the use of equipment other than Cisco was deemed unacceptable for PCCW Global Limited. In 2025, the Russian telecommunications service provider TTK, which has prior experience in cooperating with PCCW Global Limited, offered its assistance in providing the required connectivity. The proposed solution for connecting the Russian COM centres to the CRV was illustrated in Figure 2. It was clarified that under this arrangement, PCCW Global was able to configure the network equipment installed in the Russian COM centres (CE or NID) in the same manner as depicted in Figure 1. However, any such arrangement would be subject to comprehensive compliance review and internal due diligence by PCCW Global to ensure alignment with applicable laws, regulations, and company policies. Payments for the services could be made between TTK and PCCW Global, on the one hand, and between TTK and the State ATM Corporation, on the other. Consequently, the standard service contract may require minor adjustments to accommodate this solution. It was noted that establishing an interaction with PCCW Global will enable an early switch to AMHS exchange via CRV and the later transmission of various types of information, including data and voice.

Connection Moscow and Khabarovsk COM Centre to CRV

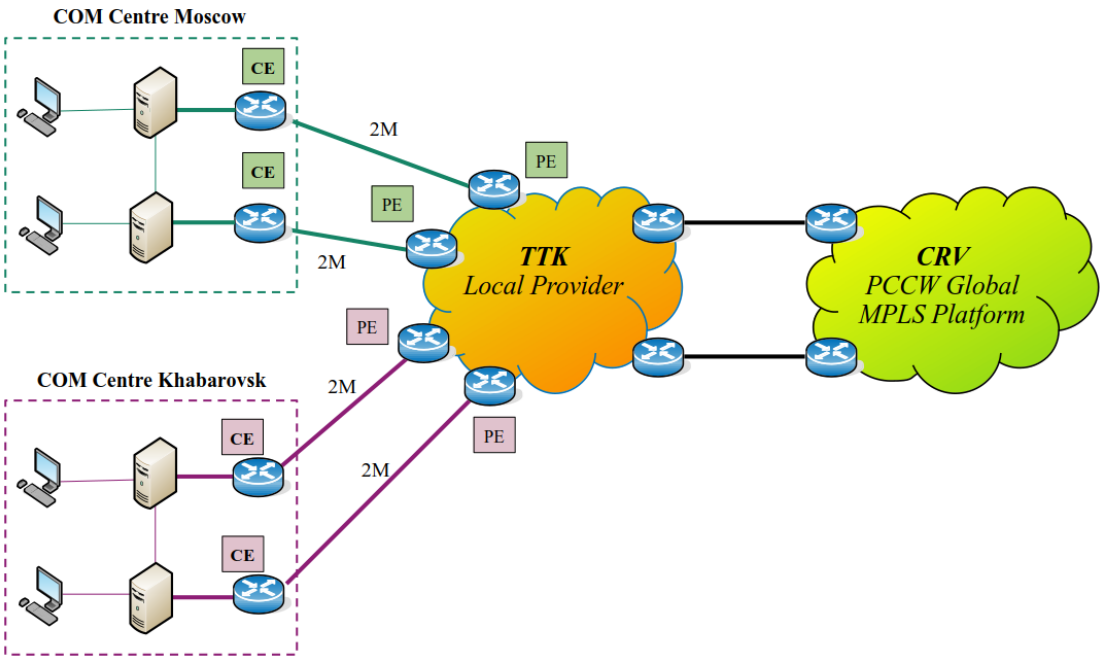

Figure 2-The proposed solution for connecting the Russian COM centres to the CRV

2.118 The Matter was further discussed in breakout sessions among interested Member States and the CRV Service provider, and two technical options for the resolution of the identified issue and way forward were agreed upon in the meeting. The finalised solution has been uploaded to the ICAO APAC CRV Secure Portal and to the CRV Portal hosted by New Zealand.

CRV Implementation in Malaysia (IP/03)

2.119 Malaysia presented the status of CRV implementation between Malaysia and neighbouring CRV States. It was informed that the official commencement date for CRV services in Malaysia started in November 2021 and the CRV Contract Agreement between PCCWG and CAAM on behalf of the Government of Malaysia was signed in Sept 2022. It was reported that Malaysia currently subscribes to package A with 2Mbps, which connects both CRV routers located in the Kuala Lumpur Air Traffic Control Centre (KLATCC) to the CRV network. Various connections showing the

status of CRV Implementation between Kuala Lumpur Air Traffic Control Centre (KLATCC) and neighbouring CRV States were shared with the Meeting. Lastly, Malaysia shared its experience with CRV operations. The Meeting was informed that Malaysia's AMHS and Voice services migration to the CRV network is substantially complete, with overall progress estimated at 90%, and is expected to be fully complete by the end of 2026. The successful implementation of CRV was greatly supported by the technical assistance of the PCCWG representatives and the strong cooperation demonstrated by neighbouring CRV States.

2.120 The Meeting noted that Malaysia has also implemented Space-based ADS-B over CRV and invited them to contribute to the preparation of SOP for contracting Space-based ADS-B services over CRV. Malaysia agreed to the request. **ACTION ITEM 15-46**

2.121 In response to a question, Malaysia informed that currently they are not using space-based ADS-B data for separation purposes; however, in future, it may be done after the establishment of a compliance policy to use space-based ADS-B data for separation purposes. It was also clarified that Malaysia is paying per aircraft, like India.

Implementation status of PAN India AMHS – India (IP/05)

2.122 This paper presented an update by India on the implementation status of the new Pan-India AMHS at Mumbai (VABB) and New Delhi (VIDP), and the current international AMHS connectivity of India with BBIS and BIS States. It was informed that India has implemented a new Pan-India AMHS to replace the legacy AMHS commissioned in 2011 at Mumbai, featuring a fully redundant dual-site architecture with a Data Centre (DC) in Mumbai and a Disaster Recovery (DR) site in New Delhi, covering 80+ airports under a single centralised platform. The system supports AFTN/AMHS messaging, IWXXM exchange via FTBP, FIXM-based flight data exchange, AIXM 5.1-compliant Digital NOTAM, and web-based and mobile flight plan submission with online payment, deployed with cyber-security protection. Site Acceptance Test (SAT) was completed in February 2025 and System Reliability and Stability Test (SRST) in March 2026, with DC-to-DR switchover achieved within approximately 8 minutes, and operational commissioning planned for Q2 2026. India currently maintains 10 international AMHS connections.

2.123 The Meeting noted all existing connections still operate on the legacy AMHS, with staged migration to the new Pan-India AMHS to be coordinated bilaterally with each correspondent State. The Meeting also noted the need to coordinate with Eurocontrol to obtain consent to utilise the European Directory Services (EDS) for the new AMHS in India.

2.124 ACSICG Co-Chair and ICAO Secretariat informed that AMHS with FTBP does not align with the FF-ICE and FIXM concepts, which are based on SWIM. Furthermore, no plan has been communicated to transfer AIXM to AMHS.

2.125 It was noted that currently, none of the States represented at the CRV OG/15 meeting was connected to Eurocontrol for EDS. India requested support from the ICAO Secretariat to connect with the appropriate focal point at Eurocontrol for EDS. The ICAO Secretariat will coordinate with Eurocontrol and support India for this interconnection for the new AMHS if feasible. **ACTION ITEM 15-47**

FAA IWXXM via AMHS Testing Update – United States (IP/06)

2.126 The paper presented the ongoing effort by the FAA to conduct IWXXM testing over AMHS to progress towards operational dissemination of OPMET data. The Meeting was informed that the United States FAA Technical Centre is conducting interoperability testing of IWXXM with Cuba. In its test environment, the FAA has deployed an AMHS-to-SWIM Gateway (ASG) that supports the

exchange of weather information in XML format over the AMHS. It was informed that the United States and Cuba have successfully conducted interoperability tests, phases I through III, which have validated the exchange of IWXXM traffic. Phase IV testing is planned for the near future to support the transition to operational dissemination of OPMET data.

2.127 ACSICG Co-Chair shared that in the SWIM environment, the exchange of MET messages should be based on Publish/Subscribe (PUB/SUB) or Request/Reply (REQ/REP) mechanisms, whereas in the AMHS environment, messages are routed based on the originator and recipient addresses. The United States was requested to explain how its AMHS/SWIM gateway performs routing across these two environments at the upcoming AMHS to SWIM Transition Coordination Group (ATSCG) planned for 19 August 2026 from 0800-0930 AM BKK time. **ACTION ITEM 15-48** The United States was also requested to provide the email addresses of participants who will provide clarifications at the ATSCG Meeting so that the ICAO Secretariat can share the Meeting invite. **ACTION ITEM 15-49**

Current Status of CRV Implementation in Indonesia (IP/07)

2.128 The paper provided updated information on the current status of CRV implementation in Indonesia. The Meeting was informed that Indonesia extended its CRV service contract with PCCW in December 2025. The renewed contract is valid until 31 December 2028, subscribing to a Connection Package-C with 3 Mbps bandwidth at two sites. The first connection was established in the first quarter of 2023. Key implementation activities include finalising bilateral agreements, establishing connections, conducting trial operations, and monitoring performance. In 2026, Indonesia carried out the modernisation of ATM system facilities, including the Voice Communication System (VCS) and the implementation of a new AMHS for Jakarta and Ujung Pandang. These systems are scheduled to become operational by mid-June 2026. As of June 2026, several applications, including AMHS, are operational, while the new AMHS is operational, and voice testing is ongoing with various neighbouring States. Based on the target timeline, Indonesia appreciated an initial discussion with the concerned parties to review related matters and align the implementation schedule.

2.129 Indonesia requested PCCWG support in relocating CRV equipment from Jakarta's old building to the new building and shared concerns that they did not wish to encounter the issues India faced with long service lead times. PCCWG assured full support and a minimum time for completion of this task.

2.130 In response to Indonesia's experience downgrading packages from 3M to 2M, Indonesia shared that their process was smooth and that they completed it within one month.

2.131 Indonesia clarified that the price difference between the 2M and 3M packages is not significant.

CRV Implementation Status in India (IP/08)

2.132 The paper provided information on the implementation and the CRV Network in India. The Meeting was informed that India operates a legacy AMHS in Mumbai, linked to various APAC States, and has installed a new Pan-India AMHS with a Data Centre in Mumbai and a Disaster Recovery (DR) site in New Delhi. India executed a CRV service contract with PCCW Global in March 2022 under Package B+ (initially 1 Mbps, upgraded to 2 Mbps in May 2025), which has been operational since December 2022, and a second CRV node at New Delhi under Package C (2 Mbps) was completed in May 2026 for seamless failover.

2.133 It was informed that to date, 7 AMHS circuits (64 Kbps each to Bangkok, Paro, Singapore, Kathmandu, Beijing, Karachi, and Colombo) and 9 voice circuits (112 Kbps each to Karachi, Kuala Lumpur, Colombo, Lahore, Yangon, and Jakarta) have been migrated onto CRV, occupying a total bandwidth of 1,456 Kbps, with performance reported as satisfactory.

2.134 Pending migrations awaiting counterpart readiness include voice circuits to Colombo and Male, AMHS and voice to Muscat, and AMHS to Dhaka. India urged Dhaka & Male, having AMHS/AFTN/Voice connectivity with India, to migrate to the CRV network at the earliest. MID region states, particularly Oman, were also urged to join the CRV network to establish Inter-Regional CRV connectivity with India.

Sr. No	**CRV Network with States**	**Bandwidth**	**Services**		**Rem**
1	Chennai-Colombo	112Kbps		Voice	.Coordination with Colombo is in progress
2	Chennai-Male	112Kbps		Voice	These links shall be implemented on the CRV Network once the counterpart states are ready
3	Mumbai-Muscat	64Kbps	AMHS		
4	Mumbai-Muscat	112Kbps		Voice	
5	Mumbai-Dhaka	64Kbps	AMHS		

Table 3- CRV Site under progress in India

2.135 The Meeting noted that Bangladesh is still in the process of joining CRV. Therefore, the Mumbai-Dhaka connection is not completed; however, the Maldives is already on CRV. It was noted that there are difficulties in coordination with Male for the Chennai-Male connection. The ICAO Secretariat will provide support to India for establishing contact with the Maldives. **ACTION ITEM 15-50**

Use cases for interregional connection – Sec (WP/23)

2.136 This paper presented use cases for interregional connections compiled by the ICAO APAC Office for Meeting information and discussion on further action. It was recalled that in the Sixteenth Meeting of the CRV OG Ad-hoc Expert group, held online on 9 October 2025, the Ad-hoc group initiated an action to compile use cases of interregional connectivity. All States with connections outside the APAC region were requested to submit relevant information to the ICAO Secretariat. This compilation was expected to provide valuable insights into the potential additional benefits that can be realised through enhanced interregional connectivity.

2.137 Following the action, the ICAO APAC Office has collected detailed information shared by different States/Administrations. Based on details shared by different States/Administrations, key use cases include AFTN, AMHS, Voice, Data and enhanced diversity.

2.138 The Meeting discussed the use of compiled use cases to support interregional connectivity and supplemented additional (missing) details in the use case compilation table.

MPLS/IP based inter-regional connection – Sec (WP/24)

2.139 This paper provided an update on the discussion on the potential interconnection of CRV and REDDIG III, and CRV and New PENS. It was recalled that the past discussion included the final technical proposal from 2022 for the interconnection of CRV and REDDIG II, along with various business models for the way forward, discussed at past ACSICG Meetings. It also requests that APAC member states deliberate on the way forward for interconnecting the CRV with other regional networks, such as REDDIG II/New PENS.

2.140 About CRV and REDDIG interconnection, the Meeting was informed that it is expected to conduct a joint workshop for CRV and REDDIG experts in Q4 of 2026, if funding is received, to discuss the way forward for the interconnection of both networks and to further work on CRV governance. While previous technical proposals have been developed and reviewed, there is currently no agreed or validated technical solution for the interconnection of CRV and REDDIG III. Further progress is expected once the REDDIG III service provider is established and the corresponding technical and governance framework is defined. This situation has directly influenced the timing of interconnection discussions, as any future implementation must be aligned with the architecture, contractual framework, and operational model of REDDIG III.

2.141 The Meeting noted that the proposal produced by PCCWG is still valid and will create a baseline for further discussion with the new service provider of REDDIG III. It was requested that as soon as the REDDIG III service provider is finalised, the information be shared with the CRV OG Ad-hoc Expert group and the CRV Service provider. **ACTION ITEM 15-51**

2.142 The process for initiating contact between both service providers to conduct detailed technical discussions on the interconnection proposal should commence at the earliest opportunity. This will allow further examination of the previously agreed solution, as well as the evaluation of additional potential technical options for interconnecting the two networks. The ICAO Secretariat will facilitate and initiate coordination to establish communication between the respective regional IP network service providers. **ACTION ITEM 15-52**

2.143 The Meeting discussed the need for and importance of an in-person workshop involving CRV and REDDIG III experts to further deliberate on the interregional interconnection, as well as other areas of mutual interest. It was recognised that face-to-face Meetings provide significant value by facilitating more effective discussions, including interactive whiteboard sessions, comprehensive evaluation of the advantages and disadvantages of proposed options, and improved understanding of complex technical matters. As APAC SWIM implementation timelines are 2024-2030, the Meeting stressed the importance of organising the proposed workshop at the earliest opportunity in order to make timely progress on this outstanding issue. **ACTION ITEM 15-53**

2.144 About CRV and New PENS, the Meeting noted that the coordination is ongoing through AST TF and EASPG. It was recalled that the Sixth Meeting of the AFS to SWIM Transition Task Force (AST TF/06), held in the ICAO EUR/NAT Office in Paris, France, from 5 to 7 May 2025, discussed follow-up on EASPG Conclusion 3/15 – Coordination on the Interregional AFS Gateways. Some initial actions were taken in response to the EASPG Conclusion 3/15; however, this action could not be completed at the time. Eurocontrol stated that its position remains as before. The role and responsibilities of the interregional AFS coordination team must first be defined, and then Eurocontrol will decide accordingly. The AST TF/06 Meeting agreed that the OG would define the terms of reference for the interregional AFS coordination team before establishing it.

2.145 The Meeting was informed that the Seventh Meeting of the EUR AFS to SWIM Transition Task Force (AST TF/07), held from 21 to 24 April 2026, reviewed the draft Terms of Reference (ToR) for an interregional AFS gateway team. The key contents of ToR address operational problems in the AFS network, including routing loops, asymmetric routing, address inconsistencies, message loss and coordination difficulties with COM Centres outside the EUR/NAT Regions. In

addition, the Meeting received a proposal to establish a list of Regional AMC focal points to improve coordination and address AMC issues worldwide. Both proposals were submitted to the parent group of the AST TF (EASPG PCG) for discussion and decision. Once the proposals are approved, the ICAO EUR/NAT Office will contact other ICAO Regional Offices regarding them.

2.146 The Meeting discussed the cost-sharing model and business case for interconnecting CRV with other regional networks.

2.147 The Meeting agreed that, with the implementation of SWIM, FF-ICE R/1, and Trajectory-based Operations (TBO), traditional point-to-point connectivity models will no longer be adequate. It was noted that, following SWIM implementation, GEMS in the APAC region may need to establish connectivity with EMS in other regions. Consequently, the currently limited interregional connections are likely to expand, with an increasing number of APAC States requiring interconnection with other regions. In this context, the Meeting emphasised that the interconnection of all regional IP networks would be essential for effectively supporting global SWIM operations.

2.148 The Meeting noted the importance of ensuring both geographical and regional redundancy when developing technical proposals for interregional connectivity. This approach would enhance network resilience, reliability, and operational continuity across interconnected regional IP networks.

2.149 The Meeting also deliberated on the way forward for the interconnection between CRV and REDDIG III and CRV and New PENS, taking into account technical feasibility, governance frameworks, cost-sharing models, and alignment with ongoing regional network modernisation processes.

2.150 The Meeting noted that while progress has been made in discussions on the interconnection between CRV and REDDIG III, EUROCONTROL has expressed reservations regarding further engagement due to the absence of a clear business case. It was reiterated that, although interregional connectivity may not demonstrate immediate business value, it represents a critical enabler for future advancements aligned with SWIM, FF-ICE, and Trajectory-based Operations (TBO). The Meeting emphasised that the value of such interconnections should not be assessed solely in terms of cost, but also in terms of enabling seamless integration, enhancing interoperability, and ensuring the safe and efficient delivery of flight operations at a global level. The Meeting requested ICAO support in engaging the higher authorities of both regions to progress on this matter. **ACTION ITEM 15-54**

2.151 The Meeting further suggested that other APAC States/Administrations engage with their European counterparts to encourage dialogue and advocate for EUROCONTROL's support of this APAC initiative, highlighting its long-term strategic importance for global interoperability and aviation system modernisation. **ACTION ITEM 15-55**

2.152 The United States shared its experience, noting the significant value derived from subscribing to both REDDIG and CRV networks, particularly in terms of enhanced connectivity, redundancy, and operational flexibility.

2.153 The Meeting further agreed that, in the event of limited interest from EUROCONTROL in pursuing the interconnection between CRV and New PENS, an alternative option could be the deployment of CRV nodes within Europe. The Ad-hoc Group and PCCWG were tasked with further examining this option and presenting a detailed assessment, including estimated costs, at the next Meeting. **ACTION ITEM 15-56**

REDDIG III Governance Model, Need for Inter-Regional Connectivity and Possible Establishment of a Reddig Node in New Zealand – ICAO SAM RO (WP/34)

2.154 The paper presented the governance, operational and financial framework of REDDIG III, as well as opportunities for inter-regional connectivity between the SAM and APAC Regions. It also described the possible establishment of a REDDIG III node in New Zealand as a complementary initiative aimed at strengthening interoperability, resilience and technical cooperation between both regions.

2.155 The Meeting was informed of the benefits and opportunities of interconnection between CRV and REDDIG III. It was proposed to continue coordination among the ICAO APAC and SAM Regional Office, participating States/Administrations, ANSPs and telecommunications service providers in order to:

a) Assess technical architectures for a possible CRV–REDDIG interconnection;

b) Identify operational services that could benefit from such interconnection;

c) Evaluate associated governance and funding aspects;

d) Develop a phased implementation roadmap;

e) Identify future interoperability opportunities with other regional aeronautical networks.

2.156 It was also highlighted that the proposal is not intended to replace or modify the existing capabilities of the CRV network, but rather to explore mechanisms that could facilitate future CNS/ATM services, including AMHS, AIDC, ATS Voice, surveillance and SWIM applications.

2.157 The Meeting noted the REDDIG III governance and operational experience as a reference for future regional cooperation initiatives. It was agreed to conduct additional technical and operational studies on technical cooperation between CRV and REDDIG III, as well as continued coordination between the ICAO APAC and SAM Regional Offices regarding the possible establishment of a REDDIG III node in New Zealand.

2.158 The Meeting noted that the proposed initiative is complementary to existing regional infrastructures and is intended to strengthen interoperability, resilience and technical cooperation between the APAC and SAM Regions.

2.159 It was informed that, within the framework of coordination between the ICAO APAC and SAM Regional Offices, as well as discussions held among REDDIG participating States and CRV Operations Group members, **the possibility of establishing a REDDIG III node in Auckland, New Zealand**, has been identified as an initiative aimed at progressively strengthening operational connectivity between both regions and gaining practical experience in inter-regional connectivity while studies and analyses related to future connectivity between the CRV and REDDIG networks continue to advance. This initiative has generated increasing interest among several South American States, as well as Panama and the Central American States (CENAMER), which recognise its potential **to improve CNS/ATM service exchange, enhance the resilience of trans-Pacific aeronautical communications and facilitate future operational cooperation** initiatives between the APAC and SAM Regions.

2.160 The initiative represented an opportunity to further strengthen connectivity and the **resilience of aeronautical services between the APAC and SAM Regions by leveraging existing and future infrastructures**. REDDIG currently maintains operational nodes in Salt Lake City, Atlanta and Johannesburg, as well as its interconnection with the FAA, while the CRV infrastructure provides connectivity towards Australia and New Zealand. In this context, the evolution to REDDIG III envisaged the incorporation of a node in Auckland, further expanding the geographical reach of the

network and creating new opportunities for diversified and redundant communication routes between ICAO regions.

2.161 Considering that REDDIG III is currently undergoing the procurement process **for its 2026–2031 operational period**, with implementation expected to commence during the last quarter of 2026, it was informed that participating States of the SAM Region have expressed preliminary interest in exploring mechanisms that would facilitate the initial establishment of this node within the framework of the REDDIG Regional Project, subject to approval by the relevant governance bodies. This approach would allow a gradual evaluation of the operational benefits of the initiative and provide practical experience in inter-regional connectivity before considering permanent cooperation and funding arrangements.

2.162 Several REDDIG participating States have preliminarily expressed their willingness to consider that the initial costs **associated with the establishment of the REDDIG III node in New Zealand be absorbed within the framework of the REDDIG Regional Project**, subject to approval by the RCC and participating States. This approach aimed to facilitate the implementation of the initiative, demonstrate its operational benefits and allow future funding and sustainability arrangements to be jointly assessed by the APAC and SAM Regions.

2.163 It was added that preliminary technical studies indicated that this connectivity could be implemented **using existing MPLS infrastructures and service-provider interconnections** while preserving the operational and governance autonomy of each regional network. It was added to recognise that the proposed initiative is complementary to existing regional infrastructures and is intended to strengthen interoperability, resilience and technical cooperation between the APAC and SAM Regions.

2.164 New Zealand informed that their preference is to do an NNI connection between CRV and REDDIG III. It was reported that CRV was designed to reduce the number of nodes. However, until the process of NNI connection between CRV and REDDIG III is in progress, they can consider this proposal.

2.165 The Meeting acknowledged the strong support provided by the ICAO SAM Secretariat and REDDIG experts to the APAC region in terms of knowledge sharing, information exchange, and collaborative efforts. The importance of sustaining such cooperation between the two regions was emphasised. It was further noted that, drawing on the example of REDDIG III, in which SAM States bear the cost of additional nodes, the APAC region could benefit from adopting similar best practices and lessons learned.

2.166 The Meeting also noted that REDDIG III has incorporated advanced technologies such as cloud-based architecture and Software-Defined Wide Area Network (SD-WAN), which are being considered by CRV for its future network development. It was suggested that the APAC region draw on the experiences of REDDIG III and integrate these best practices into the design and implementation of the future CRV network.

2.167 For the question about the responsibility of the monthly charges of the REDDIG node in New Zealand, it was informed that, as per the ICAO SAM office at this stage, it is envisaged that the recurring costs associated with the New Zealand node would be absorbed by the SAM Regional Project, subject to approval by the RCC and participating States. It was clarified that the intention is for the Project to cover these costs initially, at least during the first year of operation, in order to facilitate the implementation and evaluation of the initiative. Future funding arrangements would be reviewed based on operational experience, achieved benefits, and the outcome of discussions between the APAC and SAM Regions.

2.168 It was added that the New Zealand node is envisaged as an initial measure to facilitate and accelerate cooperation between the APAC and SAM Regions, enabling the acquisition of operational experience and the evaluation of the potential benefits of a future interconnection between CRV and REDDIG. Should such an interconnection be established in the future, both Regions could jointly assess the need to maintain the node, adapt its role, or adopt other technical and operational arrangements that may be considered more appropriate.

2.169 New Zealand stated that it has discussed initiating work on the proposal internally. Progress on the proposal is estimated to be achieved by Q4 of 2026. ICAO Secretariat will support the coordination with the ICAO SAM office to further progress on this task and provide the required support. **ACTION ITEM 15-57**

Updates on Using the Rest of CRV Pioneer State Contribution to the ICAO Managed Service Agreement (MSA) – Sec (WP/25)

2.170 ICAO Secretariat shared information about the recent development of using the balance fund of the MSA. The Meeting was informed that there is **no decision on the way forward** for using the remaining funds. At the CRV OG/14 Meeting (27-31 October 2025), the CRV II contract management process was completed, and the CRV contract was extended until 2033 currently. The current project is expiring on **29 February 2028**. There was a need for a decision to utilise the remaining funds before the proposed timelines. If the Meeting anticipates using the remaining funds after February 2028, it was necessary to initiate the process to extend the project with a new proposed plan and dates. Alternatively, the Meeting may consider initiating the refund process to all 16 pioneer States, if there is no plan to utilise the remaining funds in the near future.

2.171 The Meeting noted that CRV OG/15 has already agreed to conduct CRV III RFP. Therefore, one potential option is to utilise this fund to conduct CRV III RFP with the support of ICAO CDI. As the ICAO Secretary and CRV OG Co-Chairs will initiate discussions with ICAO CDI in 2026, there may be further updates in the CRV OG/16 Meeting. It was suggested that, while discussing with ICAO CDI, the estimated funds be finalised. If the estimated budget exceeds the remaining funds, CRV OG/16 will discuss the option of collecting the shortfall. **ACTION ITEM 15-58**

2.172 It was also suggested that ProDoc be updated to incorporate the task related to CRV III RFP with the support of ICAO CDI within the CRV OG Ad-hoc Expert group and present the revised ProDoc to MSA at the next year's CRV OG Meeting. **ACTION ITEM 15-59**

Additional Guidelines for ICAO Doc 9855 in the context of CRV Internet-Based Connectivity – Singapore (WP/35)

2.173 Singapore presented the use of public Internet-based connectivity for inter-State aeronautical communication, including Internet-based CRV connectivity using Internet Protocol Security (IPSec) over Authority-provided Internet links. It was informed that while such configurations provide flexibility where a dedicated aeronautical communication infrastructure is not available, they introduce cybersecurity and resilience considerations. This paper provided additional guidance based on the principles of Confidentiality, Integrity and Availability (CIA), supported by Public Key Infrastructure (PKI), to strengthen the security and trust of Internet-based aeronautical communications.

2.174 It was informed that ICAO Doc 9855 provides guidance on the use of the public Internet for aeronautical applications, recognising both its benefits and associated risks. In the APAC region, Internet-based connectivity is increasingly used to support inter-State coordination, including through CRV implementations where dedicated access is unavailable. One such implementation is CRV Package D, which enables connectivity to the CRV network using IPSec tunnels over Authority-provided Internet links, without reliance on dedicated terrestrial or satellite access. States can connect

to the CRV network via Internet-based IPSec tunnels using locally provisioned Internet access. While this approach improves accessibility and flexibility, it introduces additional dependencies on public Internet infrastructure, including exposure to varying performance, security risks, and external service providers.

2.175 The requirements of CIA while using interent was explained to the Meeting. It was added that, given the reliance on public Internet infrastructure, cross-border coordination is essential to ensure a timely response to incidents affecting inter-State communications. The Meeting discussed and reviewed the proposal for requirements for public Internet-based connectivity for interstate aeronautical communication. The procedure to validate the secure network configuration was explained at the Meeting.

Update on Cyber-Safety/Security and Resilience – New Zealand (WP/36)

2.176 New Zealand presented details on implementing a resilient CRV network connectivity. It was noted that several packages have been created to provide resilience in CRV. Whilst PCCWG is responsible for circuit and NID installations, CRV Users can nominate their preferred last-mile services and ask PCCWG to verify service diversity during provisioning. Leveraging account relationships for resilience was encouraged.

2.177 The Meeting noted that an overview drawing is located in the CRV portal - CRV-PCCW Overall Diagram.pptx to check on what Points of Presence (PoP) are available. It was informed that for internal networks with single circuit/NID installations, users can leverage internal LAN/WAN diversity and resilience for failover capability.

2.178 For Business-to-Business connections (B2B), it was clarified that they are internet-based connections that use IPSEC VPN technology to secure the end-to-end connection, outside of CRV and not provided by PCCWG. Usually implemented with agreement between peering users, B2B can provide limited functionality in the event of a failure. It was noted that Australia and the United States are using B2B as a redundant option to CRV. It was highlighted that the implementation of resiliency in the last mile is for each CRV User to determine, usually based on risk to service and cost-benefit.

2.179 The Meeting was requested to do an internal assessment of using CRV for several years and propose if there are more packages that can be designed to enhance the resilience.

CANSO Cyber Security Assessment of CRV – New Zealand (WP/37)

2.180 This paper shared the assessment done by New Zealand for the CRV OG using the CANSO Standard of Excellence in Cyber Security. It was recalled that the CANSO Standard of Excellence in Cyber Security, endorsed by ACSICG/12 for adoption of CNS SG/29, was adopted by CNS SG/29. The agreed maturity level for CRV was Level C – Managed.

2.181 The Meeting discussed the CANSO cybersecurity assessment and its application to CRV from the CRV OG perspective. It was recognised that the CRV OG Ad-hoc Expert group needs to discuss how to conduct a cybersecurity assessment of the CRV on behalf of CRV OG, using the CANSO Standard of Excellence in Cyber Security. It was suggested that further updates on outcomes of the discussion be shared with the CRV OG/16 Meeting. **ACTION ITEM 15-60**

2.182 The Meeting also requested the CRV service provider to conduct the assessment and provide updates accordingly. It was clarified that the outcomes of the assessment are not required to be shared. Instead, the CRV service provider is expected to confirm that the assessment has been carried out and that all identified gaps are being appropriately addressed. **ACTION ITEM 15-61**

Review of CRV OG ToR and Action Items – Sec (WP/29)

2.183 The Meeting reviewed the ToR of CRV OG and further updated the Action Items for CRV OG. There were no updates in the ToR of CRV OG.

Date and Venue for the Next Meeting

2.184 The next Meeting will be held in **the first week of March 2027**. Any States/Administrations interested in hosting the Meeting may contact the ICAO APAC Office to discuss hosting at least 4 months in advance of the Meeting. The exact dates and venue will be communicated to the Member States in due course.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the outcomes of CRV OG/15 and take any necessary follow-up actions;

b) note these outcomes need to be reviewed by the ACSICG/14 Meeting; and

c) discuss any relevant matter as appropriate

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