

International Civil Aviation Organization

ICAO

**Ninth Meeting of the Common aeRonautical Virtual
Private Network Operations Group (CRV OG/9)**

Video Teleconference, 25 – 27 January 2022

Agenda Item 7: States CRV Implementation and operations experience sharing

CRV POST IMPLEMENTATION ISSUES IN BHUTAN

(Presented by the Secretariat, Bhutan, and New Zealand)

SUMMARY

This paper summarizes the issues faced by Bhutan related to CRV post implementation due to the non-readiness of peer States and the action taken by CRV OG and ACSICG for its resolution.

1. INTRODUCTION

1.1 During the CRV OG/8 meeting *held on 17 to 19 May 2021*, under the Agenda Item 5: *CRV operational performance report*, Bhutan put forward some problems being faced by Bhutan related to CRV post implementation.

1.2 Bhutan has entered into contract for CRV with PCCWG in December 2020. However, Bhutan was not able to utilize the CRV since the peer States with Bhutan (India and Thailand) were in process to join CRV while Bhutan has to pay recurring charges every month to PCCWG. Bhutan requested the ICAO APAC Regional Office and CRV OG:

- 1) To help in negotiating with PCCWG to waive or reduce recurring charge till the peer States (India and Thailand) are ready.
- 2) To explore the alternate solutions such as connection through Hong Kong, China or any other States hosting BBIS, which have joined CRV, in order to utilize CRV for AMHS traffic for the intended purpose.

1.3 After the CRV OG/8 meeting, as the follow up action, an ad-hoc group was established to discuss a way out for Bhutan to use its CRV service to some extent temporarily.

2. DISCUSSION
The first meeting of Ad-hoc group formed by CRV OG/8 - 27th May 2021

2.1 The Ad-hoc group formed by CRV OG/8 conducted its first meeting on 27th May 2021 to discuss all possible temporary solutions. .

2.2 The Ad-hoc group reviewed the issue faced by Bhutan and discussed the **two alternate solutions** to resolve this issue. The first solution was to have a negotiation initiated by Bhutan with PCCWG by providing reference to WP/13 and IP/11 of CRV OG/8 presented by Fiji, which proposed

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a potential solution to downgrade the CRV Package as Option-1. As an alternate solution, it was proposed by Ad-hoc group that *the New Zealand may act as a gateway between Bhutan and the existing AMHS services* named as Option-2. In option-2, there may be only Six Countries who need to change the routing table: Bhutan, India, Thailand, Singapore, Australia, and New Zealand. The Airways New Zealand volunteered to act as a BBIS and started the conversation internally and submitted technical requirements.

2.3 The ICAO Secretariat reminded that such extent of discussion on the AFTN Routing Table change on temporary basis has never happened before and as the proposed alternate option required modifications into the AFTN Routing Table, the ACSICG should be a better platform to address it.

2.4 After this Ad-hoc group meeting, Bhutan informed ICAO APAC Office by email dated on 7th June 2021 that PCCWG has not agreed to downgrade CRV Package C to Package D.

The ACSICG/8 meeting - 21 to 23 June 2021

2.5 In ACSICG/8 meeting, the ICAO Secretariat summarized the issues faced by Bhutan. India and Australia proposed that Option-1 suggested by Ad-hoc group was a better option and as per current terms and conditions defined in Tender documents approved by CRV OG, PCCWG should not deny request to downgrade the CRV SLA Package of Bhutan from Package C to Package D. Australia, India, Singapore, and USA requested the ICAO Secretariat to take necessary action to discuss this issue with CRV OG as States should have option to upgrade/downgrade the circuits based on the need. It resulted into ACTION ITEM 8-3 of ACSICG/8.

2.6 Thailand informed that they will implement the CRV in first quarter of 2022. Additionally, Australia, India, New Zealand, Singapore, and Thailand agreed to support Bhutan for implementing Option-2. The ACSICG/8 meeting requested all six member States to create an Ad-hoc group with support of ICAO Secretariat to further discuss about implementation of Option-2 as ACTION ITEM 8-4 of ACSICG/8 and ACTION ITEM 8-3 of CRV OG/8.

The first meeting of Ad-hoc group formed by ACSICG/8 and CRV OG/8- 19th August 2021

2.7 The first meeting of Ad-hoc group formed by ACSICG/8 was conducted on 19th August 2021 as a follow up of ACTION ITEM 8-4 from ACSICG/8 to update the AMHS routing table for CRV post Implementation issues in Bhutan.

2.8 The Ad-hoc group discussed the following two schemes raised by Bhutan:

- a) Scheme-1: Bhutan connects to AMHS through CRV tunnel directly to New Zealand, and New Zealand acts as a bridge between CRV and existing AMHS circuits for Bhutan. In such case, Six Countries need to change the routing table, i.e. Australia, Bhutan, India, New Zealand, Singapore, and Thailand.
- b) Scheme-2: Singapore acts as BBIS for Bhutan while only four Countries will need to change the routing table: Bhutan, India, Singapore and Thailand which will be much easier and minimize the number of states to change their routing table.

2.9 The Ad-hoc group reviewed the AFTN Routing Directory, analyzed the feasibility, and compared the required temporary changes for the AFTN routing table as well as technical infrastructure of two schemes. The Ad-hoc group agreed that the impact for Scheme-2 will be a little bit less than Scheme-1. However, Singapore informed that the new CRV connection will take at least one month from Singapore to make the risk assessment, testing and sign the TMC, therefore the Scheme-2 may be implemented by December 2021. In addition, Thailand and India informed that they will implement the CRV in Q1 of 2022.

2.10 Bhutan requested to implement Scheme-2 by October 2021 and proposed that if Scheme-1 may be implemented by October 2021, they wish to choose that option. After discussion, New Zealand confirmed the feasibility to help Bhutan to implement the Scheme-1 by October 2021. The Ad-hoc group agreed for Scheme-1 that New Zealand acts as the BBIS for Bhutan and decided to move forward.

2.11 The Ad-hoc group agreed to invite technical experts to analyze what kind of changes will be required for the routing table and proposed to have another meeting with the AFTN/AMHS experts from Australia, Bhutan, India, New Zealand, Singapore, and Thailand to further discuss about the routing table changes.

The second meeting of Ad-hoc group - 3rd September 2021

2.12 The second meeting of Ad-hoc group formed by ACSICG/8 with the AFTN/AMHS experts from the six States was conducted on 3rd September 2021 as a further follow up of ACTION ITEM 8-4.

2.13 The Ad-hoc group was informed that Bhutan had sent the State Letter to ICAO APAC Office by Reference no: BCAA/ANS-CNS/006/99 dated on 25 August 2021 with Subject of *Bhutan CRV Issue* to trigger the routing table changing process.

2.14 New Zealand shared the progress of CRV tunnel establishment between Bhutan and New Zealand, and informed that New Zealand and Bhutan are discussing about the CRV IP addressing scheme through e-mail and will start to work on the letter of agreement between two countries after internal discussion. New Zealand will submit change request to PCCWG for tunnel establishment next week.

2.15 Thailand proposed a scheme on routing directory changes for Bhutan issues by adding Bhutan – New Zealand new connection, and further explained on it. The Ad-hoc group reviewed the proposed AFTN Routing Directory changes, and suggested New Zealand to take necessary action for CRV tunnel establishment with Bhutan and PCCWG along with required testing before routing table modifications by all six States. The Ad-hoc group discussed the concerns raised by Singapore for the alternate routing mentioned in the routing table to avoid looping message on the circuits. The Ad-hoc group suggested that all the affected States including the alternate routing States should be included in the discussion to share routing table changes and agreed that the States not included in current discussion will be invited to the Ad-hoc group meeting after bilateral coordination to implement CRV connectivity between New Zealand and Bhutan is done.

2.16 Thailand updated that they will contract CRV by the end of this year while India informed that PCCWG is not able to provide installation in 2021. The Ad-hoc group further discussed about the necessity to update AMC by following AIRAC cycle.

2.17 The Ad-hoc group concluded that Bhutan and New Zealand will bilaterally coordinate to implement CRV connectivity. As soon as they accomplished, they will inform India and Thailand to disconnect from the original service and make changes in the routing table. Later on, Singapore and Australia will follow the routing table changes. The Ad-hoc group agreed that the next meeting time will be based on the request from Bhutan and New Zealand.

2.18 The proposed AFTN Routing Directory changes had been circulated to the Ad-hoc group after the meeting, and revised version is provided as **Appendix A** of this paper.

2.19 The ICAO APAC Office issued a State Letter to Bhutan by Reference no: T 8/2.10 AP-CNS0044/21 dated on 13 September 2021 with Subject of *Bhutan CRV Implementation Issue* after this Ad-hoc group meeting. The State Letter summarized the agreement made by the Ad-hoc group that New Zealand will act as BBIS for temporary CRV tunnel with Bhutan through bilateral coordination,

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and both parties will inform ACSICG as soon as the CRV connection is established, for the required routing table change of affected Member States and parties.

2.20 Bhutan and New Zealand have completed the System Engineering Plan (SEP) in coordination with PCCW Global and with support from the technical team of Aerothai (Thailand). The two states (Bhutan and New Zealand) have also signed a technical letter (mutual understanding on procedures for coordinating CRV operational services) on 2nd November 2021. The signed copy of the technical letter has been shared with PCCW for onward technical set up for establishment of GRE tunnel between Bhutan and New Zealand.

2.21 An email was received from the PCCW Global on establishment of GRE tunnel between Bhutan and New Zealand through CRV on 18th November, 2021.

2.22 The managed router service for PCCW network connection service with PCCW Global has been completed as of 20th December, 2021.

2.23 The acceptance and bidirectional test is yet to be performed between the two countries.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) note the proposed AFTN Routing Directory changes in **Appendix A** ; and
- c) discuss any matters as appropriate.

Routing Directory Changes for Bhutan – New Zealand

Following is the list of COM Centre whose Routing Table should be changed in order to accommodate the route change of Paro COM Center.

- 1) Bangkok COM Centre (VTBB)
- 2) Paro COM Centre (VQPR)
- 3) Brisbane COM Centre (YBBB)
- 4) Mumbai COM Centre (VABB)
- 5) Christchurch COM Centre (NZCH)
- 6) Singapore COM Centre (WSSS)

Present Routing

(Refer to AFTN/ATSMHS ROUTING DIRECTORY ASIA AND PACIFIC REGIONS TWENTY – EIGHTH EDITION JULY 2018)

ORIGIN DESTINATION	NZCH		VABB		VQPR		VTBB		WSSS		YBBB	
	NM L	ALT N	NM L	ALT N	NM L	ALT N	NM L	ALT N	NM L	ALT N	NM L	ALT N
NZ	(N)	n	VT	vc	VA		WS	wm	YB	wi	NZ	ks
VQ	YB	ks	VQ	vt	(N)	n	VA	ws	VC	vt	WS	wi

Change to

ORIGIN DESTINATION	NZCH		VABB		VQPR		VTBB		WSSS		YBBB	
	NM L	ALT N	NM L	ALT N	NM L	ALT N	NM L	ALT N	NM L	ALT N	NM L	ALT N
NZ	(N)	n	VT	vc	NZ		WS	wm	YB	wi	NZ	ks
VQ	VQ		VT	*ws	(N)	n	WS	wm	YB	wi	NZ	ks

Yellow HIGHLIGHT = CHANGE

*India proposed to change the routing via VTBB and Alternate via WSSS (Instead of VCBI) for VABB when the Bhutan - New Zealand CRV tunnel become operational through E-mail.
