International Civil Aviation Organization

Seventh Meeting of Aeronautical Communication Service Implementation Co-ordination Group of APANPIRG (ACSICG/7)

Web-conference, 21 – 23 July 2020

Agenda Item 3: Review the report of the Seventh meeting of Common aeRonautical VPN Operations Group (CRV OG/7)

OUTCOME OF CRV OG/7 MEETING

(Presented by the Secretariat)

SUMMARY

This paper presents the outcome of the Seventh Meeting of Common aeRonautical VPN Operations Group (CRV OG/7) for review by the meeting. Expected actions by the meeting is in Session 3 of the paper.

1. INTRODUCTION

1.1 The Seventh Meeting of the Common aeRonautical Virtual Private Network Operations Group of APANPIRG (CRV OG/7) was held at the Conference Building of ICAO Asia Pacific Office, Bangkok, Thailand from 20 to 22 January 2020.

1.2 The meeting was co-chaired by Mr. Terence Palmer from Airservices, Australia and Mr. Kelepi Dainaki from Fiji Airports. 57 participants from 17 States/Administration participated in the meeting including those from Australia, China, Hong Kong-China, Fiji, India, Indonesia, Japan (as an observer) Malaysia, Myanmar, Nepal, Philippines, Papua New Guinea, Republic of Korea, Russian Federation, Singapore, Thailand. USA and representatives from ICCAIA (AIREON) and PCCW Global.

1.3 The report of the meeting and papers presented to the meeting is provided at the following webpage: https://www.icao.int/APAC/Meetings/Pages/2020-ACSICG7.aspx

2. DISCUSSION

Updates on the AMHS/ATN/AIDC and APAC CRV Implementation Tables

2.1 The meeting reviewed and updated the AMHS/ATN/AIDC and APAC CRV Implementation Tables based on the updates since September 2019.

2.2 The AMHS/ATN/AIDC table is provided in **Appendix A** and the APAC CRV Implementation Table is provided in **Appendix B** to this paper for further updates.

Feasibility of utilizing existing Satellite Link between China and Nepal while implementing CRV

2.3 Nepal intends to join the CRV on a staged basis and wishes to use the existing infrastructure to connect CRV with support of AMHS data connectivity as the first priority. China was requested to investigate the possibility whether the C-Band TES Satellite network connectivity to adjacent States can be incorporated for linking to CRV such as Vietnam, Mongolia, DPR. Korea, Mongolia, and Macau China. Whereas some of these links are to be upgraded, those that have been recently upgraded include Myanmar in 2017 (BW 110 Kbps), Nepal in 2015 (BW 110Kbps) and Vietnam in 2019 (BW 330Kbps). This would reduce both period of testing and costs. The meeting encouraged States concerned and the PCCWG to look into the proposal and to study the feasibility.

CRV Status for DSNA, France

2.4 France provided information about the progress of DSNA in its decision process for joining CRV. Several scenarios of implementation were considered. The benefits should be considered in the long term and especially the opening towards future data exchanges such as ADS-B and AIDC etc. and some services such as SWIM. There is only one Telecommunication Provider in New-Caledonia and also in French Polynesia. In order to avoid Single Point of Failure, the best scenario is to set-up a VSAT connection to CRV core network with a back-up over Internet. The decision needs to make soon, taking into account the requirement of ICAO to implement CRV no later than 2020.

Progress of CRV Implementation in India

2.5 India updated the meeting on CRV Implementation status. India (AAI) has shared High Level questionnaire with M/s PCCW Global Ltd. for assessment/comment to plan, design and implement CRV in India along with bandwidth and media redundancy requirement after successful completion of the POC. It was noted that India had recently signed a treaty for avoidance of double taxation with Hong Kong-China which has come into effect in India with effective date from 01 April 2019. In terms of the said treaty, it is possible for PCCWG to seek credit in respect of taxes paid in India against its tax liability in Hong Kong. The PCCWG and India are expected to provide updates on this matter.

Fiji Implementation of Voice & AMHS/AIDC over CRV Network

2.6 Fiji updated the meeting on the successful implementation of voice and AMHS/AIDC services with Australia, New Zealand & USA over the CRV network. The CRV NID was installed in December 2019. Fiji had completed the migration of ATS Voice and AMHS/AIDC with States concerned.

2.7 The Operational performance of the Voice & AMHS/AIDC services over the CRV has been satisfactory since it was commissioned for operation in July, 2019. ATC has acknowledged the improvement in voice quality for communication using VoIP. To improve the reliability of the CRV, Fiji plans to upgrade the current CRV Package C+ to CRV Package B+ to enhance connection resiliency. Any development on the updates?

Implementation Plan for CRV and Cyber Security Concern in Indonesia

2.8 Indonesia informed the meeting that they would use 2 package A with 2 Mbps bandwidth that connect to 2 centers in in Jakarta Centre (JATSC) and Ujung Pandang Centre (MATSC) respectively to achieve high availability and alternate functions. Both connections will service for all applications including AFTN/AMHS, AIDC, Voice, ADS-B data sharing. Indonesia is expected to provide updates on the target date for implementation with counter parts as shown in the following table:

	AIDC	AFTN/AMHS	ADS-B	VOICE
Singapore	TBD	2020	2020	2020
Australia	2020	2020	2020	2020
Malaysia	2020	-	-	2020
Papua New Guinea	2020	-	2021	2020
Philippines	2020	-	-	2020
USA	2020	-	-	2020

CRV Implementation Status in the Philippines

2.9 The voice connection over CRV between Manila and Taipei was put into operation in March 2019. AMHS CRV Inter-Operability Test (IOT) successfully completed on 30 April 2019. On 6 September 2019, the Manila/Taipei AMHS over CRV was officially into operation. Manila/Oakland ATS voice over CRV implemented in 11 September 2019. Manila/Singapore ATS voice over CRV implemented 3 January 2020. CRV Network Performance for 2019 in the Philippines is very satisfactory, though network outages experienced from 7 February 2019 to 14 December, 2019.

Airservices Australia CRV Update

2.10 Australia presented an update on the CRV implementation. Airservices elected to install 2 “Package C” CRV services. The first service was installed in the Brisbane Centre and the second service was installed in the Melbourne Centre. BGP (boarder gateway protocol) is deployed between Melbourne and Brisbane for failover of the CRV services in the case of a local link failure. Airservices elected to use a ping IP SLA measure to continuously test the availability of the PCCWG POP from the Customer Edge router. This enables Airservices to make routing decisions if there is a NID or a POP failure.

2.11 Since the migration of these services, Airservices has seen the greatly improved reliability of international network connections and improved voice quality of speech between controllers. Airservices has not experienced any loss of service due to a link failure, but rather with planned maintenance. Airservices will continue to seek to establish secure VPN tunnels over the internet between our AHMS partner states to ensure the continuity of AHMS during a CRV outage.

ATN/AMHS/AIDC/CRV Implementation Status updates by Myanmar

2.12 Myanmar informed the meeting that the target date of AIDC implementation with Thailand is 1Q2020 while AIDC testing with Kunming, Chennai, Kolkata and Vientiane will be conducted in 2020. Myanmar has taken a staged approach and would sign contract with PCCWG for exchanging traffic of AFTN/AMHS, AIDC and voice in 3Q2020.

Discussions on the Pacific Solutions updates

2.13 In following the discussions at CRV OG/6 meeting, the meeting was informed that the interconnection with PASNET being explored by New Zealand and PCCWG who were working on a way forward. Some solid solution proposal is expected to be presented to the AFSSP WG meeting scheduled for April 2020, which has been postponed without a confirmed date.

Annual Performance Presentation from PCCW Global

2.14 PCCWG presented annual service performance report for 2019 for those States/Administration who had signed off the CRV service, i.e. Australia, Hong Kong-China, Fiji, Japan, New Zealand, Philippines and USA. The information on the inventory, fault ticket reported, fault case detail, Site Availability of the subscribed services. The CRV OG member States were happy with the report format and information provided in the report. Such reports are expected to presented to the CRV OG annually and provided on the CRV OG portal site or meeting site of CRV OG meetings. The meeting encouraged States to make similar review with PCCWG individually and with CRV OG regularly.

Review the draft CRV Operations Manual

2.15 The meeting reviewed the comments collected by the Secretariat on the draft CRV Operations Manual resulted from CRV OG/6 meeting in May 2019. The meeting recalled that the manual is based on ITIL 2011 Processes and will govern the operations and performance of the CRV Network. The meeting further endorsed the information in the draft operations manual on connection process of a service provider to the CRV. Although further works are required on the operations manual, the meeting considered too late if the operations manual to be adopted in 2021. There is urgent need to have the first edition of the Operations Manual released in the year of completion of CRV implementation. Accordingly, the following draft Conclusion was formulated for consideration by ACSICG and CNS SG:

<table>
<tr><td colspan="3">Draft Conclusion CRV OG/7/1 - CRV Operations Manual</td></tr>
<tr><td colspan="2">What: That, the CRV Operations Manual provided in Appendix C to this Report be adopted as first Edition for use by CRV member States/Administrations.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Need an operations manual for CRV OG performance and CRV operations</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 25-Jul-20</td><td colspan="2">Status: Adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☐Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other: XXXX</td></tr>
</table>

2.16 India proposed to develop a CRV user checklist for daily operation which could be appended to the next edition of the Operations Manual. Need was also identified for the volunteers to contribute for the development and input from PCCWG is expected.

CRV Pioneer State contribution to the ICAO Managed Service Agreement

2.17 Pioneer States contributed to the CRV MSA fund that was used to fund the ICAO Assistance for the procurement of Asia/Pacific Common Regional Virtual Private Network (CRV) Services (RAS14801). Currently there is an available balance of approximately USD 88,000.00 less the ICAO Technical Cooperation Bureau (TCB) service overhead. the CRV OG co-chair (Asia) and & pioneer CRV member States were tasked to investigate use the MSA funds to undertake the independent safety assessment of the CRV. Accordingly, Decision CRV OG/6/3 was made in May 2019 on the funds to be used for an independent assessment on the safety and security of the CRV. The Co-Chair (Asia) will coordinate to finalize a scope of work to address the agreed use of the funds. The latest development is expected to report to the 2020 APAC Aeronautical Fixed Service Safety and Protection Planning Working Group Meeting (AFSSP WG 2020) scheduled for 21 - 23 April 2020.

CRV for AMHS Centres of the Russian Federation Interacting of COM Centres in the APAC Region

2.18 Russian Federation provided updates on their plan and progress of joining CRV at number of centres (Moscow, Khavarosk Irkusk) in Russia to interact with COM centres (Fukuok, Beijing and Ulaanbaatar) in the APAC Region. In following up the outcome of COM Coordination Meeting in May 2019, Russian Federation is considering options to join CRV at those designated entry/exit points in Russia with entry/exit points in the APAC Region. It was further informed that minimum three months would be required for Russina Federation to perform the tender process.

2.19 The all members of CRV OG attended CRV OG/7 meeting expressed their supports for Russian Federation to join CRV. China supported Russian Federation to join CRV as it would be more cost effective solution to replace the landline between Beijing and Khavarovsk which updated recently. Japan expressed no objection for Russsian Federation to join CRV for use of the service to support circuits between Japan and Russia. In following up the outcome of the meeting, the ICAO Secretariat sent a letter with reference of**:** T 8/2.10- AP-CNS0020/20 dated 20 February 2020.

MPLS/IP Based Inter-Regional Connection

2.20 The meeting agreed to a proposal to develop a high level concept on the interconnection of the CRV with other regional network such as REDDIG/MEVA/PENS. A number of States that connect to the CRV are also required to connect to other regional networks. There are potential benefits with implementing interconnections between regional networks such as harmonization and efficiency in the connection for services like SWIM and reducing costs for States that connect to other regional networks. Some States had already expressed their interest in a connection to other regional networks such as New Zealand to REDDIG and Singapore to PENS.

2.21 Noting these requirements, early discussions with these regional networks, the CRV OG and PCCWG will enhance the discussions with these regional networks at AFSSP WG 2020 how the CRV can potentially be interconnected with other regional networks.

CRV and AFS Safety and Protection planning

2.22 In following up the outcome of CNS SG/23 meeting, FAA offered to host AFS Safety and Protection joint working group meeting scheduled for 21 to 23 April 2020 in Nevada, USA. All member States of CRV OG presented at the meeting expressed their supports to organize such a meeting at the full implementation stage of CRV. The meeting considered necessary and timely to address

safety and security concerns as more and more AFS and other new applications being transferred to and exchanged over CRV.

Voice over IP Dial Plan

2.23 USA shared with the meeting on a proposed dial plan to address the Voice over IP (Internet Protocol) dialing table used for communications between Japan and FAA. Air Traffic Service (ATS) voice communications over CRV will be used for air traffic transfer between Japan ATMC and the FAA. PCCWG will perform IP digit manipulation. A comprehensive dial plan is required to provide to PCCW to ensure proper call routing.

2.24 The phone numbers for the various Air Traffic Controller positions in Japan and the FAA are required. Implementing VoIP into current CRV telecomm design requires Japan and the FAA submit information about dialing procedures performed by each entity and their voice switching equipment. These procedures will have dial sequences that will be translated between the two organizations using CRV network equipment. Translation of digits should be transparent to Air Traffic Controllers.

2.25 Adherence to ICAO dial plan format is necessary. ICAO has developed a format in which these translations should occur. An 8-digit numbering plan that looks like this:

- 1-3 digits will be for the Country Code/Area Identifier (AA) – E.164;
- 2 digits will be for the ANSP Centre code (CC) – ANSP provided; and
- 3 digits for the operator position (OO) – ANSP provided

2.26 The meeting considered necessary to maintain a table with VoIP dial plan for whole APAC Region. The table should be kept updated by PCCWG and forwarded to co-chair of CRV OG for posting on the CRV Portal.

FAA International User Portal

2.27 USA informed the meeting of a proposed plan to address the FAA's platform for providing IP services connectivity to external users using the International User Portal (IUP).

2.28 International Partner circuits connect to FTI through a set of routers positioned on the external side of the FAA's NESG (NAS Enterprise Security Gateway). The IUP provides IP (Internet Protocol) access for IP applications. IUP supports both IPv4 and IPv6 as well as operability between the two protocols. The IUP platform is implemented by L3Harris at three locations: ATL NEMC (Network Enterprise Management Center), SLC NEMC, and the FAA Tech Center (for testing).

2.29 Security in the IUP is configured in a 4-zone format: External Connection, Ops IP Connection, Internal DMZ, and External DMZ. IP tunnels, Firewalls, NATs (Network Address Translations), and ACLs (Access Control Lists) are used to strengthen security. Connection security is accomplished by having external IP sessions provided by a non-FAA server.

Update Subject/Task list of CRV OG

2.30 The meeting updated the list of subject/task (action items). The meeting also reviewed the national focal points of CRV Implementation currently kept in the CRV Implementation Manual. The meeting agreed to have it kept duplicated and posted on the ICAO webpage separately under APAC

eDocument. The updated list of national focal points of CRV Implementation is provided in Appendix E to the meeting Report.

Proposal to use CRV for Space based ADS-B

2.31 PNG and ICCAIA jointly made a presentation on use of CRV for delivery of surveillance data from spaced based ADS-B. PNG Air Services Limited (PNGASL) has contracted for the supply of space based ADS-B data from Aireon LLC and is intending to contract for a CRV connection in early 2020 for a number of applications including space based ADS-B. One prime purpose for using CRV is to reduce the need for point to point circuits and would result in lower data communications costs for ANSPs. Aireon and PNG ASL believe that delivery of space based ADS-B via CRV will achieve these objectives. Indonesia expressed support to PNG's proposal to use CRV for distribution of space based ADS-B data.

2.32 The meeting was informed that the space based ADS-B is now fully operational. The service is being used by Canada and United Kingdom to separate aircraft in the Atlantic Ocean (using trial ASEPS procedures) and over continental Canadian airspace using 5 NM separation standards. In June 2019 Aireon was officially approved by the European Union Aviation Safety Agency (EASA) as an **Air Navigation Service Provider (ANSP)** Organization to provide Air Traffic Management (ATM)/Air Navigation Service (ANS) surveillance services, to support the separation of aircraft. This authorizes Aireon as the first-ever certified provider of aircraft surveillance-as-a-service.

2.33 A number of participants asked for cost and benefit comparision between CRV and dedicated circuits used for delivery spaced based ADS-B data. Australia, Fiji and PCCWG were requested to develop a charging structure as soon as possible for an ANSP service provider to receive surveillance data so as to facilite conducting CBA by ANSPs.

SWIM Demonstration on CRV

2.34 Hong Kong China, Thailand, Singapore and PCCWG jointly presented a proposal for SWIM Demonstration on CRV hosted by Hong Kong China was scheduled for March 2020 to demonstrate the exchange of SWIM data over CRV, which is a potential hybrid SWIM infrastructure presented in HKCAD's previous paper at CRV OG/5 meeting. The demonstration would be conducted over a dedicate mini-CRV to be provided by PCCWG for the demonstration which would not impact normal operations for the routine traffic being exchanged over CRV. The SWIM Demonstration on CRV will showcase the operational benefits in using CRV to carry SWIM data and the corresponding services envisaged as necessary or complementary to support implementation of SWIM in APAC region through an operational scenario with real exchange of SWIM data.

2.35 The member States of CRV OG presented at the meeting fully supported the demonstration to be conducted by States concerned with PCCWG as it is a further step forward after SWIM Demonstrratoin in ASEAN were condcuted in Bangkok and Singapore in Novemer 2019.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matter as appropriate

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ATN/AMHS/AIDC Implementation Status in the APAC Region

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
AFGHANISTAN					
AUSTRALIA	ATN tests were conducted. BIS Router and Backbone BIS Router and AMHS implemented. AMHS has been migrated to CRV. Connection with Singapore using AMHS was implemented October 2016; Another AMHS connections pending CRV (target date by March 2020) including both connection with New Zealand and USA. AMHS connection with Indonesia pending on CRV implementation AMHS connection with South Africa has been established Plan to upgrade AMHS support IWXXM traffic from Nov. 2020.	COMSOFT	AFTN/AMHS based AIDC Implemented between Brisbane and Melbourne, Oakland, Nadi and Auckland; Implemented between Melbourne and Johannesburg; AIDC is also in use between Melbourne and Mauritius; Operational trial between Brisbane and Ujung Pandang since May 2013. Implementation in July 2017. LOA needs to be updated.		

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
BANGLADESH	In Q1/2013, Bangladesh installed ATN/AMHS and BIS Router at Dhaka (VGHS) with User Agents at Chittagong (VGEG) and Sylhet (VGSY).	COMSOFT	Tentative date of implementation of AIDC is Q4 of 2018 with Kolkata and Myanmar.		The Bangladesh ATM Upgrade Project (BATMUP) under Public Private Partnership (PPP) in Dhaka is expected to be completed by 2018. As soon as the ATM up-gradation is completed hopefully Bangladesh will be able to implement AIDC with Kolkata and Myanmar by the end of 2018.
BHUTAN	ATN/AMHS circuits, using IP over VPN, with Thailand (Bangkok) and India (Mumbai) commissioned in June and July 2017 respectively. IOT and POT with Mumbai completed on 27th June 2017. IOT and POT with Thailand completed on 2nd May 2017.	AEROTHAI'S AMHS System	Currently not applicable. If required in the future, will be decided after CRV implementation (scheduled for mid-2019).		

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	TMC signing with both countries at final stage.				
BRUNEI DARUSSALAM	ATN BIS Router planned for 2015 and AMHS planned for 2015				
CAMBODIA	BIS Router and AMHS installed. Cambodia (CATS) AMHS connected with Bangkok via VSAT IP link since 10 December 2013	AVITECH	AIDC function and capability made available. Ready for testing with neighbors ATS Facilities starting from 2017 and target date of implementation with Bangkok in 4Q2019	THALES which supports AIDC ICD Version 1.	
CHINA	ATN Router and AMHS including NCC deployed in 2008 which is being upgraded to support ATN/IPS with target date of completion in December 2013. The Beijing-Hong Kong AMHS link was put into operation in 2018; With Thailand is completed POT, after sign the TMC circuit and was put into operation in Q12020 AMHS/ATN technical tests with Macau completed in 2009. Plan for ATN/AMHS implementation with Macao China in 2019.	IN-HOUSE (Aero-Info Technologies Co., Ltd)	AIDC between some of ACCs within China has been implemented. AIDC between several other ACCs are being implemented. AIDC between Sanya and Hong Kong put in to operational use since 8 Feb 2007. AIDC between Dalian and Incheon implemented in Nov. 2016;		

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	ATN/AMHS circuit with ROK has been put into operation since June 2011. ATN/AMHS tests with India has been put into operation since 2016. ATN and AMHS IOT with Mongolia is completed in May 2018. Plan for commissioning after POT completion in 2020 Connection tests with Nepal is TBD. AMHS testing with Japan in 2020. AMHS testing with Russia in 2020.		Guangzhou with Nanning/Zhanjiang/Zhuhai implemented; Nanning and Kunming/Guiyang/Zhanjiang implemented in 2011; Zhanjiang/Haikou; Chengdu and Chongqing/Guiyang implemented in 2011; Guiyang and Chongqing/Kunming implemented in 2011; For Beijing/Ulaanbaatar, planned date of testing in 2020.		
HONG KONG, CHINA	**Manila / Philippines** CRV/AMHS circuit was put into operation in May 2019. **Beijing / China** ATN/AMHS circuit was put into operation in 2018. Plan to migrate to CRV in 2020. **Bangkok / Thailand** ATN/AMHS circuit was put into operation use in 2014. Plan to migrate to CRV in Q32020.	COMSOFT	AFTN-based AIDC with Sanya put into operational use in Feb 2007. AIDC technical trial with Taibei conducted in 2010 and completed in 2012 and put into operational use in Nov. 2012 AIDC technical and interoperability tests with Guangzhou were conducted successfully in April and	Raytheon ATM system Support AIDC ICD Version 3 commissioned in November 2016.	Already support exchange of IWXXM messages based on FTBP.

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	Fukuoka / Japan Currently on AFTN. Plan to cut over to CRV/AMHS in Q1 2020. **HoChiMinh / Vietnam** Currently on AFTN. Plan to test ATN/AMHS in 2020. **Taibei** Currently on AFTN. Plan to test CRV/AMHS in 2020		June 2017 respectively and put into operational use in May 2018. AIDC technical and interoperability tests with Manila were conducted successfully in May 2018 with no observations on exchanging core set messages (EST, ACP, TOC, AOC, LAM, LRM). AIDC operational trial with Manila was commenced in March 2019. .		
MACAO, CHINA	ATN/AMHS interoperability test with Beijing commenced in March 2009. ATN/AMHS circuit with Hong Kong put into operational use in end Dec. 2009. ATN/AMHS implementation with mainland China planned for 2019.	COMSOFT	(Not applicable for using AIDC, looking into the possible application (some way) between TWR and ACC/APP).		
COOK ISLANDS					
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	The ATN BIS Router and AMHS planned for in 2011.		With neighboring ACCs to be implemented		

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
FIJI ISLANDS	ATN BBIS IPS router and AMHS implemented over CRV for connection to USA in April, 2019 with Australia planned for June, 2019. . For connections with sub-regional centers: For New Caledonia using AMHS since 2017; For connection with Kiribati using UA/AMHS implemented in 2015.	COMSOFT	AFTN based AIDC implemented between Nadi/ Brisbane, Auckland and Oakland.	- Support and implemented AIDC messaging: ABI, EST, CPL, CDN, ACP, TOC, AOC with all three centers - AIDC ICD version 2.0 implemented with Auckland and Oakland. - AIDC ICD Version 1.0 implemented with Brisbane	
FRANCE ***(French Polynesia Tahiti)***	Planned for implementation of AMHS in 2020. Using IP with New Zealand since 2017.		Implementation of AIDC (based on Version 3) with adjacent centers (Oakland and Auckland) since 2009.	THALES EUROCAT for AIDC	Alternate routing for backup between Tahiti and Christchurch via Tahiti/New Caledonia IP link
INDIA	Dual stack ATN/IP router and AMHS implemented at Mumbai in 2011. Operational AMHS connections with Bangkok, Dhaka, Singapore, Kathmandu, Karachi implemented. With Beijing implemented in 2016; With Colombo implemented in May2017; With Bhutan implemented in July 2017; Planned for Nairobi in Q1 2020 and Muscat for 2020.	COMSOFT	-15-May-2017, AIDC implemented between Chennai and Kuala Lumpur with ABI and EST messages. CDN is done with voice confirmation. TOC/AOC to be implemented; - Chennai-Colombo under test trial; - Chennai-Male under test trial; - Chennai-Yangon under test trial;	1) Raytheon at Mumbai and Chennai. 2) Selex at Hyderabad and Bengaluru. 3) INDRA at 40 locations	1) Major Indian airports and ATC centers have integrated ATS Automation Systems having AIDC capability. Successful AIDC trials have been carried out amongst major ATSUs within India. 2) AIDC implemented between Chennai and Mumbai. 3) AMHS implemented and working between

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
			- Mumbai-Male test trials completed; LOA signed. - Trivandrum-Male under test trial. LOA signed. - Mumbai-Muscat under test trial; -Ahmedabad-Karachi under test trial. LOA signed.		A. BBIS: Mumbai-Singapore, Bangkok B: BIS: Mumbai, Kathmandu, Dhaka, Karachi, Colombo & Paro
INDONESIA	ATN BIS Router and AMHS with Singapore implemented Since February 2018; AMHS Trial (IOT) with Brisbane pending for CRV implementation.	IDS ELSA	Implementation Jakarta (new ATM system in 4Q2020) The target date of AIDC implementation will commence testing in 4Q2020 including following pairs: Jakarta-Singapore; Jakarta-Chennai; Jakarta-Ujung Pandang; Jakarta-Melbourne; Jakarta – Kuala Lumpur Ujung Pandang –Brisbane: implemented in July 2017. Ujung Pandang – Manila - Successful testing conducted; Target date of implementation 4Q2019 Ujung Pandang - Kota Kinabalu - Implementation date TBC	Thales in Makassar able to support ICD Version 3 since December 2015	For CRV, contract in 1Q2020 and implementation in 2Q2020

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
			-Ujung Pandang – Oakland, test conducted, and target date for implementation in 3Q2019. - Ujung Pandang – PNG trial 3Q2020		
JAPAN	ATN BBIS router and AMHS installed at 2000. Connection tests with USA 2000 - 2004 and put into operational use in 2005. ATN BBIS router (to apply to Dual Stack) and AMHS (to upgrade in 2015. The connection test with each country which is not currently connecting is started after update. Upgrading connection with Hong Kong and Singapore using VPN will be implemented in 2020 after implementation of CRV. Coordinating for all other circuits upgrading.	NEC	AIDC implemented between Fukuoka ATMC and Oakland ARTCC in 1998. AIDC implemented between Fukuoka ATMC and Anchorage ARTCC in 2005. AIDC implemented between Tokyo ACC/Fukuoka ACC and Incheon ACC in 2010. Implemented between Fukuoka and Incheon since June 2009. AIDC implemented between Fukuoka ACC/Naha ACC and Taibei ACC implemented. AIDC between Fukuoka ACC and Shanghai ACC under negotiation.		Japan and USA conducting testing AIDC over AMHS and cutover date is 5 May 2017.

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
KIRIBATI	Connection with Nadi using UA/AMHS implemented in 2015.				
LAO PDR	ATN BIS Router and AMHS completed, planned for operation with Bangkok since 4Q 2016.	THALES	AIDC testing with Bangkok in 2017 and target for implementation in 4Q2019. Testing with Hanoi on-going since 2017; with Cambodia operational test again in June 2018, and implementation 2Q 2019. Testing with Kunming and Yangon ongoing.	THALES which is able to support ICD Version 2.	
MALAYSIA	ATN BIS Router completed 2007. AMHS implementation planned for Q42017; Malaysia – Singapore for AMHS implementation in March 2020. Malaysia – Thailand for AMHS implementation in 2019.	FREQUENTIS	AIDC testing with Bangkok ACC conducted since 2016. Operational trial will commence in August 2019. AIDC Between Kuala Lumpur/ Chennai implemented in phases from May 2017 implementation for ABI, EST and MAC along with response messages LAM, LRM and ACP. Review on the CDN message implementation conducted in Aug. 2017. SOP signed 26 April, 2017. AIDC testing with Singapore on going since	SELEX which is able to support ICD Version 3.	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
			2016. Target date for operational trial from 3Q2018, and Implementation 2Q2019. Planned testing with Ho Chi Minh ACC – 3Q2019; AIDC between KK ACC and Manila ACC in 4Q2020 and technical testing 2Q 2019. KK ACC with Ujung Pandang TBC; AIDC between Kuching ACC and Singapore planned for 2Q2020; AIDC technical test between Kota Kinabalu ACC and Singapore planned for 3Q2019; AIDC between Kuala Lumpur and Jakarta testing planned for 4Q2020.		
MALDIVES	In the process of replacing the existing operational AFTN system by AMHS. It is expected to complete the installation before the end of 2019. With the new AMHS, it is planned to establish a new IP connection between an additional		Connection established with all the adjacent ATSUs. Interoperability tests successfully completed in 2017.	SELEX which is able to support ICD Version 3.	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
	neighboring ATSU as the current link is an X.25 connection between Colombo. Also will look for the possibility of implementing the CRV network to use with AMHS and AIDC during the same phase.		LOA signed for operational trials between Mumbai, Chennai, and Trivandrum. Operational trials were also successful with these ATSUs, while several issues were resolved from both ends. Ready to sign LOA with Melbourne and is expected during the 2nd quarter of 2019. Trials with Colombo had few issues, which Colombo is working to resolve it on their end with the automation system supplier. Connections between all 5 ATSUs are turned ON in the ATS automation system to conduct pre-notified operational trials.		
MARSHALL ISLANDS					
MICRONESIA (EDERATED STATES OF)					

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
Chuuk					
Kosrae					
Pohnpei					
Yap					
MONGOLIA	AMHS/AFTN gateway implemented 2012. ATNBIS router implemented in 2014. ATN and AMHS IOT with China was completed in May 2018. Plan for commissioning after POT completion in 2019.	COMSOFT	ATM automation system supports both AIDC and OLDI. Coordinating with Russia on OLDI connection in target date 2016. Coordinating with China on AIDC connection between Beijing/Ulaanbaatar technical trials in progress. Planned date of testing in 2019.	INDRA Aircon 2100 supporting AIDC ICD Version 2.	
MYANMAR	AMHS including ATFN/AMHS gateway implemented in Nov. 2011; Connection with Thailand implemented in 4Q2016; Planned for AMHS connection with Beijing. Target date TBC.	THALES	AIDC connection pre-operation test with Thailand conducted in 4Q2017 and Target date of implementation 1Q2020; AIDC testing with Kunming Chennai, Kolkata and Vientiane conducted in 2020.	THALES Automation system (Topsky ATC supports APAC AIDC ICD Ver. 2.	
NAURU					

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
NEPAL	AFTN/AMHS Gateway implemented in 2012. AMHS implemented with India since June 2014. AFTN connection with China. Plan to test AMHS connection soon.	COMSOFT	Nepal uses custom built ATM system from NEC. Some issues regarding ICD need to be resolved in order to proceed ahead with AIDC testing with India and China.		
NEW CALEDONIA	New router and AMHS commissioned December 2016	COMSOFT			
NEW ZEALAND	AMHS connection with the USA over CRV was implemented in April 2019. AMHS connection to Australia over CRV is scheduled for June 2019.	COMSOFT	AIDC implemented between New Zealand, Australia, Fiji, Tahiti, Chile and USA.	Supported the Basic 5 message set. ATM systems are LEIDOS and ADACEL	
PAKISTAN	ATN/AMHS connections with Mumbai since 2015. Planning for AMHS connection with Beijing and Kuwait after upgrading existing facilities between the Countries. Target dates for implementation TBC.	COMSOFT	Implemented between Karachi and Lahore ACCs Further testing to be conducted between Delhi/Karachi & Delhi/Lahore after system upgradation at Indian end; Mumbai/Karachi &AHM/Karachi on trial operation. For testing with Muscat planned for 4Q2019. Coordination for testing with Tehran is in progress.	ATM system from Intra AIRCON 2100	Existing Radar system being upgraded.

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
PAPUA NEW GUINEA	Currently AFTN over IP. AMHS implementation is planned for after successful implementation of CRV this year. AMHS implementation planned for 2020.	COMSOFT is the supplier of PNG AFTN/AMHS system	AIDC using AFTN operational with Australia, testing/trial with Oakland (USA) started late last year and in progress. AIDC implementation with Indonesia to happen after CRV implementation this year.	New ATM System from Thales (TopSky-ATC) implemented and operational now supports AIDC V3.	
PHILIPPINES	New ATN/AMHS was installed at the New CNS/ATM Center in Manila. Site Acceptance was successfully done on October 2015. The new AMHS commissioned and operational in March 2018. The international connection still using AFTN except Hong Kong. The AMHS Implemented over CRV with Hong Kong 1Q2019 and with Singapore is planned over CRV by end of 2Q2020. AMHS implementation with Oakland USA via CRV is planned for 3Q2020.	COMSOFT	On-going test with Singapore, Ujung Pandang and Taipei ACCs; Planned technical trial over new ATM system with other ACCs from 4Q2017 to 3Q2019: Coordination is underway for using AIDC function of the new ATM system with adjacent ACCs. Planned implementation: 2Q2019 – Singapore ACC; 4Q2019 – Ujung Pandang ACC; 3Q2019 – Taipei ACC; 2Q2019- Hong Kong ACC;	THALES which is able to support ICD Version 2.	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
REPUBLIC OF KOREA	ATN/AMHS circuit with China put into operational use in June 2011. AMHS implementation with China over CRV in 2Q2020. AMHS implementation with Japan over CRV in 4Q2020.	SAMSUNG	AIDC implemented between ACC and Fukuoka ATMC in 2010 AIDC between Incheon and Dalian implemented in Nov. 2016.	Rockheed Martin System	
SINGAPORE	AMHS implemented. ATN/AMHS circuit with India put into operational use in March 2011. ATN/AMHS circuit with UK put into operational use in March 2012. ATN/AMHS circuit with Thailand put into operational use in December 2014. ATN/AMHS circuit with Australia put into operational use in October 2016. ATN/AMHS circuit with Indonesia put into operational use in February 2018. Inter-Operability Test (IOT) with Japan, Malaysia, and Vietnam started 2019, targeted in 2019. IOT with Philippines, Sri Lanka, Bahrain and Brunei targeted in 2020.	FREQUENTIS COMSOFT	Operational with Ho Chi Minh implemented July 2014 Kuala Lumpur operational trial started since September 2018 and is implemented Nov. 2019. Manila operational trial started in February 2019. Implementation Nov. 2019 Technical trials with Jakarta ACC will be initiated once the Jakarta ACC ATMS renewal is completed.	THALES supports ICD Version 3 since December 2018	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
SRI LANKA	ATN BIS Router Planned for 2013. IP based AMHS implemented by Oct. 2017. - Mumbai tested May 2017 operational planned for Q4 2017; - Singapore testing in Q4 2017 operational for 2018; - Male testing and operational date TBD.	IDS	Trials with Male planned for in 3Q2019. Trial with Chennai on-going. Plan for implementation in 2018 and with Melbourne plan for 1Q2018.	INTELCAN which is able to support ICD Version 3.	
THAILAND	BBIS/BIS Routers already implemented. AMHS has been implemented since July 2011. Connection with Bangladesh, Bhutan, Cambodia, China, India, Lao PDR, Myanmar, Singapore, Hong Kong China implemented. Implementation with Malaysia planned for 2019. Interoperability Test: with Viet Nam planned for end of 3Q2019 and Italy planned for end of 4Q2019 Connection with SITA (SITA AMHS Gateway inter-connections) implemented.	AEROTHAI's AMHS System	AIDC Connection test with Lao PDR, Cambodia, Myanmar and Malaysia underway since 2016; Operation trial with these States from late 2017 to early 2019. Target date of implementation is around 2Q2020.	THALES which is being implemented with planned completion in 4Q2019. AIDC feature supports APAC AIDC ICD V.3.	
TONGA	AMHS planned for 2008. The provider is linked to the New Zealand AFTN				CPDLC and ADS-C is not considered for lower airspace

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
UNITED STATES	- Australia (1/2019) - Fiji (1/2019) - New Zealand (1/2019) - Japan (2/2019) - Philippines (3rd 2020)	IN-HOUSE	- Fiji, Japan, New Zealand, - Tahiti (via New Zealand), - Papua New Guinea (via Australia) - Philippines (3rd 2020) - Indonesia via Australia (2019) - Russian Federation (pending joining CRV)	IN-HOUSE which is able to support APAC and NAT ICDs currently Version 2.	
VANUATU					
VIET NAM	AMHS (basic) implemented. Trial phase from 4Q/2015 to 3Q/2018. IOT with Thailand in progress from 4Q/2017 Plan to use AMHS in 4Q/2018; Planned for IOT with Hong Kong, Singapore and Thailand in 2019 For IOT with Laos PDR and Cambodia in 2019.	IN-HOUSE	Operational between Ho Chi Minh and Singapore since July 2014. Trial for additional messages sets since 2018. Implementation between Ho Chi Minh with Philippines planned for 4Q2020; Technical testing with Cambodia already done; Trials between Hanoi and Vientiane, Lao. PDR on going. with Malaysia TBC Testing with Cambodia on – going; For operation trial TBC.	Support ICD Version 1.0 with THALES at Ho Chi Minh ATM system. Support ICD Version 3.0 with Selex at Hanoi ATM System.	

State/Organization	ATN G/G Boundary Intermediate System (BIS) Router/AMHS	AMHS Vendors Selected	AIDC	ATM System selected to support AIDC and Associated ICD (Implementation Status of the Basic 5 message set supported)	Remarks
Wallis and Futuna (FRANCE)	AMHS implementation planned for end of 2017			COMSOFT	

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CRV IMPLEMENTATION TABLE

State/ Administration	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
Australia	Contract in May2018 and service readiness in 3Q 2018	AFTN, ADS-B, AMHS, Voice With: **Australia** February,2019(AMHS/AIDC), March,2019(Voice) **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) **Indonesia** 4Q2019 (TBC) (AMHS/AIDC, Voice, ADS-B); **PNG** 4Q2019(TBC), (AMHS/AIDC, Voice) **Singapore** 2Q2019 TBC (AMHS/AIDC, Voice); **South Africa TBC** 3Q2019 TBC (AMHS/AIDC, Voice); **Japan** would be end of 2019.	staged approach	Termination of current COM contract
Bhutan	Contract in 3Q2019, service readiness in 4Q2019	Data(AMHS, AFTN) and voice		Administrative approval from the management for the direct contract and approval from BCAA
Cambodia	As early as convenient, dependent on neighboring countries			Internal decision making

State/ Administration	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
China	Contract in 1Q2020, service readiness in 2Q2020	Data(AMHS) With: Hong Kong 2Q2020; Japan 2Q2020; Thailand 2Q2020; India 2Q2020. Republic of Korea a.s.a.p ATFM traffic test May 2020 over CRV	staged approach	
DemocraticPeople's Republic of Korea	Contract in 3Q2018 and service readiness in 4Q2018	AFTN and VoIP		
Hong Kong, China	Contract signed on 6 April 2018. Connection was installed successfully in June 2018. CRV-Voice with Manila was put into operation on 14 August 2018.	DATA (AMHS) With: Beijing 2Q2020; Manila operational May 2019 Japan 1Q2020; Thailand 3Q2020;	staged approach	Need to coordinate with relevant CAAs/ANSPs in joining CRV in a harmonized manner, etc.
Macao, China	To be confirmed			CBA migration fromX25toIP
Fiji	Contract in May 2018 and service readiness in 3Q 2018	Data (AMHS) and VoIP With: Australia ATS voice April 2019 completed, AMHS planned June 2019, NZ ATS voice c. 2019 and USA ATS voice March 2019 completed. AMHS April 2019.	Staged approach	CBA, safety case

State/ Administration	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
France (New Caledonia and French Polynesia)	2019 is target for DNSA to sign contract subject to internal security assessment (done).	ATS Voice, AMHS with Fiji & AIDC, AMHS with USA, AIDC/AMHS with NZ and ATS voice.		CBA, cost must be affordable *Wallis and Futuna: no dedicated connection to CRV*
India	Contract in 1Q2020 and service readiness in 2Q2020. Available	. Data first then voice.	staged approach	safety case
Indonesia	Contract in 1Q2020 and Service readiness in 2Q2020	AFTN, AMHS, ADS-B and voice		CBA completed
Japan	Contract signed in Nov.2017 and service readiness in1Q 2018for Fukuoka	Data first: With: Hong Kong 1Q2020 USA completed 1Q 2019 Singapore 3Q2019; China 2Q2020	staged approach	
Malaysia	Contract to be signed 2Q 2020 and service readiness in 4Q2020	AFTN, AMHS, ADS-B and ATS voice	staged approach	New ATC centre operational in 2020. Contract issue with the new ATC main contractor. COM Project is part of the main contract.
Myanmar	Contract in 3Q 2020	AFTN/AMHS, AIDC, ADS-B and voice	staged approach	CBA and if one of counterparts join in

State/ Administration	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
Nepal	Nepal intends to join CRV on staged approach with AMHS data connectivity as first priority and intends to sign the contract with PCCW within 2020.			
New Zealand	Contract inMay2018 and service readiness in 3Q 2018	Australia AMHS June 2019, French Polynesia AMHS and Voice Chile AMHS (SAM regional network REDDIG)		CBA attractive if all counterparts join in
Philippines	Contract signed in March 2018 and service readiness in 2Q2018	Data (AMHS and AIDC) and voice with HK AIDC 2Q 2019,AMHS May 2019 with Taipei AIDC 3Q2019 , AMHS IOT 2Q 2019, Voice completed 1Q 2019. with USA AMHS &AIDC 4Q 2019. For Voice: with HK Aug. 2018, with USA June 2019	staged approach	Success transition to the New ATM centre in 4Q2018
Republic of Korea	Contract in 3Q2019 and service readiness in 4Q 2019	Data (AMHS), AIDC and VoIP With CHN AMHS 4Q2019 With JPN xx	staged approach	
Singapore	Contract in May Q2019 and service readiness in 3Q2019	1/AFTN/AMHS 2/Voice/AIDC/ADS-B AMHS With: Australia 2Q2020; Japan 2Q2020 Thailand 2020; India 2020. 3/Voice with Manila: to complete in Jan. 2020	staged approach	CBA attractive if all counterparts join in

State/ Administration	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
Sri Lanka	As soon as CRV is available	AMHS connectivity with Mumbai, Singapore and Male. Direct Speech facilities with Chennai, Trivendrum, Mumbai, Male, Jakarta, Melbourne, Singapore	Phased approach with the implementation of CRV	CBA
Thailand	Contract in 1Q 2020 and service readiness in 4Q2020	Data first Then voice, subject to safety case: China 4Q2019 Hong Kong 4Q2019; Singapore 4Q2019; India 2019.	Staged approach	

State/ Administration	Intended date for CRV cut-over	Applications targeted	Migration scheme	Prerequisites/ dependencies
United States	Contract in May 2018 and service readiness in 3Q 2018	1) with Australia AFTN to AMHS over IP: Feb 2019 Voice: March, 2019 2) With Fiji AMHS/AIDC Feb 2019 Voice March, 2019 3) With New Zealand AMHS/AIDC, Voice March 2019 4) With Japan AMHS/AIDC Feb 2019 VOICE: June 2020 5) With Philippines AMHS/AIDC 3Q2019 VOICESeptember, 2019 6) With Indonesia Voice 2020 7) With Russian Federation Pending joining CRV 8) With PNG Voice: Feb/2019 via Australia with direct CRV planned for 2020 9) other FIRs as opportune (French Polynesia, Samoa, etc.) 7) ATFM, AMHS with Attachment 8) BBIS with Fiji, Australia and Japan 3Q2018 (for only AMHS)	Staged approach	
Viet Nam	To be confirmed later (After discussed with PCCW Global)			

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Appendix C

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

OPERATIONS MANUAL

Draft First Edition – July 2020

Record of Amendment

A/L No	Date	Entered By	A/L No	Date	Entered By

Contents

~~PART I~~PART I: FOREWORD

1.1 Introduction

a. The Common ~~R~~aeronautical ~~egional~~ Virtual Private Network Operations Group (CRV OG) Operations Manual is ~~an informal publication~~ developed by ~~prepared by~~ the CRV ~~Task Force~~OG and endorsed by ACSICG and CNS Sub-group of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG), intended to provide, for easy reference of interested parties, a consolidation of material, particularly of a procedural nature, about the work of the CRV OG and its contributory bodies. It contains the Terms of Reference of the CRV OG established by ~~the Asia/Pacific Air Navigation Planning and Implementation Regional Group (~~APANPIRG~~)~~ (through Decision 27/~~34~~33~~)~~. It also contains the working arrangements and internal instructions agreed ~~developed~~ by the Group for the practical application of its Terms of Reference.

b. The document describes the ~~;~~ Terms of Reference; Composition; Position within ICAO; Working Arrangements; Rules of Procedure and Practices governing the Conduct of Business.

c. This manual basically follows the ITIL Processes which typically covers Strategy, Design, Transition, Operation, Continual Service Improvement (CSI), and presented issues require discussion under operation including Event Management, Problem Management, Incident Management, Change Management, Change Evaluation, Knowledge Management and Availability Management. The general structure of the ITIL Processes is provided in Appendix B: General Structure of ITIL~~Appendix B: General Structure of ITIL~~ ~~Appendix X~~ to this manual.

d. The framework of Part and Sections headings in addition to the page numbering has been devised to provide flexibility and the facilitation of the revision of additional or new material. Each Part includes an Introduction giving its purpose and status. A Table of Contents is also provided which serves also as a subject index and as a check list for the current pages.

e. All pages bear the date of issuance. Replacement pages will be issued as necessary and any portion of a page that has been revised will be identified by a vertical line in the margin. Additional arterial will be incorporated in the existing Sections or will be the subject of new Sections, as required.

f. Changes to text will be identified by a vertical line in the margin in the following manner;

   i. N for new or revised text;
   ii. E for editorial modification that do not alter the substance or meaning of the text;
   iii. D for deleted text

   iv. For practical reasons, this shall not be applied to title pages or to the routine insertion and deletion of Conclusions and Decisions. The absence of change bars, when data or page numbers have changed, will signify reissue of the section concerned or rearrangement of text (e.g., following an insertion or deletion with no other changes).

g. The Operations Manual will be distributed to Members and Observers of APANPIRG, the ICAO Secretariat, and to other States and international organizations participating in meetings, contributing to, or having interest in the work of the CRV OG and/or its Contributory Bodies.

~~PART II~~PART II: TERMS OF REFERENCE, COMPOSITION AND POSITION IN ICAO OF THE CRV OG

2.1 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 27/34.

2.22.1 Terms of Reference (TOR)

The TOR for The Common Regional aeRonautical Virtual Private Network (VPN) Operations Group (OG) is approved by the ICAO Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG). The CRV OG will provide oversight of the function and performance of the CRV and the performance of the Service Provider.

The activities to be performed by the CRV OG are published in the TOR and will be updated in Appendix A: CRV Terms of Reference as accepted by APANPIRGwill 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. Manage issues arising from the transition with CRV TF, if any;

c. Co-ordinate and standardize the establishment or upgrade of CRV services as required;

d. Co-ordinate activities with other 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 seamless ATM 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; and

m. Perform any other activity as required by CRV operations.

2.3 Reporting

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

~~2.4 Participation~~

~~The CRV OG will include all APAC Member States/Administrations, and any other organization as needed.~~

~~2.5 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.~~

~~2.6 Rapporteur~~

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

~~2.7~~2.2 Position within ICAO

a) CRV OG shall be the guiding and co-ordinating organ for all activities conducted within ICAO concerning the Common Regional VPN for the Asia and Pacific Regions. However, it shall not assume authority vested in other ICAO bodies, except where such bodies have specifically delegated their authority to the Group. The activities of the Group shall be subject to review by the APANPIRG.

b) The work of groups established and meetings held within the framework of ICAO, concerned with the Asia and Pacific CRV shall be coordinated with the CRV OG to ensure full harmonization with all regional activities regarding the development and operation of the Asia/Pacific system.

~~b)~~

3 PART III: WORKING ARRANGEMENTS

~~PART II: WORKING ARRANGEMENTS~~

~~2.8~~3.1 APANPIRG Procedural Handbook

The CRV shall be guided by the APANPIRG Procedural Handbook to ensure that work arrangements are consistent with its parent body

~~2.9~~3.2 Administration of the CRV OG

c) The CRV shall be administered as follows:

i. by two (2) Chairpersons, one elected from the Representatives designated by member States of the Group from ASIA Region and one from the PACIFIC region; and

ii. by ICAO Regional Director, Asia and Pacific Office designated as Secretary CRV OG by the Secretary General of ICAO. In the execution of duties the Secretary will be supported by the Asia and Pacific Regional Office.

d) The Chairpersons, in close co-ordination with the Secretary, shall arrange for the most efficient working of the Group. The Group shall always work with a minimum of formality and paperwork.

e) Between meetings of the CRV OG, some subjects may be dealt with by correspondence among appointed Representatives of Member States through the Secretary of the CRV OG. However, if States are to be consulted this should be done through the ICAO Regional Director, Asia and Pacific Office.

~~34~~ ~~PART I~~PART IV~~II~~: SERVICE STRATEGY

Service Strategy

- Strategy Management
- Service Portfolio Management
- Financial Management
- Business Relationship Management
- Demand Management

~~3.1~~4.1 Strategy Management

Process Objective: To assess the service provider's offerings, capabilities, competitors as well as current and potential market spaces in order to develop a strategy to serve customers. Once the strategy has been defined, Strategy Management for CRV ~~IT~~ Services is also responsible for ensuring the implementation of the strategy.

a) Reduce telecommunication costs in most cases (to be confirmed by local CBA)
b) Enable integration in the aeronautical infrastructure and enhanced services (GANP, regional objectives)
c) Enhance information security
d) Provide a standardized interface for AFS (instead of multiple protocols, some of which are obsolescent)
e) Rationalize coordination for network management and enhancement
f) Respond to Air Traffic requirements in a timely and standardized manner
g) Coordination with Other Regional Private Networks
h) Promote the use of CRV

~~3.2~~4.2 Service Portfolio Management

Process Objective: To manage the service portfolio. Service Portfolio Management ensures that the CRV service provider has the right mix of services to meet required business outcomes at an appropriate level of investment.

- Criteria for services to be added to CRV.
- POC of new services.

~~3.3~~4.3 Financial Management

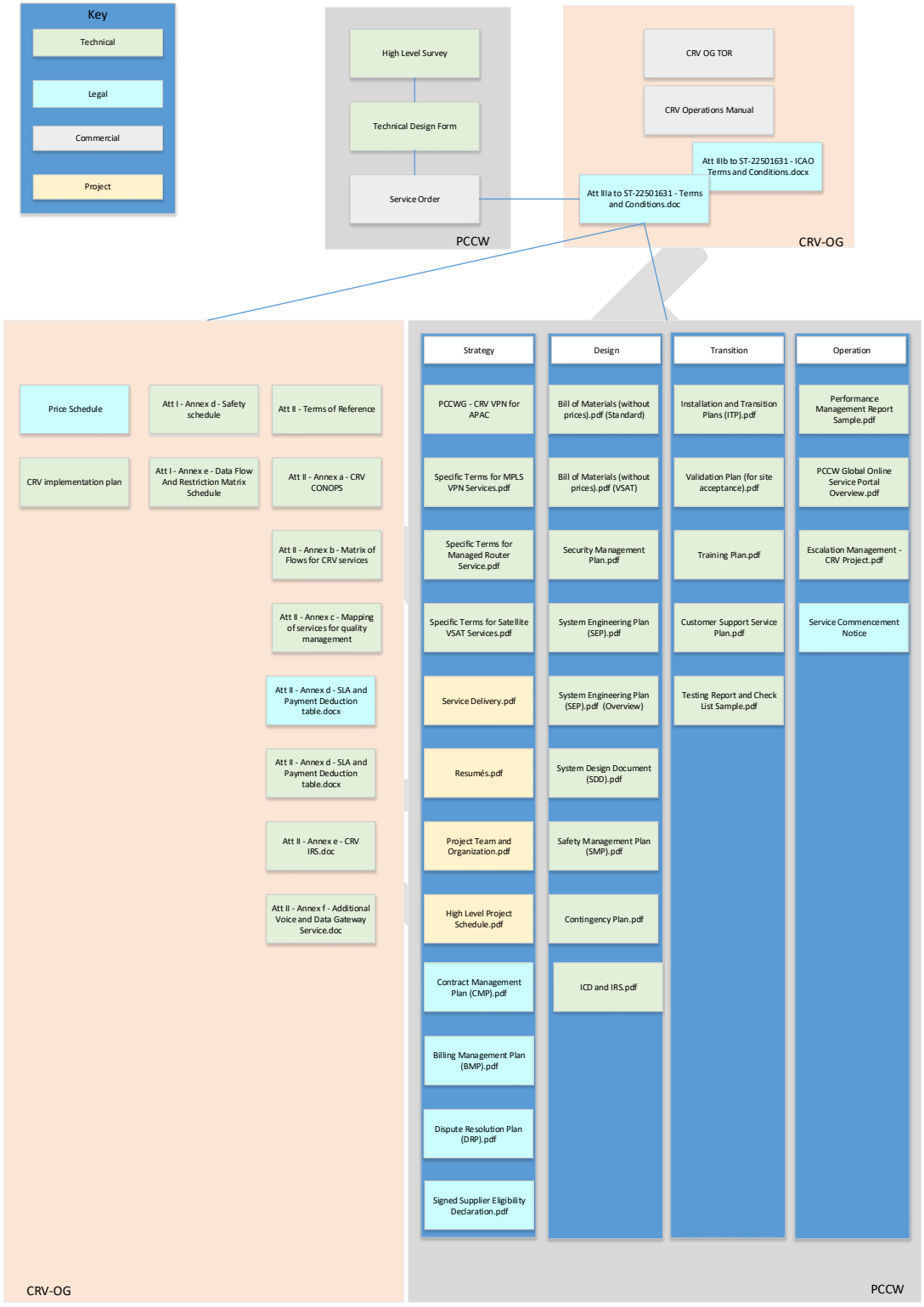
Process Objective: To monitor the management of the service provider's budgeting, accounting and charging requirements.

~~3.4~~4.4 Business Relationship Management

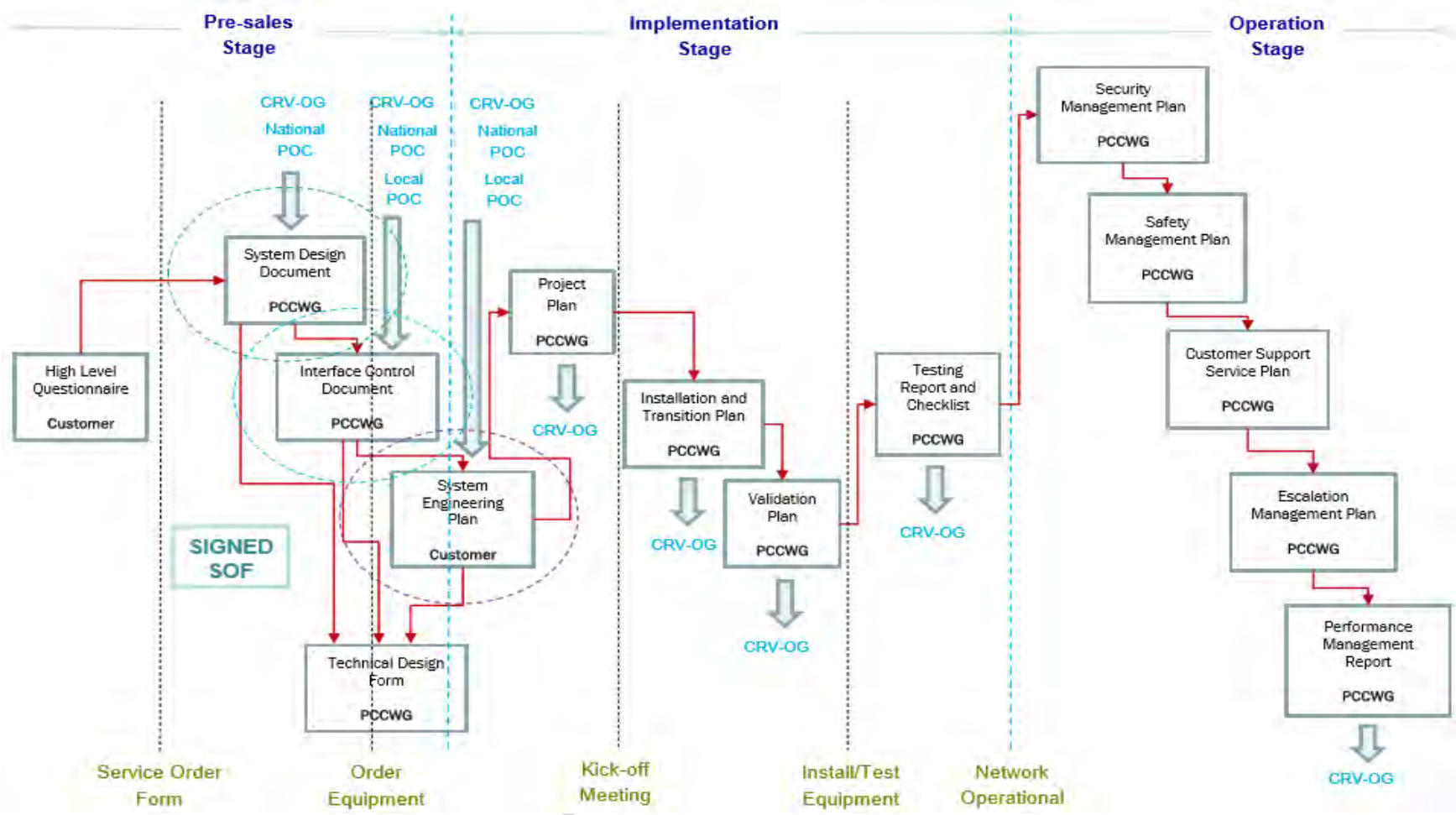
Process Objective: To maintain a positive relationship with customers. Business Relationship Management identifies the needs of existing and potential customers and ensures that appropriate services are developed to meet those needs.

~~3.4.1~~4.4.1 Legal Documentation

The list below shows the precedence of the legal documents that pertains to CRV.



~~3.4.2~~4.4.2 Design and Implementation document flow



~~3.4.3~~4.4.3 Common Package

This is located on the CRV Users Portal here: Common Package.

~~3.4.4~~4.4.4 Pre-Sales Stage

a. High Level Questionnaire

This provides the high level information to PCCW to be able to provide the Service Order Form(SOF) for signing.

Example of the High Level Questionnaire and Service Order Form.

b. System Design Document

This is the over-arching Design Document for the CRV Network.

Example of System Design Document

c. Interface Control Document

Example of Interface Control Document

d. Technical Design Form

Example Technical Design Form

e. System Engineering Plan

This is a living document covering the technical aspects of the CRV implementation. Any changes can be updated by the User or PCCW.

Example of a System Engineering Plan

4.4.5 Implementation Stage

~~3.4.5~~ Sy

a. ~~Sy~~stem Engineering Plan

This is a living document covering the technical aspects of the CRV implementation. Any changes can be updated by the User or PCCW.

Example of a System Engineering Plan

b. Project Plan

Provided to each state post signing of the Contract and is only relevant to that state. It is updated regularly by the PCCW Project manager

Example of a Project Plan

c. Installation and Transition Plan

Example of an Installation and Transition Plan

d. Validation Plan

This is PCCW's testing plan post implementation of the Managed Service

Example of a Validation Plan

e. Testing and Report Checklist

This is the result of PCCW's Testing plan post implementation of the Managed Service and is accompanied by the Service Commencement Notice (SCN)

Testing and Report Checklist

Operation Stage

~~3.4.6~~4.4.6

a. Security Management Plan

b. Safety Management Plan

Example of a Safety Management Plan

c. Customer Support Service Plan

This details the contact details for any Problems or Incidents that the State may encounter.

Example of a Customer Support Service Plan

d. Escalation Management Plan

This details the contact details if the need arises to escalate any Tickets. It also details the escalation criteria

Example of an Escalation Management Plan

e. Performance Management Report

~~3.5~~4.5 Demand Management

Process Objective: To understand, anticipate and influence customer demand for services. Demand Management works with Capacity Management to ensure that the service provider has sufficient capacity to meet the required demand.

45 ~~PART IV~~PART ~~V~~V: SERVICE DESIGN

Service Design

- Service Catalogue Management
- Availability Management
- Capacity Management
- IT Service Continuity Management
- Service level Management
- Design Co-ordination
- Information Security Management
- Supplier Management

~~4.1~~5.1 Service ~~Catalog~~Catalogue Management

Process Objective: To ensure that a Service Catalogue is produced and maintained, containing accurate information on all operational services and those being prepared to be run operationally. Service Catalogue Management provides vital information for all other Service Management processes: Service details, current status and the services' interdependencies.

~~4.1.1~~5.1.1 Requirements

a. Latency

b. Availability

c. Jitter

d. QoS/DSCP markings

e. Security

5.1.2 ~~Criteria to add a new service~~Process to add new Services to the CRV

~~4.1.2~~ In order to support the value of the CRV, a process to have been established to add new Service Provider / Service Consumer to the CRV, This process is as approved by~~ut~~ the CRV OG and is located Appendix C: Process for connecting a Service Provider / Service Consumer to the CRV~~Appendix C: Process for connecting a Service Provider / Service Consumer to the CRV~~

~~4.1.2.1 Considerations~~

~~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.~~

~~i. Service Provider (SP) is defined as a company that provides aeronautical service using the CRV as the means of communication.~~

~~ii. Service Consumer (SC) is defined as a company or organisation that consumes aeronautical information using the CRV as the means of communication.~~

~~iii. The SPSC should be referred to PCCW to enable an initial discussion with them to assess the feasibility of connecting to the CRV. During this discussion the SPSC should clarify:~~

~~- Interfaces~~

~~- Data transfer rates~~

~~- DSCP marking etc.~~

~~iv. It is recommended that Service Providers use public IP addressing for the delivery their services.~~

~~v. It is recommended that Service Consumers are provided with a 10.x.x.x IP addressing from the CRV Member State where the PCCW NID is installed.~~

vi. 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.

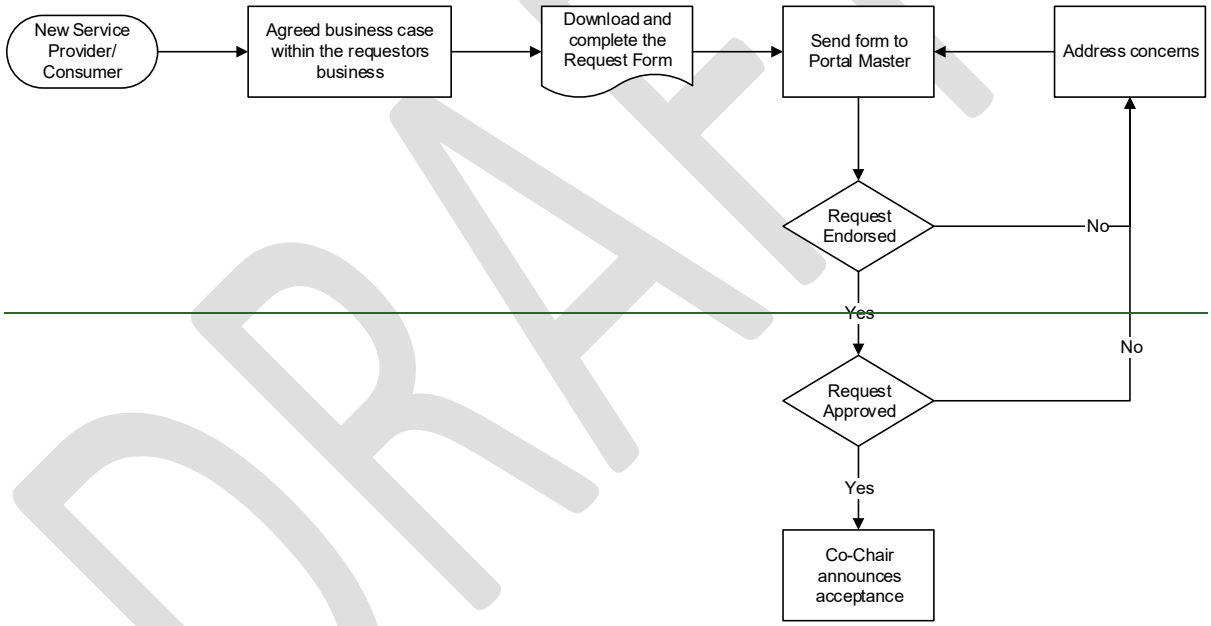
vii. SPSCs will need to adhere to the CRV System Design Document (SDD). Substantive changes to the SDD MUST be endorsed by the CRV OG.

viii. 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.

ix. The CRV OG IS NOT responsible for the accreditation/certification/validation of a Service Provider, but must ensure that the 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.

x. Service Consumers and CRV members SHOULD ensure that when obtaining a Service from a Service Provider that the service meets their operational service requirements.

5.1.2.2 Process



a. 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:

i. Provide a business justification including Benefits Realization for joining the CRV;

ii. For a Service Provider: 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;

iii. 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;

iv. Obtain a Primary CRV member state to sponsor their connection to the CRV;

v. Obtain business justification from Primary Sponsor to support their request;

vi. Obtain a Secondary CRV member state to sponsor their connection to the CRV based on the information above;

vii. The information provided above, will be provided to the CRV OG via the APAC CRV portal.

viii. CRV OG members will be notified and have 25 business days to review and address any concerns that they may have with the request.

ix. After the 25 days, if the majority of reviews by CRV OG members are endorsed, the CRV OG chairs will review the request.

x. For the request to be approved, both CRV OG Co-Chairs need to approve the request.

xi. A Document/Certificate will be provided to the primary sponsor that can used to verify that the SPSC is approved to connect the CRV.

b. The application process of Service Provider / Service Consumer is supported by the Airways New Zealand provided APAC CRV SharePoint portal. There will be Microsoft Word forms to facilitate the information and these forms will be migrated to an automated SharePoint Workflow as soon as practical.

c. 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

~~4.2~~5.2 Availability Management

Process Objective: To define, analyse, plan, measure and improve all aspects of the availability of ~~IT~~ CRV services. Availability Management is responsible for ensuring that ~~all IT~~ infrastructure, processes, tools, roles etc. are appropriate for the agreed availability targets.

~~4.2.1~~5.2.1 Monthly Performance Management Reports

~~Provided by PCCW~~ Available from the PCCW Portal ~~-~~to each State that has joined CRV, information available: ~~covering:~~

- Traffic Report
- Router Report
- QoS report
- Latency
- Packet Loss
- Jitter
- Interface

~~(More SLA data is available from the PCCW Portal)~~

~~At the time of the monthly invoice, PCCWG has we have the Service Report with ticket and availability information and the portal provides the rest.~~

5.2.2 Monthly Operations Reports

~~4.2.2~~

Provided by PCCW to each State that has joined CRV covering:

Active Service Inventory

Site Availability ~~(More SLA data is available from the PCCW Portal)~~

Ticket Statistic

~~Problem Statistic~~

Incident Statistic (defined)

Incident without Service I~~i~~mpact Statistic (defined)

Requests

Maintenance

Ticket Details

AOB

At the time of the monthly invoice, PCCWG has the Service Report (Operations Report) with ticket and availability information and the portal provides the rest

~~(*The ticket statistic category (Problem, Incident, Requests, Maintenance) was briefly discussed in O/G6. After reviewing yearly ticket summary and detail, we will need to clarify with CRV OG on the definition of "Problem" and "Incident". (PCCWG comments)*~~

From here: https://wiki.en.it-processmaps.com/index.php/ITIL_Glossary#ITIL%20Glossary%20A-Z

Incident - An Incident is defined as an unplanned interruption or reduction in quality of an IT service (a Service Interruption).

Eg. A link has been flapping in the network causing reroutes.

Problem - A cause of one or more Incidents. The cause is not usually known at the time a Problem Record is created.

Eg. Link flaps have been caused by unplanned work by a third party)

4.2.3 Monthly meetings with PCCW

5.2.3

Conducted via Telephone conference that is hosted by PCCW, with each State that has joined CRV to discuss:

States Performance Management Report,

States Operations Report

(PCCWG provided monthly service report to CRV state members, we will need to clarify with CRV OG on the meaning of "States Performance Management Report" and "States Operations Report".

Hmm, I know I wrote that, maybe I captured a discussion but did not change to the final conclusion as we only get one report that is called the Service Report (Operations Report) yet the Common Package has a Sample Performance Management Report but as this is just snips from the portal I think we decided that as each Service report came out, the State receiving the report would use the portal to review Router, Interface, QoS and Traffic, and raise any issues from that information)

4.2.45.2.4 Quarterly Operations Reports

Provided by PCCW to the OG by email covering:

Implementation progress

Site Availability (More SLA data is available from the PCCW Portal)

Ticket Statistic

Problem Statistic

Incident Statistic

Requests

Maintenance

Ticket Details

AOB

~~4.2.5~~5.2.5 Annual OG meetings

Implementation progress

Site Availability

Average Monthly Bandwidth Utilisation

Peak Bandwidth ~~peak~~ Utilisation

~~(More SLA data is available from the PCCW Portal)~~

Ticket Statistic

- Problem Statistic
- Incident Statistic
- Requests
- Maintenance

Ticket Details

~~Network Utilisation (Bandwidth peak usage)~~

AOB

~~*PCCWG: We shall clarify with CRV OG on the meaning of "Network Utilisation ".*~~

~~4.2.6~~5.2.6 Root cause analysis reports

Upon request, PCCW to p~~P~~rovide detail post every Incident to the affected State and the APAC CRV OG. Include these in each of the Monthly, Quarterly and Annual Report.

~~4.2.7~~5.2.7 Notifications of Maintenance

Ensuring that all affected parties of maintenance releases are updated as appropriate.

~~4.2.8~~5.2.8 Diversity Audits

~~A rolling audit of States/Sites physical and l~~Logical connectivity based on the information provided in the Service Commencement Notice to validate diversity of the Package selected.

Regular diversity audits should be undertaken to ensure that least amount of CRV services are impacted by a CRV ~~pop~~POP or core failure.~~.~~

~~(who, how, timing)~~

~~*(This will need more clarification from us and agreement with PCCW. It was based on the conversation in Fiji where it was raised that the Australia, New Zealand, Fiji and other Pacific sites would be terminated within two POPs in Sydney across several nodes. To ensure a single node failure did not impact multiple sites PCCW will need to provide the current POP/Node configuration for CRV and regularly audit this to ensure an agreed state is maintained.)*~~

~~4.2.9~~5.2.9 Testing failover

State LOA/MOU/Technical Letter for carrying out failover testing to ensure service continuity.

~~4.3~~5.3 Capacity Management

Process Objective: To ensure that the capacity of ~~IT~~ CRV services and the ~~IT~~ infrastructure is able to deliver the agreed service level targets in a cost effective and timely manner. Capacity Management considers all resources required to deliver the ~~IT~~ CRV service, and plans for short, medium and long term business requirements.

Co-ordinate and standardize the establishment or upgrade of CRV services as required

Oversee the performance of the CRV network;

~~4.4~~5.4 IT Service Continuity Management

Process Objective: To manage risks that could seriously impact ~~IT~~ CRV services. ITSCM ensures that the ~~IT~~ CRV service provider can always provide minimum agreed Service Levels, by reducing the risk from disaster events to an acceptable level and planning for the recovery of ~~IT~~ CRV services. ITSCM should be designed to support Business Continuity Management.

~~a)~~5.4.1 CRV Contingency Operations

The following was recorded at ~~from~~ CRV TF/6 ~~report there is this report~~:

The meeting discussed again the contingency plan in relation to the safety case. To mitigate the risk of a total or major failure (such as IT disaster that would affect the whole CRV), two layers of process would have to be articulated:

- *the procedures and measures planned and implemented by PCCW; and*

- ~~*consistently*~~*consistently, the procedures and measures planned and implemented by the CRV Users, as part of their contingency plan required by ICAO SARPS.*

Furthermore, the meeting agreed that procedures to mitigate the total failure of CRV should be discussed by CRV OG as part of the contingency planning.

~~4.5~~5.5 Service Level Management

Process Objective: To negotiate Service Level Agreements with the customers and to design services in accordance with the agreed service level targets. Service Level Management is also responsible for ensuring that all Operational Level Agreements and Underpinning Contracts are appropriate, and to monitor and report on service levels.

~~4.6~~5.6 Design Co-ordination

Process Objective: To coordinate all service design activities, processes and resources. Design coordination ensures the consistent and effective design of new or changed ~~IT~~ CRV services, service management information systems, architectures, technology, processes, information and metrics.

Change Requests

Engineering Package

Legal Documents

~~4.7~~5.7 Information Security Management

Process Objective: To ensure the confidentiality, integrity and availability of an organization's information, data and ~~IT~~ CRV services. Information Security Management usually forms part of an organizational approach to security management which has a wider scope than the ~~IT~~ CRV Service Provider.

There are distinct responsibilities for security in the CRV, This can be broken in a CRV Provider and a CRV user. At a high level the area of responsibilities can be defined as:

CRV Provider: The CRV provider is required to ensure the integrity and security of the core if the CRV network. This is detailed in the PCCWG System Engineering Plan.

This include items such ~~As a minimum the connectivity states is via~~ GRE Tunnels.

CRV User: The CRV user should implement of security controls to ensure the integrity of Aeronautical Fixed Services (AFS), to protect the CRV Users from the CRV and to prevent compromise to the CRV from their networks

~~Security of CRV and sytem //** TB edited is the responsibility of States and Service Provider for the implementation of security controls to ensure the integrity of services.~~

~~As a minimum the connectivity states is via GRE Tunnels.~~

Other methods of ensuring the security of the connectivity are:

a. Utilising as small an IP Address range as possible.
b. Only advertising relevant IP addresses.
c. Only accepting verified IP Routes when required.
d. Utilising firewalls.
e. Utilising NAT.
f. Utilising Intrusion Protection Software (IPS)

It is recommended that external security advice is sought.

~~4.8~~5.8 Supplier Management

Process Objective: To ensure that all contracts with suppliers support the needs of the business, and that all suppliers meet their contractual commitments.

a) Oversee the performance of the CRV Service Provider, including customer service;

b) 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

b)

6 ~~PART V~~PART VI: SERVICE TRANSITION

Service Transition

- Transition Planning and Support
- Change Management
- Service Asset & Configuration Management
- Release and Deployment Management
- Service Validation and Testing Management
- Change Evaluation
- Knowledge Management

~~4.9~~6.1 Transition Planning and Support

Process Objective: To plan and coordinate the resources to deploy a major Release within the predicted cost, time and quality estimates.

a) Covered by the Implementation Plan , (CRV Portal - Documentation)

~~4.10~~6.2 Change Management

Process Objective: To control the lifecycle of all Changes. The primary objective of Change Management is to enable beneficial Changes to be made, with minimum disruption to CRV~~IT~~ services.

All changes are to be conveyed to PCCW via their Change Request Form. And covered by the Change Management Process as found in the Common Package. (CRV Portal - Documentation)

~~4.11~~6.3 Service Asset and Configuration Management

Process Objective: To maintain information about Configuration Items required to deliver an ~~IT~~ CRV service, including their relationships.

a) 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;

This information is collated in the following ways:

CRV Operations Manual – APAC Portal
A list of CRV users – Registrations page on the APAC portal
Record of Variations is found in the APAC CRV Portal in the Common Package Folder

~~4.12~~6.4 Release and Deployment Management

Process Objective: To plan, schedule and control the movement of releases to test and live environments. The primary goal of Release Management is to ensure that the integrity of the live environment is protected and that the correct components are released.

a) Oversee the implementation of the CRV post Contract Award;

b) Manage issues arising from the transition with CRV TF, if any

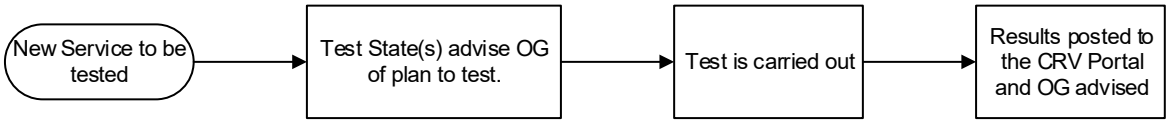
~~4.13~~6.5 Service Validation and Testing Management

Process Objective: To ensure that deployed Releases and the resulting services meet customer expectations, and to verify that CRV~~IT~~ operations is able to support the new service.

a) Accept deliverables from the CRV Service Provider on behalf of the CRV Users as required;

b) Refer to the CRV Implementation Plan

c) New Services



New services being tested by any state,
Notifies OG intention to test as soon as practical.
Advises CRV OG and PCCW 48hrs prior to testing

Testing is to be carried out with a DSCP marking of DF so as to avoid impacting other services.

The results of the tests are to be posted on the CRV portal and the OG advised of the posting.

~~4.14~~6.6 Change Evaluation

Process Objective: To assess major Changes, like the introduction of a new service or a substantial change to an existing service, before those Changes are allowed to proceed to the next phase in their lifecycle.

~~4.15~~6.7 Knowledge Management

Process Objective: To gather, analyse, store and share knowledge and information within an organization. The primary purpose of Knowledge Management is to improve efficiency by reducing the need to rediscover knowledge.

a) All information relating to the ongoing operation of the network shall be retained in the APAC CRV Portal

There will be a link to the portal from the ICAO APAC page.

b) To add items to the portal.

c) To Workflow a document.

~~5~~7 ~~PART VI~~PART VII: SERVICE OPERATION

Service Operation

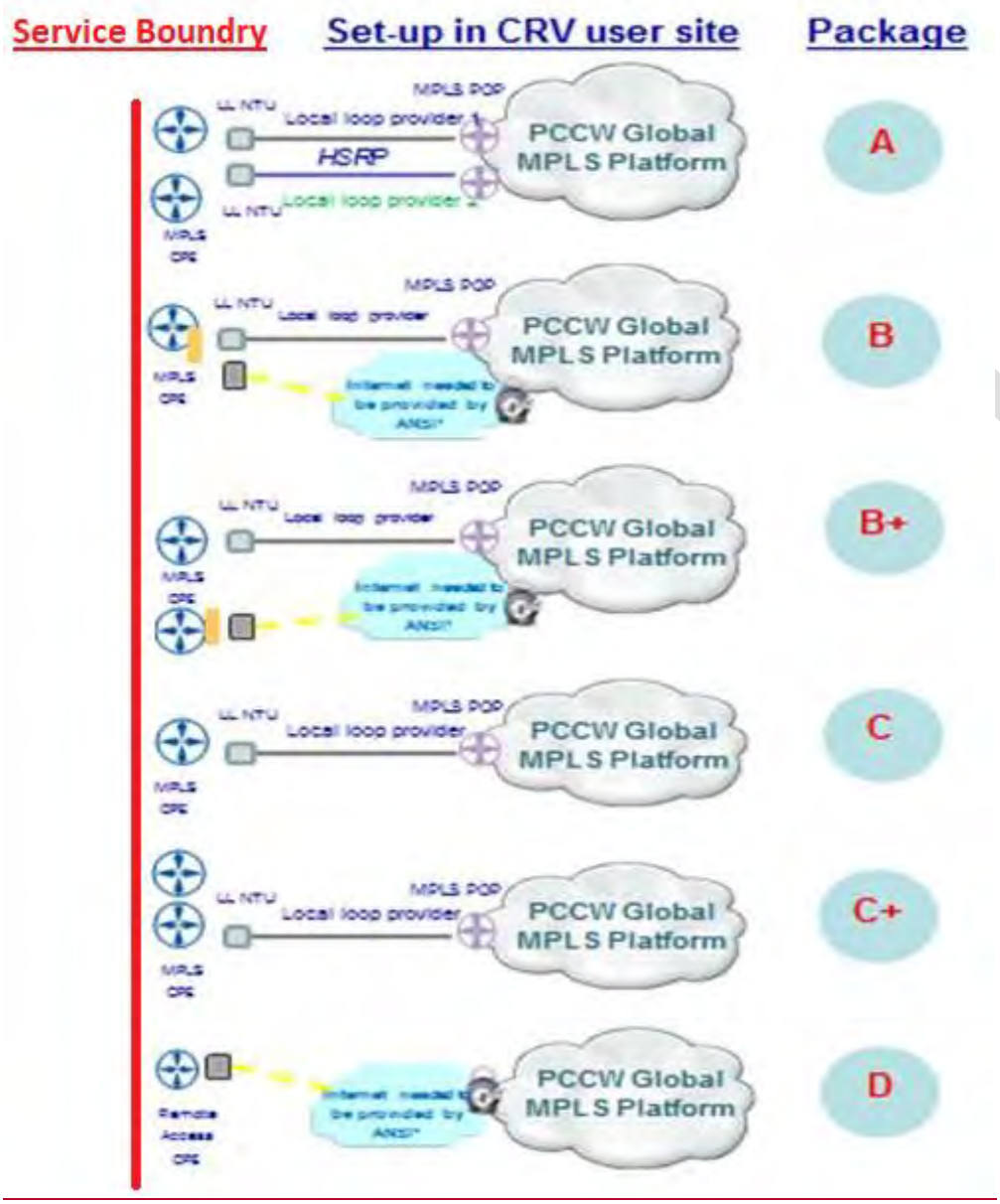
- Event Management
- Incident Management
- Request Fulfilment
- Problem Management
- Access Management

~~5.1~~

7.1 Service Boundary

It is import to define the CRV Service boundaries to ensure clear demarcation of responsibility for service operation.

The Services Boundary definition is illustrated in the diagram below, PCCWG is responsible for the connection from PCCWG MPLS Platform to the Customer interface on the PCCWG Customer Premises Equipment (CPE)/Network Interface Device (NID.)



~~5.2~~7.2 Event Management

Process Objective: To make sure CIs and services are constantly monitored, and to filter and categorize Events in order to decide on appropriate actions.

a) Managed by PCCW

5.37.3 Incident Management

Process Objective: To manage the lifecycle of all Incidents. The primary objective of Incident Management is to return the CRV IT service to users as quickly as possible.

a) Managed by PCCW

Check with Common Package.

Root cause reporting post the incident upon request. Template for this?

a)

5.47.4 Request Fulfilment

Process Objective: To fulfil Service Requests, which in most cases are minor (standard) Changes (e.g. requests to change a password) or requests for information.

a) Managed by PCCW

5.57.5 Problem Management

Process Objective: To manage the lifecycle of all Problems. The primary objectives of Problem Management are to prevent Incidents from happening, and to minimize the impact of incidents that cannot be prevented. Proactive Problem Management analyses Incident Records, and uses data collected by other IT Service Management processes to identify trends or significant Problems.

a) PCCW Initiated – Follow the Customer Support Service Plan
b) Authority CRV User Initiated
    a. Troubleshoot local connectivity
    b. Polling the NID. On the ANSP NID provided by PCCW, a local loop back will be configured using a specified IP address from the allocated range of IP addressing. This will be called the troubleshooting IP address.
    c. Troubleshoot with peers
    d. Fault with PCCW following the Customer Support Service Plan

5.67.6 Access Management

Process Objective: To grant authorized users the right to use a service, while preventing access to non-authorized users. The Access Management processes essentially execute policies defined in Information Security Management. Access Management is sometimes also referred to as Rights Management or Identity Management.

Access manage include ascpectaspect such as the following:

a) Physical Access Control

i. The Cabinet for Core Routers are locked

ii. The network main PoP sites are under 7x24 CCTV monitoring and recording

a)

b) Remote Network Access Control

i. The remote access of Cores and CE routers are controlled by access-list ACL that is only allow authorized terminal of management systems.

ii. The TACACS is deployed to allow the authorized persons of PCCWG to access Core Routers or CE routers as AAA clients.

c) Portal Access

Review member's access annuallyThese controls are detailed in the PCCWG System Design Document. (CRV Portal - Documentation).

8 ~~PART VII~~PART VIII: ~~:~~ CONTINUAL SERVICE IMPROVEMENT

Continual Service Improvement

- Service Review
- Process Evaluation
- Definition of CSI Initiatives
- Monitoring CSI Initiatives

~~5.7~~8.1 Service Review

Process Objective: To review ~~business~~ CRV services ~~and infrastructure services~~ on a regular basis. The aim of this process is to improve service quality where necessary, and to identify more economical ways of providing a service where possible.

From time to time the CRV OG will coordinate groups of ~~V~~volunteers to undertake a CRV Service Review in conjunction with the CRV Provider ~~for each section~~

. These Service reviews will be reported back to the annual CRV OG meeting.~~Small groups around these sections.~~

~~Report back up to the master document owner~~

~~Approval by Chairs~~

~~Approval by APANPIRG~~

~~Master owner of the document updates and publishes every two months~~?

~~Quarterly conference call to start with to update the document.~~

~~5.8~~8.2 Process Evaluation

Process Objective: To evaluate processes on a regular basis. This includes identifying areas where the targeted process metrics are not reached, and holding regular bench markings, audits, maturity assessments and reviews.

~~5.9~~8.3 Definition of CSI Initiatives

Process Objective: To define specific initiatives aimed at improving the CRV services and processes, based on the results of service reviews and process evaluations. The resulting initiatives are either internal initiatives pursued by the service provider on his own behalf, or initiatives which require the customer's cooperation.

~~5.10~~8.4 Monitoring CSI Initiatives

Process Objective: To verify if improvement initiatives are proceeding according to plan, and to introduce corrective measures where necessary.

9 PART IX~~IX~~: ~~CONTINUAL SERVICE IMPROVEMENT~~DEFINATIONS

6 PART VIII

DEFINITIONS

~~6.1~~9.1 Definitions

- A Service is defined as any Aeronautical Fixed ~~s~~Service (AFS) provided over the CRV supporting Meteorological Service for International Air Navigation or Air Traffic Control Services.

- Incident - According to the network design of the Service, incident that resulted in service degradation or outage. e.g. State member B subscribed two Package C (C1 and C2) and there is a fiber cut along C1. To PCCWG's point of view, C1 and C2 are two separated circuits. Even though C2 is still providing connectivity to State member B, this will still be categorized as "incident ".

- Incident without service impact - According to the network design of the Service, incident causes no service degradation or outage. E.g. State member A subscribed Package A, and there is a fibre cut on primary link. Since there is fail-over mechanism as redundancy for package A's user, the fibre cut is an incident without service impact.

- Service Consumer (SC) is defined as a company or organisation that consumes aeronautical information using the CRV as the means of communication.

- Service Provider (SP) is defined as a company that provides aeronautical service using the CRV as the means of communication.

~~A Service is defined as any service provided over the CRV supporting Meteorological Service for International Air Navigation or Air Traffic Control Services.~~

~~Connecting a Service Provider / Service Consumer (SPSC)~~

10 PART X: APPENDICES

Appendix A: CRV Terms of Reference as accepted by APANPIRG

Common Regional 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) Manage issues arising from the transition with CRV TF, if any;

c) Co-ordinate and standardize the establishment or upgrade of CRV services as required; d) Co-ordinate activities with other 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 seamless ATM 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

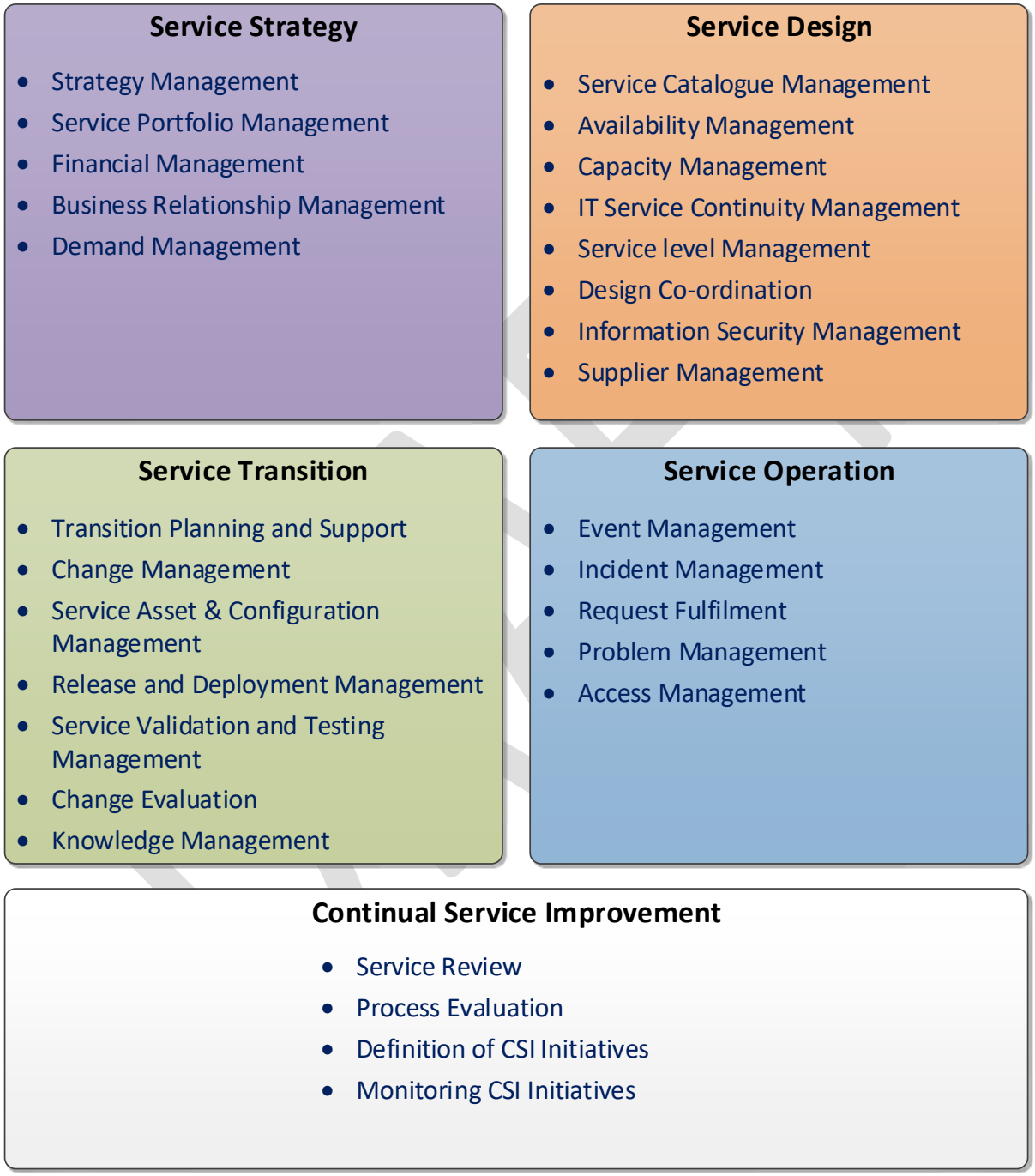
It is anticipated that the CRV OG will conduct its work primarily by Web Conferences, teleconferences and other electronic means of communications. Face to Face meetings of CRV OG may be required on an annual basis. The ICAO APAC Regional Office will provide secretariat support for the CRV OG.

6. Rapporteur

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

Appendix B: General Structure of ITIL

~~***Appendix X. General Structure of ITIL.***~~



Appendix C: Process for connecting a Service Provider / Service Consumer to the CRV

Introduction

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.

~~Service Provider (SP) is defined as a company that provides aeronautical service using the CRV as the means of communication.~~

~~Service Consumer (SC) is defined as a company or organisation that consumes aeronautical information using the CRV as the means of communication.~~

- ~~–~~The SPSC should be referred to PCCW to enable an initial discussion with them to assess the feasibility of connecting to the CRV. During this discussion the SPSC should clarify:

- ~~–~~Interfaces
-

- ~~–~~Data transfer rates

-

- ~~–~~DSCP marking etc.

1)

2) It is recommended that Service Providers use public IP addressing for the delivery their services.

3) It is recommended that Service Consumers are provided with a 10.x.x.x IP addressing from the CRV Member State where the PCCW NID is installed.

4) 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.

5) SPSCs will need to adhere to the CRV System Design Document (SDD). Substantive changes to the SDD MUST be endorsed by the CRV OG.

6) 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.

7) The CRV OG IS NOT responsible for the accreditation/certification/validation of a Service Provider, but must ensure that the 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.

8) Service Consumers and CRV members SHOULD ensure that when obtaining a Service from a Service Provider that the service meets their operational service requirements.

~~5.1.2.2~~ Process

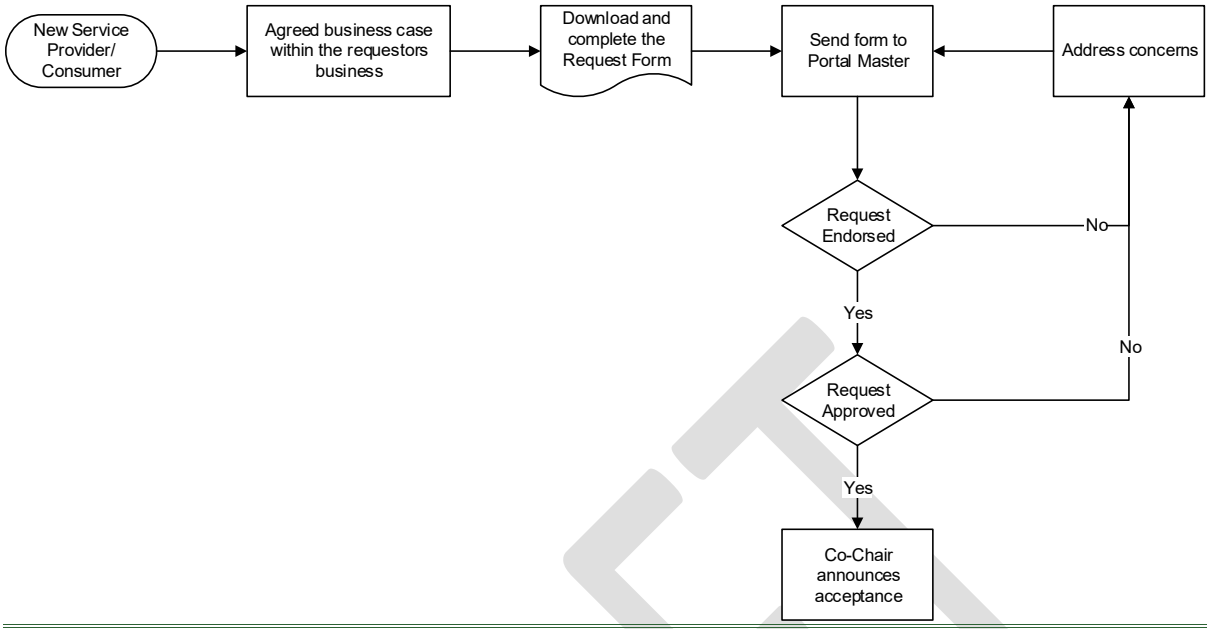


Figure 1 : Process flow for adding a new Service Provider / Service Consumer

~~a.~~ 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:

1) Provide a business justification including Benefits Realization for joining the CRV;

2) For a Service Provider: 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;

3) 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;

4) Obtain a Primary CRV member state to sponsor their connection to the CRV;

5) Obtain business justification from Primary Sponsor to support their request;

6) Obtain a Secondary CRV member state to sponsor their connection to the CRV based on the information above;

7) The information provided above, will be provided to the CRV OG via the APAC CRV portal.

8) CRV OG members will be notified and have 25 business days to review and address any concerns that they may have with the request.

9) After the 25 days, if the majority of reviews by CRV OG members are endorsed, the CRV OG chairs will review the request.

10) For the request to be approved, both CRV OG Co-Chairs need to approve the request.

11) A Document/Certificate will be provided to the primary sponsor that can used to verify that the SPSC is approved to connect the CRV.

The application process of Service Provider / Service Consumer is supported by the Airways New Zealand provided APAC CRV SharePoint portal. There will be Microsoft 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~~