



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE**

**REPORT OF
TWELFTH MEETING OF THE COMMON AERONAUTICAL VIRTUAL
PRIVATE NETWORK OPERATIONS GROUP
(CRV OG/12)**

*Denarau Island, Fiji
(23-26 January 2024)*

The views expressed in this Report should be taken as those of
the Meeting and not the Organization.

Approved by the Meeting and published by the ICAO Asia and Pacific Office, Bangkok

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1. Introduction

1.1 The Twelfth Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/12) was held *from 23 to 26 January 2024* in Denarau Island, Fiji.

2. Attendance

2.1 The Meeting was attended by **66** participants from **18** Member States/Administrations, namely Australia, Cook Island, Fiji, France, Hong Kong China, Indonesia, Japan, Kiribati, New Zealand, Pakistan, Philippines, Republic of Korea, Samoa, Singapore, Thailand, Tonga, USA, and Vietnam, and 1 telecommunication provider namely PCCW Global. The list of participants is provided in **Attachment 1**.

3. Opening of the Meeting

3.1 The opening ceremony of the Meeting was organized as per the program published on the [Meeting Webpage](#). The Meeting was opened by **Mr. Mesake Seavula Nawari, Chief Executive Officer (CEO), Fiji Airports**. Subsequently, Ms. Soniya Nibhani, Regional Officer, ANS (CNS) Implementation, ICAO APAC Office, Mr. Vaughan Hickford, Manager Enterprise Architecture and Network, Airways New Zealand, CRV OG Co-Chair (Asia) and Mr. Kelepi Dainaki, General Manager, Asset and Infrastructure, Fiji Airport Limited, CRV OG Co-Chair (Pacific) shared their welcome remarks. In addition, the ICAO Secretariat and CRV OG Co-chair (Asia) shared their sincere gratitude to Fiji Airports for hosting the CRV OG/12 Meeting.

4. Officers and Secretariat

4.1 Mr. Vaughan Hickford, Manager Enterprise Architecture and Network, Airways New Zealand, CRV OG Co-Chair (Asia) and Mr. Kelepi Dainaki, General Manager, Asset and Infrastructure, Fiji Airport Limited, chaired the Meeting.

4.2 Ms. Soniya Nibhani, Regional Officer ANS (CNS) Implementation, acted as the Secretary of the Meeting with the support of Ms. Zhong Wenhan, Regional Officer CNS and Ms. Varapan Meefuengsart, the Programme Assistant from ICAO Asia and Pacific Regional Office.

5. Organization, Working Arrangements and Language

5.1 The CRV OG/12 met as a single body during the Meeting. The working language for the Meeting was English, inclusive of all documentation and this Report. The Meeting considered **Twenty-seven (27)** Working Papers, **Nine (9)** Information Papers, and **Two (2)** Presentations under its fifteen agenda items. A List of Working Papers, Information Papers, and other resources is provided in **Attachment 2**.

6. Conclusions/Decisions - Definition

6.1 The CRV OG of APANPIRG records its actions in the form of Draft Conclusions, Draft Decisions, and Decisions with the following significance:

- a) **Draft Conclusions** deal with matters which, in accordance with the Sub-Group's Terms of Reference, require the attention of States/Organization or actions by ICAO in accordance with established procedures;
- b) **Draft Decisions** relate solely to matters dealing with the internal working arrangements of APANPIRG and its contributory bodies; and

- c) **Decisions** relate solely to matters dealing with the internal working arrangement of the CRV OG.

Agenda Item 1: Adoption of Agenda*Adoption of Agenda - Sec (WP/01)*

1.1 The tentative agenda items presented in **WP/01** were adopted as the agenda for the Meeting.

Agenda Item 2: Review outcomes of relevant Meetings*Review of Relevant Meetings - Sec (WP/02)*

2.1 The paper summarized relevant information and updates with the highlight on the reviewed outcomes of the CRV OG/11, ACSICG/10, SWIM TF/7, SWIM TF/8, SURSG/3, and relevant discussions of other Meetings, including the CNS SG/27 and the APANPIRG/34.

2.2 The CNS SG/27 Meeting adopted **Eight** (8) Conclusions and **Two** (2) Decisions. In addition, based on the outcome of discussions on various agenda items, the CNS SG/27 Meeting developed **Three** (3) Draft Conclusions for consideration by the APANPIRG/34, which was adopted by the APANPIRG/34 Meeting. The Meeting noted the Conclusions/Decisions adopted by the CNS SG/27 and the APANPIRG/34 and discussed the follow-up.

2.3 The Meeting requested that States/Administrations exchanging IWXXM data and/or FIXM data on CRV share their experience with bandwidth utilization to understand potential bandwidth requirements. Singapore informed that bandwidth utilization is not high based on their experience of sharing IWXXM data on CRV Package A, 2 Mbps. Hong Kong China reported that their bandwidth utilization for IWXXM data is also moderate. It was added that Hong Kong China had provided further analysis of bandwidth utilization by WP/21 in this Meeting.

2.4 The Meeting proposed that PCCWG share periodic Reports on CRV bandwidth utilization with CRV OG. Additional discussions were held to compute potential bandwidth requirements of CRV for future operations. PCCWG shared that the SWIM over CRV demonstrations and Surveillance data over the SWIM trial are planned to be conducted in Q1-Q2 2024 in Hong Kong China as a joint event. A total of 15 APAC Member States/Administrations are participating in the trial. This collaborative event is expected to support estimating bandwidth requirements for various SWIM services. The Meeting agreed that PCCWG will provide quarterly bandwidth utilization reports to the CRV OG Ad-hoc expert group as a periodic update. **ACTION ITEM 12-1** The CRV OG Ad-hoc expert group will continue to analyze the data and in case of any observations, they will be brought to the attention of the CRV OG meeting.

58th APAC DGCA Conference Action Items on CRV – Sec (WP/03)

2.5 The paper presented the Air Navigation (ANS) related Action Items of the 58th Conference of Directors General of Civil Aviation Asia and Pacific Regions (DGCA/58) for review and action by the Meeting. The DGCA/58, hosted by the Civil Aviation Authority of Bangladesh, was held in Dhaka, Bangladesh from 15 to 19 October 2023. The Meeting noted that the Conference formulated 51 Action Items and one action item, 58/23, related to CRV. By action item 58/23, the Conference urged States/Administrations to implement CRV by December 2023 and encouraged Pacific States to work with their partner States to facilitate CRV connectivity. The Meeting was suggested to review and take proper action on the Action Items related to CRV/Air Navigation derived from the DGCA/58 and identify Air Navigation issues, if any, that need to be brought to the attention of the DGCA/59 in 2024.

Outcomes of CRV Seminar for the Pacific States - Sec (WP/25)

2.6 The Meeting reviewed the outcomes of the CRV Seminar for the Pacific States held on 22 January 2024 on Denarau Island, Fiji. The Seminar was attended by 46 participants from 15

States/Administrations and 1 telecommunication provider. A total of **Four (4)** presentations and **One (1)** Information Paper were delivered by CRV experts from New Zealand, Fiji, PCCWG, Tonga, and ICAO also presented Information Papers on current connections, servers, issues and desired enhancements, and GANP ASBU implementations respectively. The seminar report, presentations, and other resources can be accessed by the following link: <https://www.icao.int/APAC/Meetings/Pages/2024-CRV-Seminar-and-CRV-OG-12.aspx>.

2.7 In the Seminar, PCCWG shared the list of Pacific Islands and PASNET project details. PCCWG presented the price for CRV packages for all Pacific Islands and shared their new offer and technical equipment details to encourage Pacific States to join CRV.

2.8 The Meeting noted that, in the new offer, there is a monthly cost reduction of about 50% and in three tiers, the cost will be reduced further based on the number of sites committed to joining CRV and signing service orders before 30 April 2024. PCCWG informed that they require an additional 6-7 months for CRV circuit installation as different sites have different requirements such as import licenses or other regulations to comply.

2.9 The Meeting discussed whether the proposed deadline to share the decision with PCCWG and sign the service order before 30 April 2024 is acceptable and achievable by the Pacific States. Cook Island, Samoa, and Tonga shared their strong intention to join CRV and that they should be able to sign service orders with PCCWG before **30 April 2024**. Additionally, ICAO has deployed a PSIDS Liaison officer who can support Pacific States throughout the CRV implementation process.

ICAO IPS Roadmap – USA (IP/03)

2.10 The paper presented a compilation of the ICAO documents to be published related to AFS implementation in the region. The Meeting was informed that various ICAO panels are developing numerous documents, technical manuals, and guidance material to enhance IPS. Communication Panel (CP) WG-I is finalizing IPv6 address assignment and IPv6 address access in 2024 to document in ICAO Doc. 9896 Ed. 3, while the Trust Framework Panel also develops several security documents, which may be available after 2024. It was recommended that the ICAO regional office obtain these documents, when available, for members to analyze and comment on as needed. The CRV OG was recommended to review these documents to determine impacts on the current CRV network, if any.

2.11 The Meeting appreciated USA's efforts to share comprehensive information about various AFS documentation. In response to a question, the ICAO secretariat informed that all documents drafted by various ICAO HQ Panels can be accessed on the [ICAO Secure portal](#) under the group webpage. It was reported that States/Administrations can request access to multiple groups on the secure portal.

Agenda Item 3: CRV OG Reference documents

ICAO ATN/AMHS Guidance Document Tree – Sec (WP/04)

3.1 The paper presented progress on the update of the ICAO ATN/AMHS Guidance Document Tree. The Meeting noted that the ATN Documentation Tree, which was referred to as *the first snapshot of the Tree* in the CRV OG/11 meeting, has been reviewed and adopted by ACSICG/10 and CNS SG/27 meetings through **Conclusion CNS SG/27/01 (ACSICG/10/01) – Adoption of the Asia/Pacific Regional ATN Documentation Tree**. It was agreed that ACSICG/CRV OG will update the Tree every year based on the latest development of relevant ICAO documents mentioned in the ATN Documentation Tree.

3.2 The Meeting was informed that the ICAO Secretariat had taken necessary action to update the ATN Documentation Tree on the [ICAO APAC Regional Implementation Projects webpage](#). However, after coordination with the ICAO APAC IT team, it was found that the ICAO IT team can

only change the name and version of existing documents in the Tree but cannot add/remove any branches from the Tree. To take necessary action to upload the Tree on the ICAO webpage, the ICAO IT team is working on alternatives with HQ and finding a placeholder to upload the Tree for member states' access.

3.3 The Meeting reviewed the Tree and observed that additional improvements are needed under the CRV documents section. The Meeting acknowledged the need to maintain and update the Tree in a timely manner as it provides guidance and reference to Member States for applicable documents prepared by ACSICG/CRV OG/ICAO and understand the relationship among them. The Meeting shared the concern of keeping the link to some documents provided in the Tree on the public portal because some documents, such as CRV routing policy/address, contain sensitive information. The Meeting agreed that the CRV OG Ad-hoc Expert group would review and present the revised Tree to the next CRV OG meeting for review and endorsement. **ACTION ITEM 12-2** The Meeting advised sharing the Tree with ACSICG for further review and modifications for AMHS and other relevant AFS sections. **ACTION ITEM 12-3** Additionally, it was suggested to keep the Tree on the ICAO Secure portal or New Zealand hosted CRV portal.

CRV New Service Implementation Process - USA (WP/13)

3.4 The paper presented the process for members with CRV services in operation and plans to add more connections/services to other new or existing CRV users. USA informed that as an action item owner for the task resulting from the CRV OG Ad-Hoc Expert Group, USA prepared the list of processes based on its experience in implementing new services with Indonesia and Papua New Guinea. USA added that the process will be incorporated into the CRV Operations Manual after agreement on the process. Furthermore, it was recommended that users coordinate with PCCW Global technical staff during the testing and cutover of the new service. The Meeting discussed and reviewed the process for implementing new services in CRV for AMHS and VoIP services, incorporating them in the CRV OG Operations Manual, and developing the process for new service connections in CRV.

3.5 The Meeting mentioned that WP/15 and WP/13 complement each other. The difference is that WP/13 describes the process for existing CRV users. The Meeting suggested that the CRV OG Ad-hoc Expert group develop **the process for testing new SWIM services** following the procedure mentioned in **Appendix A**. **ACTION ITEM 12-4** Singapore suggested incorporating standard compression methods while adding the process into the CRV OG Operations Manual's design section along with additional guidance for VoIP compression, such as recommended standards by CRV OG.

Outcomes of Ad-hoc Group Meetings – New Zealand (WP/14)

3.6 The paper summarized the outcomes of the CRV OG Ad-Hoc Expert Group discussions. The Meeting noted three Ad-hoc virtual meetings were held between CRV OG/11 and CRV OG/12 via Microsoft TEAMS. In addition, the Ad-hoc group also met with SWIM TF TLs quarterly. It was informed that the outcomes of Joint CRV OG Ad-hoc Expert and SWIM TF TLs Meetings, CRV OG Ad-hoc Governance Group, and other significant outcomes are being discussed by various papers under fifteen agenda items in this Meeting. The Meeting noted the work of the Ad Hoc Expert Group continues to be extremely valuable, appreciated the ongoing contribution, and invited participation to the Ad-hoc group meetings.

Adding A New Service to CRV - New Zealand (WP/15)

3.7 The paper discussed the steps required to add a new service to the CRV Network. Reference was shared from *Section 5.1.1 – Requirements, Section 5.1.2 - Criteria, Section 6.5 - Service Validation and Testing Management, and Section 6.4 - Release and Deployment Management* of the CRV OG Operations Manual. The Meeting noted that *Section 6.4 - Release and Deployment Management* needs to be modified to cover how to bring services into operation. The Meeting noted that *Section 5.1.2 Criteria* to add a new service was written from the point of view of adding parties

external to the ANSP, such as Aireon or the PCCWG console connect platform. However, it must be modified to include other services like SWIM. The first draft of the procedure prepared by the CRV OG Ad-hoc Expert group was presented to the Meeting to review the process of adding a new service to the CRV Network. The Meeting deliberated the process and observed that the process required further modifications. The following modifications/additions were suggested by the Meeting to improve the drafted process further:

1. To assess the feasibility of a Service Provider / Service Consumer (SPSC) connecting to the CRV, the list of parameters provided in a(ii) of the process needs to be reviewed and amended to accommodate other potential required parameters.
2. A process and procedure to test a new service on the CRV network need to be drafted.
3. Further discussion is needed for the required class of SWIM services.
4. The feasibility of testing a new SWIM service first on the test GRE tunnel and after successful testing on the test GRE tunnel, its transfer over to the operational GRE tunnel needs further deliberations.
5. The number of GRE tunnels for each SWIM service may not be feasible.
6. Further discussion is required for IP assignments and their grouping.
7. Currently, in the System Design Document (SDD), the QoS of SWIM services is not mentioned, requiring further action.

3.8 The Meeting requested that the CRV OG Ad-hoc Expert group modify the process provided in **Appendix B** to incorporate various discussions and suggestions shared during the Meeting in the abovementioned section. **ACTION ITEM 12-5**

CRV OG Operations Manual Status - New Zealand (WP/16)

3.9 New Zealand presented the status of the current draft of the CRV OG Operations Manual. The Meeting was informed that since the last publication of the CRV OG Operations Manual, there have been many updates, including those coming from the CRV OG Ad Hoc Groups. The updates on the Service Design Section and Definition Section were explained in detail.

3.10 With the abovementioned, the Meeting agreed to publish the CRV OG Operations Manual v1.3 (CRV OG OM v1.3) and adopted the following Decision.

Decision CRV OG/12/01 - Publish the updated APAC CRV Operations Manual		
What: The current Draft of the APAC CRV Operations Manual is ready for publication as CRV OG OM v1.3 following updates from the Ad Hoc groups.		Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: Ongoing improvements to the documentation supporting the APAC CRV network	Follow-up: <input type="checkbox"/> Required from States	
When: 26-Jan-24	Status: Adopted by CRV OG	
Who: <input type="checkbox"/> Sub groups <input type="checkbox"/> APAC States <input type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Other: CRV OG		

3.11 The latest version of the CRV OG Operational Manual will be published on [ICAO APAC e-docs](#) under CNS, [ICAO APAC CRV Secure portal](#), and on the [CRV portal](#) hosted by Airways New Zealand. **ACTION ITEM 12-6**

CRV Implementation Plan – IP Address Block Allocated to CRV Users – Singapore (WP/17)

3.12 Singapore updated the latest status of the Internet Protocol (IP) address block allocated to CRV Users -Industry. The Meeting recalled that the CRV OG/8 meeting agreed to use one vacant /19 IP address block from the Asia Pacific region IPv4 addressing scheme to allocate IP addresses to CRV Users - Industries. Each CRV User - Industry can be assigned 254, 510, 764 or 1022 usable network addresses depending on its technical specifications. To date, two (2) CRV Users - Industries are providing services over the CRV, i.e., AIREON LLC and PCCW Global. Each CRV User-Industry was allocated one /24 (i.e., 254 usable network addresses) IP address block. Hence, there are thirty available /24 IP address blocks that CRV OG can assign to CRV Users.

3.13 To better manage and forecast if the existing IP address blocks are sufficient, the Meeting was requested to update CRV OG if there are new CRV Users - Industries intending to provide services over the CRV that need to be assigned IP address blocks. The Meeting also requested that all Air Navigation Service Providers (ANSPs) monitor and inform if the allocated IP address block is sufficient. The Meeting noted that as of today, no additional industries have requested to join CRV and there are no issues with the number of IP addresses in any ANSP.

National and Local CRV Points of Contacts - New Zealand (WP/18)

3.14 The paper discussed the National and Local Points of contact. The Meeting noted that there is a need to clarify the National and Local CRV Points of Contact and how they relate to the CRV OG. The Meeting noted that there may be many local points of contact for CRV users from a State. However, the national point of contact should be one from ANSPs, which could potentially increase the workload for national contact. It means that the CRV Operations Group meetings should be attended by the National CRV Point of Contact who represents their organization and the State and all CRV users for that State, including CRV User - Industry. The responsibilities of both the National and Local CRV Points of contact were summarized.

3.15 Singapore suggested modifying the local and national point of contact responsibilities mentioned in CRV OG OM to accommodate the new CRV user's definition. Accordingly, the CRV Implementation plan may need further modifications to accommodate new CRV users definition. The Meeting requested that the CRV OG Ad-hoc Expert group incorporate this task into their agenda items.

ACTION ITEM 12-7

Agenda Item 4: CRV Governance

Outcomes of Ad-Hoc Governance Meetings - New Zealand (WP/20)

4.1 New Zealand presented outcomes of the CRV OG Ad Hoc Governance meetings, held twice since its creation from the 2023 CRV Governance Workshop held in ICAO APAC Office, Bangkok on 31 January 2023. The Meeting noted that in the last two meetings, the Ad Hoc Governance group had adopted its Terms of Reference, discussed the Governance Models of REDDIG II and New PENS to understand other regional network's governance models, and resolved the problem, a problem Statement is being drafted.

Outcomes of Third Ad-Hoc Governance Meetings

4.2 The third Meeting of the CRV OG Ad-hoc governance group was conducted on 24 January 2024. The Meeting observed that after the second Ad-hoc Governance meeting, States/Administrations were requested to share a list of daily, weekly, monthly, annual, or any other periodic tasks related to CRV performed in their States/Administrations. In response, only five States/Administrations shared their responses. Based on the response analysis, the problem statement

has been revised. However, information from other States/Administrations must be taken into consideration for further analysis.

4.3 The Meeting requested that all States/Administrations that have not submitted the response should submit the response on priority. ICAO Secretariat will share the information requested and templates with all CRV National and local Points of contact along with CRV OG/12 participants before **2 February 2024**. **ACTION ITEM 12-8** All States/Administrations already utilizing CRV will submit the list of tasks in the requested template to the ICAO Secretariat before **31 March 2024**. **ACTION ITEM 12-9** The fourth meeting of CRV OG Ad-hoc governance group will be conducted on **24 April 2024 or 3 May 2024** from 0800-1000 AM Bangkok time. ICAO Secretariat will share a doodle with all CRV OG Ad-hoc governance group experts to finalize the date. **ACTION ITEM 12-10** The latest draft of the problem statement is provided in **Appendix C**.

Agenda Item 5: New Zealand hosted CRV Portal management

Number of Subscribers to the New Zealand Hosted CRV Portal - New Zealand (WP/19)

5.1 New Zealand shared information about the New Zealand hosted CRV Portal access. During the Meeting, it was informed that on June 2023, there were 115 subscribers to the CRV Portal, significantly more than the current members of the CRV OG. An email was sent to all subscribers in June 2023 requesting a maximum of two nominations, and after the response, 47 subscribers were removed from the portal. The Meeting noted future access to the portal would be limited to **three per State for the National CRV Point of Contact, the Nominated deputy to the National CRV Point of Contact, and the person responsible for updating the Asia-Pac Telecommunication Infrastructure Routing Plan**.

5.2 The Meeting requested that the States/Administration share information about the latest CRV focal point to access the portal to CRV OG Co-chairs/ICAO Secretariat in a timely manner. ICAO Secretariat will share the list of users having access to the CRV portal with all States/Administrations before **2 February 2024** for updates. **ACTION ITEM 12-11** All States/Administration will share the **updated list of a maximum of three users** to get access to the portal before **29 February 2024**. **ACTION ITEM 12-12**

Agenda Item 6: Review and Update the APAC CRV Implementation Table

Update the APAC CRV Implementation Table - Sec (WP/10)

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

- **Under Operation**

Australia, Bhutan, China, Hong Kong China, Fiji, India, Indonesia, Japan, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Philippines, PNG, Republic of Korea, Singapore, Thailand, and the USA.

- **Under Provisioning**

French Polynesia, Macau China, New Caledonia, Myanmar, Sri Lanka, Vietnam

- **Hot Prospects in 2024**

Bangladesh, Brunei, Cambodia, Lao PDR, and Maldives

- **Not joined yet**

Afghanistan, DPRK, Kiribati, Marshal Islands, Micronesia, Nauru, Palau, Samoa, Solomon Islands, Timor Leste, Tonga, Tuvalu, Vanuatu, Russia, ICAO MID States

6.2 The Meeting reviewed and updated the APAC CRV Implementation Table. The updated CRV Implementation Table is provided in **Appendix D** of the Report.

Agenda Item 7: CRV contract management

7.1 Due to the confidentiality of the CRV contract management process, the report under this agenda is published on the [ICAO APAC CRV Secure portal](#) under the CRV group.

Agenda Item 8: CRV operational performance report

CRV Network Yearly Service Review 2023 - PCCWG (Presentation/02)

8.1 PCCWG shared the Latest CRV Updates and CRV Network Yearly Service Review for 2023. The Meeting was informed about the 2023 Ticket Summary by Ticket Type and their overview. PCCWG informed that there are 72 circuits in 39 cities with different CRV Packages, A, B+, C+, C, D+, and D. There are two service providers in the CRV network and 12 circuits are under implementation. It was further informed that 4 Member States are joining CRV in 2024: Bangladesh, Brunei, Lao PDR, and Maldives.

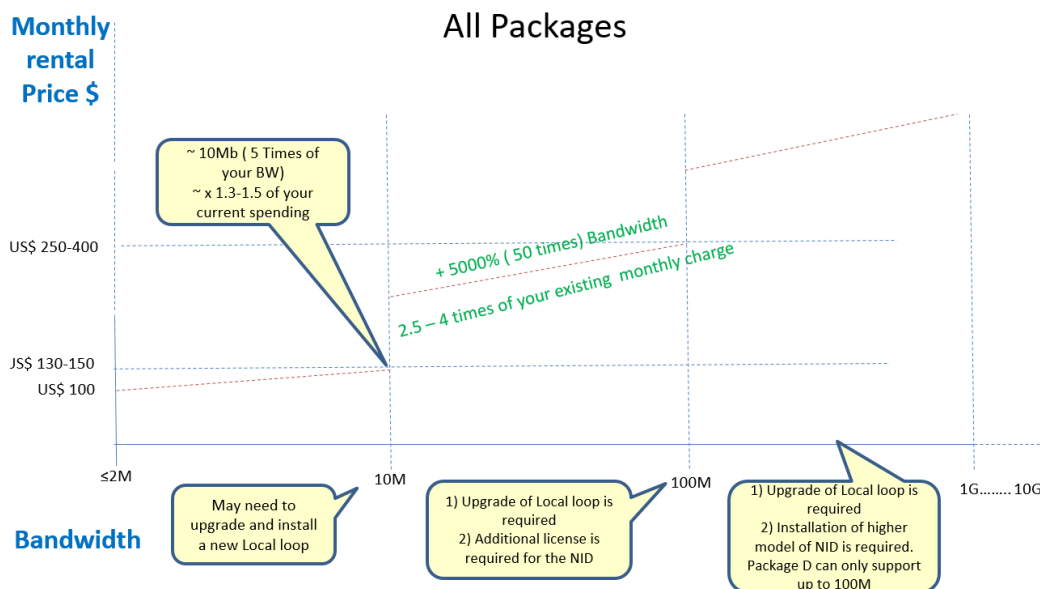
Monitoring and Analyzing CRV Network Traffic in Hong Kong, China (WP/21)

8.2 The paper introduced the CRV network traffic capturing equipment deployed in Hong Kong, China, and presented the insights and analysis derived from the captured network traffic. Hong Kong, China informed that in January 2024, Hong Kong, China implemented a CRV network traffic capturing equipment and conducted an initial analysis between 8 and 14 January 2024. From the findings and initial analysis, the Meeting noted that the statistical data provided indicates that bandwidth utilization in Hong Kong, China is relatively low. Moreover, the size of the IWXXM files exchanged with Hong Kong, China is not significant enough to warrant immediate attention. Therefore, given the current bandwidth allocation of 1,440kbps for AMHS/CRV, there is no immediate need to upgrade bandwidth capacity, assuming no significant changes in bandwidth usage patterns in the near future. Hong Kong, China, informed that they will maintain the capturing equipment to monitor CRV network traffic and conduct further analysis, mainly as more high-volume applications are gradually brought into CRV.

8.3 The Meeting noted that in WP/27, the bandwidth utilization report shared by PCCWG is an average bandwidth, which is not accurate in analyzing the sufficiency of CRV bandwidth contracted by each Member State. PCCWG informed that their platform cannot share information about peak bandwidth. The Meeting agreed that the initiative by Hong Kong, China is excellent for understanding and analyzing CRV network traffic. The Meeting encouraged other States/Administrations using CRV to conduct such experiments and share their experience in conducting similar CRV network traffic monitoring and analysis.

Bandwidth Extension of CRV to Meet Future Requirements - PCCWG (WP/23)

8.4 PCCWG shared that various States/Administrations raised concerns to PCCWG on bandwidth capacity limitation to match future SWIM applications that might consume large amounts of data in SWIM TF meetings. The SWIM TF meeting has requested that CRV OG consider deliberating the possibility of enhancing CRV bandwidth and the associated cost optimization to support operational SWIM implementation over CRV. PCCWG shared that bandwidth up to 2M has been quoted in the tender in 2015 to suit the initial requirement to build the CRV network. Other than the 2M options mentioned in the PCCWG price book, more pricing and bandwidth options can be provided for States/Administrations' consideration on request. As a rule of thumb, PCCWG presented the following diagram, clarifying the bandwidth upgrade cost concept.



8.5 The Meeting requested that Member States/Administrations review the CRV bandwidth requirement and estimate the cost based on the conceptual diagram provided in the figure. States/Administrations may contact PCCWG directly for further commercial discussion as needed.

CRV Bandwidth Utilization Rate – PCCWG (WP/27)

8.6 PCCWG presented the bandwidth utilization of each Member State/Administration in 2023. The Bandwidth Utilization Report aimed to understand how network bandwidth is utilized within the organization. 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 utilization rate cannot share peak bandwidth utilization. Member States/Administrations were requested to make additional efforts to measure and monitor CRV network performance and share it with CRV OG regularly.

Agenda Item 9: States CRV Implementation

CRV Implementation Status and Future Plans in Japan (IP/02)

9.1 The paper presented the latest progress and plans for CRV implementation in Japan. The Meeting noted that Japan has successfully established AMHS/AIDC data exchange and voice communication connections with various Member States/Administrations using the CRV network. Japan shared the intention to expand the contracted circuit bandwidth of the CRV to accommodate the increase in AMHS data traffic and the implementation of SWIM services. However, it appears that when contracting with PCCW for bandwidth over 10 Mbps, it will be necessary for the CRV/OG and PCCW to agree on a suitable price acceptable to each Member State/Administration instead of determining the price separately between a Member State/Administration and PCCW. The Meeting noted that WP/23 shared by PCCWG provided a conceptual diagram to estimate a price range for bandwidth over 10 Mbps that would be helpful to States/Administrations to determine the price.

Voice and DATA Implementation Status in Republic of Korea (IP/04)

9.2 The paper presented the current status of Air Communication Services (Voice, Data) implemented on CRV and the operational issues in ROK. The CRV migration plans of Voice and AIDC were shared. Furthermore, ROK introduced its AFTN/AMHS Disaster Recovery (DR) Center relocation project to relocate the DR Center of AFTN/AMHS to Incheon ACC to secure its geographical

separation from the main site, which is expected to be commenced in April 2024 and completed in June 2024. The Meeting noted that ROK will continue to discuss related matters with ANSP (China, Japan) and PCCW to relocate the AFTN/AMHS DR Center. Additionally, the current status of CRV use for data/voice between the ROK and China and between the ROK and Japan was shared with the Meeting. The Meeting noted that the bandwidth utilization shared is an average bandwidth utilization.

Progress of CRV Implementation in Pakistan (IP/05)

9.3 The paper provided updated information about the implementation of CRV in Pakistan and current/future Bandwidth requirements. The Meeting was informed that Pakistan had signed a contract with CRV Service Provider (PCCW Global) in December 2022. The connectivity with India over the CRV network has been successfully established, while tests/trials with China are in progress. Once Afghanistan agrees, the AFTN/AMHS link between Karachi and Kabul will be shifted to CRV. The AFTN/AMHS data and voice connectivity over the CRV network with states located in the CRV MID – region, i.e., Iran, Oman and Kuwait, will be established as soon as deemed suitable by respective states. Pakistan informed that in the future, it may consider upgrading the CRV subscription to a higher package to meet the anticipated requirement of enhanced bandwidth and to increase the redundancy and reliability of existing links operating on the CRV network.

Further Enhancing Aeronautical Network Connectivity in Hong Kong, China Via CRV Implementation (IP/06)

9.4 Hong Kong China informed that it has been proactively transitioning its aeronautical network connectivity to CRV operations, progressively replacing legacy connections with other aeronautical network centers. The paper highlighted the upcoming plan for Hong Kong, China, to enhance aeronautical network connectivity further and the need for contingency measures to cope with the unlikely event of a complete CRV outage. Hong Kong China shared its CRV Implementation plan with Macao, China and Hochiminh, Vietnam. The Meeting noted that Hong Kong China has implemented an AFTN to email gateway to consider contingency measures in the unlikely event of a CRV total outage, enabling the transmission of AFTN messages to other overseas aeronautical network centers via email, which ensures that minimal operations can be sustained even during a CRV outage.

9.5 CRV OG Co-chair (Pacific) shared the importance of considering contingency and suggested keeping B2B internet as a contingency. The USA informed it has B2B internet connectivity with Australia as a contingency management arrangement.

Australia CRV Implementation Update (IP/07)

9.6 The paper provided a comprehensive overview of Australia's progress within CRV, which detailed the successful migration of services to the CRV with 5 States and provided an update on the current connection status with AirNav Indonesia. Furthermore, the Meeting was updated on changes to Airservices Australia's VoIP gateways and how they affect its CRV intercom partners. The Meeting noted that Airservices' initiatives will continue to enhance operational efficiency and elevate the reliability of our communication systems.

9.7 It was observed that many CRV users are transmitting surveillance data over CRV, such as Space-based ADS-B data by Airion, Radar data by Hong Kong China and ADS-B data by Australia. The Meeting suggested that States/Administrations observe and share information about surveillance data bandwidth utilization so that the CRV OG Ad-hoc Expert group can analyze the estimation of surveillance data bandwidth requirements.

Progress of CRV Implementation in Sri Lanka (IP/08)

9.8 The paper presented the current status of CRV migration and adaptation in Sri Lanka. With the cost-benefit analysis of three options for CRV implementation plans, the Meeting noted that Option 3, to obtain a single Package D and an independent VPN with Mumbai, is economically feasible and reliable, which will replace all the existing IPLC connections for AMHS. It was further informed that the implementation timeline for the CRV migration with Option 3 is Q2 2024. Additionally, the Meeting was informed that discussions are requested to implement switching between the CRV Network and the Independent VPN at the IP level in a CRV failure.

Current Status of CRV Implementation in Indonesia (IP/09)

9.9 Indonesia updated meeting the current status of CRV implementation in Indonesia. The Meeting was informed that since the first quarter of 2023, Indonesia and the adjacent states have arranged further coordination to establish their connection for related applications. Indonesia introduced the status of AMHS connection over CRV with Singapore and Australia and the progress of voice connection over CRV with Singapore, Australia, Malaysia, Philippines, Papua New Guinea, and USA. The Meeting noted that other voice and data connections with adjacent FIRs are also expected to use CRV in the future.

Agenda Item 10: Review the requirement of CRV for SWIM

- **Subscriber**
- **GEMS**
- **ANSP**

Outcomes of Joint CRV OG Experts and SWIM TF TLS Meetings – New Zealand (WP/22)

10.1 The paper presented an update on the meetings between the CRV OG Experts and the SWIM Taskforce Team Leads. The joint CRV OG experts and SWIM TF TLS meetings occurred three times in 2023, on 22 February, 23 June, and 5 October 2023 via TEAMS. The outcomes of the discussions regarding the SWIM principally over CRV, PCCWG Console Connect Aviation Platform, CRV OG and SWIM TF Working Together, and CRV Governance were introduced. The Meeting requested more States/Administrations to contribute to the CRV OG Ad-hoc Governance/Experts Group.

10.2 The Meeting also discussed the Enterprise Messaging Service hierarchy architecture being used in the joint event. The PCCWG shared information about an overview of EMS hierarchy architecture over Pseudo CRV, which is provided in **Appendix F**.

The collection of CRV Requirements- New Zealand (WP/25)

10.3 The Meeting conferred the expectations of SWIM TF from CRV OG regarding CRV network requirements for providing SWIM services over CRV. The new CRV contract management process also needs CRV requirements to accommodate other future services. The Meeting recalled that discussions at the various CRV OG and CRV OG Ad Hoc meetings have raised the necessity of knowing the new application requirements for connecting to the CRV network. Out of many parameters, bandwidth has been the primary concern.

10.4 The CRV Operations Manual has specific parameters for the CRV network performance, such as bandwidth, latency, jitter, packet loss, QoS and connectivity. To ensure new services and applications provide the CRV OG with sufficient information to decide on any potential changes to the CRV Network, CRV OG needs the application owner to give details. Due to SWIM TF and CRV OG's dependency on each other's information, the discussion is not progressing well.

10.5 To further progress the discussion, CRV OG/12 Meeting developed the first draft of a form, provided in **Appendix G**, to describe the parameters that the CRV Network performs under, validation from the application or service owner that these parameters are acceptable or not and if not acceptable, the application or service owner is to provide in detail what is required.

10.6 The Meeting agreed that first draft of the form will be sent to the Ad Hoc Expert Design Group before **31 January 2024** for comment and feedback. **ACTION ITEM 12-19** The ICAO Secretariat will share the draft form with the SWIM Task Force Task Leads for filling in the form and for comment and feedback. **ACTION ITEM 12-20** CRV OG Ad-hoc Expert Group will review the duly filled form in the April 2024 Meeting. **ACTION ITEM 12-21**

10.7 Based on the information shared in the form and outcomes of the joint event (trial/demo), “**CRV data requirements for SWIM Workshop**” is planned to be hosted by the USA in late August/September 2024. The workshop was recommended to be attended by CRV OG Experts and SWIM TF Task Leads. The workshop objectives would be to review the outcomes of the joint event, analyze CRV performance and other crucial information to finalize the list of requirements and other technical specifications for the new CRV contract management process. The ICAO Secretariat will share the exact date, venue, and detailed agenda information about the workshop as soon as it is finalized. **ACTION ITEM 12-22**

10.8 CRV OG Co-Chair (Pacific) suggested sharing the *Proof of Concept test document* of CRV with SWIM TF to understand CRV's performance and capabilities by SWIM TF. **ACTION ITEM 12-23**

Agenda Item 11: MPLS/IP based inter-regional connection

MPLS/IP Based Inter-Regional Connection – Sec (WP/05)

11.1 The paper provided the current discussion status for the potential interconnection of CRV and REDDIG II and CRV and New PENS.

11.2 The Meeting recalled the efforts made for CRV and REDDIG II Interconnection and noted that the ICAO APAC Office has requested PCCW Global contact Cirion Technologies to discuss the interconnection proposal. However, despite several coordination in 2023, no concert technical proposal is ready to work further for CRV and REDDIG II interconnection.

11.3 After analysis of the issues, it seems that in the current CRV/REDDIG II contract, no clause requires PCCW Global/Cirion Technologies to establish interconnection with different regional networks. However, PCCWG has always shared its willingness to interconnect with another regional network. Therefore, the request to both parties for regional interconnection has been stalled. For this reason, it was essential to include a requirement in the new service contracting processes to establish interconnections with other ICAO regional networks. Furthermore, the CRV and New PENS interconnection status was the same as shared in CRV OG/11 by WP/12. ICAO Secretariat is coordinating with Eurocontrol for further way forward. However, there were no progress and no outcomes to share. Further discussion of this WP is recorded under WP/06.

Regional IP Network Interconnection Discussion – PCCWG (WP/06)

11.4 The paper highlighted the status of the interconnection discussion between the CRV Network provider (PCCW Global) and the REDDIG II Network provider (Cirion, previously Lumen). On September 2023, PCCWG was informed that Lumen was changed to “Cirion,” and contacts were provided. With the sharing of the high-level network diagram proposed by Cirion, PCCWG updated that they have explained to Cirion that their design did not work with CRV due to specific requirements from CRV perspective and offered the other high-level interconnection diagram together with questions

in technical, commercial and operation to Cirion for comment, which is still awaiting Cirion's feedback. As such, the Meeting was requested to provide assistance to proceed further.

11.5 The Meeting noted that the interconnection proposal of CRV and REDDIG II has been in process for five years. The response from the REDDIG II service provider is not favorable and unresponsive most of the time. Eurocontrol is also not sharing a response to the request conveyed by the ICAO Secretariat to further progress on the CRV and New PENS interconnection. The Meeting deliberated further course of action. As an outcome of deliberations, it was agreed that based on the situation's urgency, States/Administrations of the APAC region needed interconnection with SAM region may join REDDIG II or implement a dedicated line based on cost-benefit analysis. Similarly, in case of the need to interconnect with European States, New PENS can be joined by the interested States. PCCWG informed that they could support connection to CRV if other regions' States/Administrations wish to join CRV under CRV OG instructions/guidance. Concurrently, the Meeting requested that the ICAO Secretariat and PCCWG continue their efforts to reach relevant parties to progress the work on CRV-REDDIG II and CRV-New PENS interconnection. **ACTION ITEM 12-24** During the new CRV contract management process, CRV OG will incorporate the clause of interconnection with other regional networks into the contract document. **ACTION ITEM 12-25**

11.6 The Meeting suggested that the CRV OG Ad-hoc Expert group prepare use cases for regional interconnection of CRV **ACTION ITEM 12-26** and continue to work to support and encourage MID states to work with PCCWG to join CRV, with the support of the ICAO APAC Secretariat and the ICAO MID office, to implement CRV in the MID region. **ACTION ITEM 12-27**

Agenda Item 12: Using the rest of CRV Pioneer State Contribution to the ICAO Managed Service Agreement (MSA)

Updates on CRV Pioneer States' Remaining Contribution to the ICAO Managed Service Agreement (MSA) – Sec (WP/07)

12.1 The paper shared information about the recent development of using the balance fund of the MSA. The Meeting was informed that to follow up on Conclusion ACSICG/10/02 (CRV OG/11/03) – *Selection of Security Review Options 2 and 5 and Develop a ToR*, for utilization of remaining money from CRV Project, the draft ToR was prepared by the CRV OG Ad-hoc Expert Group, which was reviewed by the ACSICG/10 Meeting and endorsed as Conclusion ACSICG/10/03 – *Adoption of ToR for CRV Security Review using Options 2 and/or 5*. Based on the adopted ToR, CRV OG Ad-hoc Expert Group invited quotations from different vendors to prepare cost estimates for the work. Further information about the cost estimate and way forward was shared by CRV OG Co-Chair (Asia) by WP/08 in this Meeting.

Cyber Security Review Update – New Zealand (WP/08)

12.2 CRV OG Co-chair (Asia) presented an update on the proposed Cyber Security Review. The Meeting noted that the two cybersecurity organizations specializing in cybersecurity, namely [Aura Cyber Security Consultant - IT Risk Assessment - New Zealand](#) and ZX Security [Full Spectrum Security Services - ZX Security](#), had provided quotations. The Meeting was requested to review both quotations, suggest the need for further quotations, deliberate and share agreement/disagreement for the proposed amount, and discuss how to execute this task. Based on the discussion outcomes, it was advised that the Meeting may formulate the draft conclusion for endorsement by ACSICG/11 and adoption by CNS SG/28 Meeting.

12.3 The Meeting discussed the option to split the task between two vendors, which provided the lowest quotation for each task. It was informed that two quotes for two tasks were requested individually. Therefore, CRV OG may issue work orders for two tasks to two vendors. The Meeting observed that the amount available with CRV OG in the custody of ICAO CDI (formerly TCB) is USD 88,000, while CRV Security Review using Options 2 and 5 would cost nearly USD 20,000.

Therefore, the amount is sufficient to execute the task. The Meeting discussed the way forward for generating two work orders for two tasks to Aura and ZX Security and requested the ICAO Secretariat to suggest the process to transfer money to Aura and ZX Security for assigned tasks if agreed to be appointed by the Meeting in the future.

12.4 ICAO Secretariat informed that it has coordinated with ICAO HQ CDI to share the formal process to transfer the 16 pioneer States' money to the third-party supplier. It was also informed to HQ that all 16 pioneer States would follow the standard procedure to request ICAO CDI to transfer the funds to the third party approved by CRV OG for the CRV security assessment task. In response, CDI has informed that they understand the request. However, this could be seen as a way to use funds from an ICAO project to solo-source, thus circumventing ICAO regulations on procuring goods and services. ICAO CDI cannot proceed this way, and the funds must agree with ICAO provisions, as described in the MSA/Project Document. ICAO CDI suggested that as it is a Regional project, the best way to do this would be for the CRV OG to take the resolution to close the project, conclude that all objectives have been reached within this project, and advise the project management of ICAO APAC Regional Office. Then, the ICAO APAC Regional Office can request ICAO CDI to proceed to the closure of the project and will transfer the remaining funds requested to each contributor. To ensure there is no issue during these operations, ICAO CDI will need bank account details to be credited.

12.5 The Meeting acknowledged the significance of CRV's security assessment task, an APAC regional network. Security assessment would allow member states to find vulnerabilities in the network and fix them. Additionally, it will support the discussion carried out in CRV OG for future firewall mandates. However, the process would be very complicated if ICAO CDI carried out the project. CRV OG is already working on a new CRV contractual process, which is a very extensive and exhaustive process and requires significant effort, time, and contributions. Given that the timeline to utilize the remaining funds is five years, from December 2022 to December 2027, the Meeting suggested not using MSA's remaining money for security assessment work. As the security assessment of CRV is essential and crucial for determining the security and trust of the APAC regional network, the Meeting agreed to incorporate this task in the new CRV contract management process. **ACTION ITEM 12-28**

Agenda Item 13: Share best practices on cyber-safety/security and resilience among ACSICG/CRV OG/SWIM TF

Japan Concept of Firewall Installation (WP/09)

13.1 The paper presented the concept of introducing firewalls to systems connected to the CRV in Japan and supported discussions on future mandatory firewalls. Specific additional security measures for connecting to the CRV remain under consideration by the CRV/OG. Still, there are growing concerns about CRV security in each Member State/Administration. Japan introduced the overview of the system in Japan for connecting the CRV to the CRV NID. It was noted that Japanese AMHS has a firewall in place, but the AIDC and voice system do not. The reasons why some systems in Japan have not installed firewalls were shared. Japan summarized that a uniform firewall mandate could be excessive, as it would be required even for systems that each Member State/Administration considers less necessary to have a firewall in place.

Agenda Item 14: Review ToR and update Action Items of CRV OG

Review ToR and Action Items - Sec (WP/24)

14.1 The Meeting reviewed the ToR of CRV OG and further updated the Action Items for CRV OG, which are provided in **Appendix H and Appendix I** of this Report.

Agenda Item 15: Next Meetings and any other Business*Future of Face-To-Face Meetings - New Zealand (WP/26)*

15.1 The paper presented a discussion on the future of face-to-face meetings of the CRV. The Meeting noted that since the organizations continue to face budgetary pressure post-pandemic and the need to reduce greenhouse gas emissions, attending the annual face-to-face meetings for some CRV OG key members has become difficult. The cost of travel to the face-to-face meetings and the time of year may result in crucial CRV OG members being unable to attend OG meetings in person. The question of what CRV OG can do to reduce budget pressures, reduce our carbon footprint and increase participation was discussed.

15.2 The Meeting acknowledged the concern about the limited budget and the need to reduce carbon footprint. However, the Meeting advised States/Administrations to take reference of the amount of work completed by CRV OG in the last few years and extensive tasks that need to be completed in the next few years for the new CRV contract management process. The Meeting agreed that the work done by CRV OG is essential and provides benefits to all States/Administrations. CRV OG has already created many ad-hoc groups that work only through virtual meetings. In such circumstances, it is imperative to do at least one annual in-person Meeting so critical matters requiring detailed deliberations can be resolved and the decision-making process can be easier. Additionally, in-person meetings provide opportunities for several side meetings to resolve bilateral issues and get expert support for pending matters. The Meeting agreed to continue to meet at least once a year in person.

Date and Venue for the Next Meeting

15.3 The Meeting agreed to organize the next CRV OG Meeting as an **In-Person Meeting** to further progress tasks listed in the Terms of Reference, tentatively from **10-14 February 2025**. It was advised that if any State/Administration is interested in hosting the Meeting, they should inform the ICAO secretariat at least 4-6 months before. The ICAO Secretariat will coordinate with interested member states for further arrangements or organize the CRV OG meeting in the ICAO APAC Office, Bangkok. The dates and venue of the Meeting will be shared with APAC Member States after finalization, preferably before three months of the Meeting.

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CRV Implementing new service for existing CRV users or between existing users and new users.

AMHS service:

1. Develop a bi-lateral Memorandum of Understanding (MoU) or Letter of Agreement (LoA)
2. Both users coordinate with PCCW Global to establish a GRE tunnel (if none exists)
3. Ensure bandwidth is sufficient (64kbps)
4. Provide PCCW Global with each user's AMHS IP address subnet(s), to be advertised through the GRE tunnel (private IPv4 addresses have been assigned by ICAO to each ANSP)
5. Ensure a connection between Customer Edge (CE) routers (e.g., ping test)
6. Ensure connection between AMHS test applications (e.g., MTA connection test)
7. Perform AMHS testing (refer to AMHS ICD and EUR test procedures for more information)
8. Establish a connection between AMHS operational applications using configurations developed in test and reroute traffic to new connection (ensuring a potential fallback plan).
9. Accept the new service if the AMHS service has performed satisfactorily for 24 hours
10. PCCW should update respective SEPs
11. Inform ICAO, ACSICG and CRV OG of new routing to be recorded in various documents (e.g., Telecommunication Infrastructure Routing, etc.)
12. Report new AMHS routing to Air Traffic Service Message Handling System Addressing Center (AMC)

Note: Steps 5, 6, 8, 10 require PCCW Global online support personnel

VoIP service:

1. Develop a bi-lateral Memorandum of Understanding (MoU) or Letter of Agreement (LoA)
2. Both users coordinate with PCCW Global to establish GRE tunnel (if none exists)
3. Ensure bandwidth is sufficient (112 kbps per channel without compression)
4. Coordinate with PCCW Global of each user's VoIP IP address subnet(s)
5. Coordinate with PCCW Global for each user's respective VoIP dial plan
6. Either implement your own VoIP to legacy voice signal conversion or PCCW Global to provide this service
7. Ensure a connection between Customer Edge (CE) routers (e.g., ping test)
8. Perform VoIP application-application testing
9. Accept the new voice service if it has performed satisfactorily for 24 hours
10. PCCW should update respective SEPs
11. Inform ICAO, ACSICG and CRV OG of new routing to be recorded in various documents (e.g., Telecommunication Infrastructure Routing, etc.)

Note: Steps 5, 6, 7, 8 require PCCW Global online support personnel

New System Connection:

1. To be developed during CRV OG/12 meeting

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Criteria to add a new service.

a. Considerations

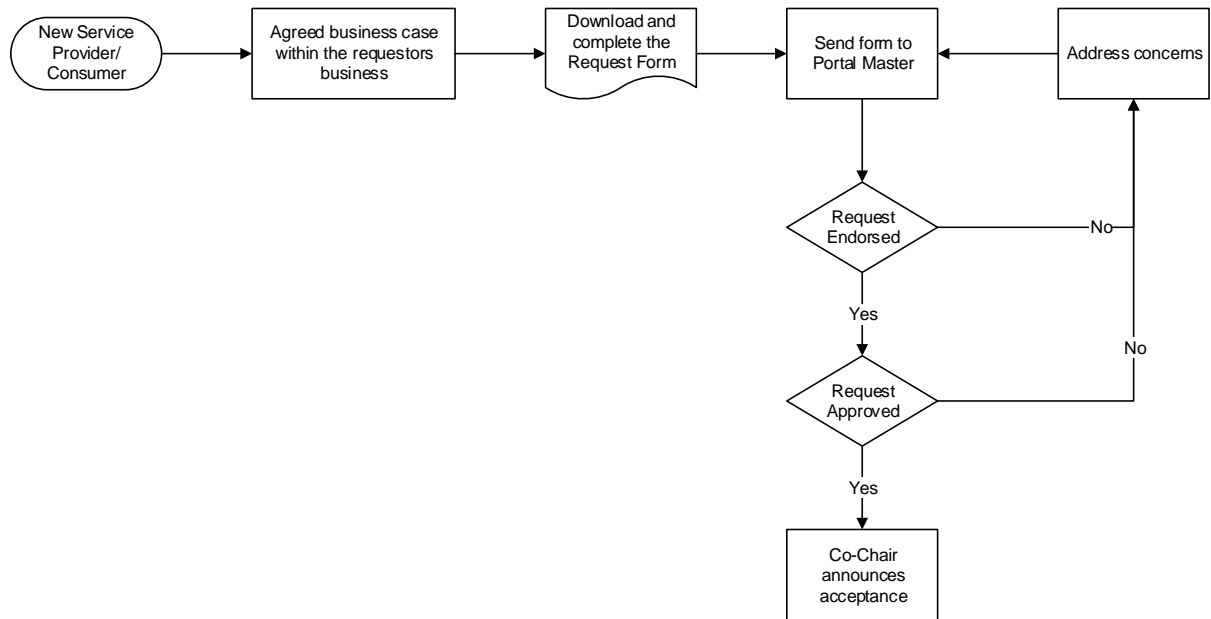
- i. Connecting a Service Provider / Service Consumer (SPSC) to the CRV can be initiated by any party that identifies a need for an SPSC to connect to it. The following should be considered by the SPSC and the CRV-Member state.
- ii. The SPSC should be referred to CRV SERVICE PROVIDER to enable an initial discussion with them to assess the feasibility of connecting to the CRV. During this discussion the SPSC should clarify:
 - a. Interfaces
 - b. Data transfer rates
 - c. DSCP marking
 - d. Bandwidth
 - e. Jitter
 - f. Latency
 - g. Packet Loss
 - h. Connections
 - i. One to One
 - ii. One to Many
 - iii. Many to Many
 - iv. Any to Any
 - v. Unicast or Multicast
- iii. It is recommended that Service Providers use public ip addressing for the delivery their services.
- iv. It is recommended that Service Consumers are provided with a 10.x.x.x ip addressing from the CRV Member State where the CRV SERVICE PROVIDER NID is installed.
- v. SPSCs will NOT be a member of the CRV Operations Group (OG). The OG may establish a CRV user group that could facilitate discussion on the use of the CRV by SPSCs.

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- vi. SPSCs will need to adhere to the Common Regional VPN (CRV): System Design Document (SDD). Substantive changes to the SDD MUST be endorsed by the CRV OG.
- vii. CRV member states should consider ICAO Doc 9855 AN/459 Guidelines on the Use of the Public Internet for Aeronautical Applications as guidance when they are the Primary sponsor.
- viii. The CRV OG is NOT responsible for the accreditation/certification/validation of a Service Provider but must ensure that all reasonable steps have been taken to ensure that the Service Provider has sufficient systems and process in place to provide their service over the CRV.
- ix. Service Consumers and CRV members SHOULD ensure that when obtaining a Service from a Service Provider that the service meets their operational service requirements.

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b. Process



1. Procedure.

- i. The information required in the connection request, should be presented in English and in a clear and logical format. The following process will be used for an SPSC to obtain approval connect to the CRV:
- ii. Provide a business justification including Benefits Realization for joining the CRV
- iii. For a Service Provider:
 - a. Provide a documentation using Section 2.3 ACCREDITATION OF AN IASP in ICAO Doc 9855 AN/459 as a guide including a cyber-security plan.
- iv. For a Service Consumer; at a minimum, provide a CRV connection plan and cyber-security plan on how they will shield the CRV from their organisation.
- v. Obtain a Primary CRV member state to sponsor their connection to the CRV.
- vi. Obtain business justification from Primary Sponsor to support their request.
- vii. Obtain a Secondary CRV member state to sponsor their connection to the CRV based on the information above.
- viii. The information provided above, will be provided to the CRV OG via the APAC CRV portal.

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- ix. CRV OG members will be notified and have 25 business days to review and address any concerns that they may have with the request.
- x. After the 25 days, if the majority of reviews by CRV OG members are endorsed, the CRV OG chairs will review the request.
- xi. For the request to be approved, both CRV OG C-Chairs need to approve the request.
- xii. A Document/Certificate will be provided to the primary sponsor that can be used to verify that the SPSC is approved to connect the CRV.
- xiii. The on boarding of Service Provider / Service Consumer will be supported by the Airways New Zealand provided APAC CRV SharePoint portal. There will be word forms to facilitate the information and these forms will be migrated to an automated SharePoint Workflow as soon as practical.

Service Provider / Service Consumer will be required to undertake the following:

Provide a business justification including Benefits Realisation for joining the CRV

Provide a High-Level System Design oh how their Service could potentially connect to the CRV.

Service Providers to use Public IP Addressing

Service Consumers to use the ICAO allocated IP addresses

Interfaces

Data transfer rates

DSCP marking

Problem Statement

Background

The CRV Network was created out of the need to replace legacy point to point half circuits between states with cost-effective telecommunications IP network connectivity with the aim to achieve ICAO current and future strategies of GANP ASBUs: B0-FICE, B0-NOPS, VoIP and B1-SWIM modules.

The initial focus was on the implementation of the network through a tender process managed by TCB and the CRV Taskforce, then implementation and migration of service via the CRV Operations Group. Some thought was given to the future, mostly ADS-B and Flow Management Data. SWIM was only a vague concept.

Associated documentation was created as part of the Tender or Implementation phases and held in an accessible portal maintained by Airways New Zealand.

Some focus is given to maintaining these documents but is challenging due to CRV OG members also having day jobs with their parent ANSPs.

To aid progress of the documentation four Ad Hoc Expert groups have been stood up representing Strategy, Design, Transition and Operations. The intention was for these groups to meet independently regularly to produce updates to the documentation between CRV OG meetings.

We also meet with other groups such as the SWIM TF regularly.

The Problem

1. The advancement of the CRV is based on the input of a core group of CRV OG members.
2. The list of tasks is increasing the more the network is operated. This requires more effort and faster turnaround on making decisions to make changes to the CRV network configuration and associated documentation.
 - a. IP Address management
 - b. Incident Management
 - c. Testing
 - d. Security improvements
 - e. Security Review
 - f. Operations Manual
 - g. Implementation Plan
 - h. Common Package update
 - i. Portal hosting – change?
 - j. Overview drawing updates
 - k. Implementation Plan updates
 - l. IPV6?
 - m. Memberships
 - n. TOR update?
 - o. Future services – IPVHF, Space Comms and ADSB
 - p. Better monitoring
 - q. Interconnects

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3. We meet once per year to discuss, agree and endorse changes. This is slow.
4. The four Ad Hoc Expert Subgroups have not met separately but met each time as a group for expediency.
5. CRV II is coming soon.
6. Information and documentation need to be accessible by all.
7. As more ANSPs and other organisations join we need to have a RASCI to define our roles, responsibilities and expectations.
 - a. OG Members
 - b. Co-Chairs
 - c. National Contacts
 - d. Local Contacts
 - e. Service Provider
 - f. User- State
 - g. User Industry
 - h. ICAO Secretariat
 - i. ICAO Regional Office
 - j. ICAO TCB
8. Budgets are constrained.
9. Sustainability needs to be considered.
10. Some states are not engaging with CRV.
11. Unknown routine activities

We need to change, to allow groups to act autonomously with ownership of actions, make decisions, and regular reporting without having to wait for an annual meeting to make the decisions and reliance on specific members.

The CRV OG uses the Co-Chairs and Secretariat as the points of contacts which can often create confusion from other taskforces and groups regarding who they should be talking to provide potential solutions.

Current State

1. One Meeting per year with the full OG and the Service Provider.
2. Ad Hoc experts four times per year.
3. SWIM TF four times per year.
4. Ad Hoc Governance group four times per year.

Proposed State

1. One Meeting per year with the full OG and the Service Provider.
2. Experts four times per year.
3. Operations twelve times per year.
4. Other TF four times per year.
5. Governance group four times per year.
6. Service Provider four times per year.

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List of daily tasks:

List of Weekly Tasks:

List of Monthly Tasks:

Other Routine Tasks and its frequency:

Future Tasks:

UPDATED APAC CRV IMPLEMENTATION TABLE

Please review the following table and share updated information in track mode by email at vmeeфуengsart@icao.int and snibhani@icao.int

CRV focal points of States/Administrations are requested to also update the [telecommunication infrastructure table on the CRV Portal](#) (please click at the link to update the table) hosted by Airways New Zealand.

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

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
				<p>March 2019 (Voice)</p> <p>In Progress: Indonesia Jan 2024 (AMHS), Voice and ADS-B pending.</p> <p>Pending: South Africa TBC (AMHS/AIDC, Voice);</p>		
3	Bangladesh					
4	Bhutan	Thailand (Bangkok)	<p>Contract signed on Oct 2019.</p> <p>CRV installed successfully in Dec 2021.</p> <p>CRV P2P Test between Paro-Bangkok completed.</p> <p>CRV P2P Test between Paro-Mumbai completed on Jan 2023</p>	AMHS first. Voice and ADS-B – to be decided.	Staged Approach	Dependent on India for full utilization of CRV network.

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
			CRV cutover between Paro-Mumbai is scheduled on March 2023			
5	Brunei Darussalam					
6	Cambodia		As early as convenient, dependent on neighbouring countries			Internal decision making
7	China*	Hong Kong China Japan Republic of Korea	Contract signed on 21 June 2020.	Applications targeted: Data(AMHS) With: Hong Kong 3Q2020; Japan 4Q2020; Thailand TBD; India 2022. Republic of Korea 4Q2022 Mongolia 4Q2022 ATFM test with Japan and ROK at Sep 2020 over CRV ADP exchange with Mongolia 4Q2022	Staged approach	

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

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

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

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
15	Indonesia		Contract in 1Q2022 and service readiness in 2023.	Australia 2024 (voice & data) Malaysia 2024 (voice) Papua New Guinea 2024 (voice) Philippine 2024 (voice) Singapore 2024 (voice & data) USA 2024 (voice)		
16	Japan*	Hong Kong China USA Singapore China RoK Philippines	Contract signed in Nov.2017	1) AMHS with China Hong Kong China RoK Singapore TaipeiACC USA 2) AIDC with RoK(planned 1Q 2024) Taipei USA 3) VoIP with RoK Philippines TaipeiACC USA	Staged approach	
17	Kiribati					

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

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

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

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
27	New Zealand	Australia USA Fiji French Polynesia Chile	Contract signed in July 2018 and service implemented December 2018	Australia Voice Completed March 2019 and AMHS June 2019 Completed USA Voice Completed March 2019 and AMHS March 2019 Completed Fiji Voice Completed April 2019 French Polynesia AMHS and Voice Chile AMHS (SAM regional network REDDIG)	Awaiting French Polynesia joining. Awaiting outcome of inter-regional network connectivity discussion. For Chile	CBA attractive if all counterparts join in.
28	Pakistan	China India	Duly Signed Service Order Form Submitted on 23 rd Jan 2023 for Finalization / Execution of the Contract. As per timeline given by PCCW Global the CRV will be implemented by August / Sept 2023	AMHS /AFTN / VOICE	In progress	Package-D is opted to establish link between China and India. Connectivity with other neighbouring regions / FIRs i.e. Tehran, Kuwait, Kabul & Muscat could be migrated on CRV only if the states join CRV.
29	Palau					

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
30	Papua New Guinea	Australia USA-Oakland USA-Aireon		Australia: AFTN June 2021, Voice Oct 2021 USA-Oakland Voice November 2021 USA-Aireon Space based ADSB-July 2021	Staged approach	Completed
31	Philippines	Hong Kong China Taipe Singapore USA Japan Indonesia Malaysia Vietnam	Contract signed in March 2018 and service readiness in 2Q2018	Completed: With HONG KONG AIDC - 2Q2019 AMHS - 2Q2019 VOICE - 3Q2018 With TAIPE AIDC - 2Q2019 AMHS - 2Q2019 VOICE - 1Q2019 With SINGAPORE AIDC – 4Q2019 AMHS – 4Q2020 VOICE – 1Q2020 With USA (Oakland) AMHS - 2Q2021 AIDC - 4Q2022 VOICE - 4Q2019	staged approach	Success transition to the New ATM center in 4Q2018 Dependencies: AIDC with Kota Kinabalu implementation via BBIS Singapore AIDC with Makassar implemented via BBIS Singapore

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
				<p>With JAPAN</p> <p>VOICE - 1Q2022 AIDC - Planned 2024</p> <p>With INDONESIA (Makassar)</p> <p>AIDC - 4Q2019 via BBIS VOICE - 4Q2023 Test done</p> <p>With MALAYSIA (Kota Kinabalu)</p> <p>AIDC - 4Q2023 Test done via BBIS VOICE - 2024</p> <p>With VIETNAM (Ho Chi Minh)</p> <p>AMHS - 2024 AIDC - 2024 VOICE - 2024</p>		

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
32	Republic of Korea	Japan China	<p>Contract signed for AMHS in 3Q 2019 and service readiness in 4Q 2022</p> <p>Contract signed for voice, AIDC in 1Q 2021 and service readiness in 1Q 2021</p>	<p>Completed: With Japan Voice – Sep 2023 AMHS - December 2022</p> <p>With China AMHS – November 2022</p> <p>Planned: With Japan AIDC – Feb 2024</p> <p>With China AIDC – 2024</p>	staged approach	AMHS POT in 4Q and operation from 4Q 2022
33	Samoa					

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
34	Singapore*	Australia Japan Philippines Thailand	Contract signed in May 2019 and service readiness in Dec 2019	Data (AMHS over IP) with: Australia Dec 2020 (completed); Japan Nov 2020 (completed); Philippines Dec 2020 (completed); Thailand Sep 2022 (completed); India Q1 2023 (in progress, testing completed); and Malaysia Q1 2023 (in progress, testing completed). Voice with: Philippines Mar 2020 (completed).	Staged approach	
35	Solomon Islands					
36	Sri Lanka	Planned: Australia India Indonesia Maldives Singapore	Nov-Dec 2022	Q1 2023 - AMHS with Singapore TBD - AMHS connectivity with Mumbai, and Male. TBD - Direct Speech facilities with Chennai, Trivandrum, Mumbai, Male, Jakarta, Melbourne, Singapore.	Phased Approach	Package D is planned based on CBA conducted. Comparison of performance of Package D and existing IPLC circuit.

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
37	Thailand	Bhutan Hong Kong, China Singapore China Malaysia India	1. Contract in 3Q2021 Status: Completed 2. Service readiness in 2Q2022 Status: Completed	Data first Then voice, subject to safety case: Bhutan in July 2022 Hong Kong, China in August 2022 Singapore in September 2022 China AMHS POT in July 2022 and operation will be performed after sign TMC. Malaysia in January 2023 India in February 2023 Cambodia and Vietnam Subject to States' readiness	Staged approach	
38	Timor Leste					
39	Tonga					
40	Tuvalu					

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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates)	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
41	United States*	Australia Fiji Japan Philippines New Zealand Indonesia	Contract in January 2018	1) AMHS with Australia Fiji Japan Philippines New Zealand 2) AIDC with Fiji Japan New Zealand 3) VoIP with Fiji Japan Philippines New Zealand Papua New Guinea (direct planned 2021) Indonesia (2024) Russia (when join CRV)	Staged approach	

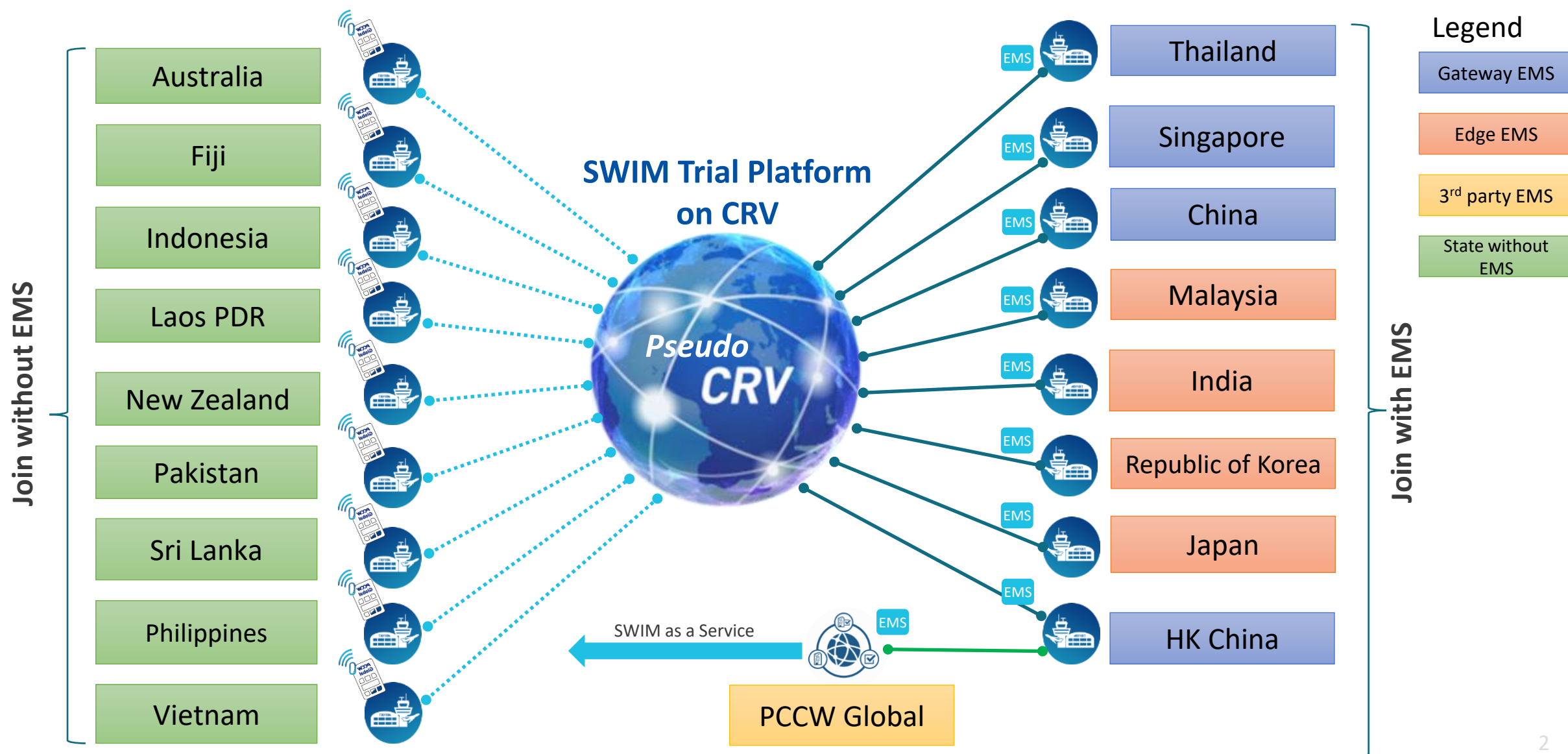
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SN	State/ Administration (with* is BBIS; marked in blue- not yet join CRV/ no updates	States /Administrations connected	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
42	Vanuatu					
43	Vietnam	Hong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

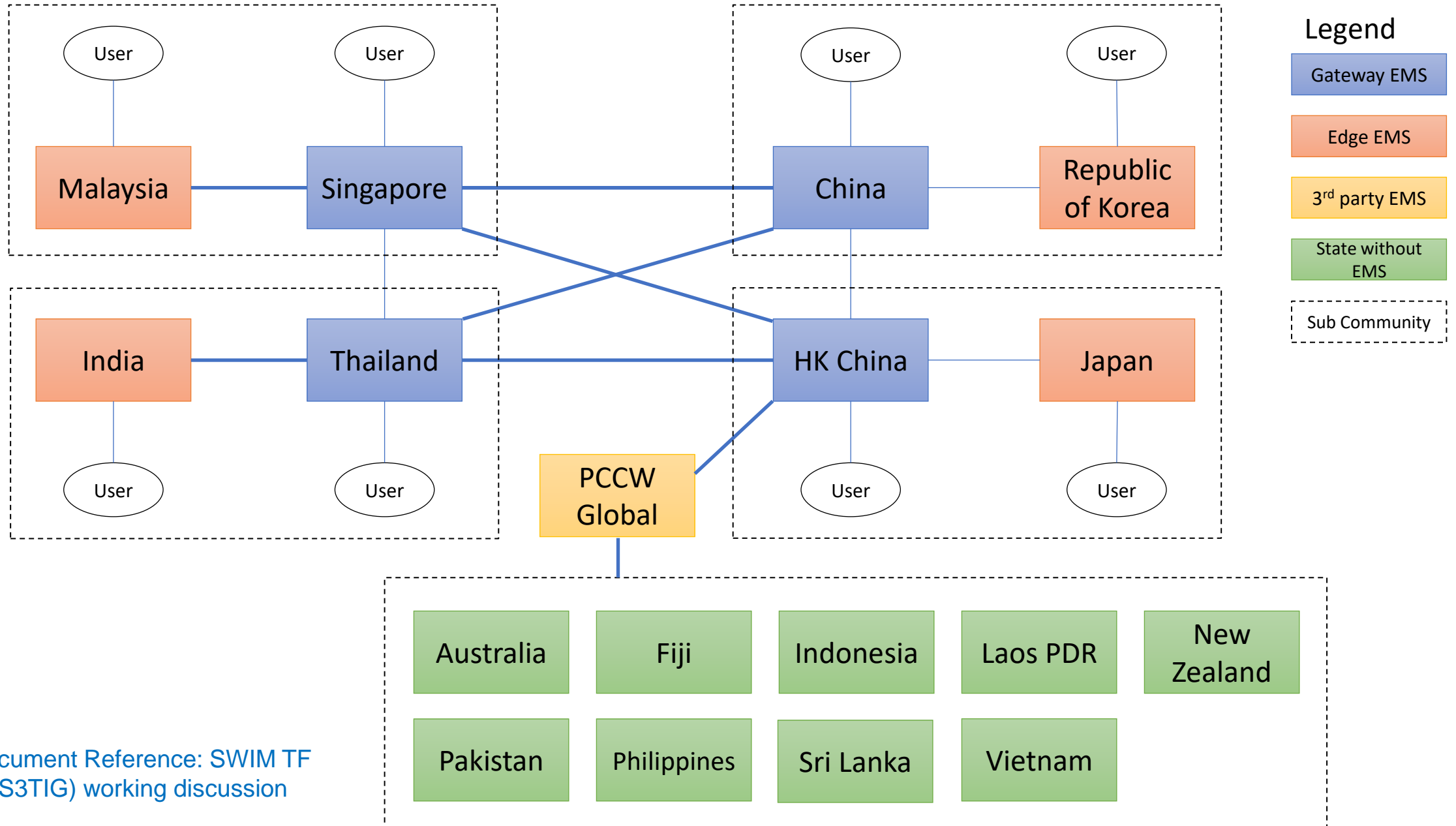
High Level Schematic of SWIM Service (layer 1-5)



Demo & Trial by SWIM TF (S3TIG) on CRV

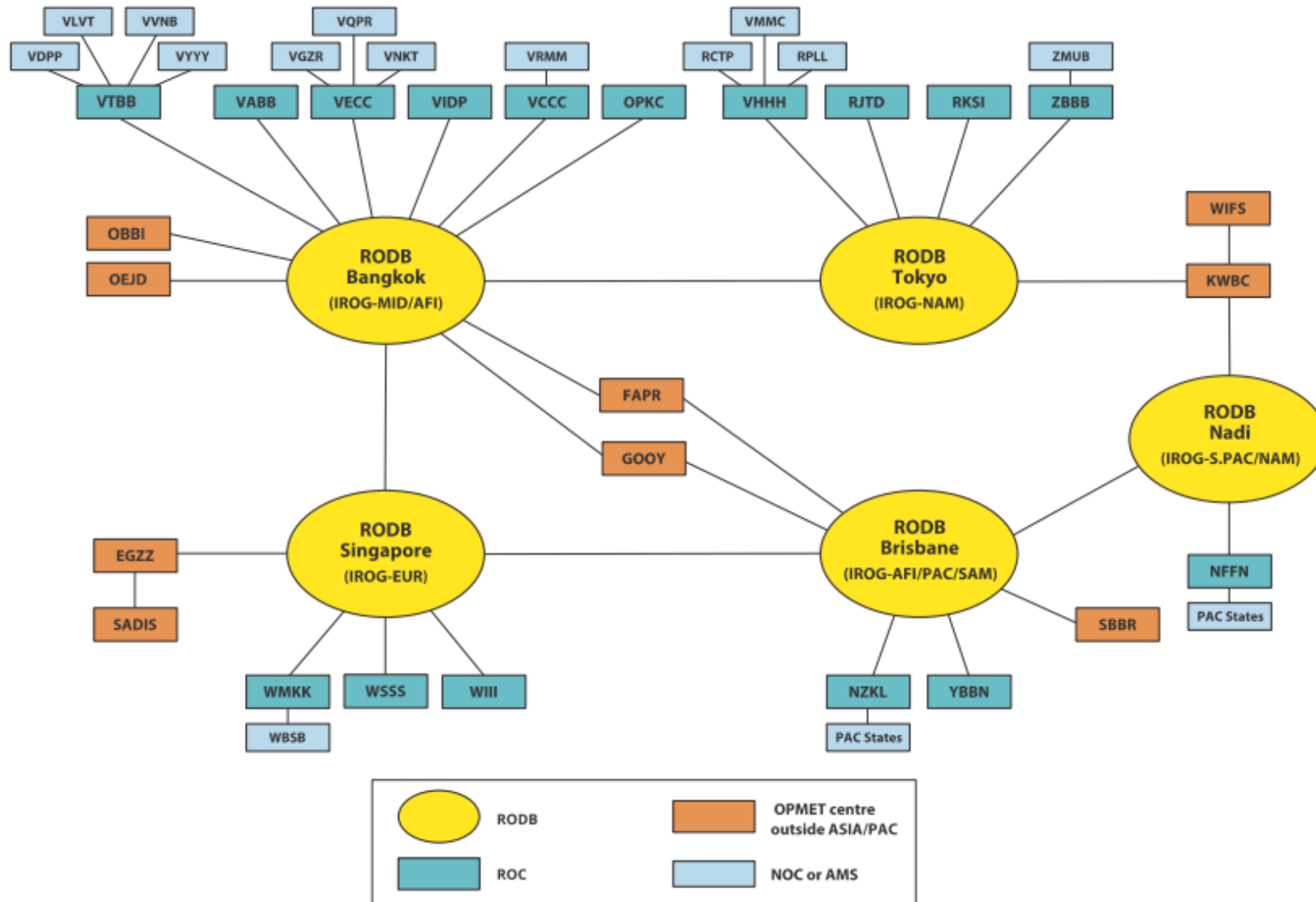


EMS Exchange of Demo & Trial by SWIM TF (S3TIG) on CRV



Document Reference: SWIM TF
(S3TIG) working discussion

ROBEX SCHEME



First draft of CRV new service requirements form

Current Network Capabilities		
<p>The information below describes the parameters of the CRV network. Please note that some parameters is specific to the region the state is located in.</p> <p>These parameters are governed by the APAC CRV OG and as such cannot be changed without the permission of the APAC CRV OG as changes may have an impact on network performance and SLA with the Service Provider.</p>		
Bandwidth	The pricing schedule has considered a range of bandwidths. Any bandwidth required beyond those considered in the price schedule is available and requires consideration by the CRV National Point of Contact and PCCWG.	64kbps 128kbps 256kbps 512kbps 1024kbps 2048kbps
Latency (ms) the average round trip delay between two sites.	Locations	Average Round Trip Delay
	Within the cities specified in Asia (On-net/Off-net)	200
	Within the cities specified in Oceania (On-net/Off-net)	200
	Between the cities specified in Middle East & Europe (On-net/Off-net)	200
	Within the cities specified in Europe (On-net/Off-net)	200
	Other cities combination not specified above	600
Jitter (ms)	Voice application	15
	Data application	250
Packet Loss		
Quality of Service Queues	Service class name	DSCP Name
	Voice	EF
	ADS-B	CS4
	AFTN, ATN.	AF21
	All traffic not otherwise defined	DF
Connectivity	1: 1 via Point to point via GRE Tunnels	

What is required?		
<p>Please complete this section for the adding of new services to the APAC CRV network to allow the APAC CRV OG to determine any changes to the current parameters.</p>		
	Acceptable/Not Acceptable Please indicate Yes for acceptable or No for Not acceptable. If not acceptable, please provide the details of what is required in the next column.	Explanation if not acceptable Please describe in detail the proposed requirements.
Bandwidth		
Latency		
Jitter		
Packet Loss		
Quality of Service Queues		
Connectivity		
Data Transfer Size/Message size		
Data Transfer Rate		

**Common aeRonautical Virtual Private Network (VPN) Operations Group (OG) of
Asia/Pacific Air Navigation Planning and
Implementation Regional Group (APANPIRG) (APANPIRG CRV OG)**

TERMS OF REFERENCE

1. Background

The establishment of APANPIRG CRV OG was proposed during the deliberations of the CRV Task Force (TF) as a dedicated group to provide oversight of the CRV operations and the performance of the CRV Service Provider. The APANPIRG CRV OG is formally established by APANPIRG Decision 27/33.

2. Terms of Reference

The Common aeRonautical Virtual Private Network (VPN) Operations Group (OG) will provide oversight of the function and performance of the CRV and the performance of the Service Provider. The following are the activities to be performed:

- a) Oversee the implementation of the CRV post Contract Award;
- b)
- c) Co-ordinate and standardize the establishment or upgrade of CRV services as required;
- d) Co-ordinate activities with other regions' ICAO CRV OGs, if any, to make sure that decision making and communication with CRV Service Provider is consistent and timely;
- e) Oversee the performance of the CRV Service Provider, including customer service;
- f) Oversee the performance of the CRV network;
- g) Oversee the escalation and solving by the CRV Service Provider of issues associated with the provision of the CRV, including safety and security related issues;
- h) Assist with the resolution of issues associated with the provision of the CRV among the CRV Users as required, including safety and security related issues;
- i) Assist with the migration of Aeronautical Fixed Services (AFS) onto the CRV, in line with the GANP and ICAO APAC seamless ANS plan;
- j) Maintain CRV OG documentation associated with the function, performance and management of the CRV, including the CRV OG Operations Manual, a list of CRV users and a record of variations to the common tender package;
- k) Accept deliverables from the CRV Service Provider on behalf of the CRV Users as required;
- l) Promote the use of CRV;

- m) Undertake continuous service improvements review to ensure CRV meets future needs; and
- n) Perform any other activity as required by CRV operations.

3. Reporting

The CRV OG will report to Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) through ACSICG and CNS SG.

4. Participation

The CRV OG will include all APAC Member States/Administrations, and any other organization as needed. Member States and/or inter-regional entry/exit Administrations in other ICAO regions may also be invited or request to participate in the activities of CRV OG.

5. Conduct of the work

It is anticipated that the CRV OG will conduct its work primarily by Web Conferences, teleconferences and other electronic means of communications. Face to Face meetings of CRV OG may be required on an annual basis.

The ICAO APAC Regional Office will provide secretariat support for the CRV OG.

6. Rapporteur

There will be two Co-Chairpersons of the CRV OG, one primarily responsible for Asia coordination and the other for Pacific coordination.

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Updated Subject/tasks List

Reference	Who	What	Due date	Status	Completed on	Result	Comment
4-1	All member States	Complete contract with PCCW Global by no later than 12/2020	12/31/2021 Dec 2022 (in CRV OG/9) CRV OG12	Open	on-going		Report on the status at each CRV OG meeting & update the CRV Implementation status table Pakistan contacted to get more information. Contact estb with PCCWG
7-2	PCCW Global & New Zealand	Pacific solution on inter-connection with PASNET , Feasiblity for interconnection	5/1/2022 Dec 2022 (CRV OG/9) CRV OG12 (decided in CRV OG/11)	close		No intercoonection with PASNET is possible. Close in CRV OG12	The PASNET is hosted by Airways, New Zealand. As per Airways, unfortunately the connectivity via PASNet is not ideal. PCCW and Airways couldn't finalise and agreed on a proposals. Hence, the option we now have for the islands is either: 1. Use the Airways CRV connection into PASNet and the islands are treated as LAN Traffic on PASNet. 2. The Islands use Package D. For Option 1, this poses several IP addressing, security and cost issues that need to be thoroughly investigated.
7-6	Hong Kong China	SWIM demonstration over mini-Pseudo CRV by HK, Singapore and Thailand	1/1/2022 CRV OG/11 (CRV OG/9) CRV OG12 (in CRV OG11)	Open	Modified in CRV OG12	HK is conducting POC with PCCWG in terms of concept for sharing surveillance data (CRV OG/9)	present the outcome of the demo to ACSICG/7 and SWIMTF/4 Postponed due to COVID-19
8-5	Co-Chairs, ICAO RO, Singapore, USA	Continue the feasibility study on inter-regional connection to support business case analysis	1/1/2022 CRV OG/11 (in CRV OG/9) CRV OG12 (in CRV OG/11)	on going	Ongoing. Technical Proposal finalized in CRV OG8 meeting was NA due to takeover of Lumen by Cirion Technologies	From: Nibhani, Soniya <SNibhani@icao.int> Sent: Monday, 29 August 2022 12:03 PM To: Hickford, Vaughan <vaughan.hickford@airways.co.nz>; Almeida, Francisco <falmeida@icao.int> Cc: fuzieda@dgac.gob.cl; cvergara@dgac.gob.cl; Luo, Yi <yluo@icao.int>; Javier Vittor <jvittor@icao.int>; Nibhani, Soniya <snibhani@icao.int> Subject: RE: CRV - REDDIG II Interconnection CAUTION: This email originated from outside of the Corporation. If you do not recognise the sender or you are not certain that the content is safe, then do not click on any links or open any attachments. Hi Vaughan, Thanks for the reply. I completely agree with the proposal. As our present contract has a long time to expire, it would be better if we initiate a formal interconnection request. Before commencing a formal request, we need to consider many other factors/points. It includes expiry of current contract of Lumen in a few years. Let's discuss it in our ad-hoc meeting on 15 September. Thanks a lot.	Meeting of Lumen and PCCWG are done on 4 November. PCCWG and Lumen will submit high level proposal by 15 december 2021 Proposal submitted and agreed in CRV OG/9 but in REDDIG meeting Lumen presented another proposal claiming easier than current proposal. However, PCCWG APAC is not agreed. 26 August 2021: Vaughan: Morning All Maybe we need to take a different approach to this considering that Lumen are only contracted to deliver specific to a contract and the APAC CRV relationship with PCCW is a bit more flexible. APAC CRV formally requests an interconnect between CRV and REDDIG via PCCW direct. PCCW discusses the proposal with Lumen. In the meantime CRV and REDDIG representatives discuss and co-ordinate the interconnect at their level. This would make the engagement a CRV/PCCW led engagement.
11-1	CRV OG Chairs, ACSICG Chairs, Australia, Japan, Jordan, Fiji, India, Hong Kong China, New Zealand, Singapore, Thailand, USA and ICAO Secretariat.	ICAO Secretariat will do necessary coordination with volunteered Member States for organising the CRV OG Ad-hoc Governance Group Meeting from 22-23 May 2023 and drafting the ToR	ACSICG/10	close	22-23 May 2023 CRV OG Ad-hoc Governance Group organised Propose to close	ToR need to be discussed in CRV OG Ad-hoc group meeting on 20 April 2023	
11-2	ICAO Secretariat, Co-Chair (Asia)	The latest version of CRV OG Operational Manual will be published on ICAO APAC e-docs under CNS, ICAO APAC CRV Secure portal, and on CRV portal hosted by Airways New Zealand	Feb-23	close	2/24/2023 Propose to close	APAC State Letter Ref.: AP034/23 (CNS) - Publication of ICAO APAC CRV OG Operations Manual v1.2 and ICAO APAC CRV Implementation Plan v2.2 dated 24 Feb 2023	
11-3	CRV OG Ad-hoc Expert Group	Nepal suggested to incorporate relevant guidance in the form of Process and Procedures into the CRV OG OM clarifying that Member States can request support of ICAO Secretariat and CRV OG for dispute resolution matters or other significant issues if arises. CRV OG Ad-hoc Expert Group will discuss the possibility of adding such provision and draft relevant clauses to add in CRV OG OM.	CRV OG/12 CRV OG13	Open		Added into agenda item for 20 April 2023 Meeting	
11-4	ICAO Secretariat, Co-Chair (Asia)	The latest version of CRV OG Implementation Plan without restricted information will be published on ICAO APAC e-docs under CNS Section. The latest version of CRV OG Implementation Plan will be uploaded on the ICAO CRV Secure portal, and CRV portal hosted by Airways New Zealand	Feb-23	close	2/24/2023 Propose to close	APAC State Letter Ref.: AP034/23 (CNS) - Publication of ICAO APAC CRV OG Operations Manual v1.2 and ICAO APAC CRV Implementation Plan v2.2 dated 24 Feb 2023	

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Reference	Who	What	Due date	Status	Completed on	Result	Comment
11-5	CRV OG Ad-hoc Expert Group	CRV OG Ad Hoc Expert Group will work on to modify relevant CRV documents and update the CRV OG Operations Manual to ensure that any changes within CRV consider modifications required to the ATN Documentation document tree	CRV OG/12 CRV OG/13	Open			
11-6	ICAO Secretariat	The ICAO Secretariat will take necessary action to update ATN Documentation Tree on the ICAO APAC Regional Implementation Projects webpage with the proposed first snapshot of the Tree that would be modified in future as more modifications would be made by ACSICG/CRV OG Meetings	CRV OG/12 CRV OG/13	Open			
11-8	CRV OG Co-Chairs ICAO Secretariat	Modified table will be shared with APAC Member States for updates using New Zealand hosted CRV portal. The table will be updated by ACSICG/10.	ACSICG/10	close	Done, Propose to close	Email shared with CRV local POC on 17 March 2023	
11-9	CRV OG Ad-hoc Expert Group	The Group will create ToR for security review of CRV for Option 2 and 5 presented in WP/14 in CRV OG11.	ACSICG/10	close	Done in ACSICG/8		
Seminar 12-1	SWIM TF, ICAO Secretariat	A dialogue about bandwidth requirements for SWIM services for CRV were initiated. Considering that the basic principle of information exchange in SWIM is publish/subscribe, the meeting requested that the ICAO Secretariat share information about any discussion planned in SWIM TF on developing a ruleset to guide or instruct users about information should be subscribed to so systems and networks are not overloaded or crashed by excessive subscription. ICAO Secretariat informed that such discussion is not being done in SWIM TF. ICAO Secretariat will share information with SWIM TF for further information/action required on this matter	CRV OG/13	Open			
12-1	PCCWG	PCCWG will provide quarterly bandwidth utilization reports to the CRV OG Ad-hoc expert group as a periodic update	CRV OG/13	on going			
12-2	CRV OG Ad-hoc Expert Group	The CRV OG Ad-hoc Expert group would review and present the revised Tree to the next CRV OG meeting for review and endorsement	CRV OG/13	Open			
12-3	ACSICG Co-Chair, ICAO Secretariat	The Meeting advised sharing the Tree with ACSICG for further review and modifications for AMHS and other relevant AFS sections	CRV OG/13	Open			
12-4	CRV OG Ad-hoc Expert Group, ICAO Secretariat	The CRV OG Ad-hoc Expert group develop the process for testing new SWIM services following the procedure mentioned in Appendix A to the CRV OG/12 report	CRV OG/13	Open			
12-5	CRV OG Ad-hoc Expert Group, ICAO Secretariat	The CRV OG Ad-hoc Expert group modify the process provided in Appendix B to incorporate various discussions and suggestions shared during the Meeting : 1. To assess the feasibility of a Service Provider / Service Consumer (SPSC) connecting to the CRV, the list of parameters provided in a(ii) of the process needs to be reviewed and amended to accommodate other potential required parameters. 2. A process and procedure to test a new service on the CRV network need to be drafted. 3. Further discussion is needed for the required class of SWIM services. 4. The feasibility of testing a new SWIM service first on the test GRE tunnel and after successful testing on the test GRE tunnel, its transfer over to the operational GRE tunnel needs further deliberations. 5. The number of GRE tunnels for each SWIM service may not be feasible. 6. Further discussion is required for IP assignments and their grouping. 7. Currently, in the System Design Document (SDD), the QoS of SWIM services is not mentioned, requiring further action.	CRV OG/13	Open			
12-6	ICAO Secretariat, CRV OG Co-chair (Asia)	The latest version of the CRV OG Operational Manual will be published on ICAO APAC e-docs under CNS, ICAO APAC CRV Secure portal, and on the CRV portal hosted by Airways New Zealand	CRV OG/13	Open			
12-7	CRV OG Ad-hoc Expert Group, ICAO Secretariat	Singapore suggested modifying the local and national point of contact responsibilities mentioned in CRV Imp Plan to accommodate the new CRV user's definition. Accordingly, the CRV Implementation plan may need further modifications to accommodate new CRV users definition. The Meeting requested that the CRV OG Ad-hoc Expert group incorporate this task into their agenda items	CRV OG/13	Open			

CRV OG/12
Appendix I to the Report

Reference	Who	What	Due date	Status	Completed on	Result	Comment
12-8	ICAO Secretariat	ICAO Secretariat will share the information requested and templates of daily, weekly, annual tasks of CRV with all CRV National and local Points of contact along with CRV OG/12 participants before 2 February 2024	2-Feb-24	Open			
12-9	States/Administrations	All States/Administrations already utilizing CRV will submit the list of tasks in the requested template to the ICAO Secretariat before 31 March 2024	31-Mar-24	Open			
12-10	ICAO Secretariat	ICAO Secretariat will share a doodle with all CRV OG Ad-hoc governance group experts to finalize the date for 24 April or 3 May 2024	2-Feb-24	Open			
12-11	ICAO Secretariat	ICAO Secretariat will share the list of users having access to the CRV portal with all States/Administrations before 2 February 2024 for updates	2-Feb-24	Open			
12-12	States/Administrations	All States/Administration will share the updated list of a maximum of three users to get access to the portal before 29 February 2024	29-Feb-24	Open			
12-13							
12-14							
12-15							
12-16							
12-17							
12-18							
12-19	States/Administrations	The first draft of the form will be sent to the Ad Hoc Expert Design Group before 31 January 2024 for comment and feedback (APX G)	31-Jan-24	Open			
12-20	SWIM TF, ICAO Secretariat	The ICAO Secretariat will share the draft form with the SWIM Task Force Task Leads for filling in the form and for comment and feedback.	1-Feb-24	Open			
12-21	CRV OG Ad-hoc Expert Group, ICAO Secretariat	CRV OG Ad-hoc Expert Group will review the duly filled form in the April 2024 Meeting	Apr-24	Open			
12-22	ICAO Secretariat	The ICAO Secretariat will share the exact date, venue, and detailed agenda information about the "CRV data requirements for SWIM Workshop" as soon as it is finalized	ASAP	Open			
12-23	ICAO Secretariat, Co-Chairs	CRV OG Co-Chair (Pacific) suggested sharing the Proof of Concept test document of CRV with SWIM TF to understand CRV's performance and capabilities by SWIM TF	1-Feb-24	Open			
12-24	ICAO Secretariat, Co-Chairs, PCCWG	The Meeting requested that the ICAO Secretariat and PCCWG continue their efforts to reach relevant parties to progress the work on CRV-REDDIG II and CRV-New PENS interconnection	CRV OG/13	Open			
12-25	CRV OG	During the new CRV contract management process, CRV OG will incorporate the clause of interconnection with other regional networks into the contract document	CRV OG/13	Open			
12-26	CRV OG Ad-hoc Expert Group, ICAO Secretariat	The CRV OG Ad-hoc Expert group prepare use cases for regional interconnection of CRV	CRV OG/13	Open			
12-27	CRV OG Ad-hoc Expert Group, ICAO Secretariat	Ad-hoc group continue to work to support and encourage MID states to work with PCCWG to join CRV, with the support of the ICAO APAC Secretariat and the ICAO MID office, to implement CRV in the MID region	CRV OG/13	Open			
12-28	CRV OG	As the security assessment of CRV is essential and crucial for determining the security and trust of the APAC regional network, the Meeting agreed to incorporate this task in the new CRV contract management process	CRV OG/13	Open			