*International Civil Aviation Organization*

**Eighth Meeting of the Common aeRonautical Virtual Private Network Operations Group (CRV OG/8)**

Video Teleconference, 17 – 19 May 2021

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**Agenda Item 7:** Revisit the CRV solution for small Pacific Islands and small ANSPs in APAC

# THE CRV SOLUTION FOR SMALL PACIFIC ISLANDS AND SMALL ANSP IN APAC

(Presented by Fiji/Fiji Airports)

**SUMMARY**

This paper presents the CRV solution for small Pacific Islands and small ANSPs in APAC region to implement CRV for voice & AMHS services

## 1. INTRODUCTION

1.1 This paper presents the CRV solution for small Pacific Islands and small ANSPs in APAC region to implement CRV for voice and AMHS services

1.2 2022 is now the target date agreed in the Beijing Declaration to implement CRV

## 2. DISCUSSION

2.1 In the second iteration of the Cost Benefit Analysis of the CRV as presented in the CRV TF/03 meeting in 2015 for the Pacific Island Sates, it has recommended that moving critical and other application to CRV can be provided on Private VSAT for 64Kbps – 128Kbps. The use of VPN over internet using 1Mbps was considered for moving non-critical application to CRV. It further concluded that VPN over Internet option has an advantage over Satellite Communications on the cost are affordable. However the performance cannot be guaranteed as the communications rely on Internet and best effort

2.2 The CRV solutions for the Pacific Island was further discussed at the CRV Workshop during the CRV OG/4 meeting Nadi, Fiji in April, 2018. Private VSAT and VPN over internet were considered as the proposed CRV solutions for the Pacific Islands.

2.2 The CRV Solutions is based on the recommended CRV SLA provided by the CRV suppliers, PCCWG. The CRV SLA Package is summarized in the table below.

| SLA Package | Package A | | Package B+ | | Package B | | Package C+ | | Package C | | Package D | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Local loop connection | 2 | | 1 | | 1 | | 1 | | 1 | | NIL ( customer self provided internet ) | |
| NID | 2 | | 2 | | 1 | | 2 | | 1 | | 1 | |
| IP Sec Gateway ( backup ) | NIL | | Yes ( customer provides internet ) | | Yes( customer provides internet ) | | No | | No | | Yes ( customer provide internet ) | |
| Availability | 99.97% (connectivity + router) | | 99.95% (connectivity+ router) | | 99.5% (connectivity+ router) | | 99.7% (connectivity+ router) | | 99.5% (connectivity+ router) | | 99.5% (IPSec gateway port only) | |
| Site to Site Round Trip Delay by zone | 200ms | 600ms | 200ms | 600ms | 200ms | 600ms | 200ms | 600ms | 200ms | 600ms | PoP to PoP 200ms | PoP to PoP 600ms |
| Site to Site Packet Drop rate | <0.1% for Voice; <0.5% for Data | | <0.1% for Voice; <0.5% for Data | | | | <0.1% for Voice; <0.5% for Data | | | | PoP to PoP <0.5% for Data | |
| Site to Site Jitter | 15ms for Voice; 250ms for Data | | 15ms for Voice; 250ms for Data | | | | 15ms for Voice; 250ms for Data | | | | 250ms for Data (PoP to PoP) | |
| Rebate | Yes | | Yes | | | | Yes | | | | No | |

2.3 To implement CRV, a communication link is required from the ANSP CRV NID to the PCCWG MPLS core. The terrestrial link available for this small Pacific Island to provide connectivity between the CRV core (MPLS PoP) and the ANSP CRV NID include IPLC using optical fiber submarine cable, satellite and VSAT communication link and PLC using optical fiber cable and Radio link.

2.4 PASNET a private communication network available in the Pacific was also considered as one of the CRV solution for the Pacific Islands to implement CRV. PASNET operates on a VSAT communication link and supported by Airways NZ. For the CRV solution PCCWG has proposed for a common CRV NID to be installed at Airways NZ center in Auckland or Christchurch and the PASNET will provide the last mile connection to these Pacific Islands to implement CRV. PASNET will provide a secure and reliable connection to the CRV.

2.5 From the recent regional CRV implementation update submitted by PCCWG, it is noted that there has been slow implementation progress with the Pacific Island States and small ANSP in the region to date. With the target date for the implementation of CRV by 2022, the CRV OG must find ways to assist these member States to implement CRV and ensures that No Country is Left Behind.

2.6 The CRV SLA packages provided by PCCWG are designed based on the network performance level to meet the customer services requirement that is provided over MPLS, VSAT or VPN over internet connectivity. SLA package are charged differently based on the service performance level. A core component of the cost is noted on the connectivity charges between the PCCWG MPLS POP and the ANSP NID which is normally refers to as the last mile connectivity. If the ANSP is not located in the same geographical area where PCCWG MPLS PoP resides it will pays more for the service cost due to international connection rate charge as compared to ANSP that resides in the same area with the PoP that is charged at a local rate . For example, the nearest PCCWG MPLS POP for the Pacific Islands is located in Sydney, Australia and the cost of last mile connection to these Pacific Islands is quite significant.

2.7 These Pacific Island have small ANSP and PASNET will provide for secure and reliable connection that can support CRV SLA Package A, B+, B, C+ & C The alternative solution will using VPN over internet using SLA Package D over 1.0M internet connection at a much lower cost.

2.8 Going forward in the implementation of CRV, the operational benefits of CRV to support current and future services like SWIM for these small ANSP will require the upgrade of the CRV service to SLA Package A, B+, B, C+ & C and improving the CRV infrastructure that will provide cost effective solution to these small ANSP with more States joining the CRV.

## 3.0 Proposed CRV Solution for exchange of voice and AMHS service for Vanuatu, Kiribati & Tuvalu

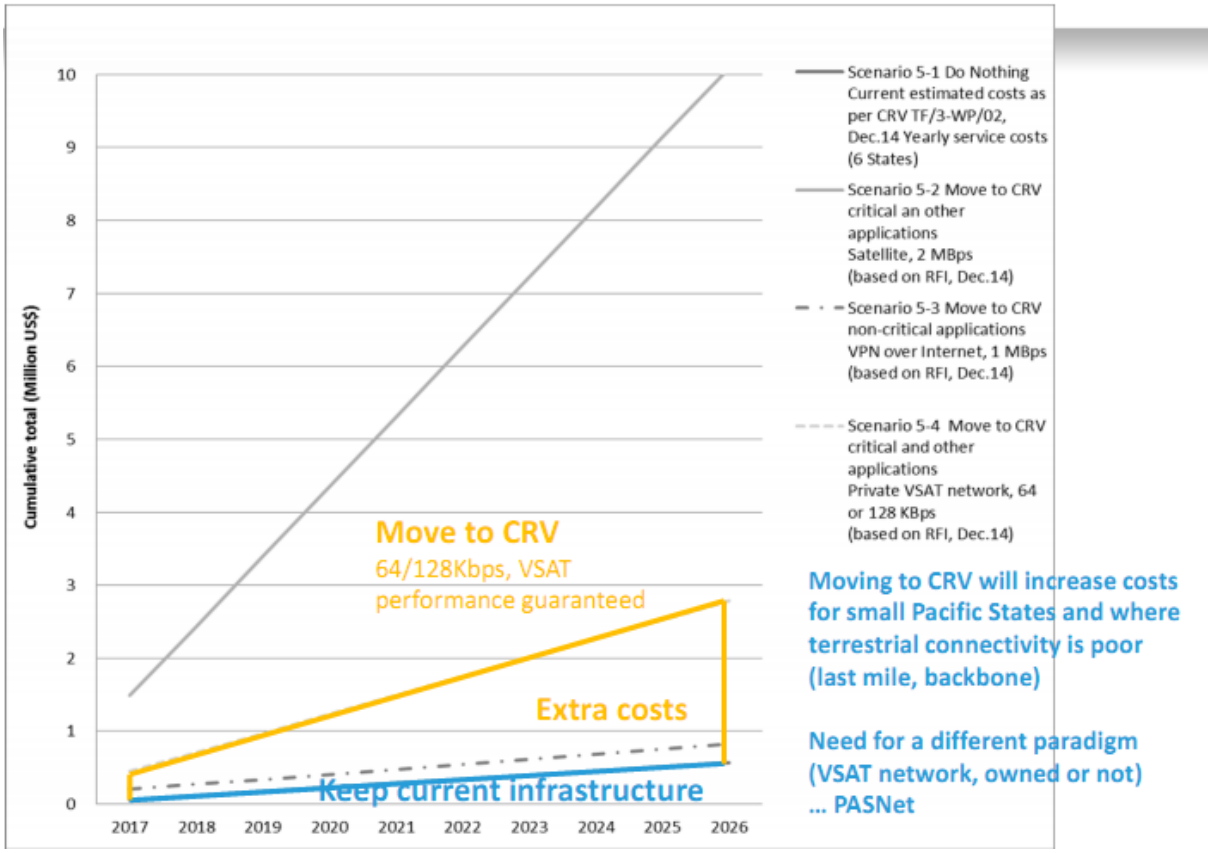
3.1 In proposing the CRV solution for these Pacific Island States, the following requirement needs to be evaluated to provide best value for money and return on investment:

a) The technical solution will be driven by the current and future operational requirement and the available communication infrastructure to implement CRV
b) The cost to implement the CRV solution

3.2 The three Pacific Island and New Caledonia upper airspace comes under the Nadi FIR that is operated by Fiji for the provision of ATM services. The voice & AMHS/AFTN services are exchange between these Pacific Island ATC Tower/Center and Nadi Air Traffic Management Centre.

3.3 International communication link is provided to these Pacific Islands through satellite and submarine optical fibre cable for Vanuatu only. PASNET is a private communication link that is provided through VSAT is another communication network that is available to these Pacific Islands to implement CRV.

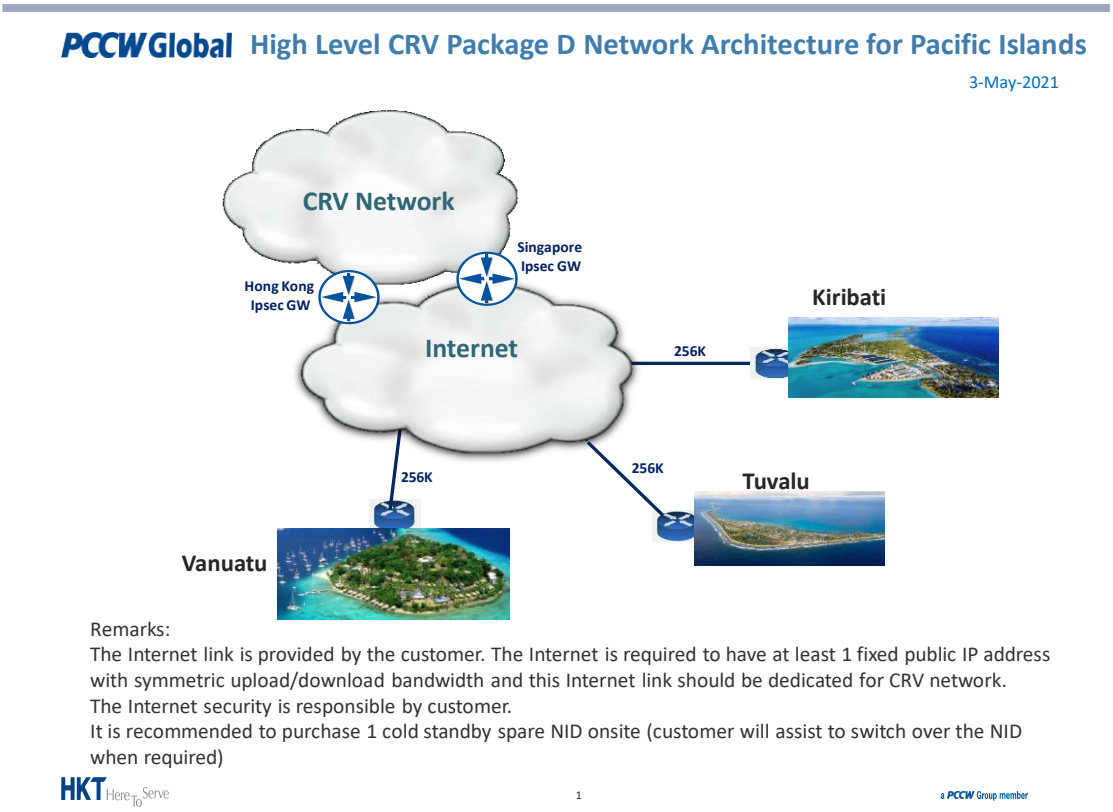
3.4 Apart from the technical solution, cost of implementation is also a deciding factor. It should be noted that the second iteration of the CRV CBA has further concluded that expected cost saving of 23% from the first iteration of the CRV CBA did no refine case of the small Pacific island states due to the existing communication infrastructure status and has recommended technical solution to implement CRV. This is explained in the diagram below:




3.5 While VPN over internet has an advantage over Satellite Communications on the cost are affordable, the performance cannot be guaranteed as the communications rely on Internet and best effort. Fiji has been using the SLA Package D using a 1.0Mbps dedicated internet from August 2020 for voice and AMHS service to Australia, New Zealand and USA after it downgrade the CRV service from Package C+ due to the financial impact caused by COVID-19 pandemic. The service performance of SLA Package D as a proof of concept is provided in Information Paper (IP11) presented by Fiji where the performance analysis has confirmed that the service is reliable and has recommended to be a CRV Solution for small Pacific Island and small ANSP in the region.

3.6 With the reliable performance of the SLA Package D, Fiji is working with PCCWG on a Technical proposal using Package D for Vanuatu, Kiribati & Tuvalu to implement CRV for voice & AMHS service to improve the ATM service in the Nadi FIR.

3.7 The High Level diagram of this propose CRV connectivity using SLA Package D is depicted below.




3.8 The proposed service to operate on the CRV with the required bandwidth is provided in the table below. The voice circuit is between each ANSP ATC Tower/center with Nadi Air Traffic Management center (ATMC) using VoIP. For AMHS, Vanuatu is currently connected to Brisbane center AMHS as an AMHS UA connection and Kiribati & Tuvalu will be connected to the Nadi AMHS as an AMHS UA connection.

| # | State | ATC Center/Tower | Service | Bandwidth | Bandwidth Required |
|---|---|---|---|---|---|
| 1 | Vanuatu | Port Villa | AMHS/AFTN | 64K | 256K |
| | | | Voice (VoIP) | 112K | |
| 2 | Kiribati | Bonriki | AMHS/AFTN | 64K | 256k |
| | | | Voice (VoIP) | 112K | |
| 3 | Tuvalu | Funafuti | AMHS/AFTN | 64K | 256K |
| | | | Voice (VoIP) | 112K | |

3.9 The proposed CRV solution total MRC will include the local internet charge and PCCWG CRV SLA Package D cost. PCCWG is charging the same MRC rate for 64kbps – 2.0Mbps bandwidth for the CRV SLA Package D.

3.10 With target date to implement CRV by 2022, it is recommended that the CRV OG to work closely with the small Pacific Islands, small ANSP in the region and PCCWG on a cost effective CRV solution to implement CRV.

<table>
<tr><td colspan="3">Draft Conclusion XX/XX - Implementation of CRV for small Pacific Island and small ANSP in the region using CRV Solution, PCCWG SLA Package D.</td></tr>
<tr><td colspan="2">What: That, the CRV OG should consider the following to assist small Pacific Islands & small ANSP in APAC in the implementation of CRV:<br>a) Small Pacific Island and small ANSP in the region to consider using CRV SLA package D as the CRV solutions to implement CRV for the exchange of voice & AMHS services<br>b) With target date to implement CRV by 2022, it is recommended that the CRV OG to work closely with the small Pacific Islands, small ANSP in the region and PCCWG on a cost effective CRV solution to implement CRV.</td><td>Expected impact:<br>☐Political / Global<br>☐ Inter-regional<br>☒ Economic<br>☐Environmental<br>☒ Ops/Technical</td></tr>
<tr><td colspan="2">Why: To facilitate the implementation of CRV for the small Pacific Island & small ANSP in the region</td><td>Follow-up: ☒Required from States</td></tr>
<tr><td>When: 17-May-21</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other: XXXX</td></tr>
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## 4. ACTION BY THE MEETING

4.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss the draft conclusion on this paper

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